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Gawhare Atul Anil
Research scholar, Institute of
Agricultural Sciences, BHU,
Varanasi, Uttar Pradesh, India

Prakash Singh Badal
Professor, Institute of
Agricultural Sciences, BHU,
Varanasi, Uttar Pradesh, India

Rohit Shelar
Research scholar, Institute of
Agricultural Sciences, BHU,
Varanasi, Uttar Pradesh, India

Avdhesh Sharma
Research scholar, Institute of
Agricultural Sciences, BHU,
Varanasi, Uttar Pradesh, India

Corresponding Author
Avdhesh Sharma
Research scholar, Institute of
Agricultural Sciences, BHU,
Varanasi, Uttar Pradesh, India

A study on perception of the farmers' about changing climate in Chandrapur district of Maharashtra

Gawhare Atul Anil, Prakash Singh Badal, Rohit Shelar and Avdhesh Sharma

Abstract

The impacts of climate change are seen everywhere in the world, but countries like India are more vulnerable because of their large population and huge dependence on agriculture. Climate change has significant economic effects on agriculture including changes in farm productivity, cropping pattern, profitability, price, supply, and trade. The impacts of climate change vary from region to region so its perception changes accordingly. Farmers' perception of climate change is a key component determining their adoption behavior. Farmers' tend to perceive changes in climate variables to different degrees. The present study focused on the perceptions of climate change in the Chandrapur district of Maharashtra state. The primary data was collected from 45 farmers' in the district through a structured interview schedule. The perception of farmers' has been recorded by asking the response on a two-point continuum on ten different parameters. The results of the study indicated that the majority of farmers' *i.e* above 70% perceived a decrease in crop yield, change in rain cycle, an outbreak of pests and diseases, an increase in temperature, and a decrease in the water table. Interestingly, Less than 30% of farmers' perceived a decrease in soil fertility and change in cropping patterns.

Keywords: Climate change, perception, crop yield, rain cycle, Chandrapur

Introduction

Climate change has become a buzzword since the beginning of the 21st century. Extreme heat wave in Canada, Heavy floods in Europe; Droughts in Argentina and Brazil are some of the facets of climate change seen this year. Climate change is probably the most complex and challenging environmental problem facing the world today (Ojwang *et al.*, 2010) [10] and is increasingly recognized as a potent threat to agriculture. It is threatening the livelihood and food security throughout the world, but the impact is more in developing countries (Mendelsohn *et al.*, 2006) [9]. Various climate change models have predicted a rise of 1.7 to 4.90°C in mean temperature by 2100 in India (Krishna Kumar *et al.*, 2011; Chaturvedi, *et al.*, 2012) [8, 3]. As a result of changing climate, rainfall is also projected to increase but changes in the distribution of rainfall are expected. However, a noticeable trend is observed in annual rainfall over the last century in India. An increase in the frequency of extreme events such as floods, droughts, etc. is another manifestation of changing climate. India is one of the countries more vulnerable to climate change (Cruz *et al.*, 2007) [5]. More than half of the Indian population is dependent on agriculture and other climate-sensitive sectors. The country is vulnerable to extreme climate events and sea-level rise. About 68% of the net sown area being rainfed, Agriculture is among more vulnerable sectors. Climate change is now considered a major issue by researchers, governments, civil society organizations, farmers', and the general public. It is a focal point of discussions at the community to global levels. Concerning agriculture, there is a need to evolve a strategy containing technologies, policies, investments, and interventions that help communities and governments prepare for the adverse impacts of climate change in terms of adaptation on one hand and those measures that will help mitigation by slowing down the emission of GHGs on the other. Any such strategy should consider farmers' beliefs, perceptions, responses, policy preferences, etc. Since Indian agriculture is diverse and climate change is complex, the nature of the problem and the farmers' responses will be diverse and heterogeneous. Understanding what farmers' think concerning climate change is also essential for mainstreaming adaptation into development planning which is considered as key to enhancing resilience. The main aim of the study was to investigate farmers' perception of climate change at ground level and to find out the most common perception among them. It was measured by whether they perceived a climate change in any of the given variables.

