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An analytical study on farmer's awareness regarding climate change

Neelesh Kohli and Dr. Kiran Singh

Abstract
Agriculture is the backbone of Indian economy, even during COVID period agriculture was the only sector which majorly contribute towards country's GDP. Climate change significantly affects the productivity of agricultural output. The present study was conducted in one district of Haryana state and the study sample was selected by using simple random sampling. Findings of the study indicate that all the farmers were found to be quiet well aware of the climate change phenomena. Majority of the farmers reported that increase in temperature, erratic rainfall, extreme weather conditions and diminishing agricultural yield are the indicators of climate change. According to the farmers, main causes of climate change are deforestation, overpopulation, rapid industrialization etc. Majority of the farmers describe that water accumulation after heavy rainfall, crop failures and extreme weather conditions such as heat waves are the major consequences of climate change. Data from the study will helpful in making a roadmap for policy formulation, designing agriculture development programmes for adaptation strategies and mitigation measures.

Keywords: Climate change, crop yield, extreme weather conditions, climate variable, greenhouse effect, global warming potential, IPCC

1. Introduction
According to The United Nations Framework Convention on Climate Change, "Climate change is defined as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Anonymous, 2021) [2]. One of the key factors affecting agricultural production is the climate. There is a great deal of concern about how the global agricultural production will be impacted by climate change and its variability. One of the most vulnerable sectors is agriculture since it is intrinsically prone to climatic fluctuations. Production and efficiency in agriculture are directly affected by climate change (Raneesh, 2017) [10]. It has an impact on agriculture production, farming methods, has implications on environment and rural areas and its adaptability (Singh, 2013) [11]. Agriculture, forestry, and fisheries are all susceptible to the effects of climate change while also increasing emissions. The manufacture of manure and fertilizer, burning of biomass, rice production, and fertilized soils account for 13.5 per cent greenhouse gas emissions from agriculture sector all over the world (Anonymous, 2022) [1].

Our farming activities have been affected by climate change, which now has resulted in decreased crop yields, a water shortage for livestock, and frequent dry spells with little rainfall over the past ten years. Due to their limited landholdings and lack of resources to adapt to climate change, small-scale, poor farmers suffer the most (Raghuvanshi, 2017) [9]. A disproportionate amount of the negative effects of climate change fall on poor rural households, whose livelihoods mostly depends on agriculture and natural resources. As a result farm income and profitability also decline (Ashalatha, 2013) [5]. Additionally, it will have a negative effect on food availability and security. Therefore, regardless of a country's size or degree of development, climate change is a problem that should concern us all. Due to rising temperatures, it is predicted that agricultural crop output in Asia would decrease by 5–30% by the 2050s. This decrease in agricultural crop yield will result in food insecurity, which will become a significant issue for people in the future (Anonymous, 2015) [3]. Despite the difficulties in the agriculture sector, there are chances for livelihood diversification in the animal husbandry and fisheries sectors, which together account for a quarter of the total gross domestic product (GSDP) in agriculture and related industries. Any influence on agricultural and related industries will have a trickle-down effect on secondary and tertiary industries

(Ansari, 2018) [4].

The temperature in India is expected to climb by 2.5 °C to 4.9 °C, which will result in a 32%–40% decline in rice yields and a 41–52% decline in wheat yields. GDP would decrease as a result by 1.8% to 3.4%. The biggest threat to Indian agriculture is therefore climate change, but farmers still don't fully understand the threat, including its signs, causes, and effects (Mahato, 2014) [8]. More unpredictable weather patterns, lengthier droughts, inconsistent rainfall, earlier flowering of some plant species, vertical shifting of trees and crops, loss of some natural resources, and the emergence of new and unwelcome pests and illnesses are all effects of climate change (Choudhury, 2017) [6].

