

Farmers' Awareness and Adaptation Strategies to Climate Change: A Study in Omalur Taluk of Salem District Of Tamil Nadu

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Abstract—This study examines the awareness and adaptation strategies of farmers in Omalur Taluk, where agriculture is a primary source of income. Using a mixed-methods approach, data was collected through structured interviews with a representative sample of farmers. The results show that while most farmers recognize the impacts of climate change, their understanding of its causes and broader effects is limited. Adaptation strategies mainly involve traditional methods, such as altering sowing periods and crop diversification, with fewer farmers adopting advanced technologies. Key barriers to adaptation include limited resources, inadequate government support, and a lack of knowledge dissemination. The study highlights the need for targeted awareness programs, policy interventions, and capacity-building efforts to improve climate resilience in the region's agricultural sector.

Index Terms—Adaptation – Climate – Awareness – Resilient.

I. INTRODUCTION

Agriculture plays a vital role in the economies of developing countries, and India is no exception. In India, agriculture is the primary driver of economic activity, contributing around 40% to the country's total GDP. Additionally, about 55% of the population is employed in the agricultural sector. Climate change impacts every aspect of economic growth, particularly in developing countries. Urgent awareness and adaptation measures are needed to mitigate the effects of climate change and enhance food security. Adaptation strategies and recognition processes must be tailored to local contexts, integrated, and flexible. Climate change will significantly affect the agricultural sector, with shifting weather patterns—

such as intense floods and storms—resulting in lower agricultural production. This, in turn, can lead to increased poverty and slow down economic development.

In Tamil Nadu, a southern Indian state that depends largely on agriculture, climate change is already having a significant impact. Unpredictable rainfall, rising temperatures, and water shortages are affecting crop yields and farmers' livelihoods. To tackle these challenges, the Tamil Nadu government has implemented various measures, such as encouraging climate-resilient crops, enhancing water management practices, and supporting sustainable agricultural methods. The climate of Salem District is typically warm, with the hottest period occurring between March and May. During May, temperatures can reach as high as 39.8°C. From December to February, the climate becomes cooler, with temperatures dropping to a minimum of 16.7°C in December. On average, the district receives an annual rainfall of 979.9 mm.

Omalur is a Town and Taluk of Salem District of Tamil Nadu. According to the 2011 Census, Omalur Block (CD) has the sub-district code 05737. The total area of Omalur taluk is 666 km², with 615.96 km² of rural land and 50.18 km² of urban land. The population of Omalur taluk stands at 494,355, with 102,313 living in urban areas and 392,042 in rural areas. The taluk has a population density of 742 people per square kilometer. There are approximately 125,462 households in the area, including 25,542 in urban areas and 99,920 in rural areas. Regarding literacy, 59.45% of the population is literate, with 66.78% of males and 51.40% of females being literate. Omalur taluk comprises 33 villages.

The primary objective of the study is to examine the perceptions of local farmers in omalur Taluk, Salem District, regarding climate change, along with their awareness and adaptive measures. The focus of the study is on the impacts of climate change on farming activities rather than on daily life. The central research question is: What is the perception of farmers about climate change, and what awareness and adaptation practices are currently in place, To address this, the study aims to explore three key aspects: the level of climate change awareness among farmers, the adaptation strategies they employ, and the impact of climate change on their farming activities.

II. MATERIAL AND METHODS

Study Area

Omalur is a town and taluka in the Salem district of Tamil Nadu, India. In the Indian administrative

system, a taluka is a subdivision of a district responsible for local governance, administration, and revenue collection. It plays a vital role in the development and management of the local community.

As per the 2011 Census, the sub-district code for Omalur Block (CD) is 05737. The taluka covers a total area of 666 km², comprising 615.96 km² of rural land and 50.18 km² of urban land. The total population of Omalur taluka is 4,94,355, with 1,02,313 people residing in urban areas and 3,92,042 in rural regions. The population density stands at 742 inhabitants per square kilometer.

Omalur taluka has approximately 1,25,462 households, including 25,542 in urban areas and 99,920 in rural areas. The literacy rate in the taluka is 59.45%, with male literacy at 66.78% and female literacy at 51.40%.

