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A REVIEW PAPER ON CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY

Mr. Pooran Singh*; Dr. Jitendra**

*SOMC
Sanskriti University, Mathura, Uttar Pradesh, INDIA
Email id: registrar@sanskriti.edu.in

*SOMC
Sanskriti University, Mathura, Uttar Pradesh, INDIA
Email id: jitendra.somc@sanskriti.edu.in

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ABSTRACT

Climate change is a complicated environmental issue that is wreaking havoc on many economic sectors in both developed and developing countries. Over the last several decades, Malaysia has seen significant changes in climatic variables. Climate change is expected to have a negative impact on agricultural output and, as a result, on the country's agricultural production. The emphasis of this article is on the possible risks and effects of global warming on Malaysian agricultural production. The study examines the present state of knowledge in Malaysia on climate change, agricultural, and food security concerns. Climate change poses a possible danger to grain production and industrial product export profits, according to available research. Climate change may reduce rice harvests by 13 percent to 80 percent, according to reports. Rice is Malaysia's primary staple grain. On the other side, owing to the negative effects of climatic variability, output of industrial crops such as oil palm, rubber, and cocoa will decrease by 10-30%. Furthermore, the country's population is projected to grow in the next decades, resulting in increasing domestic food consumption. This may increase the likelihood of food crises, putting the country's food security at jeopardy. As a result, immediate action is required to save the agricultural industry and maintain food production in the face of unavoidable climate change.

KEYWORDS: *Agriculture, Climate, Food, Production, Security.*

1. INTRODUCTION

Heavy rains and floods across the globe, forest fires, the emergence and spread of new illnesses, as shown by novel strains of pathogens and viruses, aberrant bacterial growth, and increased insect pest incidences in recent years have all been clear indicators of global environmental changes. The fundamental driver of rising temperatures has been well understood and shown to be manmade gas in the atmosphere emissions. Warmth, rainfall, and atmospheric carbon dioxide (CO2) concentrations have all been shown to have a direct influence on agricultural. Early and strong intervention is essential to mitigate the possibly catastrophic climate impacts on the productivities of various field commodities. Most emerging countries in Africa, Asia, and the Asia Pacific region depend on agricultural to make a livelihood, and the bulk of this populations that lives in dry or arid regions areas, which are generally characterized by significant climate variability(1–6).

The globe continues to confront enormous challenges in ensuring enough food for everyone that is nutritious, safe, and nutritionally appropriate. Given the complexities of climate change, if the author look at the weather extremes in Russia between 2010 and 2011, we can see that there were significant heat waves and that about 30% of grain harvests were destroyed due to fires, resulting in massive losses for the Russian economy. Given the weather patterns in India in recent years,

some regions have had excellent rainfall while others have experienced drought, making cultivation of various field crops difficult in those locations and lowering agricultural production(7).Human actions, particularly the combustion of fossil fuels, as well as natural causes, industrialization, and changes in land use, are altering air component concentrations and surface characteristics that absorb or scatter radiant radiation.

The warming is widespread throughout the world, and it is more pronounced at higher northern latitudes, with terrestrial areas warming faster than seas. The evapotranspiration of water from wet surfaces and plants will increase because of the warming, resulting in greater but more varied precipitation distribution. Because of industrialization, the concentration of ozone (O_3) will rise, which will have a detrimental effect on crop growth and production. With contributions from thermal expansion, melting glaciers and ice caps, and the polar ice sheets, the global average sea level has risen at an average rate of 18 mm/year since 1961 and 311 mm/year since 1993. The yearly average extent of Arctic sea ice has decreased by 27% each decade, with greater reductions of 74% per decade in the summer. Climate change, especially temperature rises, has already had an impact on a broad variety of physical and biological processes in numerous aquatic, terrestrial, and marine habitats throughout the globe. Climate change will exacerbate the risks of extinction and biodiversity loss for more fragile species. The amount and pace of climate change would increase the extent of harm or loss, as well as the number of systems impacted. The degree to which these systems are vulnerable is determined by their geographical position and climatic circumstances.