Any major long-term shift in the region's predicted patterns of typical weather over a lengthy period of time is referred to as a climate change. It is about atypical changes in the climate and how these changes affect other areas of the planet. These adjustments could need tens, hundreds, or even millions of years. However, the rate of climate change is accelerating due to an increase in anthropogenic activities including industrialization, urbanisation, deforestation, agriculture, and changes in land use patterns, among others (Jamshidi, 2018) [7]. Higher temperatures, altered precipitation patterns, and increased atmospheric CO2 concentrations are all possible outcomes of climate change scenarios (Raghuvanshi, 2017) [9]. The Greenhouse Effect may be crucial for agriculture in three different ways. First, higher levels of atmospheric CO_2 can directly affect how quickly weeds and crop plants develop. Second, the productivity of plants and animals may be affected by CO2-induced climate changes that vary temperature, rainfall, and sunshine levels. Lastly, as the sea level rises, agriculture may be submerged and the salinity of the groundwater in coastal areas may increase, causing farmland to be lost.

2. Materials and Methods

Haryana state was purposively selected for conducting the data. The total of 30 farmers was randomly selected from two villages of Hisar district. Data was collected using a pre-tested structured interview schedule which was then analyzed accordingly. Personal interview method was used by the researcher for collecting the data.

3. Results and Discussion

3.1 Awareness about Climate variability

As shown in fig.1 Majority of the farmers from the study sample said that they are quiet well aware of the climate change. Further, when probed about the level of awareness about climate change, more than half of the respondents (60%) agreed on the statement that climate is getting warmer; it means the average earth temperature is increasing. Forty seven per cent of the respondent's state that weather has become unpredictable as well as the duration of season is changing. Majority of the farmers (77%) accept that there is an occurrence of extreme weather conditions. Seventy three per cent farmers stated that there is an increase in the number of crop failure. Majority of the farmers reported that the atmospheric pollution is increasing day by day. Eighty seven per cent of the respondent state that occurrence of natural disasters are increasing and human and animal health problems are increasing simultaneously. Majority of the respondent (90%) reported that rainfall pattern has also been changing.

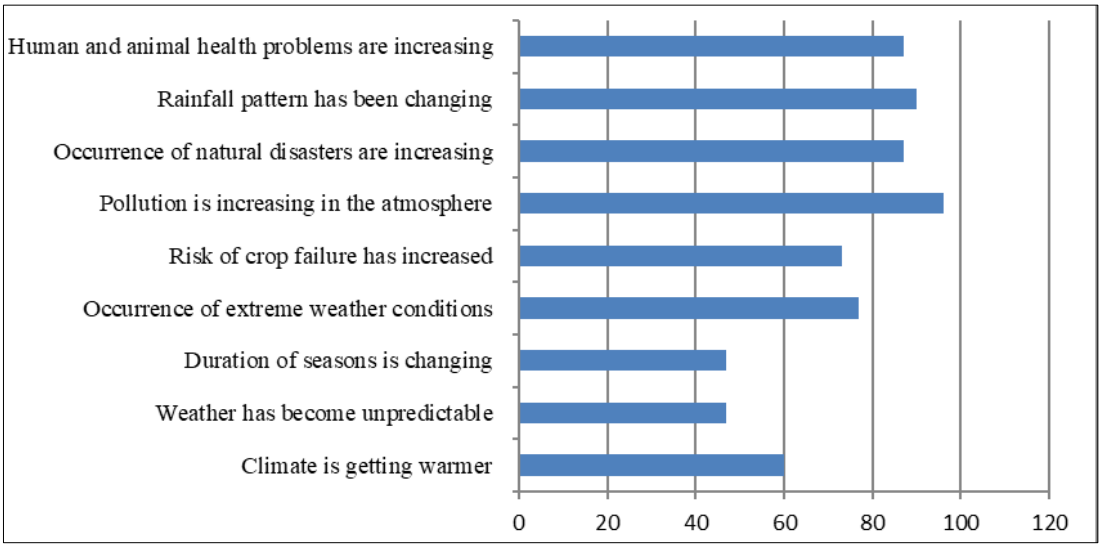

Fig 1: Distribution of respondents according to their awareness about climatic variability

3.2 Climate change and change in biological systems in past 15 years

According to fig.2 Majority of the farmers (77%) said that there is change in flowering & fruiting time, changes in fruit/crop ripening and there is an increase in yields of some crop such as wheat due to increase in temperature. More than half of the respondents describe that the incidents of disease in crops had increased and incidents of insects and pest's in crops also increases. Majority of the farmers (83%) accept that there is an increase in the use of chemicals and fertilizer in agriculture. Thirty seven per cent farmers stated that there is reduction in the cultivated area and some of the crop's production also decreases from past few years because of changing in weather pattern.

