A STUDY ON CLIMATE CHANGES IN AGRICULTURE IN SALEM DISTRICT

BHARATH R[1], SUDARSAN BABU S[2]

[1]Assistant Professor, Department of MBA, Paavai Engineering College,Namakkal, Tamilnadu,

[2]PG Student, Department of MBA, Paavai Engineering College,Namakkal Tamilnadu, India

ABSTRACT

An analysis of climate change impacts on the level of agricultural production is presented based on long-term experimental data on yields of crops grown in different soils and climatic zones. Mathematical models combining available data on the biology of agricultural crops and their response to climatic conditions have been used. A new approach and classification of micro-climate geo-complexes was developed. Agricultural production was found to be highly sensitive to micro-climatic variations. The proposed approach permits more objective use of meteorological data in changing climatic conditions. Shifts in agroclimate were established using this modelling approach. The sums of degree-days, particularly above 0 and 5°C, have significantly risen during the period 2000- 2020. The development of potato varieties adapted to a changing climate is possible. A strategy for adaptation of agriculture to climate change is presented.

1. INTRODUCTION

A consistent shift in the weather scenario of any specific region over a long period of time is termed as climate change. It includes many variables like temperature, rainfall, rates of evaporation, wet day frequency etc. The Brunt and Report states that Climate Change was identified as a crucial problem bearing on our survival long back (World Commission on Environment and Development, 1987).According to the Fourth Assessment Report (FAR) of the Intergovernmental Panel on Climate Change (IPCC, 2007) large scale variations in average temperatures and precipitation in coming decades will have a significant impact on ecosystems, related livelihood options and overall human well being. Agriculture as a managed ecosystem gets affected by climate-change most significantly. Productivity, crop duration and even selection of crops to be grown in a region depend upon temperature coupled with duration and spatial distribution of rainfall. Hence, changes in average climatic conditions along with occurrence of extreme climatic events will have significant impacts on the agricultural sector with in its turn may have critical implications on the issue of food security.

2.METHODOLOGY

According to industrial research institute in research methodology, research always tries to search the given question systematically in our own way and find out all the answers till conclusion. For finding or exploring research questions, a researcher faces lot of problems that can be effectively resolved with using correct research methodology.

2.1 Sample size

The sample size in the study is 90.

2.2 Statistical tools

- Simple percentage method
- Chi-square test

PERCENTAGE METHOD

This method is used to compare two or more series of data, to describe the relationship or the distribution of two or more series of data. Percentage analysis test is done to find out the percentage of the response of the response of the respondent. In this tool various percentage are identified in the analysis and they are presented by the way of Bar Diagrams to have better understanding of the analysis.

$$\text{Percentage} = \frac{\text{No. of Respondents}}{\text{Total no. of Respondents}} \times 100$$

CHI-SQUARE TEST

It is one of the simplest and widely used non-parametric test in statistical work. The quantity chi-square describes the magnitude of the discrepancy between theory and observation.

$$\text{Chi} - \text{Square} = \frac{\sum (oi - Ei)2}{Ei}$$

Oi = Observed frequency,

Ei = Expected frequency

In general, the expected frequency for any can be calculated from the following equations

$$E = \frac{RT \times CT}{N}$$

E = Expected frequency, CT = Column total,

RT = Row total, N = Total number of observations.

3.DATA ANALYSIS AND

INTERPRETATION

1) GENDER OF THE RESPONDENTS

TABLE NO - 3.1

GENDER OF THE RESPONDENTS

Sources: Primary data

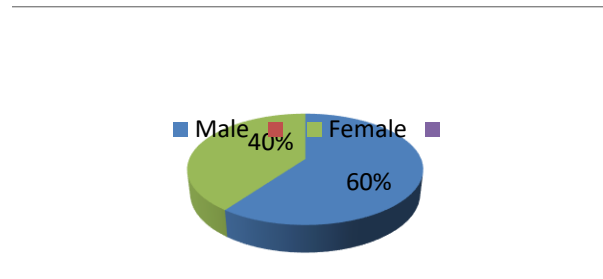| GENDER	NO OF RESPONDENTS	PERCENTAGE
Male	54	60
Female	36	40
Total	**90**	**100%**

INTERPRETATION

The above table shows that 60% of the respondents are male and remaining 40% of the respondents are female.

