

Global Food Security and Challenges

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ABSTRACT

Food is our basic need, every human being on this planet need food to live, all the foods we grow to eat is provide various kinds of nutrients which are nessecery for healthy life. In this world many people are still do not have required amount of calorie in their daily diet, because of unavailability of food and equally some are throwing foods in garbage as waist in their daily life this figure is very critical. If we try to identify the reason behind this are unequal distribution of money and foods to all to survive their best life as human being, low agricultural production of crop to fulfill the needs of all, limited area of agriculture, techniques and education about how to grow best crops and vegetables in available land. Population is increasing rapidly across the world but the production is being shorter than the before because land are being used in residential purpose. The whole world is facing problem to feed rapidly increased population, many data shows that this crisis will increased day by day till 2050 it is expected to reach around 10billion. This term is used for the world as triple burden on the countries, and because of insufficient food intake problem of malnutrition, micronutrients deficiency and crisis of global hunger is rising. No country confronts these tremendous challenges alone nor should it. Now there is need to promote such a sustainable agriculture to solve the food security problem around the world.

Key Words: Global Hunger, Food Security, Malnutrition, Sustainable Agriculture.

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INTRODUCTION

Global food security is challenge for present time because there are many factors which responsible for the global hunger and poverty, undernourished, low quality of nutrient intake and many other related problems are rising day by day. As globally we reaching on new height of development of science, simultaneously we are facing such a critical problem worldwide. Increased population and changes in the climate, agriculture and farming techniques and policies are such a determinants which are increasing risk of food security. Food unavailability and low production of food item is raising problem of global hunger, and this is on the higher level of crisis, with 821 million undernourished people in the world in 2017, which was more than 784 million in 2015, with ongoing violence of starvation, hunger and economic crisis of 12 million people [1-6].

WHAT IS MEANT BY GLOBAL HUNGER?

The problem of hunger is complex and different terms are used to describe its various forms. Hunger is usually understood to refer to the distress associated with a lack of sufficient calories. The Food and Agriculture Organization of the United Nations defines food deprivation or undernourishment as the consumption of too few calories to provide the minimum amount of dietary energy that each individual requires living a healthy and productive life, given according to the person's sex, age and physical activity.

- Under Nutrition: Insufficient nutrient intake and deficiency of few or all nutritional requirements is referring as under nutrition.(Deficiency of energy, protein, and

essential vitamins and minerals). Under nutrition is the result of inadequate intake of food in terms of either quantity or quality, poor utilization of nutrients due to infections or other illnesses, or a combination of these factors. These in turn are caused by a range of factors, including household food insecurity 'inadequate maternal health or childcare practices' or inadequate access to health services, safe water and sanitation.

- **Malnutrition:** This is the term used for the condition where nutritional imbalance are exist, whether some are more in diet and some timeless than the requirement of daily dietary intake. Continuous intake of deficient or more calories in diet is known as malnutrition. This stated many types of health problems, like protein energy malnutrition, obesity, calcium deficiency and other nutrient imbalance.

In this report, "hunger" refers to the index based on four component indicators. Taken together, the component indicators reflect deficiencies in calories as well as in micronutrients.

First for each country, values are determined for four indicators:

1. **UNDERNOURISHMENT:** Insufficient intake of all nutrients caused undernourishment, lack of protein, carbohydrate, vitamin, and minerals are not present in daily diet.
2. **CHILD WASTING:** Children under the age of five who are wasted that is, who have low weight for their height, reflecting acute under nutrition.
3. **CHILD STUNTING:** Children under the age of five who are stunted, who have low height for their age, reflecting chronic under nutrition.
4. **CHILD MORTALITY:** Mortality rate of children under the age of five is due to unhealthy dietary intake and unhygienic habits and nutritional deficiency caused child mortality.

Second, each of the four component indicators is given a standardized score on a 100-point scale based on the highest observed level for the indicator on a global scale in recent decades. Third, standardized scores are aggregated to calculate the GHI score for each country, with each of the three dimensions (inadequate food supply; child mortality; and child undernutrition, which is composed equally of child stunting and child wasting) given equal weight.

