

## IMPACT OF CLIMATE CHANGE ON AGRICULTURE IN MARATHWADA

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### Introduction:

Environmental imbalance has become a matter of greatest concern today. Earth is a precious gift from nature to humans. As long as there is a natural environment on earth, human beings can survive. Due to increasing pollution and other reasons, climate change has become a major crisis. The effects of this change in many areas are coming to light. Its impact on agriculture is a matter to be seriously considered. Climate is one of the most important factors in geography and has the greatest impact on human life. No matter how much science has progressed, it has not been able to make discoveries that can reduce the impact of climate change.

A major impact of climate change on agriculture in

Marathwada is the changing pattern of rainfall. Over the years, the state has seen fluctuations in the timing and distribution of rainfall, causing erratic crop growth. Excessive or delayed rains can lead to waterlogging or drought conditions, respectively, affecting the overall productivity of fields due to late sowing or late harvesting. Rising temperatures are another big challenge for farmers in Marathwada. Prolonged heat waves and high temperatures can negatively affect crop development. Drought can also lead to shortages in the agricultural industry or livestock. Uncertainties in rainfall and temperature have become worrisome challenges for farmers who depend on consistent production for their livelihood.

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It has been revealed that the drastic changes in the climate have a great impact on agriculture. The state of Maharashtra in India is known for various agricultural crops. But currently, the effect of changing climates on agriculture in Maharashtra and the Marathwada region has become a matter of concern for the farmers. From changing rainfall patterns to rising temperatures, these climate changes are adversely affecting the agricultural sector. Due to changes in rain and climate, crop area has been hit the most in 11 districts of North Maharashtra, Vidarbha, and Marathwada, which are important for agriculture. A study by the Indian Board of Agricultural Research and the National Dairy Research Institute found that more than 75% of the total

agriculture in these districts is under threat due to climate change. Aurangabad, Jalna, Beed, Nanded, Parbhani, Hingoli, Latur, and Osmanabad districts of Marathwada are seen to be hit hard by climate change. Recent climate change emergencies are causing crop and agricultural losses. In that sense, total days of rain are decreasing and the volume of precipitation is increasing. This is one of the most serious and most dangerous impacts of climate change on agriculture.

### Objectives of the Research Paper:

The following objectives have been set while presenting this research paper:

1. To explore the various causes of climate change.

2. Studying the impact of climate change on agriculture in Marathwada.
3. To study the background of Marathwada Division.

### Research Methodology:

The present research paper is based on secondary data. Various reports and statistics published from time to time by the Ministry of Environment, Government of India, reports of the Agricultural Science Center, and various reference books, magazines, newspapers, and weekly newspapers have been used in this.

### Marathwada Division:

It is recognized as an economically backward region of Maharashtra. The total area of Marathwada is 70,439 sq. m. There are 7674 villages in Marathwada. The geographical area of Marathwada division is 64.60 lakh hectares, out of which 47.45 lakh hectares are cultivable. 88 percent of the land area of this division falls in the Godavari basin, 10 percent in the Krishna basin, and 2% in the Tapi river basin. Marathwada is bordered by Yavatmal district and Andhra Pradesh on the east, Ahmednagar district on the west, Karnataka, Jalgaon, and Buldhana. The climate in Marathwada is hot and dry on average. Rainfall is also very low in this region. Agriculture is the main occupation in Marathwada. Various types of crops are grown in this section in both seasons. Apart from this, poultry and animal husbandry are the secondary occupations of the people here. Agriculture is dependent on rain.