Majority 60% of the respondents are male.

CHART NO - 3.1

GENDER OF THE RESPONDENTS

2) AGE GROUP OF THE RESPONDENTS

TABLE NO - 3.2

AGE GROUP OF THE RESPONDENTS

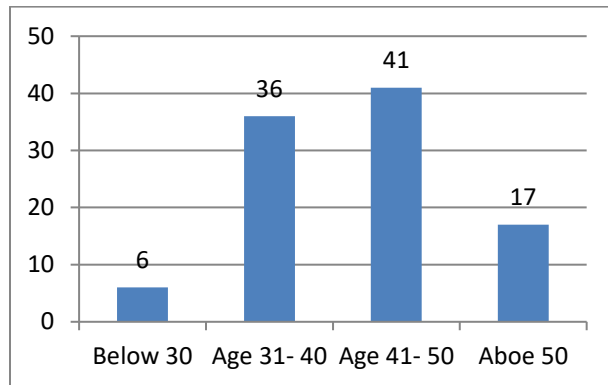| AGE	NO OF RESPONDENTS	PERCENTAGE
Below-30	05	6
Age 30-40	33	36
Age 40-50	37	41
Above- 50	15	17
Total	**90**	**100%**

Sources: Primary data

INTERPRETATION

From the above table, it is inferred that 6% of the respondent are below 30,36% of the respondents are in age between 31-40, and 41% of the respondents are in age between 41-50 and 17% of the respondents are in the age above 50.

Majority 41% of the respondents are in age between 40-50.

CHART NO - 3.2

AGE GROUP OF THE RESPONDENTS

CHART NO - 3.3

MARITAL STATUS OF RESPONDENTS

4) EDUCATION OF THE RESPONDENTS

3)MARITAL STATUS OF RESPONDENTS

TABLE NO - 3.3

MARITAL STATUS OF RESPONDENTS

Sources: Primary data

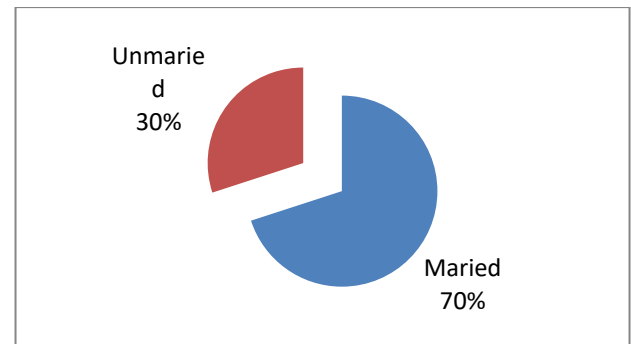| CATEGORY	RESPONDENTS	PERCNTAGE
Married	63	70
Unmarried	27	30
Total	**90**	**100%**

INTERPRETATION

From the above table of the respondents, 70% of respondents are married and 30% of respondents are unmarried.

Majority 70% of the respondents are married.