This three-step process results in GHI scores on a 100-point GHI Severity Scale, where 0 is the best score (no hunger) and 100 is the worst. In practice, neither of these extremes is reached. A value of 0 would mean that a country had no undernourished people in the population, no children younger than five who were wasted or stunted, and no children who died before their fifth birthday. A value of 100 would signify that a country's undernourishment, child wasting, child stunting, and child mortality levels were each at approximately the highest levels observed worldwide in recent decades. The GHI scale shows the severity of hunger - from *low* to *extremely alarming* - associated with the range of possible GHI scores [7-12].

EFFECT OF CLIMATE CHANGES ON GLOBAL FOOD PRODUCTION

There are some evidences that climate changes are already having a measurable effect on the quality and quantity of food produced globally. But this is small when compared with the significant increase in global food production that has been achieved over the past few decades. Isolating the influence of climatic change from all the other trends is difficult, but one recent Stanford University study found that increases in global production of maize and wheat since 1980 would have been about 5% higher were it not for climate change. All else being equal, rising carbon dioxide concentrations, the main driver of climate change, could increase production of some crops, such as rice, soybean and wheat. However, the changing climate would affect the length and quality of the growing season and farmers could experience increasing damage to their crops, caused by a rising intensity of droughts, flooding or fires. The latest IPCC report predicted improving conditions for food production in the mid to high latitudes over the next few decades, including in the northern USA, Canada, northern Europe and Russia. Conversely, parts of the subtropics, such as the Mediterranean region and parts of Australia, and the low latitudes, could experience declining conditions. For example, across Africa, yields from rain-fed agriculture could decline by as much as 50% by 2020. Beyond this, if global temperatures rise by more than about 1 to 3°C, declining conditions could be experienced over a much larger area. The future course of global food production will depend on how well societies can adapt to such climatic changes, as well as the influence of other pressures, such as the competition for land from biofuel production. The IPCC concluded that in the poorer, low-latitude

countries, climate change could seriously challenge the capacity to adapt for a warming of more than 3°C. The richer, higher latitude countries are likely to have a greater capacity to adapt and exploit changing climatic conditions [13-15].

