

Local Understanding of Climate Change and Its Impact on Food Production in Jammu Region of J & K State

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Abstract

Climate change has been recognized globally and it has a number of straight and long-term impacts. In this paper, the main purpose was to assess the perception of local people towards climate change and its impact on food production. The statistical populace for this study consists of 400 persons selected at random from Jammu region of J&K state to acquire local perception at small scale. A well-designed validated questionnaire was utilized to collect the data from the respondents who were willing to participate in our study. The data collected was analyzed and tabulated using standard statistical tools. The results from our research revealed that majority of the respondents under study were of the opinion that rise in temperature, irregular rainfall, frequent disaster and decrease in food production has direct impact of food security. Respondents in majority were aware of the climate change and its impacts on food production but they were not aware how to adopt climate changes. It is obvious that there is a significant relation between climate change and food production. It is concluded from our study that in order to cope with climate change impact socio-economic profile and people awareness concerning food production have to be modified. Finally, we recommended policy instruments to enhance food security amidst changing climate.

Keywords: Jammu; Perception; Climate Change; Food Production; Food Security; Statistics.

Introduction

Climate change has been accepted worldwide as an ever-increasing threat to planet earth impossible to overlook (Sarkar *et al.*, 2012) which poses widerange impacts on earth and universal ecosystems. The studies showed that climate change resulted in increases in air temperature and water temperatures (IPCC, 2007), impact on water assets (Pradhan *et al.*, 2015), change in precipitation pattern (IPCC, 2014; Hardy, 2003), decline in agricultural production (Viala, 2008; Pishbahar and Darparnian, 2016) and land yield (Kumar *et al.*,

2016), livelihood of rural communities (Aydogdu and Yenigün, 2016), sea level rises (El-Beltagy and Madkour, 2012), reductions in snow cover, glaciers, and permafrost (IPCC, 2007), and human health (Hardy, 2003). The researchers reported that climate change is one of the most vital environmental issue globally (Parry *et al.*, 2004; Brooks *et al.*, 2009; Ayanwuyi *et al.*, 2010; Ekpoh and Ekpoh, 2011; FAO, 2012; Karfakis *et al.*, 2012; Arbuckle Jr *et al.*, 2013; Pishbahar, 2016). The researchers claim that climate change is happening and is being driven by human activities, like industrial pollution, the burning of fossil fuels, deforestation, and land utilization changes (IPCC, 2014; Oreskes, 2004).

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Climate change is a global challenge for humans worldwide which threatens socio-economic activities including natural resources, agriculture, food security, tourism, livelihood and health. Agriculture plays a fundamental role in human welfare as there is a direct relation between climate change and agriculture (Schmidhuber and Tubiello, 2007; Ahmad, Dastgir and Haseen; 2011). Climate alteration is a vital issue for food production so lot of concern has been shown by federal agencies and others concerning the possible effects on agricultural productivity. It is understandable that climate change will manipulate food production, access to food, stability of food supplies and food consumption (Fahim *et al.*, 2013). The agriculture will be badly affected by the climate change as natural calamities, cyclones and storm surges are totally hindering the production of various crops more and limiting the food security, especially the coastal areas. It is obvious that climate variability, agriculture productivity, food security, health and poverty, are all directly associated to each other; and these are powerfully correlated to each other. Climate change is usually problematic for agricultural production and for agricultural economies and communities (Maraseni, Maroulis and Cockfield; 2009) so adjustment is a key factor that will figure the future severity of climate change impacts on food production (Easterling; 2007). It is believed that climate change influence, crop production, livestock production, hydrologic balances, input supplies, health and other components of agricultural systems. According to global comprehensive estimate for over 100 countries, global agricultural productivity would be reduced by 15.9% by the 2080's, with developing countries experiencing a disproportionately large decline of 19.7%, given the measures to abate global warming fail to be carried out. In this paper, the study area was Jammu region of J & K state as in this state agriculture is

considered as back bone of the economy, nearly 70% of the population derives its livelihood directly or indirectly from the agriculture sector. In the light of the discussion, we chose our study with the main aim to scrutinize the local sensitivity about climate change and to explore climate change impact on food production and threat to food security in future.

Materials and Methods

The present study carried out in Jammu region was qualitative in nature (questionnaire survey, focus group discussions and face to face interviews) which used to identify the impacts of climate change on food production in the study area. A set of questionnaire was developed and a total of 400 people above age 55 years involved in agriculture were interviewed in Jammu region during the survey period in 2018-19. Primary data was collected during survey and literature was reviewed to match secondary data. A well designed validate questionnaire was prepared which contained the demographic profile and perception on climate change impact with food security issues. Final questionnaire prepared by utilizing the findings of pre-testing of questionnaire survey. Stratified random sampling technique has been applied as sampling procedure. The data collected was tabulated and analyzed statistically using statistical software SPSS (version 20).

