PERCEPTION OF FARMERS ABOUT CLIMATE CHANGE IN UDAIPURDISTRICTOF RAJASTHAN

ABSTRACT

Climatechangeisasevereenvironmentalissuethathasaglobalimpactonagriculturaloutput. It is critical to investigate farmers' perception about climate change ~~it is~~as one of thestrongestfactorsofchangingfarmers'behaviourtomitigateclimatechangeandtakenecessaryand appropriate actions to assure agricultural output. The present study was undertaken inUdaipur district of Rajasthan in order to identify the perception level of farmers about climatechangerelatedtoWeatherandClimate,AgricultureandLivestockrelatedactivities.A sampleof 120 respondents from two tehsils were taken on the basis of random sampling technique.The study revealed that Change in onset date of monsoon, very high temperature duringsummer season, Occurrence of drier spell heavy, Pest attack on crops, decreases quality ofproducts of crops/fruit plants, Poultry and livestock rearing become difficult and Scarcity offoddercropswerethe importantaspects related tohigherperception of farmers.

Keywords-ClimateChange,Perception,Weather,IPCC

INTRODUCTION

Climate change is one of the biggest challenges facing in the world today. The Inter-governmentalPanelonClimateChange(IPCC)wasestablishedin 1988 bytheWorldMeteorologicalOrganization(WMO)andtheUnitedNationsEnvironmentProgramm ed(UNEP) to assess climate change based on the latest science. Recent climate changes andclimatevariationsarebeginningtohaveeffectsonmanynaturalandhumansystems.AnIPCCSpe cialReportonclimatechange,desertification,landdegradation,sustainablelandmanagement,foods ecurity,andgreenhousegasesfluxesinterrestrialecosystems(IPCC2007).Climate is one of the inputs for agricultural growth and survival of related population. Totalannual crop losses in the world agriculture are mainly due to direct weather impacts. Increasein atmospheric carbon dioxide (CO_2) and other greenhouse gases *viz.*, methane (CH_2), nitrousoxide(N_2O)andChloroFluoroCarbons(CFC)duetofossilfuelburning,rapidindustrializatio n and deforestation create a layer in the atmosphere and prevent the long wave radiation emitted by earth which otherwise would have escaped to space. As a result, theaverage global temperatures are increasing (Aggarwal, 2008). Climate is an important factorofagriculturalproductivity.Thefundamentalroleofagricultureinhumanwelfare,concernhas

been expressed by many organizations and others regarding the potential effects of climatechange on agricultural productivity. Interest of this matter has motivated a substantial body ofresearchonclimatechangeandagricultureoverthepastdecade(AydinalpandCresser,2008).In Asia, agricultural crop yield is expected to decline upto 5 to 30 per cent by 2050s due torisingtemperaturesandthisdeclineinagriculturalyieldwillleadtofoodinsecurity,whichwillbecome the most serious future problem for human beings (Raghuvanshi and Ansari, 2017).Different crops respond differently as the global warming will have a complex impact. Thetropics are more dependent on agriculture as 75 per cent of world population lives in tropicsandtwothirdsofthesepeople'smainoccupationisagriculture.Withlowlevelsoftechnology,widerangeofpests,diseasesandweeds,landdegradation,unequallanddistributionandrapidpopulation growth, any impact on tropical agriculture will affect their livelihood. Rice, wheat,maize, sorghum, soybean and barley are the six major crops in the world grown in 40 per centcroppedarea,andcontributeto55percentofnon-meatcaloriesandover70percentofanimalfeed (Motha 2005). Looking to the above facts, the present study was undertaken with theaimed to identify the perception of farmers about climate change related to agriculture andalliedfields.

METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan with a total of 120respondents selected from two tehsils and eight villages. 15 respondents were selected fromeach village. To identify the adaptation strategies, a schedule was prepared with the help ofagricultureandmeteorologicalexperts.Datawerecollected~~withthehelpof~~through interviewschedule. Face to face interview technique was used for collection of information from theselected respondents. For identifying perception level, frequency and percentage was used tofindoutresultanddiscussion:significantornon-significantdifferencebetweentherespondentsof both tehsils, Z test was applied.