TABLE NO - 3.4

EDUCATION OF THE RESPONDENTS

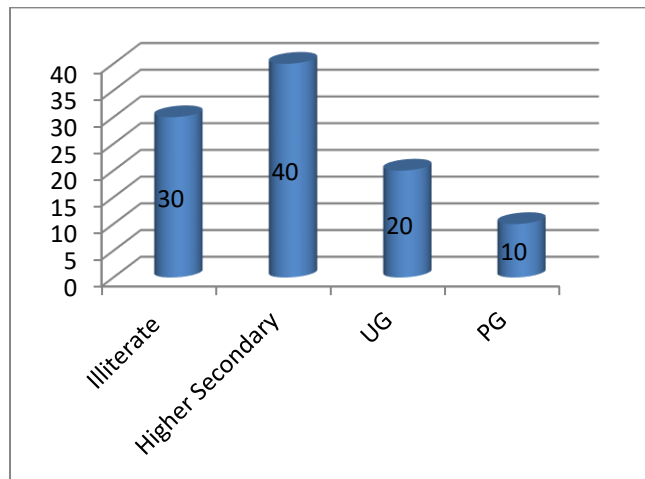| CATEGORY	RESPONDENTS	PERCNTAGE
Illiterate	27	30
Higher secondary	36	40
UG	18	20
PG	09	10
Total	**90**	**100%**

Sources: Primary data

INTERPRETATION

From the above table of the respondents, 30% of the respondents are illiterate, 40% of respondents are higher secondary level, 20% of respondents are under graduate level, 10% of respondents are post graduate level.

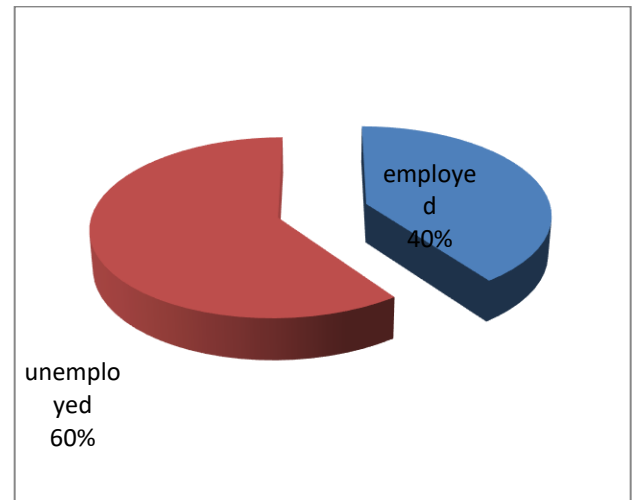Majority 40% of the respondents are higher secondary.

CHART NO - 3.4

EDUCATION OF THE RESPONDENTS

CHART NO - 3.5

OCCUPATION TYPE OF RESPONDENTS

5) OCCUPATION TYPE OF RESPONDENTS

TABLE NO - 3.5

OCCUPATION TYPE OF RESPONDENTS

Sources: Primary data

CATEGORY	RESPONDENTS	PERCNTAGE
Employed	36	40
Unemployed	54	60
Total	**90**	**100%**

INTERPRETATION

From the above table of the respondents, 40% of the respondents are employed and 60% of the respondents are unemployed.

Majority of the respondents are unemployed is 60%.

6) ACCEPTANCE OF CLIMATE CHANGES

CATEGORY	RESPONDENTS	PERCNTAGE
YES	45	50
NO	45	50
Total	**90**	**100%**

TABLE NO - 3.6

ACCEPTANCE OF CLIMATE CHANGES

Sources: Primary data

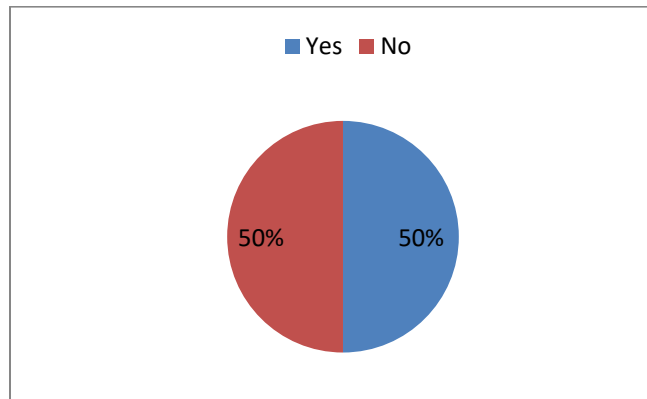### INTERPRETATION

From the above table of respondents, 50% of respondents are YES and 50% of respondents are NO.

