



## INDIAN AGRICULTURE AND CLIMATE CHANGE: FACING THE CHALLENGE

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### ABSTRACT:

*The climate change is one of the major concerns for the world today. Particularly increase in earth's temperature has become the major problem. The last two decades has witnessed the rise of earth's temperature ranging between 2 to 6 degree Celsius. The major reasons for this climate change are mostly manmade. The excessive industrialization, release of hazardous gases such as carbon dioxide generated out of industrialization and excessive burning of fossil fuel causes pollution. Along with these issues the waste water of the industries released into the rivers causes water pollution.*

*Both air and water pollution culminate into the greenhouse effect that ultimately leads to the increase in temperature in earth's atmosphere. These pollutions; however, is having worst impact on the Indian agriculture. Particularly the soil health and quality of crops have become major concerns for the new age farmers. In this context, the present research paper attempts to assess the impact of climate change on the agriculture sector in India. It also attempts to come up with certain suggestions and strategies that would enable Indian farmers to cope with the challenge's climate change have raised for them.*

### INTRODUCTION:

India has been cherishing its status as the agrarian nation since ancient times. Majority of agriculture of the Indian subcontinent however is based on monsoon rains. Many a times it is subjected to either excessive rains or drought like situations. As a result, the conditions and lives of Indian farmers have been vulnerable to the climatic conditions. Earlier situation was quite normal. But as the world witnessed the growth of industrialization and started depleting natural resources in excess situation has started changing rapidly. Human activities viz. continuous and over irrigation, coal mining, excessive use of electric energy, and most importantly the excessive burning of fossil fuel have led to the climate change. Even the excessive deforestation has contributed its share in the climate change. Recent innovations in the fields of thermal energy, atomic energy and nuclear power are causing the air pollution. All these symbols of development however have

proved to be dangerous to the very existence of the entire

eco-system as well as very existence of human and animal species.

Along with these worldwide reasons India, to feed its ever-growing population, had initiated Green Revolution under the leadership of Dr Swaminathan. This green revolution at initial stage proved to be the most apparent step towards the modernity in Indian agriculture sector. It facilitated and trained the farmers to achieve targets of highest yields through use of genetically modified seeds, use of chemical fertilizers, pesticides etc. One of the important aspects of these modern farm techniques was to bring maximum number of land under the irrigation facilities. The union Government of India as well as state governments of the respective states had taken measures to bring as much possible as land under irrigation. But after fifty years of continuous and over irrigation

the health of the soil or land used for agriculture in irrigated areas has reached to a worst condition. There are traces of salinity resulting in the loss of productivity of the soil. This ultimately has posed a biggest challenge for the farmers as well as for the government. On this backdrop the present research paper attempts to track the effects of climate change on the agriculture sector. It also aims to understand the reasons for the worst climatic conditions and how it affects the Indian agriculture. The paper also is an attempt to come up with a model that would enable farmers to reduce the worst effects of worst climatic conditions.

#### **Nature of the Climate Change:**

It is believed that human activities are changing the climate. This climate change is expected to have a huge impact on our lives. Sea level is expected to rise by at least 40 cm by 2100 and it will inundate vast areas, including some of the most densely populated cities. Global temperature has risen by 0.6 degree Celsius in the last 130 years. This rise in global temperature will lead to huge impacts on a wide range of climate factor. The release of hazardous gases like Co<sub>2</sub>, methane, and nitrous oxide is causing excessive air pollution. Such dumping of hazardous gases in the atmosphere at an alarming rate leads to greenhouse effect. Under normal circumstances the Sun's rays hit the earth and are reflected back into space. However, gases in the atmosphere such as carbon dioxide and methane form a barrier for sunlight. Because of the properties of these gases the heat of the sun rays is trapped in the atmosphere. The sun rays cannot escape from the earth's atmosphere resulting in the increase in earth's temperature.

