International Journal of Multidisciplinary Trends

E-ISSN: 2709-9369
P-ISSN: 2709-9350
Impact Factor (RJIF): 6.32
www.multisubjectjournal.com
IJMT 2025; SP-7(11): 24-27
Received: 21-08-2025
Accepted: 24-09-2025

Dr. Kempegowda P
Associate Professor of Economics, Government First Grade College, Malur, Karnataka, India

Corresponding Author:
Dr. Kempegowda P
Associate Professor of Economics, Government First Grade College, Malur, Karnataka, India

Challenges of food security: Impact of climate change

Kempegowda P

DOI: https://www.doi.org/10.22271/multi.2025.v7.i11a.856

Abstract
Food is essential for the existence of all species. Access and availability of food are the basic rights of all living things on the earth. Production and distribution of food among all segments of the society is crucial and it needs to be ensured by the authorities that entire society has access to equitable food. Supply chain needs to be improved and systematized to achieve food security for all. But production and equitable distribution process hence food security might get affected due to some factors. As per the studies productivity and management of the same are getting affected due to climatic conditions. Climate change in this process remains the most common driver of food insecurity. It will continue to disrupt the entire food supply chain in the long term from production (upstream) to storage, processing and distribution (downstream). Food systems are serious concerns of food security and deeply affected by climate change. This paper provides an overview of climate change on the food security.

Key Words: Access, production and distribution, food security, supply chain, society

Introduction
Based on the 1996 World Food Summit food security is defined when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.
The four main dimensions of food security:

- **Physical *availability* of food:** Food availability addresses the "supply side" of food security and is determined by the level of food production, stock levels and net trade.
- **Economic and physical *access* to food:** An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
- **Food *utilization*:** Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals are the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
- ***Stability* of the other three dimensions over time:** Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

For food security objectives to be realized, all four dimensions must be fulfilled simultaneously. In economics, food security is when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs for an active and healthy life. It is comprised of four key dimensions: availability, accessibility, affordability, and stability.
The need for achieving food security is felt significantly in the recent years due to enormous pressure from the ever increasing population in India and across glob especially in developing nations where population growth has been an issue. Across glop including India, Pakistan even in United Nations of America ensuring the food security for the growing population has been a challenging task. Climate change has its own adverse effect and added the enormity of India's food-security challenges. Extreme weather events, including cyclones, wildfires, floods and droughts are threatening livelihoods, food security and access to health diets. Climate Change affects everyone. Small farmers and producers the backbone

of agriculture are the frontlines of the climate crisis and hardest hits. Climate extremes are one of the leading drivers of crisis in agri food systems worldwide. In spite of the considerable progress made during the last several decades in reducing hunger, as of 2015 almost 800 million people are chronically undernourished. An estimated 161 million children under five years are stunted. FAO estimates that, to satisfy the growing demand driven by population growth and dietary changes, food production will have to increase by 60 percent by 2050.

Objectives of the Paper

- To understand the concept of food security and its challenges
- To examine the impact of climate change on food security
- To study the impact of climate change in some of the countries
- To study the strategies of addressing the climate change on food security

Methodology

The present study is based on the secondary data published. The study is descriptive in nature. Data is collected from the various secondary sources like journals, websites, working papers and analyzed. The paper makes use of the data provided in the 2024 Global Report on Food Crisis and European Parliamentary Research Service.

Climate Change and Food Insecurity a discussion

In spite of the considerable progress made during the last several decades in reducing hunger, as of 2015 almost 800 million people are chronically undernourished. An estimated 161 million children under five years are stunted. At the same time, 500 million people are obese. Two billion people lack the essential micronutrients they need to lead healthy lives. FAO estimates that, to satisfy the growing demand driven by population growth and dietary changes, food production will have to increase by 60 percent by 2050. It is not enough to have sufficient food produced globally to meet demand - enough food is produced globally now but there are still almost 800 million hungry people - but that everybody has access to it, in the right quantity and quality, all the time. According to the United Nations, in 2015, there are still 836 million people in the world living in extreme poverty (less than USD1.25/day). And according to the International Fund for Agricultural Development (IFAD), at least 70 percent of the very poor live in rural areas, most of them depending partly (or completely) on agriculture1 for their livelihoods. It is estimated that 500 million smallholder farms in the developing world are supporting almost 2 billion people, and in Asia and sub-Saharan Africa these small farms produce about 80 percent of the food consumed. Climate change threatens to reverse the progress made so far in the fight against hunger and malnutrition. As highlighted by the latest assessment report of the Intergovernmental Panel on Climate change (IPCC), climate change augments and intensifies risks to food security for the most vulnerable countries and populations. Four out of the eight key risks induced by climate change identified by IPCC AR5 have direct consequences for food security: • Loss of rural livelihoods and income • Loss of marine and coastal ecosystems, and livelihoods • Loss of terrestrial and inland water ecosystems, and livelihoods • Food insecurity and breakdown of food systems The earliest and the more impacted are the most vulnerable countries and populations, including in arid and semi-arid areas, landlocked countries and small island developing states. Climate change will also have broader impacts through effects on trade flows, food markets and price stability and could introduce new risks for human health. Greatly expanded efforts to respond to climate change are needed immediately to safeguard the capacity of food systems to ensure global good security.

