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Knowledge of vegetable growers towards the impact of climate variability in Seoni district of Madhya Pradesh

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Abstract

The present study was undertaken with the objective to assess the knowledge of the vegetable growers towards the impact of climate variability on vegetable production. In order to achieve the objective of the study, six villages from Seoni block of Seoni district were selected randomly. Finding of study revealed that overall knowledge mean score towards impact of climate variability on vegetable production was 4.30. It is also revealed from the study that vegetable growers had replaced vegetables crops due to different weather parameters. The results of the study will serve a guideline to researchers, extension personal and policy makers to make effective policies and plans on climate variability so vegetable growers can reduce the losses by this.

Keywords: Vegetable, climate variability, rainfall, temperature, knowledge

Introduction

Climate change is the major cause of low production of most of the vegetable crops in all countries. Vegetables are the fresh, edible portion of herbaceous plant consumed in either raw or cooked form. (Abewoy, 2018) [1]. Vegetables are cheapest sources of natural protective food, contributing carbohydrates, vitamins and minerals in human diet (Choudhury, 2006) [4]. A balanced diet is essential to sustain good health. They are the best resources for overcoming micronutrient deficiencies. India is the second largest producer of vegetables (17.3t/ha) after China (22.5t/ha) (Kumar *et al.*, 2011) [7]. For a well-balanced diet, about 300 gram vegetables are required containing root vegetable, green vegetables and others vegetables, but only 130 grams per capita is available. Most of the leafy vegetables and root crops are rich in minerals like Ca, Fe, and phosphorous some leafy vegetables are rich in microelements like copper, manganese zinc and vitamin A, B, C. In the vegetable production climate plays a major role and now a days climate change is rapidly affecting the vegetable production.

Vegetable crops are very sensitive to climate variation and sudden rise in temperature as well as irregular rainfall at any stage of crop growth can affect the normal growth, flowering, pollination, fruit development and decrease in the crop yield. (Afroza *et al.*, 2010) [2]. A little change in the climatic parameters will bring drastic changes in the quality and nutritional value of vegetables and also affect the post-harvest quality and basis for severe losses and affect food safety during storage. (Cotty and Jaime- Garcia, 2007) [5]. Besides these losses also affects insect pest and disease incidence and weed infestation in vegetable crops (Vermeulen *et al.* 2010) [9]. In this view climate factors affects the vegetable production. Farmer's knowledge about the climate is more important to mitigate the ill effect of weather or climate to some extent. In the recent years extreme weather events like excessive and deficit rainfall, flood, severe frost, temperature and drought are occurring more commonly affecting agricultural production and productivity which leads to decrease farmer's income (Bhan *et al.* 2014) [3].

A lower agricultural production and productivity due to climate change has implication for food prices, which in turn affect the livelihood and food security status of household in a country. Under this circumstances improved and sustainable agriculture technology according to forecast based, agro advisories and full information about factor effecting of climate variability are more useful to reduce vulnerability and improve adaptability of agriculture to climate variability. In Seoni district of Madhya Pradesh major vegetable crops grown are Tomato, Onion, Brinjal, Chili, Cucurbits.

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In a vegetable growing area of a Seoni many factor are available which directly connected with climate change and like average temperature increase, change in rainfall amount and pattern, change in climatic variability and extreme events, weed, pest and pathogen. The present study was, therefore undertaken to assess the knowledge of the vegetable growers towards the impact of climate variability on vegetable production.

Materials and Methods

The present investigation was carried out in Seoni district of Madhya Pradesh. The Seoni district is located in the southern part of Madhya Pradesh. The Seoni block was selected for the study out of the 8 blocks of district. The Seoni block comprises of 289 villages, out of which namely 6 villages

Mungwani khurd, Mungwani kala, Simariya, Khairy, Singhodi and Jamuniya were selected randomly on the basis of availability of vegetable growers and adopted by KVK Seoni. Respondents were selected by simple random sampling method to make sample of 120. For the present study the 20.00 per cent vegetable growers from the total farmer of selected villages of Seoni block were selected by proportionate random sampling method. The data were collected through personal interview by a well-structured and pre tested interview schedule. Data were classified, tabulated and analyzed to find out the findings and draw conclusion. The statistical tool mean was employed to analyze data.