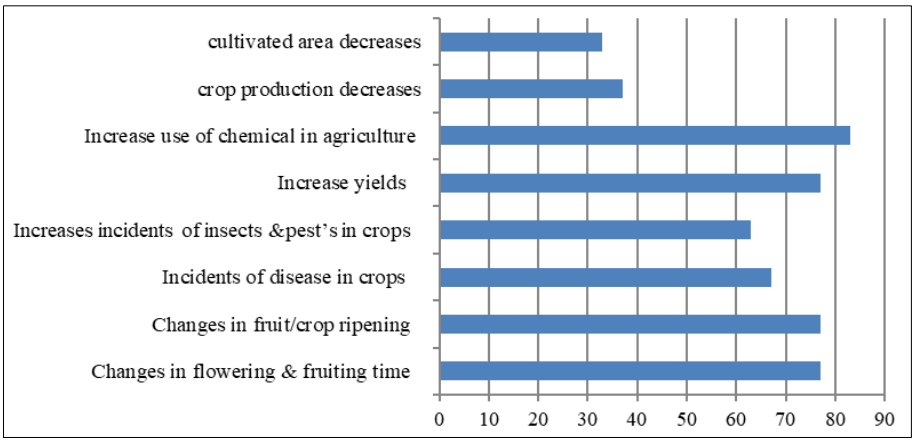

Fig 2: Distribution of respondents according to their response on change in biological systems in past 15 years

3.3 Losses from various disasters

Fig.3 shows that majority of the respondents (93%) faces huge loss because of accumulation of water after heavy rainfall; it is very common problem among the farmers. More than half of the respondents (63%) agreed on the statement that drought, storm and disease and pest outbreak, are some common reasons which are responsible for agricultural losses. Ninety three per cent of the respondent's describe that how erratic rainfall causes huge loss in agricultural productivity. Majority of the farmers (93%) accept that environmental pollution is also one of the common causes for agricultural loss.

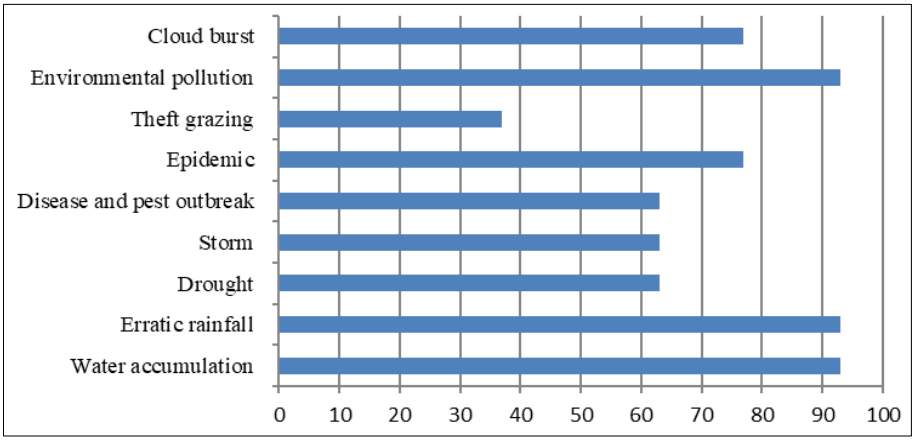

Fig 3: Distribution of respondents according to Disasters faced along with extent of losses during past 15 years

3.4 Farmers perception about climatic variability in Rainy Season

As shown in fig.4 majority of the farmers (93%) from the study sample said that there is a change in timing of rain onset because of climate change. More than half of the respondents (77%) agreed on the statement that there is uneven distribution of rainfall and total amount of precipitation has also changes. Only seven per cent of the respondents agree on the statement that there is a change in frequency of rainy day. Forty seven per cent farmers stated that there is slight change in cloudy weathers and cloudy days.

