

Climate Change and Food Safety

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Abstract

Climate changes have great impacts on various foods. Changes can occur in any stage from growth to storage. The increase or decrease of temperature, humidity, pH causes various food hazards and food borne diseases and various healths issues and makes the food unsafe for consumption. There are currently a number of studies dealing with the potential effect of increased temperature, extreme weather events and cascading events on food safety and human health. Food security and safety plays an important role. If the food is safe then it provides various nutritive value, increases demand, maintains health and many other benefits, and if the food is unsafe then it causes many issues regarding health. Climatic changes include global warming, droughts, rainfalls, floods, etc. They have a great impact on food safety and security.

Keywords- Climate, Food, safety, Processing, Storage

Introduction:

Climate change has an effect on the occurrence of food safety hazards during any stage of the food chain like harvesting, processing, storage etc. There are many pathways from which climate related factors may affect the food. Factors that affect food safety include global trade, technological development, socio-economic, urbanization, and agricultural land use.



Fig-1: Climate Change Scenario

These factors have direct and indirect effects on the food. Some factors that have impact on food safety are; change in temperature and precipitation patterns, increasing frequency and extreme weather intensity based events, ocean warming and acidification, and

change in transport pathways of complex contaminants. Increased temperature and change in rainfall pattern can cause the growth of bacteria, viruses, fungi, parasites, and cause food borne diseases. Extreme weather changes such as floods, droughts may lead to the contamination of soil, water, agricultural land, food and animal feed with pathogens, chemicals and some of the hazardous substances originated from sewage, agriculture and industrial settings.

Climate change and food safety impacts:

The interactions between climate changes, food safety, variation, and food borne diseases are very complex. Climate related changes may impact the host, environment and agent.

Food safety and security is one of the leading concerns associated with climate changes. Climate changes affect food security in many ways. It impacts crops, livestock, forestry, fisheries and aquaculture, and also causes grave social and economic consequences in the form of reduced incomes, trade disruption and many health impacts.

1. Effect of climate on packed food products
2. Effect of climate on fresh fruits and vegetables
3. Effect of climate on beverages
4. Effect of climate on poultry products
5. Effect of climate on spices, condiments etc.

Climate Change, Food Storage and Distribution:

Climate changes have many effects on the packed food products and stored products. Commercially food processing and packing is widely done in industries. Food packaging is reported to contribute 1.27% of UK GHGs. Food waste and packaging is reported to contribute about 50% of the greenhouse gases to the environment.

1. Effect of Climate on Packed food products:

Packaging helps reduce food waste, due to its protective function. Much of the research has shown that the environmental benefit for preventing food waste is typically 5 to 10 times higher than that of environmental harm of its packaging. Moreover, product protection pays off for various food groups with res



Fig-2: Spoiled Bread

moving perishables), while efficient packaging provides some optimal food preservation, by using minimal recyclable, reusable materials wherever possible. Most of the packaging can have many impacts on the environment as they release greenhouse gases, contaminate groundwater and air. Some packed foods are spoiled because of lower resistance to thermal shock and fractures.

2. Effect of climate on fresh fruits and vegetables:

Climate change is becoming a very serious concern for various fruit and vegetable processing sectors, as several years of volatile and extreme weather has led to the falling of crop yields, and many field losses which have resulted in reduced and various irregular deliveries of raw materials to the processing factories.

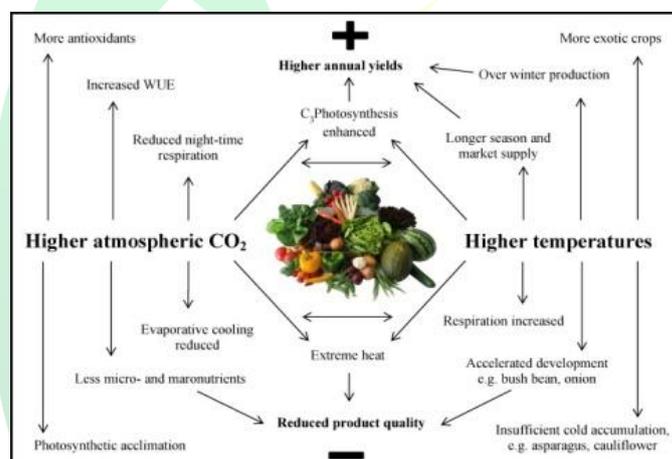


Fig-3: Influence of Climate Change on Quality of Fruits and Vegetables

3. Effect of climate on beverages:

Many of the popular food and beverages are grown by smallholder farmers all around the world. These farmers have to experience the increasing challenges, as they struggle to grow their crops in extreme weather, droughts, floods, and other threatening conditions. Extreme weather, prolonged droughts, new pests and some plant diseases have made it more difficult for farmers to grow their crops, many of them are forced to switch to new crops or face significantly reduced incomes.