Results and Discussion

The data shown in Table 1, reveals that in response to questions 2, 4 and 10th above 80% respondents agree, in response to questions asked 1, 5, 6 and 11th above 70% respondents agree. Further, in response to questions 3, 8 and 9th above 50% respondents under study agree.

Table 1: Perception of respondents about impact of long term climate change on Agriculture

S. No	Question Asked	Agree (%)	Can't say (%)	Disagree (%)
1	Area of some crops (like paddy (Basmati) etc) has decreased	76.5	9.5	14.0
2	Use of traditional crop varieties decreased	85.5	8.0	6.5
3	Changes occurred in flowering and fruiting time of crops	61.5	24.0	14.5
4	Cropping pattern has changed	81.5	13.0	5.5
5	Population of rodent like rat has increased	71.5	19.5	9.0
6	Some insects have extinct and some have been getting adapted with changing climatic condition	78.5	17.5	4.0
7	New species of seasonal weeds seen in recent years	73.5	18.0	8.5
8	Conditions getting favorable to flourish weeds/insects/diseases	67.5	21.5	11.0
9	Investment in agriculture has increased	61.5	31.0	7.5
10	Traditional irrigation sources like pond has reduced	91.5	4.5	4.0
11	Level of ground water has decreased	75.5	14.5	10.0

The data shown in Table 2, reveals that in response to questions asked, 2, 7, 8 and 11th above 80% respondents under study agree, in response to questions, 1, 5, 6 and 9th above 70% respondents agree. Further, in response to questions asked 3, 4 and 10th above 50% respondents under study agree. The results are in agreement with the earlier study.

The data presented in Table 3, reveals that in response to questions asked to respondents to know their perceptions of climate change and the environment in general. It is observed that 84.25% respondents believed that temperature increased, 83.5% believed that irregular rainfall was increased, 81.0% believed that occurrence of storm surges, flooding and disasters have increased, 80.25% believed that climate is getting warmer, 72.75% respondents believed that erosion increased, 69.0% believed that there is increase in the risk of crop failure, 57.75% believed that drought frequency has

increase, 43.25% respondents believe that there is a variations in year-to-year weather pattern, 37.25% respondents believe that there is uncertainty in predicting weather and 27.25% respondents believed that there are more changes in sea level (Waves, Tides & currents).

The data shown in Table 4, reveals that 35.25% respondents believe that climate change has increased the deforestation, 22.25% respondents believe that climate change has Increased the risk of crop failure, 39.25% respondents believe that climate change has increased pest and disease, 47.25% respondents believe that climate change has increased erosion and dry up water resource, 42.25% respondents believed that decreased water level and fresh water availability in the area and 28.5% respondents believe that climate change has effected health status of the people.

Table 2: Impact of long term climate change on allied activities

S.No	Statement	Agree (%)	Can't say (%)	Disagree (%)
1	Species of some animals and birds has extinct.	73.5	17.5	9.0
2	Scarcity of fodder in the area.	86.0	10.0	4.0
3	Behavioral changes and adverse effects on health of livelihood.	68.5	22.0	9.5
4	New fish species found and old species have extinct in rivers.	59.0	35.5	5.5
5	Investment on physical facilities increased.	78.5	5.5	16.0
6	Human health problems are increasing.	79.0	16.5	4.5
7	Migration of birds and animals has increased.	81.0	12.5	6.5
8	Drinking water availability decreased.	87.5	6.5	6.0
9	Air pollution are increasing.	79.5	19.0	1.5
10	Water pollution are increasing.	69.0	27.5	3.5
11	Drudgery of farms/ farm women has increased.	80.5	9.5	10.0

Table 3: Perceived knowledge on climate changes as observed by respondents.

S. No.	Perceived knowledge	Frequency	Percentage (%)
1	Increased in temperature	337	84.25
2	Drought frequency has increase	231	57.75
3	Erratic rainfall has increase	334	83.5
4	Climate is getting warmer	321	80.25
5	Uncertainty in predicting weather	149	37.25
6	Variations in year-to-year weather pattern	173	43.25
7	Increase in storm surges, flooding and disasters	324	81.00
8	More erosion	291	72.75
9	More changes in sea level (Waves, Tides & currents)	109	27.25
10	Increase in the risk of crop failure	276	69.00

Table 4: Perceptive Assessment of Climate Change

S. No.	Statement	Frequency	Percentage (%)
1	Increased the deforestation	141	35.25
2	Increased the risk of crop failure	89	22.25
3	Increased pest and disease	157	39.25
4	Increased erosion and dry up water resource	189	47.25
5	Effected health status of the people	114	28.5
6	Decreased water level and fresh water availability in that area	169	42.25

The data presented in Figure 1, shows that there were various climatic changes that affect the overall agricultural sector of the study area. The climate change and food production is related. It is reported by 91.0% respondents that use of pesticide increased, 78.5% respondents believe that use of fertilizers has increased, 76.5% respondents believe that there is a low food production during last 15 years, 63.5% respondents believed that normal crop is effected due to climate change and 61.5% respondents believe that irrigation technology not benefitted much.