Majority of the respondents Both Are EQUAL.

CHART NO - 3.6

ACCEPTANCE OF CLIMATE CHANGES

CHART NO - 3.7

CLIMATE CHANGE TO YOU PERSONALLY

7)CLIMATE CHANGE TO YOU PERSONALLY

TABLE NO - 3.7

CLIMATE CHANGE TO YOU PERSONALLY

CATEGORY	RESPONDENTS	PERCNTAGE
YES	75	83
NO	15	17
Total	90	100%

Sources: Primary data

INTERPRETATION

From the above table of the respondents, 52% of respondents are very important, 28% of respondents are quite important, 11% of respondents are not important and 8% of respondents are none.

Majority of the respondents are very important is 52%.

8) CLIMATE PROBLEMS TACKLE BY THE RESPONDENTS

TABLE NO - 3.8

CATEGORY	RESPONDENTS	PERCNTAGE
very important	47	52
Quite important	25	28
Not important	10	11
None	08	9
Total	90	100%

CLIMATE PROBLEMS TACKLE BY THE RESPONDENTS
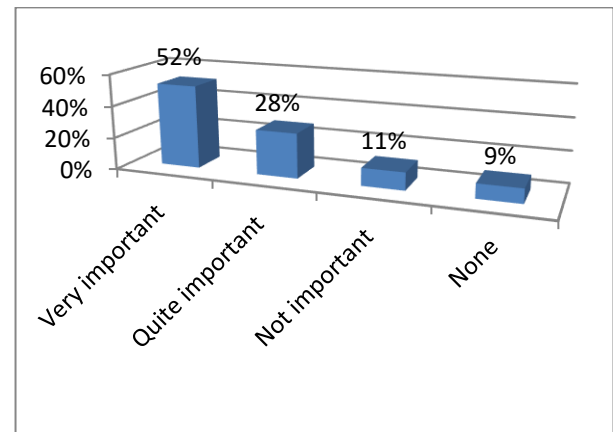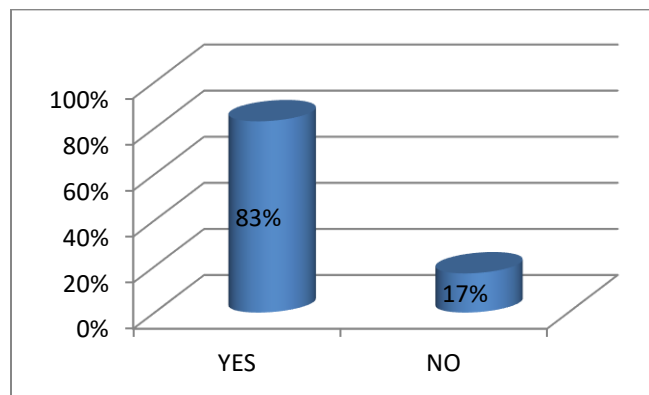
Sources: Primary data

INTERPRETATION

From the above table of the respondents, 83% of the respondents are YES and 17% of the respondents are NO.

Majority of the respondents are YES is 83%.