Comment [Ma1]: Adaptation to what? It should be…to identify climate change adaptation ….

RESULTS AND DISCUSSION

Perceptionisthesensoryexperimentoftheworld.Itinvolvesbothrecognizingenvironmental stimuli and actions in response to the stimuli. Through the perceptual process,people gain information about the properties and elements of the environment that are criticaltosurvivalofthem.Perceptionnotonlycreatesourexperienceoftheworldaroundus,itallowsus to act within our environment. The present study was conducted on perception of farmersabout climate change in Udaipur district of Rajasthan. As a response of farmers, its crucial toknow what farmers think about climate change because their perception will influence

theirabilitytoadaptandchangetheirfarmingpractices.Inthiscontext,theinformationwithregard toperceptionoffarmersaboutweatherchange,agricultureandanimalproductionarecollectedandpresented in subsequenttables.

Perceptionoffarmersabout effectonweather duetoclimatechange

To know the perception of farmers about weather and climate change, an interviewschedule was developed consisting ten statements. The data were recorded regarding weatherandclimatechangeand presented in Table1.

Table1indicatesthattheperceptionofcentpercentofrespondentswasreportedaboutthe aspect namely change in onset date of monsoon and accorded the first priority by thefarmers.Thiswasfollowedbytheveryhightemperatureduringsummerseason,occurrenceofmore dry spell, fluctuation in temperature during winter, number of rainy days has decreased,changeinwithdrawalofmonsoonandunevenrainfallduetoclimatechangeinwhichthehighperception was observed among the 98.33, 97.50, 95.83, 90.83, 81.66 and 78.33 per centrespondents,respectively.

Comment [Ma2]: Could be presented in much better ways. I advise the author to read more articles on the same topic to familiarize with how facts are presented in journal articles.

Analysis of table further reveals that numbers of heavy showers decreased, duration ofsummer season is prolonged and increase in cyclonic effect were the aspects of weather andclimatechange,whichgottheperceptionby65.00,44.16and35.83percentfarmersofUdaipurdistrict.Almostalltheaspects ofweatherandclimatechangemoreorless samepriorities wasgivenby therespondentsofboth thetehsils in respectof their perception.

Table1:Perceptionoffarmersabout effectonweatherduetoclimatechange

n= 120

S.No.	Statements	Girwatehsil		Kotratehsil		Total		Z Value
		f	%	f	%	f	%	
1.	Changeinonsetdateofmonsoon	60	100	60	100	120	100	2.12*
2.	Numberofrainydayshasdecreased	59	98.33	50	83.33	109	90.83	
3.	Uneven rainfall due toclimatechange	39	65	55	91.66	94	78.33	

4.	Occurrenceofmoredryspell	58	96.66	59	98.33	117	97.50	
5.	Numberofheavyshowersdecreased	33	55	45	75	78	65.00	
6.	Change in date ofwithdrawalofmonsoon	42	70	56	93.33	98	81.66	
7.	Very high temperatureduringsummer season	58	96.66	60	100	118	98.33	
8.	Fluctuationintemperatureduringwinter	55	91.66	60	100	115	95.83	
9.	Durationofsummerseasonisprolonged	28	46.66	25	41.66	53	44.16	
10.	Increaseincycloniceffect	28	46.66	15	25	43	35.83	

f=frequency,%=percent,*Significantat0.05level

Further analysis of Table 1 reveals that calculated 'Z' value (2.12) was found to bemorethanitstabulatedvalueat5percentlevelofsignificance.Therefore,therewassignificantdifference between the perception level of respondents of both the tehsils about weather andclimatechange.

These results are similar with IPCC report released in 2007 in which reported that thetemperature have increased as compared to previous years, the rainfall amount has decreasedas compared to previous years, dry spells during rainy season have increased, total number ofrainy days has decreased and the rainfall has become unexpected and irregular. Krishna *et al.*(2011) also reported that more than 80.00 per cent of the respondents perceived rainfallvariability with untimely, late monsoon start, no winter rain, and high intensity with shortperiods. Furthermore, they have been experiencing an unpredictable rainfall pattern over thepast 10 years. Escarcha*et al.* (2018) who found that almost all the farmers observed both thefrequency and severity of extreme event such as heat, floods, typhoons and drought hadincreased,reflecting the actual trends inperception and temperaturerecorded.