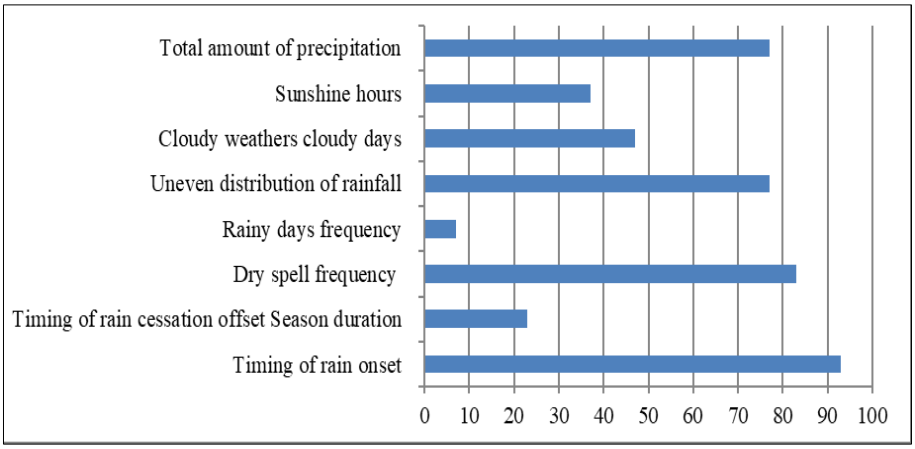

Fig 4: Distribution of respondents according to their perception about climatic variability (Rainy Season)

3.5 Farmers perception about climatic variability in Winter Season

According to fig.5 majority of the respondents (83%) feel that there is a change in cold intensity over past few years because of climate change. More than half of the respondents (63%) agreed on the statement that there is an increase in the frequency of heavy fogged days, this happen majorly due to pollution which arises in our atmosphere because of several reasons. Thirty seven per cent of the respondents observed that maximum and minimum temperature in winter's changes. Forty seven per cent farmers reported that there is slight change in number of cool days and the duration of winter also changes from past few years. Only twenty three per cent of the respondents analyze the change in winter rainy days.

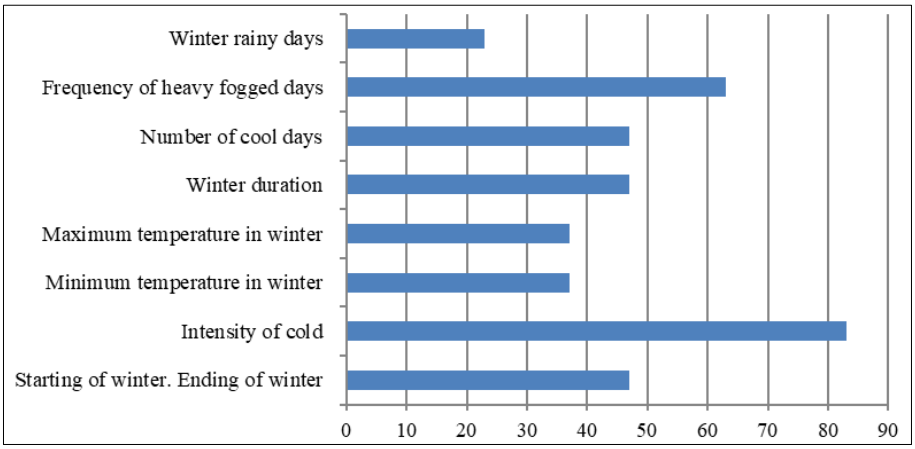

Fig 5: Distribution of respondents according to their perception about climatic variability (Winter Season)