CHART NO - 3.8

CLIMATE PROBLEMS TACKLE BY THE RESPONDENTS

9) CLIMATE CHANGE IS SOMETHING THAT FRIGHTENS

TABLE NO - 3.9

CATEGORY	RESPONDENTS	PERCNTAGE
YES	72	80
NO	18	20
Total	**90**	**100%**

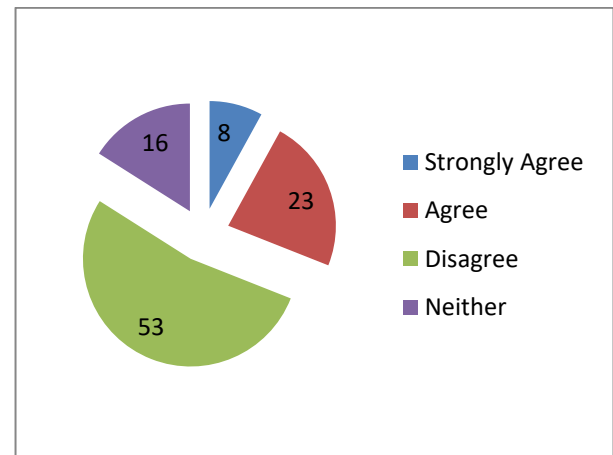CLIMATE CHANGE IS SOMETHING THAT FRIGHTENS

Sources: Primary data

INTERPRETATION

From the above table of the respondents, 8% of the respondents are agree, 23% of the respondents are strongly agree, 53% of the respondents are disagree and 16% of the respondents are neither.

Majority of the respondents are disagree is 53%.

CHART NO - 3.9

CLIMATE CHANGE IS SOMETHING THAT FRIGHTENS

10) CLIMATE CHANGE IS A REAL PROBLEM OF THE RESPONDENT

TABLE NO - 3.10

CLIMATE CHANGE IS A REAL PROBLEM OF THE RESPONDENT

Sources: Primary data

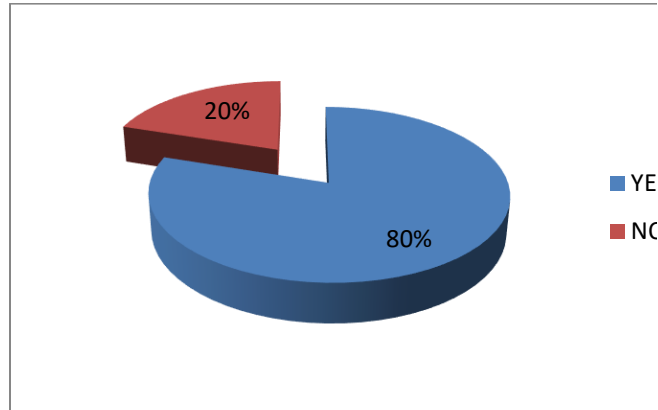| CATEGORY	RESPONDENTS	PERCNTAGE
AGREE	07	8
STRONGLY AGREE	21	23
DISAGREE	48	53
NEITHER	14	16
Total	**90**	**100%**

INTERPRETATION

From the above table of the respondents, 80% of the respondents are YES and 20% of the respondents are NO.

Majority of the respondents are YES is 80%.

CHART NO - 3.10

CLIMATE CHANGE IS A REAL PROBLEM OF THE RESPONDENT

CHART NO - 3.11

GOVERNMENT IS NOT DOING ENOUGH TO TACKLE CLIMATE CHANGE IN RAIN SEASON

11) GOVERNMENT IS NOT DOING ENOUGH TO TACKLE CLIMATE CHANGE IN RAIN SEASON

TABLE NO - 3.11

CATEGORY	RESPONDENTS	PERCNTAGE
YES	81	90
NO	09	10
Total	**90**	**100%**

GOVERNMENT IS NOT DOING ENOUGH TO TACKLE CLIMATE CHANGE IN RAIN SEASON

Sources: Primary data
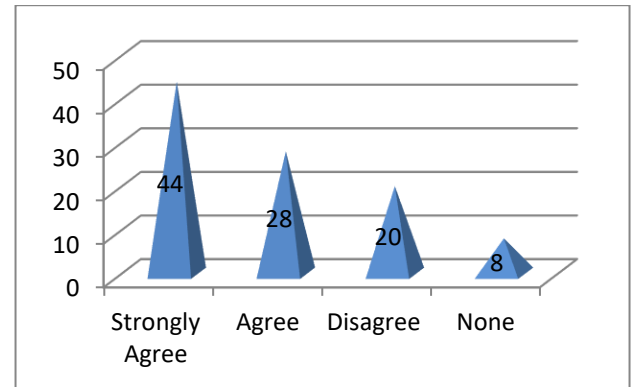
INTERPRETATION

From the above table of the respondents, 44% of the respondents are strongly agree, 28% of the respondents are agree, 20% of the respondents are disagree and 8% of the respondents are none.

