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"Assessing the Impact of Climate Change on Agriculture and Allied Activities"

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Abstract

Agriculture and climate change are inextricable. Crop yield, biodiversity, water use, and soil health are directly affected by the impact of climate change. Tropical countries are likely to be more affected compared to temperate countries. The brunt of environmental changes in India is very high due to higher dependence on agriculture. Such a study would contribute towards a better understanding of the intensity and impacts of the climate change. The research study was conducted in Sultanpur district of Uttar Pradesh taking 120 respondents from Lambhua Teshil , Badhiya block. From the study it was observed that 53.33% of respondents solely depend on agriculture. The study revealed that 58.33%, 55.83%, 54.16%, 54.16%, 53.33 % of the respondents observed negative impact on sowing time, spacing, grain yield quantity, straw yield and land preparation respectively. 44.16%, 40.83%, 40.83%, 39.16% felt increasing of number of irrigation, Disease infestation, pesticide use, and insect, pest infestation respectively. 49.16 % observed no effect on disease infestation, number of irrigation and pesticide use.

Introduction

Climate change is one of the biggest environmental issues facing the world today. Climate change refers to any change in climate, whether due to natural variability and/or as a result of human activity (1,2). There are already increasing concern globally regarding climate change that affects the environment and livelihood. Now a days most of the countries are facing the problems of rising temperature, rising sea level, changes in precipitation patterns etc. Climate change effects can be measurable in different degrees, at different times and with a varying intensity depending on the region and sector of the economy. Predicting future impact is therefore difficult but this inherent complexity must not prevent immediate attempts to do so together with an understanding of the magnitude of uncertainty. Agriculture and forestry production will be affected directly by the climate change (3,4). The resources and ecosystem services will also be affected: soil, water, pollination, nutrient cycling, genetic resources and biodiversity. Adaptation strategies should be introduced in response to climate change to reduce negative effects and exploit potential positive ones.

According to the assessment by the EEA, European Commission, OECD, the World Wide Fund for Nature, IUCN, and various UN bodies for Europe, in many regions there is increase in irrigated area and water abstraction for irrigation. In the northern temperate region agro-climatic zones are likely to move northwards as a result of climate change. In the southern areas, current crop areas may be abandoned due to very low availability of water (5,6,7). The impact of climate change on agriculture is severely felt in India. It has been predicted that under the scenario of a 2.5°C to 4.9°C temperature will rise, rice yields will drop by 32%-40% and wheat yields by 41%-52%. This will cause the GDP to fall by 1.8%-3.4%. Understanding on global climate and its change is pre requisite to take appropriate initiatives to combat climate change. The only solution for these huge populations seems to be adequate adaptation strategies.

Materials and Methods

Research methodology refers to the structural configuration of the study for conducting research within the frame work of the objectives. It includes different types of methods, tools, techniques and approaches for any research work. Moreover, research methodology is concerned with the objective verification which requires logical analysis of problems and devising appropriate procedure to obtain evidence.

A research design is defined as the programme that guides the researcher in the process of collecting, analysing and interpreting observations to draw inferences. The present study comes within the preview of survey research mainly to 'Ex-post facto in nature. For the present study I have selected one block from the 8 blocks of Sultanpur district by random sampling method. Then I have selected villages. In the study I have taken the views of 120 farmers who were selected through disproportionate random sampling method from the 3 villages (40 from each village). I have conducted a pilot study and also pre testing of the interview schedule was done taking 10% of the total respondents i.e. 12 number of respondents.

Personal interview and focused group discussion techniques were followed for collection of information. Different statistical tools like percentage, frequency were followed.

Results and Discussion

Socio-economic characteristics of farmers

The socio-personal characteristics are defined on the basis of personal, social, economic characters. Respondents were categorized and their frequency and percentage was calculated for further analysis. From this study it is observed that most of the respondents i.e. 40% belong to middle aged category while 38.33% were old aged and 21.66% were young.

The findings reveal that the majority of respondents 34.16% were high school pass out where 7.5%, 13.33%, 21.66%,23.33% were illiterate, could read and write, primary school pass out and college pass out respectively.

As regards the family type, it has been observed that most of the respondents 56.66% belong to the joint family where 43.33% belong to nuclear family.

From this study it is observed that most of the respondents (45.83%) have 20-40 years of experience while 30% have upto 20% experience and 24.16% have more than 40% experience. Further, the land holding of the farmers reveal that that most of the respondents i.e 60% of the respondents have upto 1 hac of land and 34.16 % and 5.83 % of the respondents have 1-2 hac land and > 2 hac land respectively.

The findings about family income reveal that majority of respondents (40%) have annual income of Rs. 20000-Rs 40000 while 33.33%, 15% and 11.66% have Rs. 40000-60000, >Rs 60000 and below Rs. 20000 respectively.