### Climate Change:

The increasing number of vehicles, increasing factories, and increasing air-conditioned buildings are continuously increasing the emission of carbon dioxide. Methane emissions from livestock are increasing. The use of excess nitrogen fertilizers in rice paddies is increasing the amount of nitrous oxide. That is why air pollution is continuously increasing on one side. On the other hand, forests and plants that use carbon dioxide are being destroyed on a large scale. In

December 1997, many countries came together to adopt the Kyoto Protocol to reduce greenhouse gas emissions from industry, but it came into force in February 2005, and the agreement committed 37 industrialized countries and the European Community to reduce greenhouse gas emissions because the temperature of many countries on earth has been increasing in the last decade. During this period, the average temperature of the earth appears to have increased, and it was decided to bring carbon dioxide (CO<sub>2</sub>) and other green gas emissions under complete control by 2020, but still many countries, including India, are failing to control their energy problems. The Paris Agreement was signed in 2015. 197 countries have signed the treaty, which has committed to keeping the average temperature rise within 2.00 degrees this century. It has been decided to fully control the temperature increase by 2030 by reducing the amount of carbon dioxide by 45% to possibly limit the temperature to 1.5. A decision has also been taken to completely reduce carbon emissions by phasing out all coal-fired power plants by 2050. Otherwise, there will be an increase in many natural disasters, such as the melting of ice on the poles, an increase in heat waves, and an increase in the amount of heavy rainfall, the IPCC has said in a new report. The year 1998 was considered the hottest year in the Earth's ecological history. This type of climate change has had an adverse effect on global economies and has had a large negative impact on India as well.

### Causes of Climate Change:

After the Industrial Revolution, global population and economic growth increased dramatically. At the same time, the amount of greenhouse gases has also increased to an unprecedented extent. Scientific records show that the current levels of carbon dioxide, methane, and nitrous oxide in the atmosphere are much higher than in the last 8 million years. Therefore, the increase in the amount of these gases is the main reason

for the increase in global temperature after 1950. A major cause of global warming is primarily the emission of greenhouse gases. Due to this increase in the number of gases like carbon dioxide, chlorofluorocarbon, methane, nitrous oxide, etc. in the atmosphere, a large change is seen in the global climate. The sun's rays fall on the ground and heat the ground, but this heat is not emitted into the atmosphere, so the earth remains warm without cooling down. It changes with heating. Apart from this, carbon dioxide is increasing due to the large increase in the population of the world. Also, the number of animals in the world is increasing day by day, while volcanic emissions have helped to increase the global temperature, which has led to major changes in climate. The Industrial Revolution took place in Europe in the 18th century. As a result, humans began to use forests extensively as fuel. As carbon dioxide is produced when any carbon material is burned, after burning wood and coal, the amount of carbon dioxide in the atmosphere starts to increase. Apart from this, due to the excessive use of mineral oil and gas by mankind, a change in climate is seen.

### **Impact on Agriculture in Marathwada:**

The impact on agriculture due to low rainfall in the last few years has intensified in recent times. Floods and droughts are occurring more frequently as a result of climate change and warming. Therefore, there is a fear that the loss of agriculture will increase further in the future. The following effects of climate change are seen on the agricultural sector in Marathwada:

#### **1. Irregular and unseasonal rainfall:**

Due to climate change, irregular and unseasonal rainfall has increased in some parts of the country, which is an adverse effect of climate change due to

global temperature rise. Rainfall in Marathwada is decreasing day by day. In the year 2010, the general rainfall in Marathwada was 820.81 mm. If there was actually 821.91 mm, i.e., more than average rainfall, in the recent period, i.e., in 2018, the average rainfall was 814.22 mm. In fact, only 525.56 mm of rain fell, which is less than the average. Most of the agriculture in Marathwada is dependent on rain. The distribution of rainfall in Marathwada is uneven. In Marathwada, due to heavy rainfall in some areas and a lack of rainfall in others, it seems to have adversely affected the production of food grains.

