



## CLIMATE CHANGE IN RAIN FED RURAL CONTEXT OF MADURAI DISTRICT

### KEYWORDS

Climate change, Rain fed agriculture, implications of climate change

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**ABSTRACT** *The climate change is happening slowly in earth. It impacts on agriculture and other activities. But the people are not bothering about the mitigation or controlling of climate change. So the implication is increasing every year. In this context the study was conducted with the objective of elicit the people perception on climate change and implication of climate change in agriculture. The study was conducted in rural context of Madurai district. The farmers felt that due to climate change the rainfall is decreased, wind is decreased and temperature has been increased. The irrigation facilities and vegetations were decreased due to the climate change. Finally the agriculture is become non profitable livelihood. To cope up with climate change the farmers adapting coping mechanism like mixed cropping, tank silt application, sale of livestock and migration.*

### Introduction

Climate is the average weather, including seasonal extremes and variations, either locally, regionally, or across the globe. Climate changes caused by human activities, most importantly the burning of fossil fuels (coal, oil, and natural gas) and deforestation, are superimposed on, and to some extent masked by, natural climate fluctuations. Natural changes in climate result from interactions such as those between the atmosphere and ocean, referred to as internal factors, and from external causes, such as variations in the sun's energy output and in the amount of material injected into the upper atmosphere by explosive volcanic eruptions.

The climate change is happening slowly in earth. It impacts on agriculture and other activities. But the people are not bothering about the mitigation or controlling of climate change. So the impact is increasing every year. Due to this the agriculture is heavily affected and the production is also decreased. Various changes have occurred in agriculture. But the people to not know this is due to climate change. The people are also not aware on adaptation strategies. It is a time for people to know identify the climate change adaptation strategies otherwise the agriculture will be destroyed.

### Objectives

To study the economic changes of rain fed farming family  
To assess the people perception on climate change  
To explore implications of climate change in agriculture

### Materials and methods

This study has been conducted to assess the people perception on climate change and the vulnerability condition of people. Madurai is one of the important districts in the Tamilnadu state so; Madurai district is taken as a sample for this study. In Madurai district T.Kallupatii block is rain fed agriculture area so this block has been selected. In this block randomly these three villages Panchayats were selected such as Salichandai, P.Ammappatti and Kilankulam. There are seven hamlets in these village panchayats.

The data collection was focused on two methodologies. To get the qualitative data the Participatory rural Appraisal (PRA) methodology was followed. All the PRA techniques

like social mapping, resource mapping, vulnerability mapping were conducted to collect the data. To get the quantitative data 30 percent (281) of farmers were selected based on simple random sampling method. The interview schedule was prepared and data were collected from the 30 percent of respondents.

### Economic changes of farmers

Studying the farmer's economic changes is necessary because the economy is an important criterion to assess the development of any people. In this objective the change of housing pattern, changes of land holding is assessed.

### Changes of housing pattern

Past 30 years before there was 65 percent of hut and last ten years before it is reduced as 27 percent. Presently the hut is only 2 percent. Due to the economic development the farmers were changed their house from hut to tile so the tiled house is increased from 34 percent to 70 percent in last ten years back. Presently the tiled house is 21 percent. Last 30 years back the cement house was only one percent but it is tremendously increased as 77 percent at present. Basically the hut is adaptive for high temperature but the hut is too less. The tiled house is not suitable for the living in high temperature so it is good that presently it is decreased as 21 percent. This change is occurred in last 10 years only so it may due to the high temperature.

Because of mosquito problem people are not able to sleep outside the home (open air) during the summer now-a-days. Hence majority of the houses are converted to cement structure without fan (electricity) sleeping is very difficult for children during summer. Power supply is highly fluctuating and shut down is the very big problem in villages now.

### Land holding

The average land holding size of the farmer is 4.28 acres. It shows majority of the farmers are marginal and small land holding farmers. Out of 755 families, 124 families are landless (16.40 percent). The remaining 631 families have lands ranging from one to eight acres. 89 farmers (14.10 percent) are having land more than 5 acres and remaining 542 farmers (85.90 percent) are small and marginal farmers.

**Table -1: Comparison of size of land holding**

Villages	Present (in acres)	Past (10yrs.)	Past (30yrs.)
Thambipatti	37.35	54	85
Avarampatti	43	50.78	88.75
Kilangulam	42.05	45.55	81
Sokkampatti	22.75	26	59
Chatrapatti	24.51	36.5	71
Andipatti	29	37	46
Salisandai	23.25	39.5	68
Total	221.91	289.33	498.75

Before 30 years there was 498.75 acres of land in these villages after 20 years it is decreased as 289.33 acres. It is observed that more than 50 percent of land is decreased. At present only 221.91 acres of land is available.

### Perception on climate change

As we all aware the climate has been changed and the people are suffering lot so to know the perception of people about the climate change this objective was framed in this study. In this area temperature, wind, and rainfall were assessed.

### Temperature

Temperature is important thing for lives of man or vegetation. Majority (93 percent) of farmers were accepted that the temperature has been increased and five percent of the farmers feel the temperature is decreased. Only two percent of the farmers felt that the temperature is same. It is proved that the farmers were aware that the climate is changed.

