ISSN No:-2456-2165

# Climate Change is Affecting Agriculture in Karnataka State

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**Abstract:- Farmers are under pressure from climate change because to changes in rainfall patterns, distribution, warming timing, and the frequency of extreme climate events. One important industry in Karnataka that boosts the state's economy is agriculture. Additionally, because rainfall is only predictable in select places, these factors significantly reduce the state's farmers' production in the agricultural sector. Crop practises, manpower, and interpretive and utilitarian resources are frequently used in agriculture. Cropping practises may be affected by changes in temperature or rainfall in Indian land areas brought about by climate change. However, as farmers' adaptation plans directly affect how much they can produce because of climate change, the study emphasises the need for more funding for both the Indian agricultural sector.**

***Keywords:-*** *Affecting, Agricultural, Climate Change, Rainfall, Farmers, Temperature.*

## I. INTRODUCTION

Karnataka is currently experiencing a severe drought. The state's agriculture faces all of the difficulties associated with dryland farming, such as rainfed agriculture, fallow lands, small operational holdings, low rainfall value, low yielding staple cropping systems, low utilisation of water-nutrient combinations, and inadequate irrigation techniques. Given the worldwide impact of climate change, agriculture needs increased attention, especially at the regional level where climatic conditions may have an impact on food supplies. Improving our lifestyle and lessening our impact on the environment are very important. It is defined operationally as a farmer's ability to manage and recover from a climate-related disaster. The average effects of a few years' worth of rainfall are utilised to determine the relative effects on the current temperature in years where rainfall is obtained on an annual basis. The future scenarios were scaled up for varied vegetation areas and state forecasts, and the relative impacts on yield were calculated for Karnataka level in each agro-climatic zone.3. Apart from climatic considerations, crop diversification is used as an indicator to evaluate how climate variation affects agriculture among recent farmers. These metrics only apply to the following sectors: farmers, horticulture, livestock, fisheries, land use patterns, flooding, irrigation, and economic and family management. It is imperative that governments, funders, and practitioners increase their efforts immediately to assist farmers in adapting to the current impacts of strategies and programmes for climate adaptation must be implemented in response to the various socioeconomic, biophysical, and climatic challenges that farmers encounter. In order to comprehend the effects of climate change distribution and the possible advantages of actions to lessen or increase its influence, accurate estimations of the impacts of climate change on nations are essential. Even while it is possible, I believe the harm will be great unless there is a rapid and thorough adaptation to high temperatures. (Source: ) The phrase "climate change" describes the documented rise in the mean temperature. Winds in the oceans and close to the Earth's surface have increased in the last several decades. Its effects are profound, especially for kids. Their wealth and abilities are envied by developing nations. There are not many challenges. The repercussions of climate change affect everyone. Individuals who live in resource-poor places, lowland beaches, deltas, and other dynamic environments Karnataka's semi-arid and dry desert regions are especially susceptible. That is true. This is due to the fact that agriculture serves as the main source of income for the vast majority of people who reside in these areas. The first island, water as a source of income, and biological resources. Climate-related changes have an impact. As the sea level rises, it dives. The dynamics of the atmosphere do not change when these lowlands flood. The weather in Karnataka is significantly milder and more unpredictable.

Studies on the agricultural adaptation of smallholder farmers to climate change introducing some pertinent research findings and suggestions for the investigation. Additionally, the government might take steps to offer some logistic Assistance like insecticide sprayers, simple access to energy, and financial support tube wells in the research region, whether deep or shallow. Social and economic traits Experience in general farming, farming, and training Farmers' perceptions of the effects of climate change are influenced by a number of significant elements. Thus, programmes that concentrate on these elements are more likely, raises farmers' awareness of and capacity for responding to the effects of climate change. In order to effectively handle supplier solutions, an integrated strategy including both the government and both parties is required.(Malled 2021) Climate change may have a big effect on agriculture, crop diversity has been used as an indicator to examine how climate change is affecting agriculture. Crop diversification is influenced by a variety of economic factors in addition to climatic ones, including farmer income, consumer demand, and market dynamics. We evaluate the effects of meteorological and economic conditions and construct the Composite Entropy Index as a metric for crop diversification in Karnataka. In Karnataka, we create CEI for every district between 1999 and 2015. The model's results show that climate has a major impact on