Table 1.1 Selected Villages and Sample Size of the Respondents

S.No	Villages	Marginal farmers	Small farmers	Total Respondents
1.	kottagoundampatti	10	10	20
2.	kottamariamankoil	10	10	20
3.	M. Chettipatti	10	10	20
4.	Pachanampatti	10	10	20
5.	Pagalpatti	10	10	20
6.	Sellapillaikuttai	10	10	20
7.	Thindamangalam	10	10	20
8.	Thumbipadi	10	10	20
9.	Periyeripatti	10	10	20
10.	Tholasampatti	10	10	20
11.	U.Maramangalam	10	10	20
12.	Gollapatti	10	10	20
13.	Moogilpadi	10	10	20
14.	Naranampalayam	10	10	20
15.	S. Chettipatti	10	10	20
16.	Thekkampatti	10	10	20
17.	Vellalapatti	10	10	20
	Total	170	170	340

Sampling size

This study examines the awareness and adaptation strategies of small and medium-hold farmers to climate change in Omalur Taluk of Salem District. It explores the key factors influencing farmers' awareness and their choices of adaptation measures. Primary data was utilized to conduct this research.

The study employed a random sampling technique to collect data from farm households in Omalur Block of Salem District, which comprises 33 Revenue Villages, including 3 Town Panchayat and 30 Village Panchayats. The research focused on 17 villages within Omalur Panchayat, selecting a sample of 340 households consisting of small and marginal farmers.

Each village contributed 10 small farmers and 10 marginal farmers, chosen randomly. Primary data was gathered through questionnaire-based interviews conducted in Tamil, the widely spoken local language, to ensure accurate information collection. The study aimed to assess the awareness of small and marginal farmers regarding climate change adaptation strategies and identify key factors influencing their adaptation choices using primary data collection methods.

Statistical Tools

The collected data were analyzed using statistical tools, including simple percentage and correlation, with the assistance of SPSS.

II. RESULTS AND DISCUSSION

Socio –Economic profile of the Farmers

To gain insight into the perception and adaptation strategies of farmers, it is crucial to understand their demographic characteristics. Therefore, various demographic and socio-economic factors, such as household income, total agricultural land, income sources, and main agricultural products, were examined. The demographic data collected helps describe the sample population's characteristics, which are an essential aspect of the study and require careful analysis.

Table 1.2 Gender of the Respondents

Gender	No of Respondents	Percent
Male	203	59.70
Female	137	40.30
Total	340	100

Source: Primary Data

Table 1.2 shows the Gender role farming community and helps to understand the ratio of their involvement in farming. Out of the total respondents, 203 (59.70percent) belong to male and 137 (40.30percent) belong to female

Table No: 1.3 Age group of the Respondents

Age	No of Respondents	Percent
Below 30	45	13.23
30-40	72	21.17
41-50	104	30.58
51-60	78	22.94
Above 60	41	12.05
Total	340	100

Source: Primary Data

Table 1.3 provides insights into the age distribution of the most active farming group in Omalur. Among the 340 respondents, the largest group, 104 (30.58%), falls within the age range of 41-50 years. The second highest group is 51-60 years, with 78 (22.94%) respondents. A smaller proportion, 72 (21.17%), are in the 30-40 years age group, and 45 (13.23%) are below 30 years. Only 41 respondents (12.05%) are aged 60 years or older.

Table No: 1.4 Education status of the Respondents

Education level	No of Respondents	Percent
Elementary school	35	10.29
Primary school	53	15.58
Secondary school	61	17.94
High school	77	22.64

Degree	59	17.35
No illiterate	55	16.17
Total	340	100

Source: Primary Data

Table 1.4 In Omalur higher positions and well-paid jobs are typically held by educated individuals, while agriculture is often seen as a lower-status, low-income occupation. Education plays a crucial role in shaping people's career choices and performance, and it also facilitates innovation in farming practices by helping farmers understand and adapt to changes. Despite the benefits, the survey reveals that most respondents have limited education. Table 4.3 shows that out of 340 respondents, 77 (22.64%) have completed secondary school, 61 (17.94%) have some secondary school education, and 59 (17.35%) have a degree. Additionally, 35 (10.29%) have elementary school education, while 55 (16.17%) have no formal education or cannot read and write.