High temperature experienced only in the months of April, May and June. Now the high temperature is continuing up to August month. Also the temperature increased one to two degrees more compare with last 40 years. Change in housing type adversely affecting the population in terms of increased hot weather inside the house and crops requires more wetting/moisture to complete the crop cycle otherwise the crop is damaged (crop yield decrease or total crop failure) Increasing maximum temperature increases the evaporation and soil moisture reduces the availability of water for crops leads to withering of crop and increases the cost of irrigation.

**Table – 2: Change of temperature**

Temperature	Frequency	Percent
Increases	261	93
Decreases	15	5
Same	5	2
Total	281	100

### Wind

Wind in another important component for comfort living and adapting to temperature. Majority (88 percent) of respondents feel that the quantity of wind is decreased and 11 percent of respondents felt that it is same and one percent of respondents feel that the wind is increased. Again this analysis of people perception is proved that the change is happened in wind also.

Generally the winter period for this area is Karthigai to Masi (December to 15 March). The winter period is decreased upto Thai (Mid of February). It affects pulse crop (Garden bean - Mochai in Tamil) yield hence this crops flowering and fruiting purely depends on the dew. Erratic Rainfall, change in pattam (Season), Availability of drinking water for livestock

### Rainfall

The rainfall is a major component for agriculture and ground water. The study observes that no one respondent feel that the rain fall is being increased. Majority (89 percent) of the respondents feel that the rainfall is being decreased. About 10 percent of the respondents said that the rain fall is same but it is irregular. So the rain fall is also changed due to climate change. And ultimately it affects the agriculture

This area is not receiving enough amount of rainfall for cultivating rain fed crops in the months of July and August. But increasing amount of rainfall in summer is happening. Even North East monsoon distribution of rainfall is not as a seasonal distribution generally now the rainfall comes because of low pressure or cyclone in Bay of Bengal. So, heavy down pour received in shorter period not helpful for the crop cultivation. Total number of rainy days from 47 days to 40 days is the change observed for the last 40 years.

**Table – 3: Change of Rainfall**

Rainfall	Frequency	Percent
Decreases	251	89
Same but irregular	27	10
Increases	0	0
Same	3	1
Total	281	100

### Implication of climate change and adaptation

The previous chapter is analyzed that the rainfall is decreased and this chapter is explained that the impact of climate change. It takes the criteria of irrigation facility, vegetation changes and economic analysis of agriculture

### Lack of irrigation

Presently 256 respondents feel that the water is not adequate for irrigation purpose due to the change of rainfall. Change in rainfall months and distribution of rainfall in the season negatively impacted the pattam (agriculture season). Example: Generally (40 years before) this area receives rainfall during the months of Adi, Avaniand Puratasi (July to September) is called Aadipattam. This is the main season for rainfed crop cultivation like Groundnut, Varaghu (Kodo millet- Paspalumscrobiculatum), Kelvaraghu (Finger millet – Eleusinecoracana), Thinai (Fox tail millet- Setaria italic), Samai (Panicummilliare) and Kudiraivalli (Sanwa millet – Panicumcrasgalliver) and Cholam (sorghum bicolor). Varaghu, Cholam, Samai crops withstand erratic rainfall and gives assured yield because of its resistance to pest and tolerant to drought. It provides food for human and livestock.

### Vegetation

Majority (96 percent) of the respondents feel that the vegetation is decreased and four percent of the respondents are feel that vegetation is same and no one is feel that the vegetation is increased. It is sure that the vegetation is de-

creased. Due to change in the rainfall the farmers are not able to cultivate groundnut for the past 30 years and Samai, Varaghu (kodomillet) and Thinai (Fox tail millet). Many local indigenous types of millet seeds are eroded from the area is a very big bio-diversity loss. Due to the change of pattam (season) farmers changed their crops like Maize and improved cotton varieties in different season attracts more pest and disease and high risk too, hence the crop not able to withstand (not drought tolerance)in the erratic rainfall.

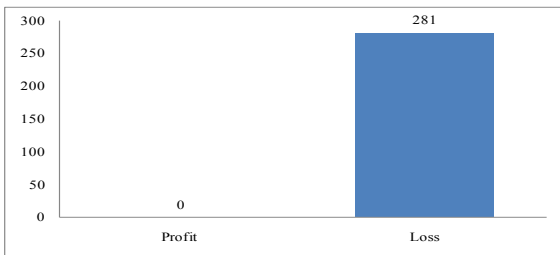
**Table – 4: Change of Vegetation**

Vegetation	Frequency	Percent
Increase	0	0
Decrease	269	96
Same	12	4
Total	281	100

**Agriculture economy**

Cent percent the respondents are felt that agriculture is not profitable. Due to the climate change the rainfall is decreased and cost of cultivation is increased due to the high usage of pest and fertilizers. Ultimately the climate change is affected the farmers.

**Chart -1: Agriculture Economy**



**Conclusion**

To cope with the climate change the farmers used the coping mechanism like mixed cropping, tank silt application, goat rearing, sale of livestock, and migration to neighbor state. They also using the adapting practices like Irrigating the crops by using open and bore well Changing the crops like Maize, Supply of drinking water by government through water tanker trucks

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