Perceptionoffarmersabouteffectonagricultureduetoclimatechange

Tomeasuretheeffectofclimatechangeonagriculture,twelvestatementsweredeveloped. The frequency and percentage of each statement was calculated and the results ofthesame havebeen given in the Table2.

Table2: Effectof climatechangeon agriculture

n= 120

S.No.	Statements	Griwa Tehsil		Kotra tehsil		Total		Z Value
		f	%	f	%	f	%	
1.	Croppingpatternchanged	32	53.33	30	50	62	51.66	
2.	Droppingofflowersinfruit crops due to increased temperature	44	73.33	46	76.66	90	75.00	
3.	Pestattackismore	56	93.33	59	98.33	115	95.83	
4.	Moreoccurrenceof diseases	54	90.00	55	91.66	109	90.83	
5.	Number of irrigations isincreased	38	63.33	56	93.33	94	78.33	
6.	Wind speed affects thepollinationin fruit crops	28	46.66	15	25	43	35.83	**1.16^{NS}**
7.	Productionofvariouscropsisr educing	56	93.33	58	96.66	114	95.00	
8.	Traditionalvarietiesofcropsar egetting extinct	40	66.66	37	61.66	77	64.16	
9.	Ripeningtimeofcrops/fruitsar echanged	46	76.66	49	81.66	95	79.16	

10.	Decreasesqualityofproductso fcrops/fruit plants	54	90	57	95	111	92.50	
11.	Effectonnaturalvegetation	51	85	45	96	80	66.66	

12.	Heavyrainaffectsthegrainformationin cereals	27	45	23	38.33	50	41.66	

f=frequency,%= per centNS= Non-Significant

Table 2 reveals that pest attack is more (95.83%), production of various crops isreducing(95.00%),decreasesqualityofproductsofcrops/fruitplants(92.50%),moreoccurrence of diseases (90.83%), ripening time of crops/fruits are changed (79.16%) andnumber of irrigations is increased (78.33%), were the statements which are highly perceivedduetoseverechangeofclimatechangeinthestudyarea.Whereas,effectonnaturalvegetation,traditional varieties of crops are getting extinct, cropping pattern changed, heavy rain affectsthe grain formation in cereals and wind speed affects the pollination in fruit crops were alsoaffected due to climate change as reported by 66.66, 64.16, 51.66, 41.66 and 35.83 per centfarmers, respectively.

From the above discussion, it can be concluded that cropping pattern, more insect-pestand disease attack, change in natural vegetation, changes in ripening of crops, quality ofproduceofcropsandfruit plantswereadverselyaffecteddueto climatechange.

FurtheranalysisofTable2revealsthatcalculated"Z"value(1.16)wasfoundtobelessthan its tabulated value at 5 per cent level of significance Therefore, there was no significantdifference of perception level of respondents about agriculture between the respondent ofGirwaandKotratehsils.

These results are similar with the findings of Chand and kumar (2018) who reportedthat the majority of farmers were aware about climate change and its negative impact onagriculture and considered climate change as a silent risk to their future livelihood. SimilarfindingsalsoreportedbyKrishna*etal.*(2011), Williams *etal.*(2015)andKabir*etal.*(2016).

Perceptionoffarmersaboutchangeinanimalproductionduetoclimatechange

To measure the effect of climate change on animal production, eighteen statementsweredeveloped.Thefrequencyandparentageofeachstatementwerecalculatedandresultsofthesame havebeen presented in Table3.