Characteristics	Category	Frequency	Percentage
Age	Upto 35 years	26	21.67
	36-50 years	48	40
	>50 years	46	38.33
Education	Illiterate	9	7.5
	Read and Write	16	13.33
	Primary School	26	21.67
	High School	41	34.16
	College and Above	28	23.34
Family Type	Nuclear	52	43.33
	Joint	68	56.67
Farming Experince	20 years	36	30
	20-40 years	55	45.84
	>40 years	29	24.16
Land Holding	Upto 1 hac	72	60
	1-2 hac	41	34016
	<2 hac	7	5.84
Annual Income	Upto 20000	14	11.66
	20000-40000	48	40
	40000-60000	40	33.34
	>60000	18	15

Table.1 Distribution of the respondents according to their socio economic characteristics

S.No	Farming Pratices	Effect of Climate Change					
		Positive		Negative		No Effect	
		F	P	F	P	F	P
1.	Soil Fertility	12	10	64	53.33	44	36.6
2.	Crops Grown	15	12.5	45	37.5	60	50
3.	Cropping Pattern	18	15.5	48	40	54	45
4.	Variety Selection	15	12.5	45	37.5	60	50
5.	Land Preparation	12	10	64	53.33	44	36.6
6.	Sowing Time	8	6.66	70	58.33	42	33.33
7.	Spacing	13	18.3	67	55.83	40	81.66
8.	Seed Treatment	10	8.33	12	10	98	65
9.	FYM Application	20	16.66	22	18.33	78	46.66
10.	Use of Chemical Fertilizers	39	32.5	25	20.83	56	65
11.	Time of Application	11	9.16	10	8.33	99	46
12.	Intercultural Operation	40	32.5	32	26.66	48	82
13.	Weed Growth	20	9.15	58	48.33	42	40
14.	Insect, Pect Infestation	47	33.33	10	8.33	63	35
15.	Disease Infestation	49	16.66	12	10	59	52
16.	Pesticide Use	49	39.16	12	10	59	49
17.	No of Irrigations	53	40.83	8	6.66	59	49
18.	Harvesting	23	40.83	48	40	49	49
19.	Grain Yield Quality	10	44.16	60	50	50	40.85
20.	Grain Yield Quantity	5	8.33	65	54.15	50	41.65
21.	Straw Yield	6	5	65	54.16	49	41.65
22.	Storage	22	18.33	22	18.33	76	40.83
23.	Market Price	39	32.5	31	25.83	50	63.33

24.	Overall Health of the Crop	12	10	62	51.66	46	41.66
25.	Shelf life of the Crop	8	6.6	64	53.33	48	38.25
26.	Storage Pests and Diseases	50	41.66	12	10	58	40
27.	Taste of the Produce	7	5.83	69	36.66	44	48.33
28.	Any Other	21	17.6	40	33.33	59	49.16

Table.2 Distribution of respondents according to their view on impact of climate change on agriculture

S.NO	Statement	Agree		Disagree		Cnn't Say	
		F	P	F	P	F	P
1.	Species of some animal and bird has extinct	81	67.5	14	11.67	25	20.83
2.	Scarcity of fodder in the area Behavioural changes and adverse effect on health of livestock	84	70	14	11.67	22	18.33
3.	Behavioural changes and adverse effect on health of livestock Pollutions are increasing	69	57.5	13	10.84	38	31.66
4.	New fish species found and old species have extinct in rivers	66	55	8	6.67	46	38.33
5.	Pollutions are increasing	86	71.67	0	0	34	28.33

Table.3 Distribution of respondents according to their view on impact of climate change on allied activities

Impact of climate change on agriculture

Climate change impact and associated vulnerabilities are of particular to developing countries where large parts of population depend on climate sensitive sectors like agriculture for livelihood. Impact of climate change at local level is difficult to assess due to poor understanding of microclimate. Most of the farming communities cannot classify the concept climate change but are good at describing changes in weather and its impact. Farmers were asked about changes occurred in agriculture and allied activities according to their past experiences as impact of climate change.

From this table it is observed that most of the respondents 71.66% felt that pollutions are increasing due to climate change. 70%, 67.5%, 57.5%, 55% experienced scarcity of fodder, extinction of species, adverse effect on livestock, effect on fishes as the impact of climate change.

In the study area the respondents viewed pollution and scarcity of fodders as most serious impact of climate change. From the table it was observed that majority of farmers 81.66% observed no effect on seed treatment, 58.33%, 55.83%, 54.16%, 54.16%, 53.33 % observed negative impact on sowing time, spacing grain yield quantity, straw yield and land preparation respectively. 44.16%, 40.83%, 40.83%, 39.16% felt increasing of number of irrigation, Disease infestation, pesticide use, and insect, pest infestation respectively. 49.16 % observed no effect on disease infestation, number of irrigation and pesticide use.

Summary and conclusion are as follows; Climate change will bring about changes in weather patterns, river systems, crop yields and impact people. Climate is closely related to human and economic activities including agricultural system. Some changes in climate will affect agriculture through their direct and indirect effects on crops, livestock, fisheries etc. Tropical countries are likely to be affected more as compared to the temperate countries. The brunt of environmental changes is expected to be very high in India due to greater dependence on agriculture, alarming increase in human and livestock population, changing pattern in land

use and socio-economic factors that create a great threat in meeting the food, fibre, fuel and fodder requirement. The findings from the study conclude that there was both positive and negative impact of climate. 58.33%, 55.83%, 54.16%, 54.16%, 53.33 % observed negative impact on sowing time, spacing grain yield quantity, straw yield and land preparation respectively where 18. 44.16%, 40.83%, 40.83%, 39.16% felt increasing of number of irrigation, disease infestation, pesticide use, and insect, pest infestation respectively. In the study area most of the respondents 71.66% felt that pollutions are increasing due to climate change.

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