

Food Security in Developing Countries: Factors and Mitigation

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Abstract

Since 1976, eradicating hunger has become one of the priority objectives of the United Nations, which is included in the Charter of Human Rights; the right to get adequate food. The qualification of food security in time and space must analyze not only the three components it covers but also the relationships that these three components maintain. Climate change contributes to food insecurity, but it is not the only factor. To address food insecurity in various forms, greater food security must be combined with improved sustainable agricultural practices with minimal strain on the environment. This review of literature insists on the principles of food security, which in particular allows a better understanding of food insecurity in developing countries and favors a greater contribution of agriculture and food systems in general to nutritional progress.

Keywords

Food Security, Developing Countries, Climate Change

1. Introduction

This Food insecurity is often linked to a problem of accessibility, availability, stability, and utilization (Saaka, 2016). Food insecurity is often attributed to sharp rise in food prices associated with economic constraints, conflicts leading to political instability, and unusual climatic conditions (FAO, 2018b). Its need is now more urgent than ever as efforts should step up to meet the Millennium Development Goal (MDG) of halving the proportion of people who suffer from hunger by 2025. As pointed out by Capaldo et al. (2010), food security policies

should be based as much on the assessment of households' current conditions as on the expectation of their future access to food.

To reduce the hazard of future undernutrition, policy design should address the uncertainty that households face alongside their risk-management options.

[World Bank \(2020\)](#) projections estimated about 115 million people as potentially at risk of being forced into extreme poverty in 2020, a third of these being from developing countries¹. The 2021 World Health Organization's State of Food Security Report, *inter alia*, explores the triple factors of conflict, climate, and economic slowdowns in driving food (in) security. Food security is a fundamental aspect for every nation, particularly developing countries facing multiple economic and climatic restrictions. The United Nations listed removing hunger and poverty as the first-millennium development goal, indicating the centrality of the food security issue.

United Nations Committee on World Food Security defines Food Security as follows: "A situation where all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life" ([Pérez-Escamilla, 2017](#); [IFPRI, 2019](#); [Disabled World, 2017](#)).

According to [Disabled World \(2017\)](#), two common definitions come from the United States Department of Agriculture (USDA), and the UN's Food and Agriculture Organization. First, food security exists when people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life ([FAO, 2018b](#)). Secondly, food security for a household means access by all members at all times to enough food for an active, healthy life. According to USDA, therefore, food security includes accessibility of nutritionally adequate and safe foods, availability of food that is to acquire acceptable foods in socially appropriate ways without resorting to emergency food supplies, scavenging, stealing, or other coping strategies and use based on knowledge of basic nutrition and care, as well as adequate water and sanitation ([USDA, 2019](#); [India's Water and Food Security, 2019](#)).

An important mitigation strategy in pursuing food security is the planting of crops. Land, considered a basic input in farming that contributes to food security, not only acts as a source of cash income through agricultural production but also as a source of food for household consumption ([Maxwell & Wiebe, 2018](#)). Studies suggest that farms with larger areas of cropland are more likely to be more efficient, thereby promoting food security ([Fekadu & Muche, 2010](#)). Several factors related to mitigation strategies could influence food security. Off-farm income can serve as a proxy to capture households' diversification strategies for manag-

¹In commonplace parlance, the term "developing countries" is preferred as more acceptable than the denigrating "poor countries". "Developing countries" is often used interchangeably with "low-income countries", most of these being in Africa, Asia, and Latin America. Our use of the term maintains this exclusive economic implication, while at the same time remaining critical of the notion's problematic flattening of the global social landscape along a notion of linearity crafted after particular experiences. This explains our insertion of the term in double quotations early in this text. To avoid a tedious reading, we drop these later in the text with hope that the reader will remain vigilant.

ing food insecurity (Fekadu & Muche, 2010). Concerning on-farm income, several authors have identified the potential importance of livestock in promoting food security. Livestock are considered a source of financial, human, and social capital. Livestock provides income that contributes to the ability to access, buy, and produce food, for example, as a source of energy (i.e., draught animal power) that helps efficiently control weeds. Livestock can also provide safety to maintain sustenance during food-insecure periods and stimulate employment for herders and slaughterhouses (FAO, 2018a; Mapiye et al., 2020). Households that own large quantities of livestock are expected to be more food secure, especially during periods of drought when crop yields decrease.