Methodology

The study was conducted in the Chandrapur district of Maharashtra state which falls into the eastern part of the Vidarbha region of the state. Vidarbha belongs to one of the drought-sensitive areas of central India. The study conducted by World Bank reveals that the economically backward region of Vidarbha will witness sweeping downward economic impacts in the wake of a changing climate over the next three decades. Keeping these points in mind this study was conducted in nine villages from three randomly selected blocks of the Chandrapur district. The sample of 45 farmers' across different landholdings from the primary sampling unit was selected with the help of multi-stage random sampling. To assess the Individual's perception about changing climate, a structured schedule was developed. The schedule consist of fifteen statements and the responses for each statement were recorded on two continuums. Data was collected directly interviewing each farmer and recording their responses in a structured survey schedule. The collected data were subjected to statistical analysis by computing averages and percentages and presenting the results in tabular and graphical format.

Results and Discussion

Farmers' perception of climate change is a key component determining their adoption behavior. Farmers' tend to perceive changes in climate variables to different degrees. The results after analysing the collected data (Table 1) revealed that the perception about increasing temperature among the farmers' is uniform among two blocks. 80 percent of the farmers' from both Worora and Chimur block and 67 percent of the farmers' from Pombhurna block perceived that the temperature in the atmosphere is increasing since past

years. Overall 76 percent of the total respondent agreed for the same. Further Table indicates that 73 percent of the total respondents felt a change in rainfall pattern over the last ten year as a result of changing climate. As farmers' are more concerned about timely rainfall they could easily observe the variability of the rain cycle due to changing climatic patterns. About 87 percent, 73 percent, and 60 percent of the respondents from the block Worora, Chimur and Pombhurna perceived it as one of the facts of climate change, respectively. Climate change is directly affecting crop yield. Climatic factors such as rainfall and temperature have adverse effects on crop productivity in general (Guntukula and Goyari, 2020) [7]. Nearly three-fourths (71%) of the overall respondents confirmed the decrease in the yield of crops. Similarly, block-wise data indicated that in the Chimur block, 80 percent of the respondents while in the Worora and Pombhurna block, 67 percent each of the respondents perceived the same. Table 1 further revealed that 69 percent of the overall respondents admitted that the level of water table had decreased. In the Chimur block, 80 percent of the respondents while in the Worora and Pombhurna block, 60 percent of each of the respondents agreed that level of groundwater has declined. These findings are matching with GSDA's Water Scarcity Report of October 2019. Then after Table 1 indicated that more than half (58%) of the overall respondents said that outbreaks of pest and disease increased. Thus it can be said that the outbreak of pests and diseases was one of the impacts of climate change in the study area. Whereas, an increase in the use of inputs required for cultivation was preferred by 54 percent of the overall respondents.

Table 1: Perception of the farmers' about changing climate

S.N.	Statements	Response (%)							
		Worora		Chimur		Pombhurna		Overall	
		Yes	No	Yes	No	Yes	No	Yes	No
1.	Decrease in soil fertility	33	67	20	80	20	80	24	76
2.	Decrease in Yield of crop	67	33	80	20	67	33	71	29
3.	Change in rain cycle	87	13	73	27	60	40	73	27
4.	Outbreak of pests and diseases	54	46	60	40	60	40	58	42
5.	Occurrence of flood/drought	20	80	40	60	33	67	31	69
6.	Decrease in number of beneficial insects	07	93	07	93	14	86	09	91
7.	Change in cropping pattern	14	86	40	60	26	74	27	73
8.	Increase in Temperature	80	20	80	20	67	33	76	24
9.	Decrease in water table	60	40	80	20	60	40	69	31
10.	Increase use of inputs	60	40	60	40	40	60	54	46