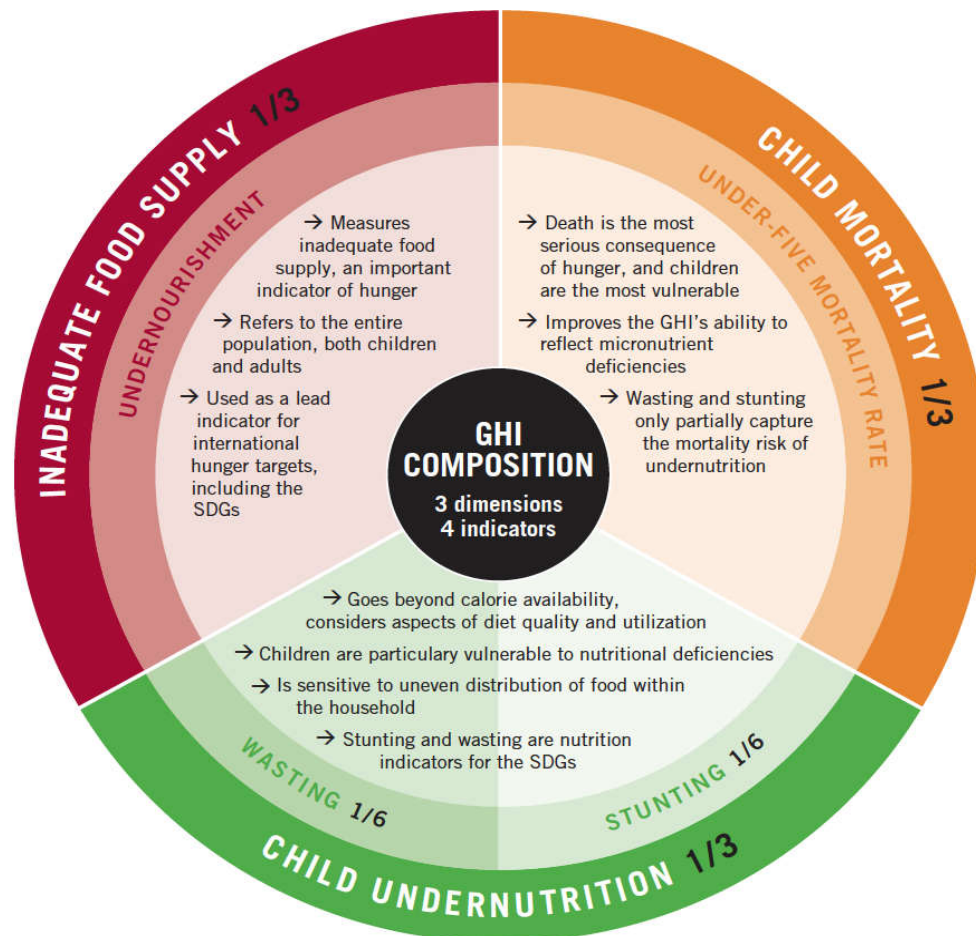


Figure 1.1: Composition of the Global Hunger Index

Source: Wiesmann et al. (2015). Note: The values of each of the four component indicators are standardized. See Appendix A for the complete GHI formula and Appendix B for the sources of data. SDGs = Sustainable Development Goals.

THERE ARE AT LEAST FOUR CHANNELS BY WHICH CLIMATE CHANGE AFFECTS FOOD SECURITY [11, 13]

- **Temperature increase.** Higher temperatures lead to heat stress for plants, increasing sterility and lowering overall productivity. Higher temperatures also increase evaporation from plants and soils, increasing water requirements while lowering water availability.
- **Changing patterns.** In many places, growing seasons are changing, ecological niches are shifting, and rainfall is becoming more unpredictable and unreliable both in its timing and its volume. This is leading to greater uncertainty and heightened risks for farmers, and potentially eroding the value of traditional agricultural knowledge such as when to plant particular crops.
- **Rising sea levels.** Rising seas contaminate coastal freshwater aquifers with salt water. Several small island states are already having serious problems with water quality, which is affecting agricultural productivity. Higher seas also make communities more vulnerable to storm surges which can be 5-6 metres high. The storm surge from cyclone Nargis travelled 35 kilometres inland, killing 140,000 people and flooding around 14,400 km, an area one third the size of Switzerland.

- **Water.** The interactions between climate change, water scarcity and declines in agricultural productivity could lead to regional tensions and even open conflict between states already struggling with inadequate water supplies due to rising populations and over-pumping of groundwater.

Agriculture and fisheries are highly dependent on the climate. Increases in temperature and carbon dioxide (CO₂) can increase some crop yields in some places. But to realize these benefits, nutrient levels, soil moisture, water availability, and other conditions must also be met. Changes in the frequency and severity of droughts and floods could pose challenges for farmers and ranchers and threaten food safety. Meanwhile, warmer water temperatures are likely to cause the habitat ranges of many fish and shellfish species to shift, which could disrupt ecosystems. Overall, climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places as we have done in the past. The effects of climate change also need to be considered along with other evolving factors that affect agricultural production, such as changes in farming practices and technology.