1.1 Climate change is expected to have the following negative effects on human systems:

- A general decrease in crop potential yields due to rising air temperatures.
- A general reduction in prospective agricultural yields in most Mid-latitude areas owing to yearly average temperature rises of more than a couple degrees Celsius.
- A rise in vector-borne and water-borne illnesses, as well as heat-stress mortality.
- A global rise in energy consumption because of rising summer temperatures in many areas of the globe. Climate change has been shown to have some positive impacts on humans (IPCC, 2001).

1.2 Climate change has a number of beneficial effects, including:

- A rise in the potential yields of certain crops in some Mid-altitude areas with temperature changes of less than a few degrees Celsius.
- A rise in the worldwide supply of well-managed forest timber.
- A rise in water availability in certain water-scarce areas of Southeast Asia.
- Lower energy consumption owing to colder winter temperatures

1.3 Climate Change and Agriculture:

The world's population will continue to rise, reaching 9.1 billion people by 2050. If all of these people were to be fed adequately, overall food output would have to rise by 70–100%. Increasing food production in a sustainable manner to feed the world's growing population is a huge issue. Agriculture is naturally vulnerable to climatic fluctuation and change, which may occur because of natural or human-caused factors. Global warming caused by greenhouses gas concentrations is expected to have a direct influence on agricultural, feeding, and forage plant producing lines, as well as animals care and the structure and equilibrium of food or food products trade. Climatic modification is currently affecting agriculture growth, and the impacts will vary different degrees of heating and associated alterations in precipitation systems, including from one region on to

next. As per the International Committee on Climatic Changing, global warming has an effect on agriculture productivity in very many parts of the world, with unfavourable repercussions being so much more common than favourable, and impoverished countries being especially vulnerable to further unfavourable effects. Climatic warming is considered to have reduced global corn and grains yields by 3.8 and 5.5 %, correspondingly, due to the effects of global warming, and many experts have projected significant drops in crop production when air temperatures reach key physiological thresholds for agricultural crops.

Global warming has been happening, because it is one of the greatest ecological and societal threats to the nation's or our own existence. Any need for ambitious and exceptional actions never was higher, with the Pact taking force this November and critics seeking to undermine it. Effective intervention is vital for the survival from the so "overlooked billions," who live in dry lands on the brink of ecological collapse, because the harshest climatic models are already an actuality! Drylands are projected to increase by 11% by 2100 because of climate change. Drylands are becoming more unproductive due to the loss of fifteen out of twenty-four ecosystem services. Approximately 10% of drylands have already been damaged, and additional area will be destroyed in the future years. The science establishment, international agencies, governments, and the private sector, is from the other hand, pay minimal consideration to arid areas and agriculture sectors in arid regions. This is due in part to common misconceptions or mischaracterizations of macroeconomic determinants, as well as the crucial lessons that may be gained regarding adapting to climatic climate by studying the intricate interplay of these elements in drylands.

1.4 Climate Change and Food Security:

Agricultural stability is defined by the International fund For Agricultural development as "a state of physiological, cultural, and socioeconomic accessibility to enough, safe, and nourishing food that meets their nutritional needs and daily nutritional preferences for an enough standard of living at all times."The FAO's definition of food supply includes four key aspects: availability, stability, access, and use. The term "availability" refers to the availability of acceptable quality food in sufficient quantities, whether produced domestically or imported.

To be severely food insecure, a community, home, or individual must have accessibility to appropriate amounts of food is essential. The word "consistency" especially for food supply that is consistent with consumption. "Access," the cognitive element, relates to human capacity to gain adequate means in obtaining acceptable goods in adequate amounts for a healthful eating. Furthermore, "utilization" pertains to all aspects of food that have to do with food security issues. To put it another way, foodstuff is used to attain a state of nutrient well-being in which all neurobiological needs are met via an adequate diet, fresh drinking, cleanliness, and universal medicare.

Agricultural is not only a resource of nutrition and also a resource of income for the majority of the population. As a consequence, the important question for food and nutrition insecurity is not whether there is enough food, and even if the community has enough economic and non-capabilities to guarantee that everybody has availability to enough quantities of high nutrient. All four dimensions of dietary productivity will be affected by climatic change: food and water or productivity, adequate food, food chain reliability, and food usage. Due to a lack of another one of the FAO's food insecurity components, around 2 billion adults out of the worldwide people of over 7 billion are foods hungry. However, the overall effect of climate change on food security, as well as on the general socioeconomic circumstances of the people, varies from area to region and through time.