Majority of the respondents are strongly agree is 44%.

12) EXPERTS ARE AGREED THAT CLIMATE CHANGE IS A REAL PROBLEM IN SUMMER

TABLE NO - 3.10

EXPERTS ARE AGREED THAT CLIMATE CHANGE IS A REAL PROBLEM IN SUMMER

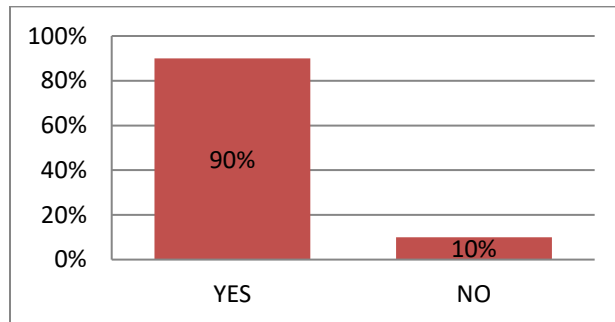| CATEGORY	RESPONDENTS	PERCNTAGE
Strongly agree	40	44
Agree	25	28
Disagree	18	20
None	07	8
Total	**90**	**100%**

Sources: Primary data

INTERPRETATION

From the above table of the respondents, 90% of the respondents are YES and 10% of the respondents are NO.

Majority of the respondents are YES is 90%.

CHART NO - 3.12

EXPERTS ARE AGREED THAT CLIMATE CHANGE IS A REAL PROBLEM IN SUMMER

13)EVIDENCE FOR CLIMATE CHANGE IS UNRELIABLE

TABLE NO - 3.13

CATEGORY	RESPONDENTS	PERCNTAGE
Below Rs. 50,000	12	13
Rs. 50,000 to 1,00,000	51	57
Rs.1,00,000 to 3,00,000	20	22
Above 3,00,000	7	8
Total	**90**	**100%**

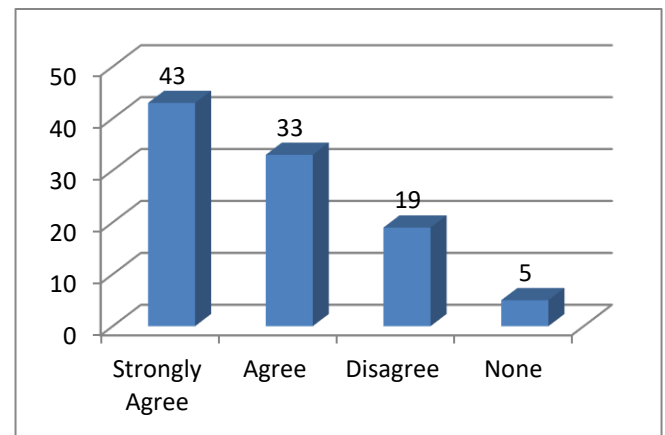**EVIDENCE FOR CLIMATE CHANGE IS UNRELIABLE**

   Sources: Primary data

INTERPRETATION

From the above table of the respondents, 43% of the respondents are strongly agree, 33% of the respondents are agree, 19% of the respondents are disagree and 5% of the respondents are none.

Majority of the respondents are strongly agree is 43%.