Interestingly it was observed from Table 1 that only 31% of total sampled farmers' in the study area had perceived frequent occurrence of flood or drought as the impact of climate change. The majority of farmers' considered it not because of climate change. This perception of farmers' might be true as the region falls in a zone of certainly and assured rainfall. Thus, as per the majority of farmers' perceptions, frequent floods or drought have not happened in the region. The table further shows that few (27%) farmers' had seen a change in the existing cropping pattern due to climate change. Thus it is inferred that climate change had little impact on the existing cropping pattern in the region. Farmers' had not switched over to other crops as they did not perceive the threat of climate change to existing cropping patterns in their area. Thereafter, Table 1 indicated that 24 percent of total sampled respondents perceived a decrease in soil fertility as a sign of climate change while the majority of farmers' did not

perceive it. In Worora Block, 33% of farmers' agreed that there was a decrease in soil fertility due to climate change. While only 20% of farmers' in each of the Pombhurna and Chimur block agreed on the same. Thus it can be said that decrease in soil fertility was not measure consequence of climate change in the study area. And at last Table 1 showed that, very few (9%) of the respondents agreed that there is deduction in number of beneficial insects while, majority (91%) of the respondents declined the statement. Climate change impacts the insect pest's natural enemies in different ways. Plant grown under higher temperature and CO₂ provides nutritional opportunities for different insect pests, eventually affecting the fitness of the insect feeding on predators (Coviellaet.al. 2002). This might be the reason respondents were observed growth in beneficial insects.

Conclusion

The study concluded that majority of farmers' perceived climate change and its consequences in one or more ways in the study area. They perceived it in the form of increase in temperature, decrease in water table, fluctuations in the rainfall pattern, outbreak of pests and diseases, decrease in yield of crop and increased use of inputs. Such a perception of farmers' on one hand indicates what the adaptation interventions should aim at and on the other hand farmers' will be receptive to policies and programs that help them deal with climate change. There is also a noticeable variation in how farmers' see climate change, its manifestations, adaptation and coping mechanisms which only underscores the need for regionally differentiated strategy to deal with changing climate. The perceptions of farmers' about climate change can be used as effective guiding tool in formulating adaptation and mitigation strategies to climate change at national and state level. The findings from the study would help in providing the inputs to policymakers for policy formulations and for developing capacity building programs for farmers' to cope up better with climate change.

References

1. Apata TG, Samuel KD, Adeola AO. Analysis of Climate Change Perception and Adaptation among Arable Food Crop Farmers in South Western Nigeria (No. 1005-2016-79140) 2009.
2. Birthal PS, Negi DS, Kumar S, Aggarwal S, Suresh A, Khan M. How sensitive is Indian agriculture to climate change? Indian Journal of Agricultural Economics 2014;69(902-2016-68357):474-487.
3. Chaturvedi RK, Joshi J, Jayaraman M, Bala G, Ravindranath NH. Multi-model climate change projections for India under representative concentration pathways. Current Science 2012, 791-802.
4. Coviella CE, Stipanovic RD, Trumble JT. Plant allocation to defensive compounds: interactions between elevated CO₂ and nitrogen in transgenic cotton plants. Journal of Experimental Botany 2002;53(367):323-331.
5. Cruz RV, Harasawa H, Lal M, Wu S, Anokhin Y, Punsalmaa B, Ninh NH. Asia. climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change 2007.
6. Gawhare A Investigation into individual and collective actions for adaptation to climate change in agriculture. Thesis, M.Sc. Department of Agricultural Economics, Institute of Agricultural Sciences, BHU, Varanasi 2019.
7. Guntukula R, Goyari P. Climate change effects on the crop yield and its variability in Telangana, India. Studies in Microeconomics 2020;8(1):119-148.
8. Kumar KK, Patwardhan SK, Kulkarni A, Kamala K, Rao KK, Jones R. Simulated projections for summer monsoon climate over India by a high-resolution regional climate model (PRECIS). Current Science 2011, 312-326.
9. Mendelsohn R, Dinar A, Williams L. The distributional impact of climate change on rich and poor countries. Environment and development economics 2006;11(2):159-178.
10. Ojwang GO, Agatsiva J, Situma C. Analysis of climate change and variability risks in the smallholder sector. FAO 2010.
11. Shankar KR, Nagasree K, Sankar GM, Prasad MS, Raju BMK, Rao AS *et al.* Farmers' Perceptions and Adaptation Measures towards Changing Climate in South India and Role of Extension in Adaptation and Mitigation to Changing Climate 2013.
12. Solomon S, Manning M, Marquis M, Qin D. Climate change 2007-the physical science basis: Working group I contribution to the fourth assessment report of the IPCC (Vol. 4). Cambridge University press 2007.