1.4.1 Climate Change and Food Availability:

Climatic warming affects agriculture and foodstuff productivity in a number of ways. It has a

primary influence on feed productivity via variations in agribusiness circumstances, as well as a secondary influence on economic creation and redistribution, and hence agriculture farm produce desire. The life forms, cultured cultivars, ground situations, direct CO_2 influence on seedlings, and other site-specific factors variables all influence crop production response to climate changes. Climate change, such as CO_2 and O_3 concentrations in the atmosphere, as well as temperature and rainfall patterns, are expected to have a direct impact on agricultural production, food supply, and therefore global food security in the future.

1.4.2 Climate Change and Stability of Food Production:

Food production stability guarantees that food is always available in adequate quantities to meet demand. By causing larger year-to-year variations in crop yields, such severe weather events may have a negative impact on food production stability and, as a result, food security. Extreme weather events will become more severe and common, as climatic changes grow more intense and widespread. Droughts in semi-arid regions may significantly decrease agricultural yields as well as animal numbers and productivity.

1.4.3 Climate Change and Access to Food:

Individuals, groups, and nations with access to food have the capacity to purchase adequate amounts of high-quality food to meet their needs. Climate change is expected to have a little effect at the global level, with estimates ranging from a -1.5 percent decrease to a +2.6 percent rise by 2080. Agriculture's significance as a source of revenue may be considerably greater at the regional level. Agriculture's economic production will be a significant contribution to food security in these areas. Sub-Saharan Africa is projected to have the greatest effect of climate change on agricultural economic production, implying that the poorest and already most food-insecure area would experience the greatest reduction in agricultural revenues because of climate change. In many developing countries, agriculture is the primary source of food and revenue. Climate change threatens rural and urban people' access to food by decreasing agricultural output and earnings, raising hazards, and altering markets.

1.4.4 Climate Change and Food Utilization:

Any effect of climate change on the environment's health will have an impact on the appropriate use of food needed for nutritional well-being, which is dependent on water and sanitation. Consequently, there may be a significant drop in labor productivity, as well as a rise in poverty and even death. Similarly, severe rainfall events may raise the risk of water-borne illness epidemics, especially in areas where conventional water management systems are inadequate to deal with climatic extremes. Heavy rains and floods will have a greater effect in ecologically degraded regions and places where sanitation and hygiene are inadequate. All of these occurrences will increase the number of individuals who are exposed to various illnesses, reducing their ability to effectively use food.

2. DISCUSSION

The author has discussed about the Climate Change, Agriculture and Food Security. Climate change and biodiversity are intertwined, with one having an effect on the other. Human-caused climate change threatens biodiversity, while biodiversity mitigates the effects of climate change. Forests, for example, are nature's social security check in times of catastrophe and crisis, and they also serve as a sink for damaging GHG emissions, thus the existence of healthy biodiversity helps to develop natural resilience to climatic extremes.

In the next years, it will be critical to ensure that the world's growing population has access to enough nutritious food to ensure humanity's survival. It can only be possible if crop scientists significantly increase the biological yield of coming variety, which will then be backed by

agriculture administrators across the globe and maintained by farming community. In this flexible and innovative ecosystem, extensive relationships involving science and academic institutes, efficient farming administrators, legislators, agriculture production professionals, nationally and internationally commerce, and agriculture organizations on a worldwide scale are essential.

3. CONCLUSION

Considering the different scenarios of climatic change and their consequences on agricultural productivity, food security, and nutritional security on a global scale, changing climatic will undoubtedly have a substantial influence. Not only will global temperature affect people dietary sources and nutritious accessibility, but it will also have had an influence on existing agriculture durability, intensive animal requirements, and macroeconomic stability. Future advances in agriculture production, production, and competitiveness are crucial to maintaining peace among many players at the rural, regional, province, international, and global sectors. Abundant genomic variation, especially CWR, has not been extensively and efficiently used to boost the hereditary land productivity of so many crop production across the world. Importantly, CWR have robust gene pools that allow them to survive in severe environments. CWR should be prioritized in crop breeding enhancement efforts throughout the world.

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