Table3Effectof climatechangeon animalproduction

n=120

S. No.	Statements	GirwaTehsil		Kotratehsil		Total		
		f	%	f	%	f	%	Z Value
1.	Poultry and livestockrearing becomedifficult	55	91.66	57	95	112	93.33	
2.	Mostoftheanimalspeciesgettingdistinct	43	71.66	44	73.33	87	72.50	
3.	Scarcityoffoddercrops	53	88.33	59	98.33	112	93.33	
4.	Habitsofanimalsandbirdsare changing	20	33.33	38	63.33	58	48.33	
5.	Healthoffarmanimalsareaffected	53	88.33	57	95	110	91.66	
6.	Deathrateoflivestockisincreasing	43	71.66	44	73.33	87	72.50	
7.	Effectonpubertyofanimals	49	81.66	37	61.99	86	71.66	
8.	Decreaseinproductionofanimals	52	86.66	56	93.33	108	90.00	**1.72^{NS}**
9.	Effectonthinnessofeggshallin poultry	42	70	30	50	72	60.00	
10.	Effect on breeding ofanimals	38	63.33	40	66.66	78	65.00	
11.	Diseasesandinjuriesduetoheatwaves	52	86.66	38	63.33	90	75.00	
12.	Increasedmalnutritionalinanimals	55	91.66	58	96.66	113	94.16	

13.	Highmortalityinpoultrybirds	51	85	57	95	108	90.00	
14.	NasalDiseaseddueto AirPollution	25	41.66	18	30	43	35.83	

15.	Brucellosisinanimals	36	60	16	26	52	43.33	
16.	Metabolic disruption inanimals	36	60	20	33.33	56	46.66	
17.	Effectonimmunesystem	48	80	50	83.33	98	81.66	
18.	Lamenessinpoultry	41	68.33	55	91.66	96	80.00	

f=frequency,%=per cent NS=Non-Significant

Table 3 reveals that increased malnutritional in animals was perceived at highest levelby 94.16 per cent respondents due to climate change. This was followed by poultry andlivestock rearing become difficult and scarcity of fodder crops, which were given secondpriorityby the 93.33 percent farmers forboth thestatements.

Analysis of table clearly indicates that health of farm animals are affected (91.16 %),high mortality in poultry birds (90.00 %), decrease in production of animals (90.00 %), effectonimmunesystem((81.66%),lamenessinpoultry(80.00%),diseasesandinjuriesduetoheatwaves (75.00%), death rate of livestock is increasing (72.50 %), most of the animal speciesgetting distinct (72.5%), effect on puberty of animals (71.65%) and effect on breeding ofanimals(65.00%)werealsoconsideredimportantaspectsbytherespondents.Whereas,effecton thinness of egg shall in poultry, habits of animals and birds are changing, metabolicdisruption in animals, brucellosis in animals and nasal diseased due to Air Pollution were thestatements perceived by 60.00, 48.33, 46.66, 43.33, and 35.83 per cent respondents. Thesestatements were comparatively less affected due to climate change. The probable reason ofthese findings may be due to majority of respondents choose crop-livestock diversification tomitigatetheeffect of climatechange.

Further analysis of Table 3 reveal that calculated Z value (1.72) was found to be lessthan its tabulated value at 5 per cent level of significance. Therefore, there is no significantdifference of perception level between the respondents of Girwa and Kotra tehsils. It meansthefarmershavesimilarperceptionabouteffectonlivestockproductionduetoclimatechangeinUdaipur district of Rajasthan.

TheseresultsaresimilarwiththefindingsofSejian*etal.*(2012)whofoundthathighertemperature, potentially caused by greenhouse gases, would likely result in a decline in dairyproduction,reducedanimalweightgain,reproduction,andlowerfeed-conversionefficiencyinwarmregions.Incidenceofdiseasesamonglivestockandotheranimalsareli

kelytobeaffected

byclimatechange.Sincemostofthediseasesaretransmittedbyvectorssuchasticksandflies(development stages of ticks and flies are often dependent on ambient temperature). Cattle,goat,horses,andsheepparealsovulnerabletoanextensiverangeofnematodeworminfections, mostof whichhavetheirdevelopmentstages influencedbyclimatic conditions.

CONCLUSION

Fromtheabovediscussionitcanbeconcludedthattheweather,agricultureandanimalproductionwereadversely affected duetoclimatechangein Udaipur districtof Rajasthan.

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