- **Impacts on Crops**

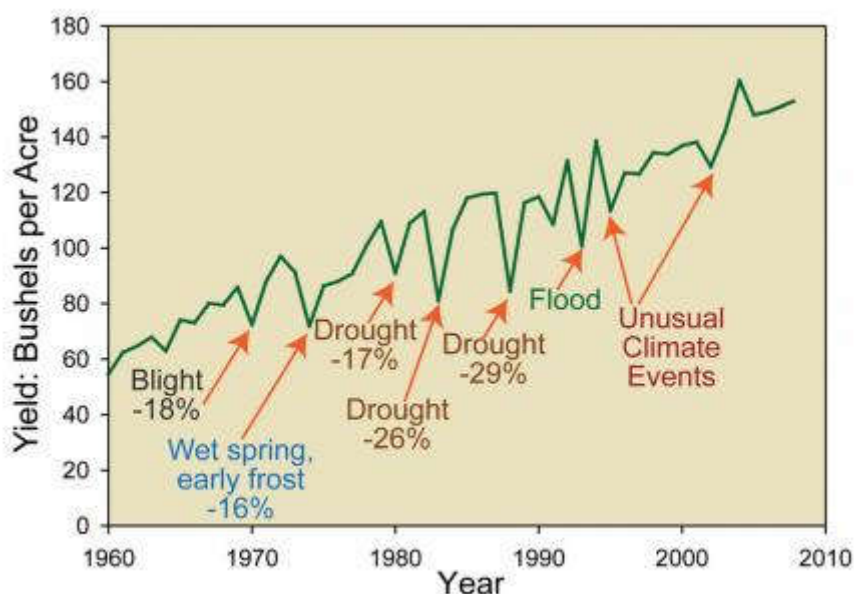


Fig.1.2; Impact of climate changes on the crop production year wise:
Source: USGCRP(2009)

Despite technological improvements that increase corn yields, extreme weather events have caused significant yield reductions in some year

Crops grown in the United States are critical for the food supply here and around the world. U.S. farms supply nearly 25% of all grains (such as wheat, corn, and rice) on the global market. Changes in temperature, atmospheric CO₂, and the frequency and intensity of extreme weather could have significant impacts on crop yields.

For any particular crop, the effect of increased temperature will depend on the crop's optimal temperature for growth and reproduction. In some areas, warming may benefit the types of crops that are typically planted there, or allow farmers to shift to crops that are currently grown in warmer areas. Conversely, if the higher temperature exceeds a crop's optimum temperature, yields will decline.

- Higher CO₂ levels can affect crop yields. Some laboratory experiments suggest that elevated CO₂ levels can increase plant growth. However, other factors, such as changing temperatures, ozone, and water and nutrient constraints, may counteract these potential increases in yield. For example, if temperature exceeds a crop's optimal level, if sufficient water and nutrients are not available, yield increases may be reduced or reversed. Elevated CO₂ has been associated with reduced protein and nitrogen content in alfalfa and soybean plants, resulting in a loss of quality. Reduced grain and

forage quality can reduce the ability of pasture and rangeland to support grazing livestock.

- More extreme temperature and precipitation can prevent crops from growing. Extreme events, especially floods and droughts, can harm crops and reduce yields. For example, in 2010 and 2012, high nighttime temperatures affected corn yields across the U.S. Corn Belt, and premature budding due to a warm winter caused \$220 million in losses of Michigan cherries in 2012.^[1]
- Dealing with drought could become a challenge in areas where rising summer temperatures cause soils to become drier. Although increased irrigation might be possible in some places, in other places water supplies may also be reduced, leaving less water available for irrigation when more is needed.
- Many weeds, pests, and fungi thrive under warmer temperatures, wetter climates, and increased CO₂ levels. Currently, U.S. farmers spend more than \$11 billion per year to fight weeds, which compete with crops for light, water, and nutrients. The ranges and distribution of weeds and pests are likely to increase with climate change. This could cause new problems for farmers' crops previously unexposed to these species.
- Though rising CO₂ can stimulate plant growth, it also reduces the nutritional value of most food crops. Rising levels of atmospheric carbon dioxide reduce the concentrations of protein and essential minerals in most plant species, including wheat, soybeans, and rice. This direct effect of rising CO₂ on the nutritional value of crops represents a potential threat to human health. Human health is also threatened by increased pesticide use due to increased pest pressures and reductions in the efficacy of pesticides.