Table No: 1.5 Annual Household Income Respondents

Annual Household Income	No of Respondent	Percent
Below 100000	23	6.76
100000-200000	117	34.41
200000-300000	87	25.58
300000-400000	67	19.70
Above 400000	46	13.52
Total	340	100

Source: Primary Data

Table 1.5 highlights the importance of understanding the respondents' income, as it is closely linked to their reliance on farming and overall economic status. Among the respondents, the largest group, 117 (34.41%), reported an annual income between 1,000,001 and 2,000,000 INR, followed by 87 (25.58%) earning between 2,000,001 and 3,000,000 INR. The remaining respondents included 67 (19.70%) with an income between 3,000,001 and 4,000,000 INR, 46 (13.2%) earning above 4,000,000 INR, and 23 (6.76%) with an income below 100,000 INR.

Table: 1.6 Total Land Occupied by the Respondent

Total Land Occupied (Hectares)	No of Respondents	Percent
Up to 1	17	5.00
1 to 2	33	9.70
2 to 3	47	13.82
3 to 4	73	21.47
4 to 10	170	50.00
Total	340	100

Source: Primary Data

The size of farming land is closely linked to income sources and opportunities for improving farmers' livelihoods, as it influences their ability to adapt to climate change. Larger farms allow for crop diversification, reducing risks associated with unpredictable weather (Belay et al., 2017). Table 3.5 shows that most respondents own small to medium-sized farms, with 170 (50%) owning 4 to 10 hectares, the largest group. Fewer respondents own smaller plots: 17 (5%) own up to 1 hectare, 73 (21.47%) own 3 to 4 hectares, 47 (13.82%) own 2 to 3 hectares, and 33 (9.70%) own 1 to 2 hectares.

Table No: 1.6 Years of Farming Experience of the Respondents

Farming experience (Years)	No of Respondents	Percent
0-10	33	9.70
11-20	36	10.58
21-30	32	9.41
31-40	16	4.70
Above 41	223	65.58
Total	340	100

Source: Primary Data

Table 1.6 presents data on farming experience among the 340 respondents, showing a strong trend toward extensive experience. The majority, 65.58%, have been farming for over 41 years, highlighting a significant presence of highly experienced farmers in the surveyed group. In comparison, smaller percentages have less than 41 years of experience, with the lowest percentage (4.70%) having 31-40 years of farming experience. This distribution suggests that most farmers in the area possess considerable knowledge and expertise, which may impact their farming practices and adaptation strategies.

Table No: 1.7 Type of Farming

Type of Farming	No of Respondents	Percent
Small	170	50.00
Medium	170	50.00
Total	340	100