CHART NO - 3.13

EVIDENCE FOR CLIMATE CHANGE IS UNRELIABLE

14)ANNUAL INCOME LEVEL OF THE RESPONDENTS

TABLE NO - 3.14

CATEGORY	RESPONDENTS	PERCNTAGE
Strongly agree	39	43
Agree	30	33
Disagree	17	19
None	04	5
Total	**90**	**100%**

ANNUAL INCOME LEVEL OF THE RESPONDENTS

Sources: Primary data

INTERPRETATION

From the above table of the respondents, 13% of the respondents are below 50,000, 57% of the respondents are between Rs. 50,000 to 1,00,000, 22% of the respondents are between Rs. 1,00,000 to 3,00,000 and 8% of the respondents are above 3,00,000.
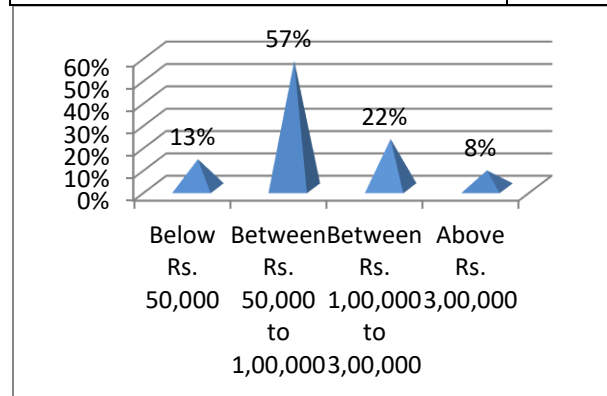
 Majority 57% of the respondents are between Rs. 50,000 to 1,00,000.

CHART NO - 3.14

ANNUAL INCOME LEVEL OF THE RESPONDENTS

Particulars	Observed Frequency	Expected Frequency	$(O-E)^2$	$\dfrac{(O-E)^2}{E}$
R1 C1	29	24.3	22.09	0.91
R1 C2	1	5.7	4.41	0.15
R2 C1	28	30.1	1	0.08
$R_2 C_2$	9	7	2.89	0.51
$R_3 C_1$	12	13	22.09	3.88
$R_3 C_2$	4	5.7	4	0.57
$R_4 C_1$	4	3.02	0.97	0.32
R4 C2	3	1.3	2.89	2.22
Calculated value				8.64

15) RELATIONSHIP BETWEEN RECENT FLOODS IN THIS COUNTRY AT DUE TO CLIMATE CHANGES AND POLLUTION FROM INDUSTRY IS THE MAIN CAUSE OF CLIMATE CHANGE

RECENT FLOODS IN THIS COUNTRY AT DUE TO CLIMATE CHANGES / POLLUTION FROM INDUSTRY IS THE MAIN CAUSE OF CLIMATE CHANGE	YES	NO	TOTAL
STRONGLY AGREE	29	1	30
AGREE	28	9	37
NEUTRAL	12	4	16
DISAGREE	4	3	7
TOTAL	73	17	**90**

Source: Primary Data

NULL HYPOTHESIS

H_0: There is no significant relationship between recent floods in this country at due to climate changes and pollution from industry is the main cause of climate change.

ALTERNATIVE HYPOTHESIS

H_1: There is a significant relationship between recent floods in this country at due to climate changes and pollution from industry is the main cause of climate change.

TABLE NO - 3.15

CHI SQUARE TEST

Degree of freedom   : (r-1)(c-1)= (4-1)(2-1)=3

Level of significance : 5%

Table value   : 7.815

Calculated value   : 8.64

RESULT

Since the calculated value is higher than the table value. So, we accept the alternative hypothesis. There is relationship between recent floods in this country at due to climate changes and pollution from industry is the main cause of climate change.

4. RESULTS AND DISCUSSION

4.1 FINDINGS

- ➢ Majority of the respondents are male in the study under topic of a climate changes in agriculture.
- ➢ Majority of the respondents are in age between 41-50 is 41%.
- ➢ Majority of the respondents are married is 70%.
- ➢ Majority of the respondents are higher secondary is 40%.
- ➢ Majority of the respondents are unemployed is 60%.
- ➢ Majority of the respondents are both EQUAL.
- ➢ Majority of the respondents are very important is 52%.
- ➢ Majority of the respondents are YES is 83%.
- ➢ Majority of the respondents are disagree is 53%.
- ➢ Majority of the respondents are YES is 80%.
- ➢ Majority of the respondents are strongly agree is 44%.
- ➢ Majority of the respondents are YES is 90%.
- ➢ Majority of the respondents are strongly agree is 43%.
- ➢ Majority of the respondents are between Rs. 50,000 to 1,00,000 is 57%.