The data shown in Figure 2, revealed that 41.0% told that during last 15 years they noticed disease and pest outbreak, 32.5% told that they noticed yield reduction, 31.0% respondents reported that they face theft/grazing, 27.5% respondents reported that they observe loss of livestock, 37.5%

respondents told that they observed contamination of irrigation and drinking water, 33.0% respondents reported that they noticed income got effected, 28.5% respondents told that due to health problem they faced sudden death of a family member and 87.0% respondents told that they observed more environmental pollution during last 15 years.

The data presented in Figure 3, shows that majority (62.5%) of the respondents were of the opinion that climate change and social condition is related. Further, 58.5% respondents believe that climate change threatens livelihood of people dependent on agriculture and natural resources.

The data presented in Figure 4, shows that majority (87.5%) of the respondents were of the opinion that climate change food production is related. Statistically, there is a significant difference in the opinion of the respondents ($p < 0.01$).

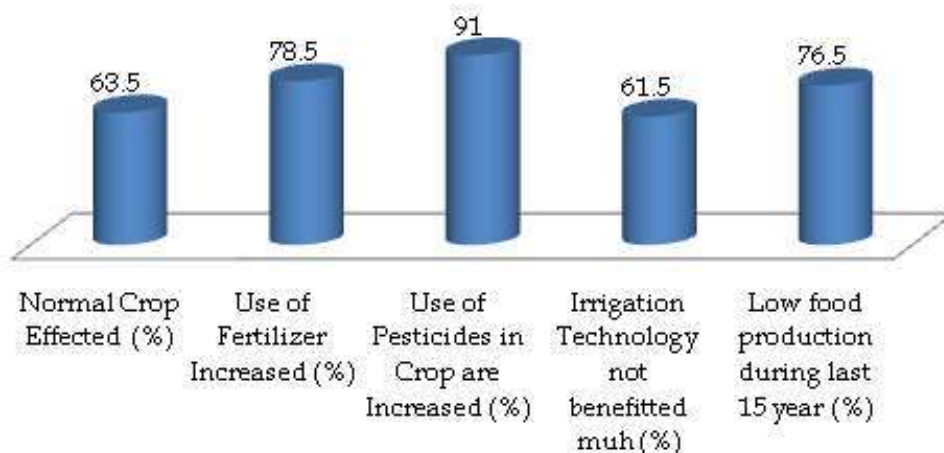


Fig. 1: Climate Change and Food Production

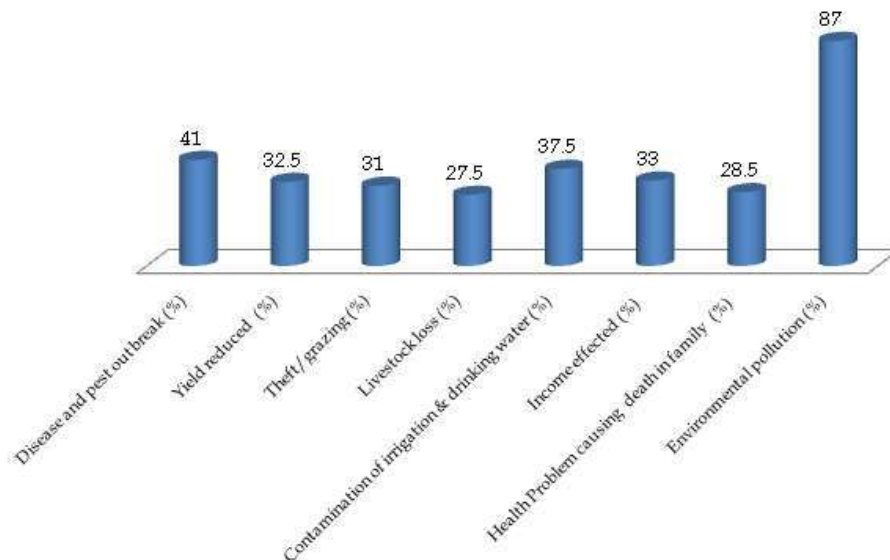


Fig. 2: Disaster Respondents faced disaster during last 15 years

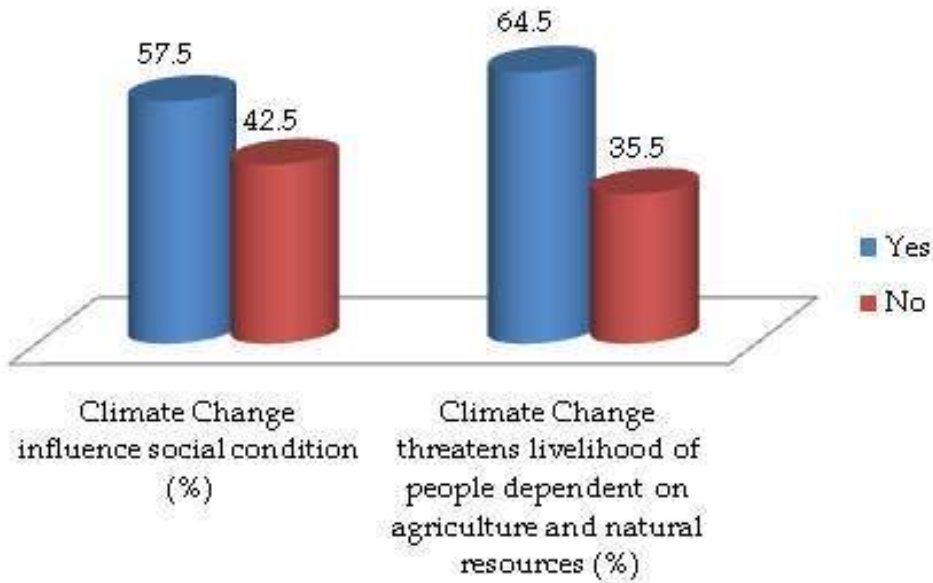


Fig. 3: Climate change and Social condition