3.6 Farmers perception about climatic variability in Summer Season

As shown in fig.6 majority of the respondents (83%) strongly believe that maximum temperature in summers changed and increased over past few years mainly because of climate change. More than half of the respondents (73%) observed that there is an increase in the intensity of summer 'loo', which is also responsible for agricultural damage. Sixty three per cent of the respondents observed that there is slight change in number of hot days and the duration of season also changes from past few years. Only twenty three per cent of the respondents analyze the change in summer rainy days, basically the farmers explained that the rain in the summers downfall. And the farmers also describe the early arriving of summers and change in summer ending from past years.

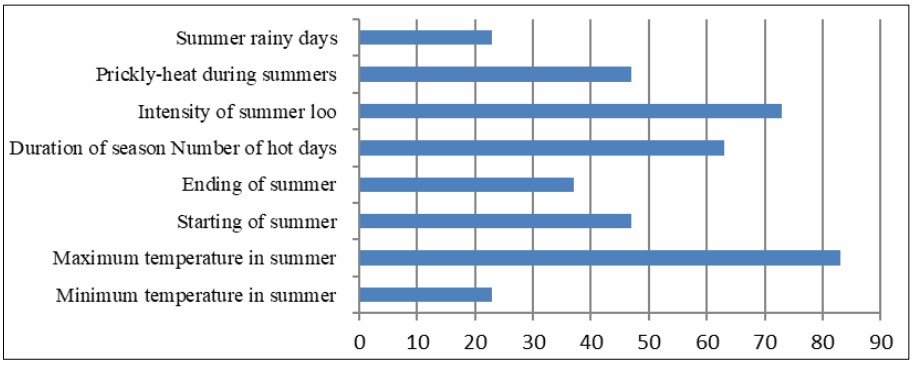

Fig 6: Distribution of respondents according to their perception about climatic variability (Summer Season)

3.7 Impact of climate change

Eighty seven per cent of the respondents strongly believe that there is an increase in the pollution level such as water pollution, air pollution etc. which directly leads to climate change. As shown in fig.7 more than half of the respondents (67%) admitted that climate change is also responsible for agricultural production and has impact on crop production. Forty seven per cent of the respondents' state that there is reduction in crop cycle period and climate change also effects the soil erosion and sediment transport. Eighty three per cent of the respondents observe the occurrence of flood and drought due to climate change. And fifty three per cent of the farmers found that climate change effect biological health of soil as well as there is an infestation of pest, disease and weeds. Sixty per cent of the respondents admitted that there is an increase in atmospheric temperature. Seventy three per cent of the respondents observed the reduction in soil water availability due to climate change which also effect on soil organic matter and soil fertility. Forty three per cent of the respondents argue that climate change has impact on plant growth.