Climate change remains the most common driver of food insecurity. It will continue to disrupt the entire food supply chain in the long term - from production (upstream) to storage, processing and distribution (downstream). On the supply side, rising temperatures and more frequent extreme weather events harm key crops like wheat and grain maize, and challenge livestock and seafood. Southern Europe is particularly vulnerable, raising climate justice issues within the EU, while some northern regions could experience more favorable conditions for specific crops. Impacts on pollinators, pests, diseases and labor productivity further reduce yields. The resulting economic losses threaten producers' livelihoods and affordability for consumers, worsening food insecurity. Along the supply chain, climate change affects both the quality and quantity of food, raising concerns about sufficient access to nutritious food. Moreover, the EU's reliance on imports from trade partners, themselves vulnerable to climate change, especially for animal feed, raises concerns about the future of EU food sovereignty and dietary traditions key to food security. The EU's responses span several policy areas, including food production (agriculture, fisheries and aquaculture), climate adaptation, water, soil and biodiversity. However, challenges remain in coordination and implementation. The EU's strategic focus has recently shifted from building a sustainable food system towards a competitive and resilient agricultural sector. While ex-post measures, such as improved insurance schemes, are paramount, they should not overshadow ex ante adaptation efforts that promote a sustainable food system, integrating new technologies, sustainable farming and evolving dietary trends.

Climate change could possibly disturb development toward a world zero hunger. An obvious and from other related indicators of nutrition, such clear global designs is visible of the effects of climate change on production of crop that could have effect availability of food internationally. The strength of entire food systems of may be at danger because of short-term inconsistency in supply. The condition in Pakistan is not hopeful as 21 million populations in urban areas are facing food insecurity in terms of (calorie consumption). This problem is worst in province of Baluchistan, where 20 districts have extremely food-insecure urban populations. In Province of Sindh six and five in Khyber Pakhtunkhwa are also facing food insecurity, though Punjab seems comparatively better to other provinces (Arshad, & Shafqat, 2012, p. 141.). In rural regions, 80 districts are facing issue of food in security, in which mostly backward 38 districts also included. Across many regions, 28 districts of KPK, 22 of Baluchistan, 11 in Sindh, 10 in Punjab, and 5 districts of Northern Areas face food insecurity.

The International food policy research institute (IFPR) classified the status of hunger into five category-low, moderate, serious, alarming and extremely alarming. India falls into the category of alarming. The most important

aspect contributing to this development is the non-availability of basic requirement of food. It has been observed that the consumption of food, in terms of nutrition and quantity, is lacking far behind. In India approximately, 320 Indians go to bed without food every night and recent data is very much alarming and situation is going even worse. Food riots have taken in many countries of the world. It's becoming very difficult to maintain food security.