ISSN No:-2456-2165

crop diversification even after accounting for economic factors. Karnataka's crop diversification expanded as a result of climate change.(Journal 2020)

The purpose of the Consumer Protection Act, as stated in its preamble, is to better protect the interests of consumers by establishing consumer councils and other authorities to mediate disputes between consumers and handle related matters. According to the declaration of purposes and reasons, the Act aims to provide quick and easy resolution for consumer issues.(Hyderabad et al. n.d.) totally Climate change has a negative impact on people's health due to the COVID-19 pandemic, but it is also very beneficial for the environment. Our country and state benefit from climate change in terms of marginal farmer agriculture, healthy bodies, pure air, and reduced atmospheric pollution from humans. Additionally, heavy rainfall increases crop yields. When it comes to significant crop assessments, future forecasts, implications of climate change, agricultural yield, and the Hyderabad, Karnataka region, local scale is crucial in mitigating regional climatic scenarios. This is due to the fact that it is a complicated factor that can have an impact on farmers' physical well-being based on various growth phases and crop development, projections, weather, and crop phenology, as well as anomalous heat stress and seizures during thermal farming operations.(Malled and Jaganath 2021)found that most farmers in the Bidar district grow sugarcane, but because sugar factories don't pay fair prices for the sugarcane that is grown and supplied to them, these farmers face a number of financial difficulties, including debt, poverty, underemployment, and so on. The following analysis, interpretation, and discussion of the primary data obtained on the respondents' social background and social problems is done.(Factories 2017)

Karnataka's agricultural development should be centred on lowering greenhouse gas emissions by implementing strategies like sharply cutting deforestation, enhancing forest management and conservation, The promotion of agroforestry for the efficient management of food or energy in wildfires Carbon sequestration in soil reclaiming land by managed grazing; enhancing the diet of ruminant animals; creating plans to preserve soil and water resources by enhancing the availability, quality, and effectiveness of livestock manure utilisation; and transferring and distributing it among farmers. Pay attention to how the various sectors of agricultural output are affected by climate change.(Macharla and Lal 2019)

A crop-coconut simulation model verified for 13 agro-climatic zones represented by 16 centres was used to assess the impact of climate change. Over 90% of India's coconuts are produced in these areas. The outputs are acquired annually for 30 years for three scenarios in 2020, 2050, and 2080. The average effects of the 30 years are utilised to determine the relative effects on current yields. Assuming that the coconut area stays unchanged in future scenarios, the relative impacts on yields have been calculated for each ago-climatic zone at the district level and have been increased for state and national predictions.(O'Neill, MacKellar, and Lutz 2011)The main causes of the existing crop estimation system's comparatively high number of crop estimates are the wide regional variability in growing seasons and the delays in compiling yield estimates based on crop cutting experiments. The accuracy of these projections is dependent on state governments, as agriculture is an issue of state policy.(Ashish Bahuguna 2014)An essential component of Indian culture's ethics is the protection of sacred groves and landscapes, as well as sacred species, groves, woods, and landscapes. Forests and sacred groves serve as significant stores of animal and floral diversity, which are sustainably maintained by nearby people. Sacred groves serve as a focal point for community-managed conservation initiatives and the possibility of carbon isolation in Himachal Pradesh, Maharashtra, Kerala, Karnataka, and other regions. Planting trees is regarded as a productive, virtuous, or "karma" activity.(GoI n.d.)

Through bio-reinforcement, human food raises the number of micronutrients in grains, and their increased bioavailability impacts the health of a significant segment of the population, particularly youngsters and expectant mothers. Certain kinds are designated for use in the product. To control the grain's antinutrient content and starch qualities, research into the genetic elements of the starch biosynthesis pathway has begun. Boost output and quality.(Report et al. 2019) farm output, all expenses covered. The amount spent for inputs like seeds, fertilisers, pesticides, equipment rentals, labour hire, irrigation fees, and so forth are referred to as paid costs. The net worth is determined by deducting the entire cost of the product, which includes the seeds and fertilisers. Irrigation, pesticides, and turnover expenses. All crops and their byproducts are produced as part of total agricultural production. Revenue from by-products includes straws, stems, and other items sold at market value.(Singh 2020)

➢ *Objectives*

- To study the effect of climate on household farmers Agriculture
- To analyse residence and Farmers Agriculture in Karnataka