In the case of the America Planning Association Food Division (APA, 2010), a healthy, sustainable food system is resilient. It supports the physical and mental health of all farmers, workers, and eaters. Moreover, it is diverse in size and scale geographically and culturally and for all choices; including a diverse range of food production, transformation distribution, marketing, consumption disposal practices; occurring at diverse scales from local, nationally, and globally. A healthy system supports fair and just communities for all farmers, workers, and eaters. In addition, it provides economic opportunities and equitable physical access to affordable food that is healthy and culturally fitting across geographical regions of the country and at different scales of activities, locally to globally, for a diverse range of its stakeholders. It also empowers the different stakeholders to actively participate in decision-making across all sectors within the system (Calzadilla et al., 2013). It promotes and optimizes production and minimizes waste, provides nutrition and promotes health for all its stakeholders, and supports sustainable intensification of food systems to meet local and global needs by managing livestock, fisheries, forestry, and agriculture responsibly (protect and enhance the environment). A healthy food system creates and shares value across the entire food and agriculture chain, from farmers to consumers. It respects the right of farmers, workers, and consumers by improving livelihoods and providing equal opportunities. In addition, a healthy food system behaves legally and responsibly by respecting land and natural resource rights, avoiding corruption, and being transparent about activities. Finally, a healthy food system promotes access to information, knowledge, and skills for more sustainable food and agriculture systems (APA, 2010).

From the above brief introductory observations, food security in developing countries such as Uganda, Kenya, Uganda, Somalia, Rwanda, and Zimbabwe is an important topic. However, food security is challenged by factors such as the effects of climate change, rapid urbanization, and poor soil fertility (Figure 1). Several research articles have been written so far about food security in developing countries in the countries mentioned above. The purpose of this review article was to bring up to date this conversation in various studies so far, identify gaps and give future directions on food security in developing countries. The overall objective of the review was to find the factors that affect food security in developing countries.

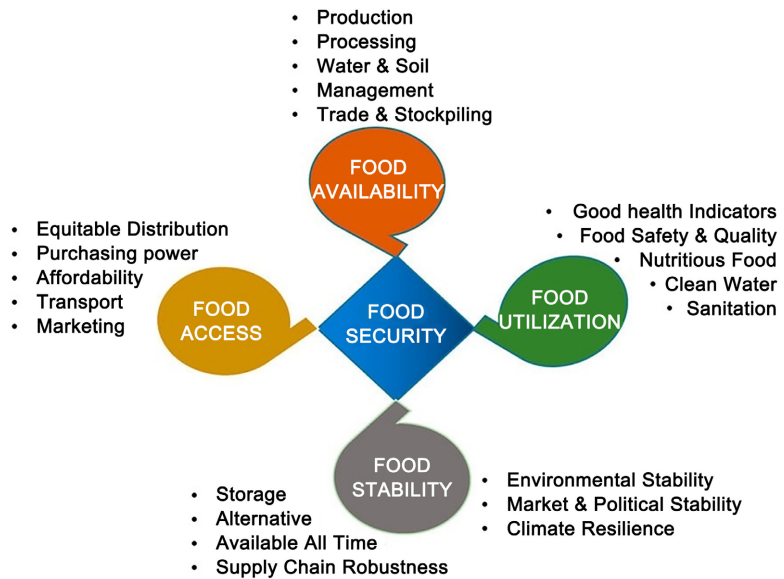


Figure 1. Essential components of food security, including the sub-pillars as defined by FAO*, IFAD; UNICEF; WFP; WHO. Source: Figure modified from Animasaun et al. (2023). *FAO: Food and Agriculture Organization; IFAD: International Fund for Agricultural Development; UNICEF: United Nations Children’s Fund; WFP: World Food Programme; WHO: World Health Organization.

