

Construction of Index to Measure Perception of Farmers' towards Climate Change

Abstract

The climatic conditions of Vidarbha region of Maharashtra is semi-arid and experiences sub-humid to humid conditions in monsoon season, semi-arid in winter and arid in summer season. In recent years, Vidarbha region is witnessing the changes in the weather parameters especially in the temperature and rainfall. These changes have created an impact on the productivity of major crops of the region. Perception about changes in the climate by the farmers is the pre-requisite for their adaptations to climate change. In order to develop adaption strategies under changing climate it was thought to develop perception index to assess the level of perception of farmers of Vidarbha towards climate change. The developed index was used for assessment of farmer's perceptions towards climate change in Vidarbha.

Keywords: perception index, climate change, Vidarbha

Introduction

Ban and Hawkins (2000) define perception "it is the process by which we receive information or stimuli from our environment and transform it into psychological awareness". It is interesting to see that people infer about a certain situation or phenomenon differently using the same or different sets of information. The simple meaning of perception is becoming aware of something via the senses. In Psychology perception is

- Recognition and interpretation of sensory stimuli based chiefly on memory.
- Insight, intuition, or knowledge gained by perceiving.
- The capacity for such insight.

For this research purpose, Perception towards climate change was operationally defined as the awareness knowledge gained by the farmers' towards the climate change and variability and the changes perceived by them in climate parameters like rainfall and temperature over the period of last 40 years especially one decade back in comparison to study year via the senses, based chiefly on memory.

Material and Methods

The perception index was developed to measure the perception level of 300 farmers spread over 10 villages of five tahsils of Yavatmal and Akola district due to its varying agro climatic characteristics and the number of incidences of farmers' suicide was found high than other districts. With regards to the assessment of farmers' perception towards climate change and variability, researchers first look at how climate data recorded at meteorological stations evolved (trends and variability) and then how farmers' perceived these changes. Descriptive statistics based on summary counts of the structured interview schedule was used to gain insight into farmers' perceptions of climate change and variability. In the literature a number of studies have undergone the same type of analysis. For example, Vedwan and Rhoades (2001) examined how apple farmers' in the western Himalayas of India perceive climate change. This is done by comparing the locally idealized traditional weather cycle with climate change as perceived by the farmers' of the region using snowfall and rainfall data to measure the accuracy of perceptions. Hageback *et al.* (2005) assessed small-scale farmers' perceptions of climate change in the Danagou watershed in China by comparing the local precipitation and temperature data trend with the responses given by farmers' to the question —Do you feel any change in the weather now compared to 20 years? Another study by Maddison (2006), using data for over 9,500 farmers' from eleven African countries, compared the probability that the climate has changed, as revealed by an analysis of the statistical record, with the proportion of individuals who believed that such a change has in fact occurred to assess farmers' perceptions of climatic change. Following the same approach provided in the literature, a schedule was developed.



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Farmers' were asked to compare the general pattern of rainy season(s) now days with those when they were young, to determine if they perceived any change in climate. Farmers' were asked to name the differences between the past and today's climate according to climate variables (rainfall pattern, temperature and sunshine). For instance, farmers' were asked if the rainfall onset / cessation was now early, late or unchanged compared to past climate; if the number of rainfall events or dry spells have decreased, increased or stay unchanged; if temperature, the number of hot /cool days in years have decreased, increased, or stay unchanged, etc. Open-ended questions were also asked to farmers' to mention any other indicators of climate change in their environment.

Apart from methodology mentioned above and in order to quantify the farmers' perception to climate change and variability, a schedule was developed, which identifies how well farmers' perceived the changes in the climate over the period of last 40 years in comparison to study year on the five point Likert scale. It consisted of 16 indicators related to temperature, rainfall and other climate variables. Number of studies on assessing farmers' perceptions on climate change literature suggested first to record the perceptions of farmers' and then compare those perceptions of climate change with the climatic data records as stated above. Accordingly, the responses were designed to be reported on a Likert scale as "very low", "low", "normal", "high", and "very high". The scoring of 1,2,3,4 and 5 was followed for "very low", "low", "normal", "high", and "very high" response respectively to measure the farmers' perception to the changes in the climate on main parameters like rainfall and temperature. The scoring procedure was reversed for few indicators for both districts Akola and Yavatmal as per the findings indicated by meteorological data and secondary sources. The scale with main indicators and sub indicators to measure perception of farmers' towards climate change and variability is as follows.

Scale to measure Perception of farmers towards climate change

Have you noticed any long-term changes in the mean temperature over the last 40 years? (Please Explain) Please mark

Sr no	perception indicators	Very Low	Low	Normal	High	Very High
1	Amount of total rainfall compared to previous years					
2	Chances of heavy rains and floods					
3	Chances of frequent and intense droughts					
4	Change in the timing of rains/earlier/late/erratic a change not in the total amount of rainfall but in the timing of the rains, with rains coming either earlier or later than expected					
5	Total rainy days					

	compared to previous years					
6	Duration of dry spells during rainy season					
7	Temperature compared to past years					
8	Intensity of heat during summer					
9	Bitterness of cold during winter					
10	Chances of high temperature and heat wave occurrence					
11	Chances of low temperature and cold wave occurrence					
12	The intensity of fog compared to previous days					
13	Dew drops occurrence compared to previous days					
14	Night temperature compared to older years					
15	Sunshine hours during rainy season					
16	Ground water table compared to previous days					

The sum of score of all items of the climate changes administered to the farmers' was computed which indicated the perceived climate change score for particular selected farmer. The minimum obtainable score of an individual farmer was 16 and maximum obtainable score was 80. The raw score such obtained was converted into perception index for the above 16 main indicators in aggregate form, with the help of following formula.

$$\text{Perception Index} = \frac{\text{Obtained perceived climate change score}}{\text{Obtainable perceived climate change score}} \times 100$$

On the basis of equal interval, the farmers' were categorized on their perceived climate change perception index as follows:

Sr. No.	Perception	Index range
1.	Low	Up to 33.33
2.	Medium	33.34 to 66.66
3.	High	Above 66.66

The perception of farmers' about climate change was then verified with the climatic data on rainfall and temperature available with Dr.PDKV research stations of Akola and Yavatmal and reports of IMD, Pune.

Conclusion

The perception index developed was used for measurement of farmer's perception towards climate change and variability in Akola and Yavatmal districts of Vidarbha.

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