Source: Primary Data

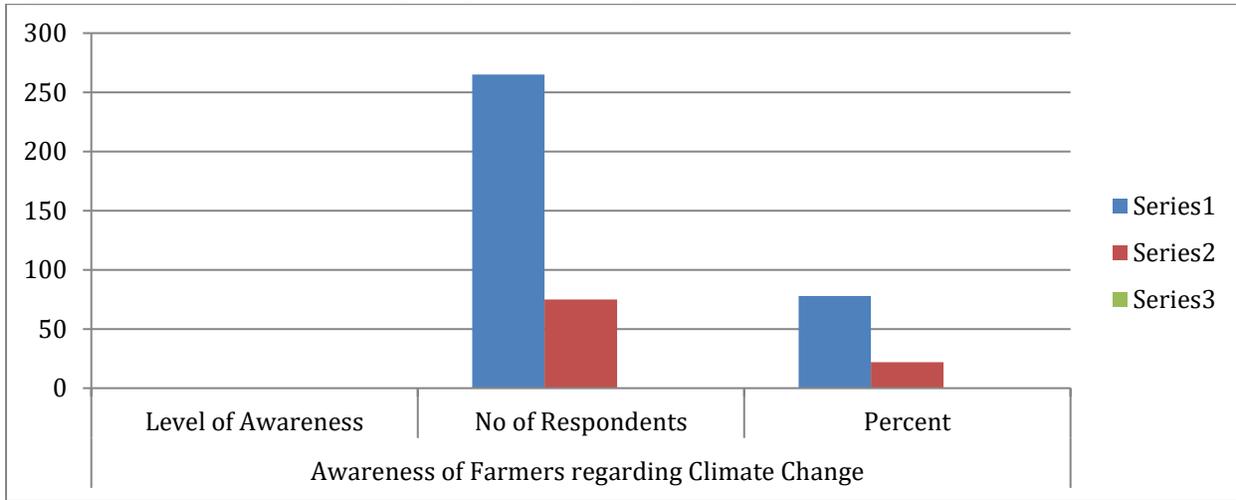
Table 1.7 reveals that the survey results show an equal distribution between small-scale and medium-scale farming practices among the 340 respondents, with each category representing 50% of the total. Small-scale farming typically involves smaller land holdings and less intensive methods, while medium-scale farming often includes larger land areas and more advanced techniques. This even distribution highlights the diverse agricultural landscape in the surveyed area, with farmers utilizing a variety of farming scales and approaches.

Table No: 1.8 Awareness of Farmers regarding Climate Change

Level of Awareness	No of Respondents	Percent
Aware	265	77.94
Not aware	75	22.06
Total	340	100

Source: Primary Data

Figure: 1.1 Awareness of Farmers regarding Climate Change



The Table 1.8.shows the awareness of farmers regarding climate change, with 265 respondents (77.94percent) indicating that they are aware of climate change, and 75 respondents (22.06percent) indicating that they are not aware.

The data reveals the following key insights

High Awareness Level: A significant majority (77.94%) of farmers are aware of climate change. This indicates that efforts to educate and inform farmers about climate-related issues have been largely successful. This awareness may contribute to better

adaptation strategies and sustainable farming practices.

Low Unawareness Level: Only 22.06% of farmers are not aware of climate change. While this is a relatively small proportion, it still suggests the need for further awareness campaigns targeting this group.

Potential Impacts: Since climate change directly affects agricultural productivity, water availability, and pest outbreaks, it is crucial for all farmers to be informed. The current awareness level suggests that most farmers may already be taking precautionary measures to mitigate its effects.

Table No: 1.9 Four Climate Change Adaptation Strategies

Adaptation strategies	Descript	No of Respondents	Percent
Different crop varieties	This means that farmers could change the date of planting crops with respect with the change in the climate (early or late planting).	43	12.64
Improving crop and livestock	This include planting of short duration crop, drought tolerant crop and improved livestock variety both for milk and meat and etc.	72	21.17
Farming , soil and water conservation	Includes soil erosion preservation, management and care of soil in order to make it suitable for their crops, dam construction, conservation of rain water for watering the crops in times too little rain, ground water harvesting, etc	144	42.35
Irrigation	Includes irrigation development from rivers or lakes in order to cope up with the challenges of climate change.	81	23.82