Results and Discussion

Table 1: Mean score of knowledge among respondents towards impact of change in temperature

S. No.	Technological components	Mean score	Rank
1.	Change in temperature hampered the growth of nursery of vegetables	3.03	I
2.	Change in temperature inhibits seed germination of vegetable crops	2.50	II
3.	Change in temperature affects transplanting of vegetable crops	2.43	III
4.	Plant growth of the vegetables is hastened by change in temperature	2.50	II
5.	There is more insect and pest attack in vegetables due to change in temperature	2.07	VII
6.	There is more incidence of disease in vegetables due to change in temperature	2.50	II
7.	Weed infestation is increased due to change in temperature	2.50	II
8.	Flower initiation stage is affected by change in temperature	1.90	VIII
9.	Fruit initiation stage is affected by change in temperature	2.43	III
10.	Maturity of vegetable crops is affected change in temperature	2.17	V
11.	Harvesting of vegetables is affected by change in temperature	2.23	IV
12.	There is problem in transportation of vegetables due to change in temperature	0.97	IX
13.	Change in temperature affects storage of the vegetable crops	2.03	VI
Overall mean (\bar{X})		2.25	

Knowledge level among respondent towards impact of change in temperature

Mean knowledge scores shows the knowledge of the respondents towards the impact of change in temperature on vegetable production. The knowledge mean score ranges from 0.97 to 3.03 and overall mean score was 2.25. The statements whose knowledge mean score higher than overall mean score were change in temperature hampered the growth of nursery of vegetables with mean score 3.03 and ranked first. Change in temperature inhibits seed germination of vegetable crops, plant growth of the vegetables is hastened by change in temperature, there is more incidence of disease in vegetables due to change in temperature and weed infestation is increased due to change in temperature had same mean score 2.50 and statements ranked same rank i.e. second. Change in temperature affects transplanting of vegetable crops and fruit initiation stage is affected by change in temperature received

same ranke, third with 2.43 mean score.

The knowledge statement who receives low score than overall mean were harvesting of vegetables is affected by change in temperature had 2.23 mean score with rank four. Maturity of vegetable crops is affected by change in temperature had 2.17 mean score with rank five. Change in temperature affects storage of the vegetable crops with mean score 2.03 and the statement was ranked sixth. There is more insect and pest attack in vegetables due to change in temperature with mean score 2.07 and ranked seventh. Flower initiation stage is affected by change in temperature had 1.90 mean score and statement was ranked eight. There is problem in transportation of vegetables due to change in temperature with mean score 0.97 and had ninth rank. It is cleared that the statement whose mean score were more than the overall mean score have more impact of change in temperature than the statement who receives low mean score than overall mean score.

Table 2: Mean score of knowledge level of respondents towards the impact of change in rainfall and distribution

S. No.	Technological components	Mean score	Rank
1.	Change in rainfall and its distribution hampered the growth of nursery of vegetables	2.23	IV
2.	Change in rainfall and its distribution inhibits seed germination of vegetable crops	2.23	IV
3.	Change in rainfall and its distribution affects transplanting of vegetable crops	1.83	IX
4.	Plant growth of the vegetables is hastened by change in rainfall and its distribution	1.93	VIII
5.	There is more insect and pest attack in vegetables due to change in rainfall and its distribution	1.80	X
6.	There is more incidence of disease in vegetables due to change in rainfall and its distribution	2.07	VI
7.	Weed infestation is increased due to change in rainfall and its distribution	2.00	VII
8.	Flower initiation stage is affected by change in rainfall and its distribution	2.40	II
9.	Fruit initiation stage is affected by change in rainfall and its distribution	2.23	IV
10.	Maturity of vegetable crops is affected by change in rainfall and its distribution	2.10	V
11.	Harvesting of vegetables is affected by the change in rainfall and its distribution	2.30	III
12.	There is problem in transportation of vegetables due to change in rainfall and its distribution	1.00	XI
13.	Change in rainfall and its distribution affects storage of the vegetable crops	2.47	I
Overall mean (\bar{X})		2.04	

Knowledge level towards impact of change in rainfall and distribution

The perusal of the data depicted mean scores obtained regarding knowledge level of respondents towards the impact of change in rainfall and distribution of rainfall. The knowledge mean score ranges from 1.00 to 2.47 and overall mean score was 2.04. The statements whose knowledge mean score higher than overall mean score were change in rainfall and its distribution affects storage of the vegetable crops with 2.47 mean score with first rank. Flower initiation stage is affected by change in rainfall and its distribution. The statement was ranked second with mean score 2.40. Harvesting of vegetables is affected by the change in rainfall and its distribution with mean score 2.30 and received third rank. Change in rainfall and its distribution hampered the growth of nursery of vegetables, change in rainfall and its distribution inhibits the seed germination of vegetable crops and fruit initiation stage is affected by change in rainfall and its distribution had same mean score 2.23 and ranked fourth. Maturity of vegetable crops is affected by change in rainfall

and its distribution with mean score 2.10 ranked fifth. There is more incidence of disease in vegetables due to change in rainfall and its distribution had 2.07 mean score and statement ranked sixth.

Other statement that had low mean score than overall mean were, weed infestation is increased due to change in rainfall and its distribution with mean score 2.0 and ranked seventh. Plant growth of the vegetables is hastened by change in rainfall and its distribution had 1.93 mean score with eight rank. Change in rainfall and its distribution affects transplanting of vegetable crops had 1.83 mean score and statement was ranked ninth. There is more insect and pest attack in vegetables due to change in rainfall and its distribution with 1.80 mean score and received tenth rank. There is problem in transportation of vegetables due to change in rainfall and its distribution had 1.00 mean score with rank eleven. It is cleared that the statement whose mean score were more than the overall mean score have more impact of change in rainfall and distribution than the statement who receives low mean score than overall mean score.