Fig-4: Climate Change on Beverages

Example: Barley is a key ingredient in many popular beverages, and is sensitive to heat and drought — both of which are becoming more common because of global warming. Researchers suggested that world barley yields can decrease by 17%-18% by 2099, which would mean an increase in prices for consumers and a loss of essential income for many small-scale grain farmers. Climate changes reduce incomes.

4. Effect of climate on poultry products:

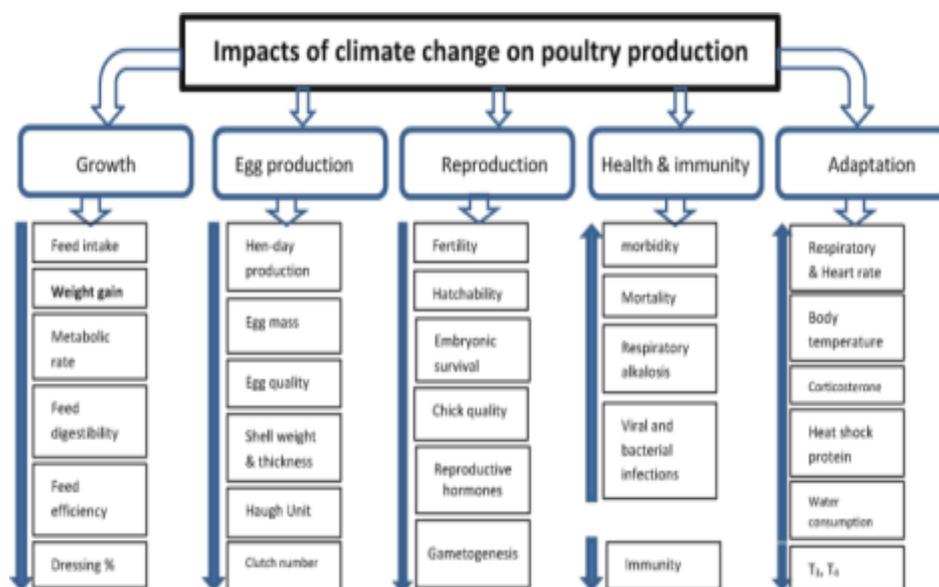


Fig-5: Climate Change Effect on Poultry Production

5. Effect of climate on spices and condiments:

The effect of global warming in many parts of the world including India has been causing serious problems for the last few years. Like many of the agricultural, horticultural crops, and spice crops are facing the brunt of climate changes. Different types of abiotic factors; especially temperature, rainfall, sunshine hours, wind, etc. directly or indirectly influence different types of physiological growth stages (like flowering, fruit setting, fruit development, seed setting and final reproductive or vegetative yield of spice crops). The high temperature causes spike shedding in black pepper. Prolonged dry season may cause the reduced pollination and abortion of cardamom flowers. The arid conditions and violent winds are detrimental to the plant growth of vanilla. Also sudden temperature falls, changes during the early vegetative stage results in bolting of onion. High rainfall and humidity increases the growth of pests like aphids and diseases like powdery mildew in most of the seed spices like, coriander, fenugreek, cumin, etc.

Conclusion:

Food safety and security is one of the leading concerns associated with climate changes. Climate impacts crops, livestock, forestry, fisheries and aquaculture, and also causes grave social and economic consequences in the form of reduced incomes, trade disruption and many health impacts. Food security and safety is currently playing an important role in various sectors. Climatic effect on various crops, processing fruits and vegetables, food products, etc. reduces the productivity, demand, lowers the value of a particular food.

Climatic changes affect directly and indirectly to various food products.

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