#### **Reasons of the Climate Change:**

Mostly, it appears that the major reasons of the climate change are manmade. Humans being the most intellectual animal on this planet had been using his brains to use natural resources for his or her comfort. One of the most important inventions of the twentieth century the steam engine has created a space for the generation of Industrial Revolution. Many of the traditional jobs of labor are now done through machines which functions either on electricity or fuels. The burning of fuels causes the pollution. Even the industries have been releasing its chemical remains or chemically stressed water into the rivers that results in disturbing the natural systems of rivers and turns them into gutters. The employments of modern farming techniques also have led to soil pollution that culminates into depleting the health of the soil. It is also one of the reasons of the climate change. Deforestation has been one of the most important aspects of climate change. Humans for their need of timber have been cutting trees at rapid speed. Normally it is expected that 33% of the earth's surface needs to be covered by the forest. However, the excessive deforestation has already deforested near about 50% of the total forests.

#### **Impact of Climate Change on Indian Agriculture:**

Agricultural productivity can be greatly affected by the climate change. Particularly there are two ways of in which this impact is evident. One of them is direct impact which is an outcome of the continuous changes in temperature, precipitation, co<sub>2</sub> level growth while other is indirect impact of climate change on the agricultural productivity. It is primarily evident

through the pests, insects, diseases or weeds. The rise in the temperature of the earth has resulted in the changing the seasonal cycle.

The soil system is greatly affected by the climate change. The soil system responds to the short-term events such as episodic infiltration of rainfall and also undergoes long-term changes such as physical and chemical weathering due to climate change. The global climate change affects the organic matters, supply of temperature, hydrology and changes in the potential evaporation. Organic matter and carbon ratio usually diminish a warmer soil temperature whereas drier soil conditions suppress both root growth and decomposition of organic matter that naturally leads to vulnerability to erosion. The increase in earth's temperature also accelerates evaporation rate from the soil that consequently leads to speeding transpiration from the plants. In such conditions plant themselves cause soil moisture stress.

Along with the soil conditions the climate change also affects the cropping pattern. The increased temperature greatly affects horticultural crops. Its impact is evident in the vegetable crops. Even the decreasing water and moisture levels affect the fruit and vegetable production. Depleting health of the crops naturally affects the livestock and poultry, which has been one of the important supportive businesses of the farmers. Many a times, in situations of draught and famines, livestock and poultry, it is evident that livestock and poultry have helped farmers survive the famines and draughts. It also stimulates the transmission of diseases from plants to the animals and through animals to the humans.

### **Reducing the Worst Effects of the Climate Change:**

On this backdrop, certain precautionary measures have become the necessity of the time. Specific measures can only provide a successful adaptive response if they are adopted in appropriate situations. These precautionary measures may include issues ranging between proper planning of the land available at our disposal to managing resources inputs to agriculture. Proper utilization of the land is one of the important aspects that can protect though to some extent, the depriving status of the soil. Farmers need to be careful while choosing the cropping pattern so as they would be enabled to give rest to land, they possess without having to bear financial losses. Watershed management, disaster vulnerability assessment and revision of trade policy and various programmes are some of the aspects that needs to be assessed and undergo necessary changes.

Along with these precautionary measures, some strategies can be employed for improving the ability of agriculture to respond diverse demands and pressures. One of them would be providing training and general education to the people who are dependent on agriculture. Even they should be trained to start some agriculture allied businesses. The existing food programmes and other social security programmes needs to be reassessed. Another important aspect is that the infrastructure facilities like transportation, distribution and market need to be improved. Even farmers need to be encouraged to go for organic farming techniques.

### **CONCLUSIONS:**

Taking into account the recent advancements into the fields of industry and technology it is clear that we cannot, for a longer time, resist the intervention of modern techniques in to agriculture. Rather it is suggested to employ modern technological assets to improve the quality of agriculture as well as its products. The use of micro irrigation techniques such as drip and sprinkler irrigation is suggested. Even, the organic farming techniques with appropriate blend of modernity would enable us to resist the problems that we are facing today.

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