An Overview of World Food Insecurity*:* An Analysis

Over 281.6 million people in the 59 countries/territories with data meeting GRFC technical requirements faced high levels of acute food insecurity in 2023. This fifth consecutive annual increase is mostly attributed to expanded analysis coverage. At 21.5 percent, the prevalence was marginally lower. Among countries with comparable data between 2022 and 2023, the situation worsened in 12, driven by conflict/insecurity, weather extremes and/or economic shocks, but it improved in 17. Thirty-six countries/territories are considered protracted food crises in the GRFC, having been included in all eight editions. Among them, 19 are protracted major food crises and accounted for up to 80 percent of the total population facing high levels of acute food insecurity across food-crisis countries/territories each year. Major food crises have more than 1 million people or 20 percent of their total population facing high levels of acute food insecurity (IPC/CH Phase 3 or above), an area classified in Emergency (IPC/ CH Phase 4) or above, or were included in the Inter Agency Standing Committee humanitarian system-wide emergency response Level 3. The number of major food crises in the GRFC has almost doubled since the first GRFC edition in 2017. Nineteen countries are classified as protracted major food crises, having been classified as major food crises in all eight editions (refer to Technical Notes for full list). Of these 19, Afghanistan, Democratic Republic of the Congo, Ethiopia, Nigeria, the Syrian Arab Republic and Yemen have been among the ten largest food crises in terms of numbers of people facing high acute food insecurity. Colombia (residents), Congo (residents), Côte d'Ivoire and Senegal became major food crises for the first time in the GRFC 2024 either because data became newly available (Congo and Colombia residents) or levels of acute food insecurity increased to the extent that they met the inclusion thresholds (Côte d'Ivoire and Senegal). Mauritania and Guinea, which were major food crises in the GRFC 2023, were no longer so in the GRFC 2024 as their situations improved (2024 Global Report on Food Crisis).

Socio-economic implications of climate change impacts

Climate-related impacts on the food supply chain have several social and economic consequences. On the food production side, reduced yields result in economic losses but also in higher and more unstable prices, raising affordability concerns for food security. The European Investment Bank (EIB) finds that Member States currently experience an average economic loss of around 6% of annual crop and livestock production due to climate change, amounting to €28.3 billion, with south-eastern Europe most affected. By 2050, this loss could reach €40 billion under a high emissions scenario. Yield losses have social consequences on producers and consumers. The EIB estimates that only 20-30% of climate-related crop losses are insured, with significant variations across Member States. In southern and Eastern Europe, farmland values could fall by 5-9% per degree of warming, with lower profitability possibly leading to farmland abandonment. For consumers, inflation reduces food affordability. Extreme heat in 2022 reduced yields in some regions of Western Europe and increased food inflation in Europe by 0.43-0.93 percentage points. Warming projected for 2035 would amplify this inflationary impact by up to 50%. In 2024, 9% of EU citizens could not afford a meal containing meat, chicken, fish or a vegetarian equivalent every second day.

Major Findings of the Paper

It is clear that climate is affecting the basic purpose of food security and causing the socio economic impact on the society hence governments have to act quickly and initiate proper action to ensure food security otherwise access to food availability and supply becomes biggest challenges to all the countries especially where population has been rising and hunger remains un solved because climate change reduces agriculture productivity along with the issue of nutrition, damages supply chain due to extreme weather, increases poverty and in equality**.**

Strategy to manage climate and ensure food security

Promoting farming systems that use climate resist techniques and produce a more diverse mix of foods, to improve food systems' resilience, increase farm incomes and enable greater availability and affordability of nutrient-dense foods, improving supply chains to reduce post-harvest food losses, improve hygiene in food distribution channels, and better link production and consumption centers**.**

References

1. World Bank. Available from: https://www.worldbank.org
2. United Nations Office for the Coordination of Humanitarian Affairs (ReliefWeb). Available from: https://reliefweb.int/organisation/unisef

3. Food and Agriculture Organization of the United Nations. Climate and agrifood systems - interactive report. 2025. Available from: https://www.fao.org/interactive/2025/climate-and-agrifood-systems/en/
4. Jaswal SS. Challenges to food security in India. IOSR J Humanit Soc Sci. 2014;19(4):93-100.
5. Chakrabarthy M. Climate change and food security in India. Observer Research Foundation. 2016;157:1-11.
6. Food and Agriculture Organization of the United Nations. Climate change and food security: risks and responses. Rome: FAO; 2015. p. 1-40.
7. Naz S. Climate change's impact on food security in Pakistan: challenges and mitigation strategies. Pak Soc Sci Rev. 2024;8(2 Suppl):426-438.
8. Jensen L, Hourdin C; Graphic: Chahri S. Climate change impacts on food security in the European Union. European Parliamentary Research Service. 2025; p. 1-7.
9. International Bank for Reconstruction and Development / International Development Association (IBRD-IDA). Food security update. The World Bank; 2025. p. 1-24.
10. Global Network against Food Crises. Global report on food security. Food Security International Network; 2024. p. 1-54.