➢ *Hypothesis*

- Agriculture is facing challenges from climate change.
- The Karnataka government should be concerned about the problems facing the Agriculture Farmers in Karnataka

## II. BACKGROUND OF THE STUDY

The northern microclimatic zones (NEDZ) and eastern dry microclimatic zones (EDZ) of Karnataka. The temperature and precipitation ranges in the research region are 120°C to 460°C and 210mm to 1100mm, respectively. It has been noted that there are insufficient techniques for evaluating the strength and vulnerability of adjustments at the household level in this study, in contrast to national and international balance evaluation studies. Research carried out at the household level can help clarify the different

elements that lead to vulnerability and make it easier to compare decisions made by individuals, different access and reaction levels, and alignments.Agriculture family is an appropriate unit of analysis because, within a larger social framework, it can make decisions without regard to money, symbolising the flows of information and social capital. The house enables the observation of energy dynamics, the gendered nature of decision-making, and the importance of family composition and size in determining strength and vulnerability. The study mainly focused on farm families' compatibility to determine if members of the same family or those from unrelated groups eat together.

Farmers must have some understanding of the surrounding environment and natural changes to do large-scale studies on adaptations, as perception is a prerequisite for adaptation. Soon, most of the developing countries must act urgently to combat annual climate change. But the main sources of information and understanding about climate change are exposure to greater social capital and expertise in agriculture. Both large- and small-scale research into local knowledge of climate dangers and adaptation strategies may have been conducted. However, neither the possibility of action nor comparative quantitative statistics on the degree to which people react or act have been studied. Produced goods. Understanding the local agroclimatic conditions as well as a few other factors that mostly determine agricultural income in the various research locations is therefore crucial. Such knowledge has a significant impact on raising agricultural productivity when chosen wisely. Carefully selecting farming methods, crop and animal varieties, crop patterns, and farming practises is crucial. It is also crucial to gather traditional wisdom and enact a flurry of penalties in order to adapt to climate change. The mechanism to lessen the effects of climate change will be established by maintaining stock. The future will change in step with the current state of the environment. Farmers may find it difficult to adjust to climate change, so it makes no sense to develop strategies for managing inter-annual climate fluctuations. Implementing a change that is only intended to last a year, however, might not be the best course of action if the environment is changing permanently. In reaction to climate change, investments should be modified gradually; but, in response to climate tremors, this is not the case. The ideas of modifying the weather and adapting to it are not the same. Examining the factors or causes that influence farmers' ability to adjust to shifting environmental conditions is therefore prioritised. It is now critical to use advocacy strategies for the poor that are based on their assets and life outcomes, institutional frameworks, and ways to influence their decision-making.

## III. METHODS

The main goal is to pinpoint the variables that affect vulnerability and adaptability as well as the volume of adaptive behaviours taken by households. This is true even though the study considers a few factors related to agricultural households in the climate change-vulnerable Karnataka region, including their susceptibility and the adjustments imposed by the climate. While primary field research has advantages, this study has limits and leaves potential for more investigation. Thus, even while research carried out at the farm level have revealed that the environment has not changed, the study has attempted to highlight important limits in tropical areas where farming is more vulnerable to warming and precipitation.The modification may lead to significant concessions in inland revenue. General studies assert that, to the extent that they now occupy the space, cross-sectional and time-series data cannot be produced to comprehend the temporal dimension since it is highly dependent on the compatibility and vulnerability of individuals. Comprehensive regional community-level studies aid in investigating underlying causes, processes, and relationships that might be complementary to one another; maybe due to the time and resource requirements of such a complementary approach, the current study makes use of such a data set to generate comparisons between various points in time and show what is happening.

Merely studying afro-climatic zones is one limitation. The vast sample drawn from Karnataka's many acro climatic zones could be very helpful in providing more crucial policy inputs due to the regional effects of the global phenomenon known as climate change.

## IV. RESEARCH DESIGN

Finding the variables that affect vulnerability and adaptability as well as the volume of adaptive measures taken at the agricultural level is the main goal. This is true even though the study considers a few factors related to agricultural households in the climate change-vulnerable Karnataka region, including their susceptibility and the adjustments imposed by the climate. While primary field research has advantages, this study has limits and leaves potential for more investigation. To do this, the study has attempted to draw attention to important boundaries in tropical regions where farming is extremely susceptible to warming and precipitation, even though investigations carried out at the farm level have revealed that the environment remains unaltered. The modification may lead to significant concessions in inland revenue.(Climate, Effects, and Farmers n.d.)