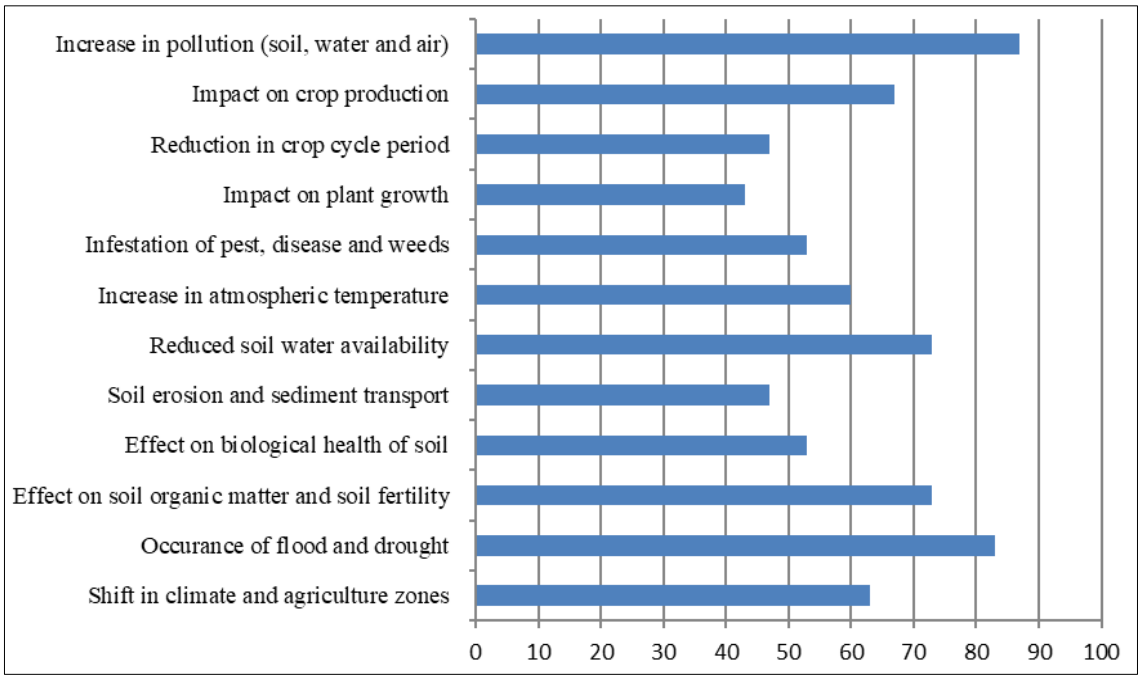

Fig 7: Distribution of respondents according to their perception about Impact of climate change on agriculture and allied activities

3.8 Impact of long term climate change

As shown in fig.8 Eighty three per cent of the respondents state that the use of traditional crop varieties decreased over past few years because of various reasons. Forty per cent of the respondents admitted that the area of some crops has decreased and some insects have extinct and some have been getting adapted with changing climatic condition. Forty seven per cent of the respondents' state that changes occurred in flowering and fruiting time and new species of seasonal weeds seen in recent years. Sixty three per cent of the respondents observe that the cropping pattern has changed and traditional irrigation sources like pond have reduced over the year. Forty per cent of the farmers found that some insects have extinct and some have been getting adapted with changing climatic condition. Thirty seven per cent of the respondents admitted that population of rodent like rat has increased. Twenty three per cent of the respondents observed the conditions getting favorable flourish weeds insects' diseases.