4.2 SUGGESTIONS

- ➢ Increase in global temperatures will cause an increase in evaporation rates and annual evaporation levels.
- ➢ Increased evaporation will lead to an increase in storms in some areas, while leading to accelerated drying of other areas.
- ➢ These storm impacted areas will likely experience increased levels of precipitation and increased flood risks, while areas outside of the storm track will experience less precipitation and increased risk of droughts.
- ➢ Water stress affects plant development and quality in a variety of ways first off drought can cause poor germination and impaired seedling development in plants
- ➢ At the same time plant growth relies on cellular division, cell enlargement, and differentiation.
- ➢ Drought stress impairs mitosis and cell elongation via loss of turgor pressure which results in poor growth.
- ➢ Development of leaves is also dependent upon turgor pressure, concentration of nutrients, and carbon assimilates all of which are reduced by drought conditions, thus drought stress lead to a decrease in leaf size and number.
- ➢ Plant height, biomass, leaf size and stem girth has been shown to decrease in Maize under water limiting conditions.
- ➢ Yield is also negatively affected by drought stress, the reduction in crop yield .

4.3 CONCLUSION

Climate change, its causes and impacts are one of the most emerging issues in science and technology domain. India, a tropical country, is facing its impacts through droughts, floods, cyclones, heat waves, hailstorms, and coastal salinity which have become threats to sustainable development. About 70 per cent of the Indian population is directly or indirectly associated with agriculture and sub-sectors, and major Sustainability Development Goals (SDGs) are expected to be met from this sector. Increasing global temperature due to the emission of enormous amount of green-house gases from various sources is the cause of climate change and impacts. Extreme temperature and its erratic events disrupt the activities of all the existing lives on the planet by means of severe damage or loss. Assessment of the impacts and a comprehensive understanding of the benefits of adaptation options over combating the uncommon incidents of climate change is pivotal in the current scenario to sustain life. So far in the journey of Indian agriculture sector, climate adaptation strategies have shown positive impacts. Still much more needed in the light of emerging .

5. REFERENCES

- Brown, N.C., Downey, D.M. and T.R. Benzing. 2007. Shenandoah River Fish Kills: Effects of Water Temperature and Discharge During Spawning Periods. Abstract of presentation at the Virginia and North Carolina Chapters of The American Fisheries Society 2007 Meeting, February, 2007, Danville VA.

- Council for Agricultural Science and Technology (CAST). 2004. Climate Change and Greenhouse Gas Mitigation: Challenges and Opportunities for Agriculture. Ames, Iowa: CAST, 120 p.

- Environment Maryland Research and Policy Center. 2007. A Blueprint for Action, Policy Options to Reduce Maryland's Contribution to Global Warming. June 2007.

- Environmental Protection Agency. 1998. Climate Change and Maryland, Office of Policy, September 1998.

- Hilton, T. W., and R.G. Najjar. 2005. Long-term trends in Chesapeake Bay salinity. Abstract of presentation at the 2005 Estuarine Research Federation Meeting. Norfolk, VA.

- U. S. Environmental Protection Agency. How will climate change affect the Mid-Atlantic Region? EPA/903/F-00/002, Region 3, Philadelphia, PA 19103 June 2001

- West, T.O. and G. Marland. 2002. A synthesis of carbon sequestration, carbon emissions, and net carbon flux in agriculture: comparing tillage practices in the United States. Agricultural Ecosystems and Environment 91:217-232.