Table 3: Mean score of knowledge level of respondents towards impact of climate variability

S. No.	Technological components	Mean score	Rank
1.	Climate variability hampered the growth of nursery of vegetables	4.95	I
2.	Seed is not germinated due to climate variability	4.83	II
3.	Climate variability affects transplanting of vegetable crops	4.03	XII
4.	Plant growth of the vegetables is hastened by climate variability	4.24	VIII
5.	There is more insect and pest attack in vegetables due to climate variability	4.38	IV
6.	There is more incidence of disease in vegetables due to climate variability	4.04	XI
7.	Weed infestation is increased due to climate variability	4.20	IX
8.	Flower initiation stage is affected by climate variability	4.27	VII
9.	Fruit initiation stage is affected by climate variability	4.33	VI
10.	Maturity of vegetable crops is affected by climate variability	4.43	III
11.	Harvesting of vegetables is affected by the weather variation	4.05	X
12.	There is problem in transportation of vegetables due to climate variability	4.36	V
13.	Climate variability affects storage of the vegetable crops	3.82	XIII
Overall mean ^(x)		4.30	

Knowledge level towards the impact of climate variability

Knowledge of the vegetable growers towards impact of climate variability on vegetable production shows that mean score ranges from 3.82 to 4.95. The overall mean of knowledge score was 4.30. The statements whose knowledge mean score higher than overall mean score were climate variability hampered the growth of nursery of vegetables with the mean score 4.95 and ranked first and 4.83 is mean knowledge score towards the statement that seed is not germinated due to climate variability and received second rank. Maturity of vegetable crops is affected by climate variability had 4.43 mean score with third rank. There is more insect and pest attack in vegetables due to climate variability with mean score 4.38 and statement ranked fourth. There is problem in transportation of vegetables due to climate variability had 4.36 mean score with fifth rank. Fruit initiation stage is affected by climate variability received mean score 4.33 with rank sixth. From these knowledge score it can be cleared that impact of climate variation were more in these

crop production stage and also insect pest attack was increased in vegetable production.

Other knowledge statement that received low mean score than overall mean were flower initiation stage is affected by climate variability with 4.27 mean score and ranked seventh. The mean score was 4.24 for the statement that plant growth of the vegetables is hastened by climate variability and ranked eighth. Weed infestation is increased due to climate variability with mean score 4.20 ranked nine. Harvesting of vegetables is affected by the weather variation with mean score 4.05 and ranked tenth. There is more incidence of disease in vegetables due to climate change had mean score 4.04 and statement was ranked eleventh. Climate variability affects transplanting of vegetable crops with mean score 4.03 with ranked twelve and Climate variability affects storage of the vegetable crops with mean score 3.82, ranked thirteen. It is cleared that the statement whose mean score were more than the overall mean score have more impact of climate variability than the statement who receives low mean score than overall mean score.

Table 4: Crop replacement due to weather variation

Season	Old crops	Replaced by	Due to
Kharif	Okra	Pulses	Water stagnation
	Cucumber	Brinjal	Late onset of monsoon
	Tomato	Soybean	Excess water
	Bitter gourd	Maize	Insect attack
Rabi	Green Pea	Tomato	Low temperature at the time of maturity
	Radish	Other crop	Temperature
	Spinach	Wheat	Pest attack (temperature)
	Garlic	French bean	Low temperature at the time of sowing
Summer	Cucumber	Urd crop	High temperature
	Tomato	Cabbage	High temperature
	Chilli	Cow pea	High temperature
	Musk Melon	Urd crop	High temperature

Crop replacement due to weather variation

The vegetable growers had replaced their old vegetable crops by cereal/pulses/ other vegetable crops. It is cleared that in kharif season okra was replaced by pulses due to water stagnation problem, cucumber replaced by brinjal due to late onset of monsoon, tomato replaced by soybean due to excess water and bitter gourd was replaced by maize due to more insect pest attack in bitter gourd. In *Rabi* season vegetable growers replaced green pea replaced by tomato due to low temperature at the maturity time, radish by other crop due to temperature, Spinach by wheat due to pest attack increased by change in temperature and garlic by french bean due to low temperature at the time of sowing. In summer season, cucumber replaced by urd crop, tomato by cabbage, chilli by cow pea and musk melon by urd crop due to high temperature.

Conclusion

It can be concluded from the study that vegetable growers has replaced vegetable crops by others vegetable crops/cereals/pulses and growers knowledge towards the impact of climate variability on vegetable production shows that some of the crops stages were effected by climate variability. Awareness programmes related to climate variability and frequent training programme should be organized at village level by the state agricultural department/state agricultural universities/Krishi Vigyan Kendra/NGO. Information about climate variability should be provide on timely basis so as farmers knowledge will increase and can adopt suitable climate resilient practices to sustain vegetable production and reduces losses from climate variability.

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