2. Factors That Affect Household Food Security in Developing Countries

Food security is one of the important conditions that must be met for the individual to be nutritionally secure and to maintain good health at the household level (Chakraborty & Newton, 2011). A household is classified as food secure if all its members still have access to enough food to lead an active and healthy life. Therefore, food security at the household level is perceived in terms of access to food consumption. Household size has a negative and significant relationship with the high level of food security, implying that the likelihood of food security decreases with increasing household size. The importance of household size in agriculture depends on:

- The availability of labor for agricultural production;
- The total area cultivated in different crop enterprises;
- The amount of agricultural products retained for domestic consumption and the marketable surplus are all determined by the size of the farm household. As noted by Committee on World Food Security, this system has three components: adequate access, stable food supplies, and sustainable food purchases (Mutisya et al., 2016). Agriculture remains the single most important sector for many developing countries (Hoffmann, 2011; Yamba et al., 2019; Mutisya et al., 2016; Oxfam International, 2019; World Health Organization, 2021).

Low productivity is one of the primary causes of low and unstable value added along the value chains leading to a stagnant rural economy with the persistence of poverty. In developing countries, most households are smallholder farmers

with low production levels. When the level of production is low, it affects the ability of households to meet their food preferences and have access to stable food supplies (Borsky & Spata, 2018). Developing countries are likely to be more vulnerable to food insecurity and challenge the task of doubling food production by 2050 to feed the people due to the degradation of land and water resources. Water scarcity is growing as salinization and pollution of groundwater, as well as degradation of water bodies and water-related ecosystems, rise (Fekadu & Muche, 2010). Almost 250 million people in sub-Saharan Africa are now undernourished. In developing countries, more generally, even if agricultural output doubled by 2050 as expected to feed the world, one person in 20 would still risk being undernourished, an equivalent to 370 million hungry people, most of whom would be in Africa and Asia. The erratic rainfall of rain-fed environments makes crop planting a difficult task. The potential cereal yield has stagnated in the less favorable rain-fed areas with poor soil fertility (Doss & Tsikata, 2014). In developing countries such as Uganda, Kenya, Uganda, Somalia, Rwanda, and Zimbabwe, most smallholders do not practice high-yield farming methods and produce mainly for subsistence. Increasing productivity is crucial for improving the livelihoods of smallholder farmers, who make up most of the rural poor. The quality of feeds given to livestock affects the output of related products like meat, milk, eggs, and hides.

Water scarcity, degradation in quality, and rapid urbanization occurring in developing countries such as Uganda, Kenya, Uganda, Somalia, Rwanda, and Zimbabwe, with unparalleled economic growth, is one of the challenges to achieving food security in the world (Chenge, 2015). This growth has increased the urban poor living in slums vulnerable to food insecurity. Degradation in quality and urbanization leads to a reduction in the workforce and necessary skills in rural areas and to a decline in food production because, in many developing countries, food is largely produced by rural smallholder farmers (Chenge, 2015).

Education, pests and disease, poor supply chain system, and land markets are other factors that influence food security through access to information on best agricultural production, nutrition, and sanitation; increased efficiency, hence increased production and better decision-making as well as the pride that comes with education (Mutisya et al., 2016). Lack of education is linked to food insecurity (Saaka, 2016). A high level of education of the household head has an advantage because they will be able to understand better the pros of modernizing agriculture, as well as embracing technological inputs. This gives them an upper hand and enhances household food security (Chenge, 2015). In addition, pests and diseases reduce the efficiency of livestock production, and they have a negative impact in terms of economic costs and animal welfare. Pests, diseases, and weeds majorly affect crop yields causing significant losses to farmers and threatening food security. The poor supply chain system is also a factor that contributes to food insecurity. When food distribution is poor, a region can have surplus food while other regions are food insecure (Harris-Fry et al., 2015). In

developing countries such as Uganda, Kenya, Uganda, Somalia, Rwanda, and Zimbabwe, most smallholder farmers are exposed to the risk of changes in the market prices of food inputs, labor, and production. Food is a product that is more monetized. Land markets have developed in many countries, and credit is widespread. All of these developments increase the risks a farmer faces. For example, due to indebtedness, farmers can lose their land to their lenders and become landless workers (Harris-Fry et al., 2015).