Source: Primary Data

Figure: 1.2. Climate Change Adaptation Strategies

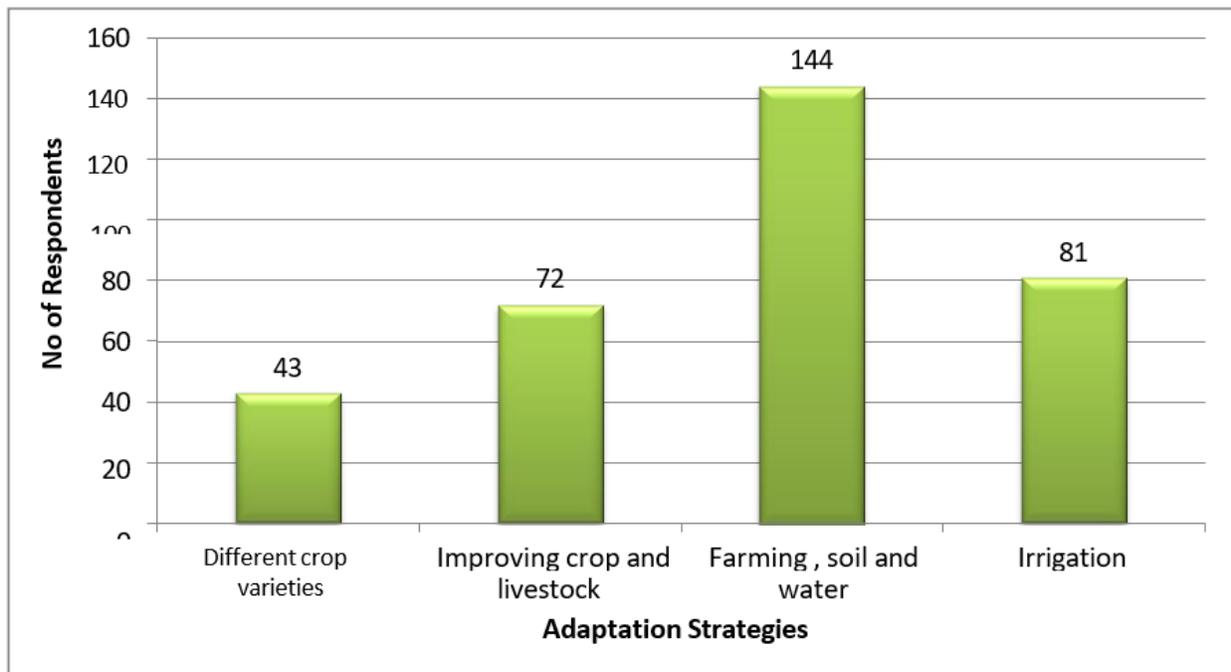


Table 1.9 shows the different adaptation strategies used by farmers. Only 43 respondents (12.64%) reported using different crop varieties, adjusting planting dates to match climate changes. 72 respondents (21.17%) implemented strategies to improve crop and livestock farming, such as planting drought-tolerant crops and using improved livestock. Soil and water conservation was the most common strategy, with 144 respondents (42.35%) using practices like soil management and rainwater conservation. 81 respondents (23.82%) adopted irrigation systems to address climate challenges. Overall, soil and water conservation was the most widely used strategy, followed by irrigation, crop and livestock improvements, and using different crop varieties. These efforts reflect farmers' adaptation to climate change to maintain agricultural sustainability.

III. CONCLUSION

Climate change has become a major factor affecting agricultural productivity. Changes in climate and extreme weather events significantly impact agriculture, posing a threat to national food security. The extent, frequency, and nature of these climatic changes can have serious repercussions for farming practices. Climate variability may compel farmers to

adopt new methods, such as altering sowing times, adjusting land preparation, modifying growing periods, changing harvesting schedules, and managing pests and diseases. Therefore, understanding farmers' perceptions of climate change, its causes, impacts, and indicators is crucial in helping them adapt to and mitigate the negative effects of climate change on agricultural productivity. Out of 340 respondents, 119 (35.00%) believe that adaptation measures have a positive impact on climate change. The most commonly implemented adaptation strategies were soil and water management, with 230 respondents (67.64%) adopting this approach. Growing early crops was another prevalent strategy, used by 215 respondents (63.23%). Adjusting planting dates was also a key adaptation measure, with 254 respondents (74.70%) making changes to their planting schedules. Other strategies included purchasing insurance (137 respondents, 40.29%), changing crop varieties (190 respondents, 55.88%), mixed farming (211 respondents, 62.05%), temporary migration (182 respondents, 53.52%), and early tree planting (191 respondents, 56.17%). Additionally, 223 respondents (65.58%) reported using irrigation, 175 (51.47%) secured off-farm employment, and 184 (54.11%) reduced livestock numbers. However, only 80 respondents (23.50%) reported receiving government

support for implementing these adaptation measures. Moreover, 193 respondents (56.76%) indicated they had no access to climate information. The highest response in the "Farmer Awareness" category was "Yes," with 265 respondents, making up 77.94% of the total. This indicates that the majority of farmers surveyed are aware of climate change.

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