According to general research, cross-sectional and time-series data cannot be generated to fully understand the temporal dimension since it is strongly dependent on the compatibility and vulnerability of humans, to the extent that they currently inhabit the space. Such a data collection is used in the current study to generate comparisons between various periods in time and show what is happening. This is probably due to the time and resource requirements of such a complementary strategy. Extensive studies conducted at the regional community level facilitate the investigation of fundamental causes, mechanisms, and interrelationships that may enhance each other. One drawback is limited research to afro-climatic zones. Due to the regional implications of the large sample taken from Karnataka's numerous acro climatic zones, it may be highly beneficial in providing more crucial policy inputs.

ISSN No:-2456-2165

Table 1 Data Analysis

| Sl No. | Farmers | No. of Holdings (in 000's) | Area (in 000' ha) |
|---|---|---|---|
| 1 | Marginal (0.1 to 0.99) | 4768 | 2079 |
| 2 | Small (1.00 to 1.99) | 2214 | 3106 |
| 3 | Semi-medium (2.00 to 3.99) | 1193 | 3187 |
| 4 | Medium (4.00 to 9.99) | 450 | 2568 |
| 5 | Large (10.00 & above) | 56 | 861 |
| Total | | 8690 | 11805 |

Source: Govt of Karnataka and Dept. of Agriculture Census 2015-16.

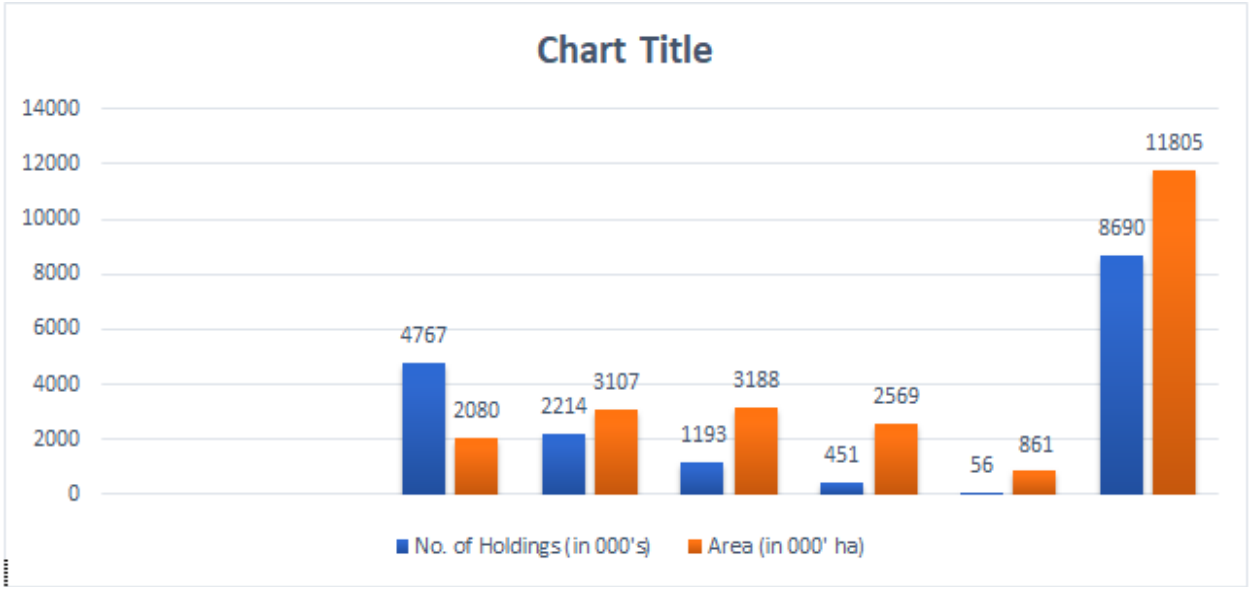


Fig 1 Chart Title
Source: India stat of census 2011.

The average operational holding size for fully owned and self-sufficient social farmers is 1.36 hectares. It was found that the average operational holding size possessed by big farmers was 15.45 hectares. However, 0.44 hectares is the average acreage owned by the fewest farmers who possess the greatest number of operating properties. Middle farmers are in second place with an average area of 5.69 hectares, followed by semi-medium farmers (2.67 hectares) and small farmers (1.40 hectares).