Climate Change and Its Consequences for Food Security

Meteorologists and climatologists worldwide have observed the effects of global warming on weather phenomena. Moreover, the impact is huge: more drought and heat waves, more rainfall, more natural disasters like floods, and so on (Valente et al., 2017). These upheavals do not spare human beings. Climate change is affecting the global economy. It is already disrupting the social, health, and geopolitical balances in many parts of the world. The scarcity of resources such as food, energy, and water creates new conflicts (Hoffmann, 2011). The potential increase in food insecurity and malnutrition is one of the most significant impacts of climate change. It is thus out of the question, as numerous writers reviewed here have indicated, that climate change, especially global warming, is affecting food security through the availability, accessibility, use, and affordability of food (Godden, 2008; Idriss, 2019; Harris-Fry et al., 2015).

Global warming is affecting food production in a complex way. Direct impacts include changes in agro ecological conditions; indirect impacts include changes in economic growth and income distribution, affecting the demand for agricultural products; the warming atmosphere directly affects agricultural production (Ibnouf, 2011). It is anticipated that additional temperature increases would, however, result in an overall decrease in food production. Inclusively, we can expect malnutrition levels to rise in some of the world's most vulnerable populations. However, rising temperatures can lead to devastating crop losses and can be critical if they coincide with key stages of crop development. There are real concerns because it is very likely that food insecurity will generally increase in many of our most vulnerable populations over the next few years (Zhang et al., 2013).

Since 2001, Global Carbon Dioxide (CO₂) emissions have increased, with a recent Intergovernmental Panel for Climate Change (IPCC) report indicating that the past five years have been the hottest on record since 1850 (McGrath, 2021). With this, the amount of arable land has decreased considerably, which is intimately connected to an increase in global warming (Valente et al., 2017). Changes in temperature and precipitation due to anthropogenic greenhouse gas emissions will affect land suitability and crops (IPCC, 2007; Bates et al., 2008). The severity of the drought has increased with global warming, degrading the available arable land. Many households in rural areas rely heavily on subsistence agriculture to survive, and with a decline in arable land; these households will face a looming threat of food insecurity. Climate-related disasters can destroy

crops, degrading livelihoods and exacerbating poverty (Bates et al., 2008). The accelerated melting of ice will affect the quantity and reliability of available water. This has a significant impact on water resources, with very different consequences for human societies and ecosystems. Agricultural and food production, closely linked to water scarcity, will become riskier in many developing countries (Bates et al., 2008).

As such, rising temperatures and climatic upheavals disrupt ecosystems; modify the conditions and the reproduction cycles of the plants. Climate change exacerbates the risks of hunger and malnutrition through extreme weather events (Lobell et al., 2011). For example, the frequency and intensity of disasters such as droughts, floods, and storms could increase, hurting livelihoods and food security. In all this, it is clear that climate change poses a high risk for food security, from crop production to food distribution and consumption. The effects of climate change are likely to affect the four basic dimensions of food security: the availability of food, food accessibility, food utilization, and the stability of food systems (FAO, 2018b; Gitz et al., 2016; IPCC, 2007; Zhang et al., 2013; Duquesne et al., 2010).

It is anticipated that for moderate global average temperature rises (estimated between 1°C - 3°C), there will be an overall upturn in global food production. However, additional temperature increases would cause a fall in food production (Godden, 2008). Regions at lower latitudes will become hotter and drier with a shortened growing season. Small-scale and subsistence farmers will be at particular risk. The climatic changes have a direct impact on agricultural production, which in turn influences the food security of nations (Godden, 2008; Hoffmann, 2011; Idriss, 2019; Valente et al., 2017; Harris-Fry et al., 2015).