#### **2. Increase in soil fertility:**

An increase in water and soil temperature resulting in soil water scarcity has resulted in a massive increase in salinity in coastal agriculture in Gujarat and Maharashtra and the adverse effects of frequent storms on crops in these areas. As a result of this, per capita food production in 1995 was 207 kg, and now it is 155 kg. A major reason for this declining per capita agricultural output is large-scale, but only rain-fed, paddy agriculture. Today's agriculture has become a manufacturing industrial process, increasing the risk to the environment, due to which the Indian economy seems to have found itself in a vicious cycle of soil erosion, a threat to genetic biodiversity, depletion of energy resources and forest resources, water scarcity, an increasing amount of chemicals in water, and food grain production decreasing.

#### **3. Farmer Suicide:**

Farmer suicide has become a common occurrence in Marathwada due to indebtedness and barrenness due to climate change.

Table 1: Numbers of farmer's suicides in Marathwada

| Year         | Ch.<br>Sambhajinagar | Jalna      | Beed        | Parbhani   | Hingoli    | Nanded     | Latur      | Dharashiv  | Total       |
|--------------|----------------------|------------|-------------|------------|------------|------------|------------|------------|-------------|
| 2010         | 2                    | 4          | 79          | 22         | 2          | 55         | 4          | 23         | 191         |
| 2011         | 1                    | 6          | 73          | 23         | 5          | 33         | 4          | 25         | 170         |
| 2012         | 2                    | 6          | 91          | 35         | 3          | 39         | 0          | 22         | 198         |
| 2013         | 1                    | 8          | 98          | 17         | 2          | 46         | 3          | 29         | 204         |
| 2014         | 56                   | 32         | 152         | 70         | 31         | 118        | 44         | 71         | 574         |
| 2015         | 144                  | 83         | 301         | 104        | 41         | 190        | 106        | 164        | 1133        |
| 2016         | 151                  | 76         | 222         | 98         | 49         | 180        | 116        | 161        | 1053        |
| 2017         | 139                  | 91         | 207         | 125        | 56         | 153        | 94         | 126        | 991         |
| 2018         | 149                  | 78         | 191         | 129        | 58         | 96         | 82         | 139        | 922         |
| <b>Total</b> | <b>645</b>           | <b>384</b> | <b>1414</b> | <b>623</b> | <b>247</b> | <b>910</b> | <b>453</b> | <b>760</b> | <b>5436</b> |

Source: Divisional Commissioner Office, Aurangabad

Data on the total farmers' suicides in the Marathwada along with district-wise breakups is presented in Table 1. It is observed that 1133, 1053, 991, and 922 farmers committed suicide in the years 2015, 2016, 2017, and 2018, respectively, in the region. The present investigation, therefore, was undertaken in the eight districts of the Marathwada region.

Marathwada, one of the most drought-prone areas in Maharashtra, has continued to be in the news over the last few months due to the severe agrarian crisis that the region has been facing and the very high rates of farmer's suicides. In fact, Marathwada has now been referred to as the suicide capital of the country, with a steady increase in farmer suicides.

### Conclusion:

The international organization that studies climate change, 'IPCC', has come to the conclusion that there is a big threat to India due to rising global temperatures and that India will be affected by heat waves. The interplay between development and environmental change is proving problematic for India. Development is mainly associated with industrialization, and the improvement of the standard of living is taken to mean the use of modern technology in life. All these are called developments, but this development seems to

harm the natural resources. Agriculture, water, and forests have all been affected by this development. Crops and cropping systems are at risk due to the continuous occurrence of conditions affecting the seasonal cycle due to drought or heavy rains and floods in the monsoon, cloudy weather and unseasonal rain in the winter, and hailstorms in the summer. Security is in trouble.

Conservation and conservation of nature are important for the development of mankind because human beings can survive only as long as there is a natural environment on earth. Humans are the main cause of this climate change, so the following measures can be implemented to sustain the existence of the earth and mankind: reducing the use of fuel, solar Increasing the use of energy, wind energy, protecting and conserving forests by stopping destruction, avoiding the use of non-biodegradable materials like plastic, keeping the population under control, focusing on developing nuclear energy, using methane as fuel, etc. can prevent the increase in global climate change. .

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