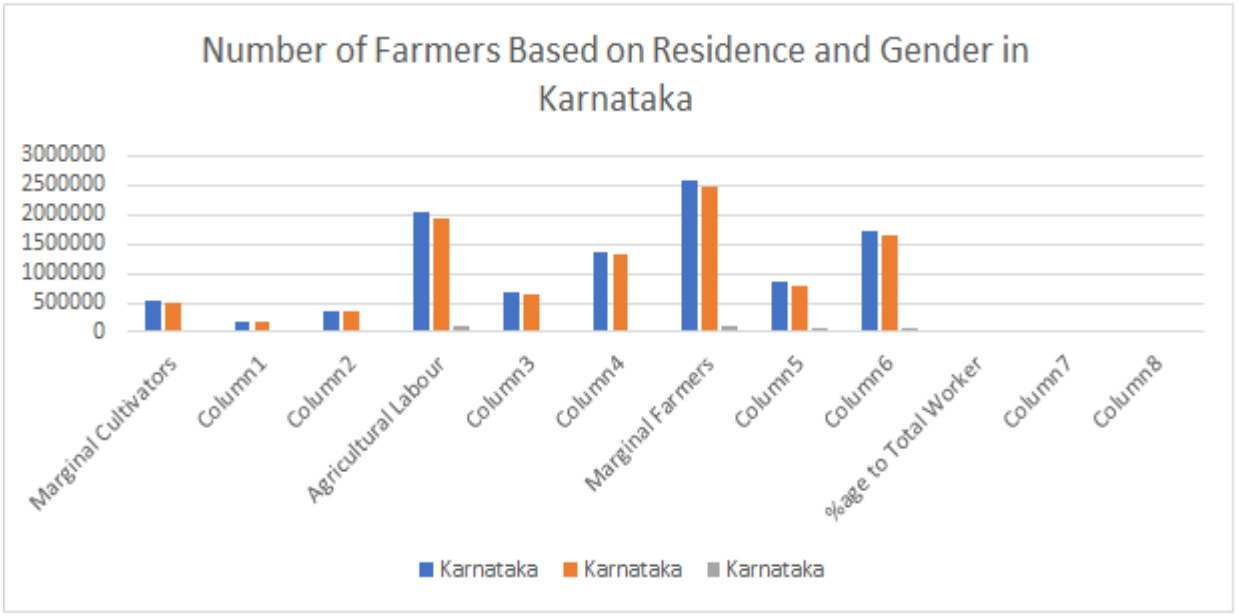


Fig 2 Number of Farmers Based on Residence and Gender in karnataka
Source: 2011 census.

There are 542340 male cultivators in the state of Karnataka, 185203 female cultivators (357137), and 2036042 male cultivators (674181 female 1361861). Subsequently, there are 2578382 men and 859384 women who are marginal farmers, making up the total population of 9.25% men and 4.70% women (17.90%). In Karnataka, the overall population proportion is 23.02% female and 13.28% male. The demographic composition of marginal farmers is 2457678 male 802523 female 802523, whilst agricultural labourers comprise 1941450 male 631459 female 1309991. There are 26112 male marginal farmers in Karnataka, 14139 female farmers in 11973, and 94592 male farmers in 42722 female farmers in 51870. Additionally, there are 120704 male marginal growers and 63843 female cultivators, for a total population proportion of 1.29% male and 0.82% female 2.65%.

## V. CONCLUSION

To either directly or indirectly explain how temperature and rainfall are impacted by climate change in agriculture and farmers, I have used a variety of datasets pertaining to Karnataka farmers in this study. The analysis of temperature, crop, and rainfall trends in the Karnataka region's ecosystems is the main goal of this study. To estimate daily, monthly, and annual temperature patterns, daily maximum and minimum temperature data are employed. The current data indicates that there is an increase in warmth, less precipitation, and the number of people who are, Issues Similar to This is one of the riskiest flood-related issues, particularly in light of the ongoing drought. A scarcity of precipitation is causing agricultural land to disappear, putting food security in jeopardy. The waterfront Excessive extraction of groundwater, harvesting structures, and soil erosion on rivers have an influence on farmers and the green cover. sources that are diverse Dietary changes are habits; if they don't eat enough whole grains, beans, and millets, their food security is compromised, which frequently leads to sickness and weakened immunity.

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