For any particular crop, the effect of increased temperature will depend on the crop's optimal temperature for growth and reproduction (Cartel et al., 2006). 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 (Kassie et al., 2015). 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. More extreme temperatures and precipitation can prevent crops from growing. Extreme events, especially floods, and droughts, can harm crops and reduce yields. 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. The ranges and distribution of weeds and pests will likely increase with climate change (Cartel et al., 2006). This could cause new problems

for farmers' crops previously unexposed to these species. Thus, 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.

Heat waves, which are projected to increase due to climate change, could directly threaten livestock (Kuczynski et al., 2011). Heat stress affects animals both directly and indirectly. Over time, heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production. Drought may threaten pasture and feed supplies. Drought reduces the amount of quality forage available to grazing livestock. Some areas could experience longer, more intense droughts, resulting from higher summer temperatures and reduced precipitation. For animals that rely on grain, changes in crop production due to drought could also become a problem. Climate change may increase the prevalence of parasites and diseases that affect livestock. The earlier onset of spring and warmer winters could allow some parasites and pathogens to survive more easily. In areas with increased rainfall, moisture-reliant pathogens could thrive (Tubiello et al., 2007). Potential changes in veterinary practices, including an increase in the use of parasiticides and other animal health treatments, are likely to be adopted to maintain livestock health in response to climate-induced changes in pests, parasites, and microbes. This could increase the risk of pesticides entering the food chain or lead to the evolution of pesticide resistance, with subsequent implications for the safety, distribution, and consumption of livestock and aquaculture products. This presents us with a paradox: Increases in CO₂ may increase the productivity of pastures; it may also decrease their quality. Similarly, increases in atmospheric CO₂ can increase the productivity of plants on which livestock feed. However, the quality of some of the forage found in pasturelands decreases with higher CO₂. As a result, cattle would need to eat more to get the same nutritional benefits (Tubiello et al., 2007).

Many fisheries already face multiple stresses, including overfishing and water pollution. Climate change may worsen these stresses. In particular, temperature changes could lead to significant impacts. The ranges of many fish and shellfish species may change (Yamba et al., 2019). The abundance and the species composition of fish found in some waters are changing due to altered physico-chemical characteristics such as water temperature and reduced dissolved oxygen. Many aquatic species can find colder areas of streams and lakes or move north along the coast or in the ocean. Nevertheless, moving into new areas may put these species into competition over food and other resources. Moreover, some marine disease outbreaks have been linked to changing climates (Knueppel et al., 2010). Higher water temperatures and estuarine salinities have enabled an oyster parasite to spread farther north along the Atlantic coast. Changes in temperature and seasons can affect the timing of reproduction and migration. Temperature and the changing of the seasons control many steps within an aquatic

animal's lifecycle. In addition to warming, the world's oceans are gradually becoming more acidic due to increased atmospheric carbon dioxide (CO₂). Increasing acidity could harm shellfish by weakening their shells, which are created by removing calcium from seawater. Acidification also threatens the structures of sensitive ecosystems upon which some fish and shellfish rely (Lam et al., 2012).

3. How Developing Countries Can Mitigate Food Insecurity

In developing countries, programs of local economic development and local environmental governance seek to inter alia address the interconnected questions of poverty and food security, improving local productive activities, facilitating the diversification of household economic activities, and creating jobs and incomes (Relief Web, 2018). Some governments in developing countries have implemented food and agricultural interventions to ensure the local availability of nutritious and safe food throughout the year; to build the capacity of the most vulnerable households to access these foods and to meet their other needs; to provide adequate information on healthy and balanced diets, especially through agricultural extension services; to collaborate with other humanitarian and/or development sectors, particularly social sectors such as health, education, and social affairs (Berthe, 2015). Indeed, there is a range of investment options in agriculture that improve food security and help mitigate it. For example, the transition from continuous cultivation to fallow, the restoration of cultivated lands and pastures, irrigation, conservation agriculture, organic agriculture, and organic soil management generate advantages in terms of mitigation and food security (Danso-Abbeam et al., 2015; Yaseen et al. 2015).