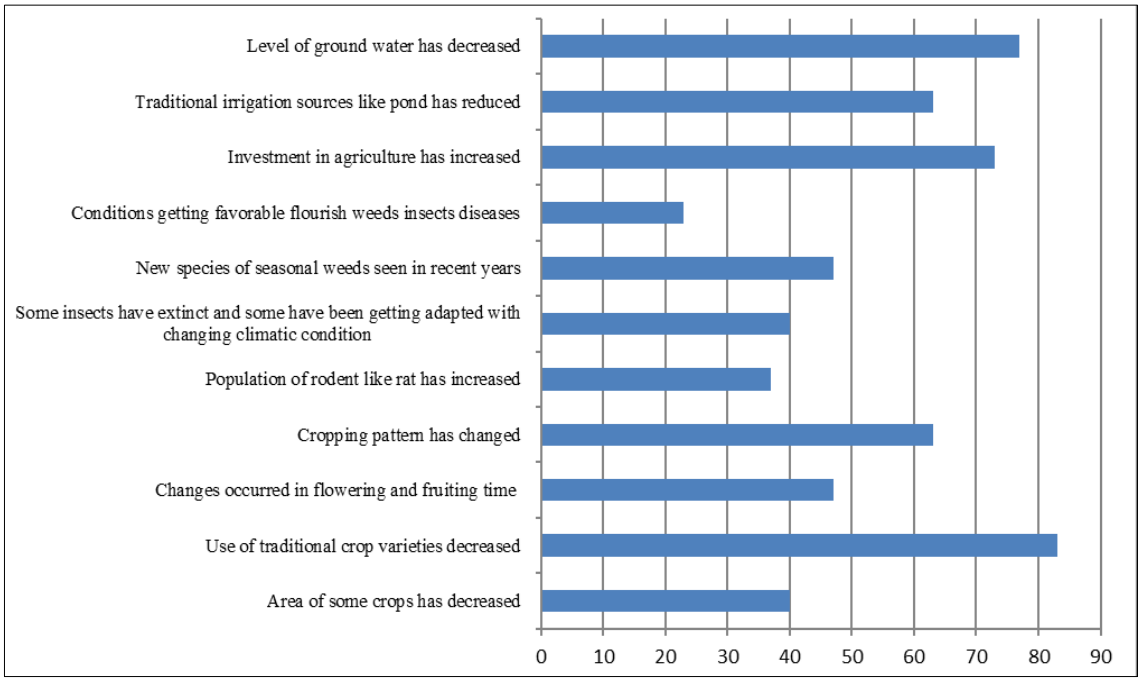

Fig 8: Distribution of respondents according to their perception about impact of long term climate change on agriculture

4. Conclusion

Climate change is the result of Global Warming has now started showing its impacts worldwide and it act as a primary determinant of agricultural productivity which directly impact on food production across the globe. Extreme weather events and climate change have a significant impact on agriculture,

endangering the safety of the nation's food supply. Climate change's intensity, frequency, and character can have a significant impact on agricultural and farming methods. The most vulnerable industry to climate change is the agricultural sector since the nature and characteristics of crops and vegetation of any area depend on its climate. A rise in the average seasonal temperature can shorten the growing season for many crops, lowering their final yield. Climate change, including variations in temperature and precipitation, has a significant impact on food production systems of the country because it can cause pest and disease outbreaks, reduce harvests which eventually affect the food security of the country. India will need to take action at the international, regional, national, and local levels to address the effects of climate change on agricultural and food production. Farmers may be forced to adopt novel practices as a result of climate change, including adjusting sowing dates, soil preparations, growing season lengths, harvesting dates, and disease and insect management.

5. Reference

1. Anonymous; c2022. https://www.ipcc.ch. Climate Change 2022: Impacts, Adaptation and Vulnerability. Assessed on 22-01-2023.
2. Anonymous; c2021. https://unfccc.int. Climate change. Assessed on 13-01-2023.
3. Anonymous; c2015. https://www.fao.org. Climate change and food security: risks and responses. Assessed on 02-01-2023.
4. Ansari MA, Joshi S, Raghuvanshi R. Understanding farmers perceptions about climate change: a study in a North Indian State. Advances in Agriculture and Environmental Science. 2018;1(2):85-89.
5. Ashalatha KV, Gopinath M, Bhat ARS. Impact of Climate Change on Rainfed Agriculture in India: A Case Study of Dharwad. International Journal of Environmental Science and Development. 2013;3(4):368-371.
6. Choudhury AR, Arutchelvan V, Asha B. Awareness on impact of climate change in agriculture, A study of Chidambaram agricultural area by using educational global climate model software and weather research and forecasting model. International research journal of environmental sciences. 2017;6(4):24-36.
7. Jamshidi O, Asadi A, Kalantari K, Azadi H. Perception, Knowledge, and Behavior towards Climate Change: A Survey among Agricultural Professionals in Hamadan Province, Iran. Journal of Agriculture, Science and Technology. 2018;20:1369-1382.
8. Mahato A. Climate Change and its Impact on Agriculture. International Journal of Scientific and Research Publications. 2014;4(4):1-6.
9. Raghuvanshi R, Ansari MA, Amardeep. A Study of Farmers' Awareness About Climate Change and Adaptation Practices in India. International Journal of Applied Agricultural Sciences. 2017;3(6):154-160.
10. Raneesh KY. A Review on the Impact of Climate Change on Crop Production in Humid Tropics. Scientific Federation Journal of Global Warming. 2017;1(1):1-5.
11. Singh RP, Reddy KR. Impact of climate change and farm management. Climate Change and Environmental Sustainability. 2013;1(1):53-72.