Other reasons for the existing food insecurity: Another reason for the food insecurities are exists because of that many times food production and availability is sufficient but it is out of reach for all. Here is the details of the factors which are responsible for the insecurity:



Fig: 1.3: Reasons for the food insecurity:

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- This is mainly due to lack of improvement in agricultural productivity owing to inadequate resources and markets needed to obtain agricultural stability. An agrarian crisis is currently being unleashed in India and it has a variety of causes, the prominent being the huge cut in government’s development expenditure in the nineties, particularly in rural areas.
- The key issue which catalyzes the problem of food insecurity in urban areas and needs to be addressed is the large proportion of informal workforce resulting in unplanned growth of slums which lack in the basic health and hygiene facilities. Rural-to-urban migration has shown a gradual increase, with its share in total migration rising from 16.5% to 21.1% from 1971 to 2001. These rural migrants form a large chunk of population referred to as informal sector. The emergence of these rural origin pockets in the urban areas has resulted in a number of slum settlements characterized by inadequate water and sanitation facilities, insufficient housing and increased food insecurity.
- The children are food insecure because of factors attributed to overpopulation, poverty, lack of education and gender inequality. Poverty is a major cause as it limits the amount of food available to children. Overpopulation is linked to competition for food and can lead to malnutrition amongst children, especially in rural areas where access to food is limited. Lack of adequate knowledge amongst mothers regarding nutrition, breast-feeding and parenting is another area of concern.

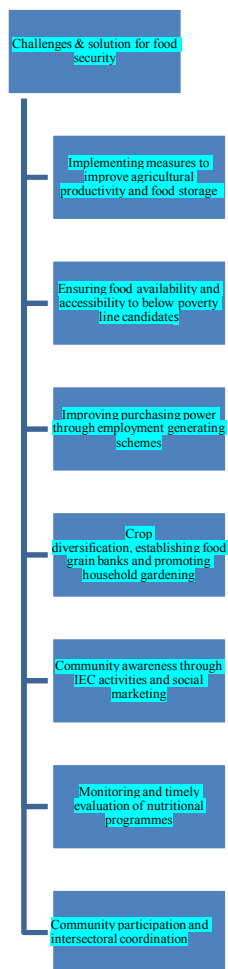


Fig: 1.4: Challenges and solutions for the food security for all.

CONCLUSION

- Climate change will affect food production for all physical systems, marine and terrestrial, as basic environmental conditions change. Temperatures are rising and precipitation patterns are shifting, making crop selection and timing uncertain. The physiological responses of plants and soil systems to increased levels of CO₂ in the atmosphere remain unknown. Ocean acidification is slowing and reversing coral growth and is harming organisms at the bottom of the food chain, with knock-on effects for important fisheries. Increased frequency and intensity of storms adds to the toll of crop damage. The effects of these changes will be felt most by vulnerable households and communities that lack the physical and socioeconomic infrastructure to buttress their resilience.
- Food security at the household level requires access to affordable food. In the case of rising food prices, affordability means that consumers must be able to absorb higher costs, at least temporarily. Households for which food accounts for a lower proportion of their expenditure are more likely to be able to absorb rises in food prices; for low-income households, safety nets are needed in the short term to ensure that food remains affordable. Over the longer term, livelihoods that provide higher incomes contribute to improvements in food security.
- Political and social dynamics shape the economic context of food systems, and in particular whether and how farmers invest in agricultural production. An uncertain economic future makes it risky for farmers to plant crops in the expectation that their efforts and inputs will pay off at harvest time, and depresses longer-term investments. Corruption undermines economic incentives by imposing additional costs on producers and other stakeholders throughout the value chain
- Corruption can undermine food security in several ways: by diverting funds intended for agricultural development, by siphoning off food supplies from incoming aid shipments, and by adding marginal expenses to poor farming households, whether through the need to pay bribes or the diversion of government subsidies for inputs. Bangladesh, for example, scores poorly on corruption, research on Bangladeshi rice farmers found that the cost of corruption adversely affects caloric consumption and those low-budget households, which are the least flexible and resilient, are affected most. In India, the public food distribution system that is intended to provide poor people with subsidized grain is notoriously corrupt, with almost 60% of food meant for beneficiaries diverted for sale or export.

Food insecurity is the worldwide problem, mentioned above solutions and awareness could minimize the food unavailability in the world. Every person need balance diet with all nutrients, if we take few step in solving the problem then we could provide food to all.

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