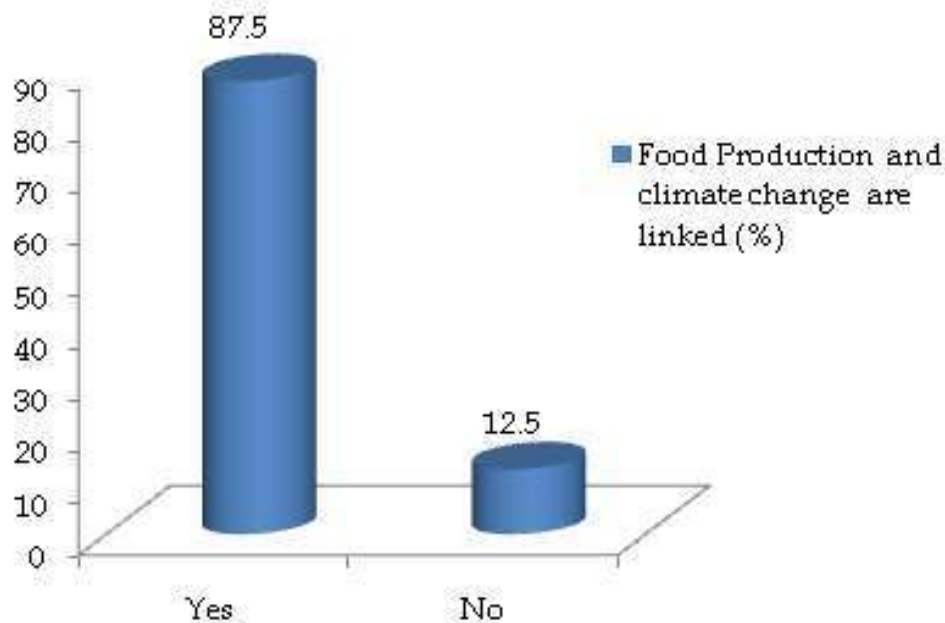


Fig. 4: Food Production and climate change is Linked

Conclusion

Climate change has impact on food production worldwide due to increase in temperature, erratic rainfall, flooding, erosion, earthquakes etc. The study showed that more than 80% respondent were of the opinion that there is erratic rainfall, global warming, floods and frequent natural disaster due to climate change. The excessive rainfall and extreme variation in temperature badly affected the crop productivity, thus affecting the incomes

as well as food security. The results of our study are in conformity with the earlier study (Kaul and Ram, 2009). Over the past 15 years risk of crop failure, decrease in food production, pest and disease, erosion, frequent flood incidents and sea level are increased due to climate change. It is suggested to take following following adaptive measure for reducing climate change effect i) Awareness program regarding food production issues should be organised ii) To increase crop production, indigenous knowledge and traditional

adaptive techniques should be practiced iii) To ensure food production, community based food storage capacity be made. iv) To combat the climate change, Government organisations, NGOs and donor agency should collaborate v) Cropping pattern should be changed to make assured food production vi) More tree plantation should be done to combat climate change.

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