Some local authorities play a cross-cutting role in the environment and the economy by integrating a wide range of activities in these two areas to have a major effect on the assets, strategies, and activities related to the modes and means of existence, and therefore on food security, from the point of view of policy choices, food security measures aimed at protecting assets have been implemented (Harris-Fry et al., 2015). These measures are part of a comprehensive approach to maintaining resource productivity (agriculture, livestock, fisheries, etc.) and encouraging a type of local economic development that takes into account the demands of the poor (Duquesne et al., 2010). This approach emphasizes better access to education, health and water, land tenure, land title acquisition, access to technology and animation services, communication, and credit, all of which are essential for the rural poor to increase their income and ultimately ensure their food security. Of particularly notable value is the fact that education will open avenues to off-farm employment, which will act as a safety net. These and more realities need to be studied, which is an important reason why Africa needs to play an active role in research and development on matters that affect the continent (Mutisya et al., 2016).

From the above, the following points can be made. First, a holistic farming

system must be designed to reconcile best the various demands concerning productivity, sustainability, and societal values, for the long term. Thorough breeding, nutrition, and health initiatives to improve the sustainability and productivity of terrestrial livestock systems need to be pursued (APA, 2010). New phenotypes linked to sustainable animal productivity should be developed and combined with breeding schemes. Precision feeding could increase production efficiency by adapting accurately to the needs and the delivery of feed to individual animals. The development of new or alternative feeds, in particular alternative protein sources, has the potential to minimize reliance on imports while enhancing productivity. Planting pasture legumes like lablab, mucuna, and others, wherever possible, would offer supplementary protein to livestock and multiple uses to farmers, such as nitrogen fixation into the soil (APA, 2010).

One unfortunate misconception is that ordinary farmers have little or nothing to offer in this process. However, given their long experience in what they do, they have a lot to offer, and ignoring them is a big mistake. They need to be constructively engaged, particularly to take stock and use their knowledge systems (Mason et al., 2015). Moreover, since they are supposed to be the primary beneficiaries of food security-related policies, it is important to listen to them. Bottom-up planning may impact positively. It is imperative to design and implement policies that integrate population dynamics, natural resources, agriculture, and food security since these, as we have seen in the above exploration, are interlinked. This is only possible if the policymakers and stakeholders understand these interlinkages and relationships. To appreciate this complexity, it is imperative to bring on board technocrats in different fields in an integrated way (Nyong et al., 2007).

Then the question of land reform emerges from this review that land reforms and fairer agricultural policies in the developed world can help in several ways. However, within developing countries, the most critical factor is the need for a more equitable distribution of land and access to it in order for more people to benefit from agriculture (Resosudarmo et al., 2019). Technologies and infrastructures should also be given priority because they highly impact food security and the food chain. To manage the different agricultural systems and marketing strategies that would work best for a given group of farmers, care should be taken to modify available technology to suit community settings and needs (Rampa et al., 2020).

There is also a need to “beef up” agricultural extension services with approaches like the farmer field school methodology. Such approaches would be important given the huge shortcomings of agricultural extension services in most parts of sub-Saharan Africa (Danso-Abbeam et al., 2015; Berthe, 2015; Yaseen et al., 2015; Relief Web, 2018). There should also be fairness in International Trade, and this particularly concerns the need to lower trade barriers to agricultural imports from these countries. This would increase markets for developing countries. Additionally, subsidies need to be checked too because it

would reduce the glutting of world markets for agricultural products, which depresses prices of agricultural produce in the underdeveloped world (Borsky & Sparta, 2018).

Finally, there is a need to “beef up” plant breeding efforts for “crops of the poor” mainly grown in developing countries, like millet, sorghum, and yams. Conventional plant breeding has achieved some improvements for parts of Africa, but especially for maize. There is still a need to develop and spread rapid, sustainable growth of farm yields, especially for food crops in developing countries, to achieve improved livelihoods and food security (Thomas, 2008; Ceccarelli et al., 2010).

4. Food Security and Climate Change

Climate change has had an enormous relationship on food security; climate change has been the one factor that humans have not been able to cope with. This is probably because, unlike overpopulation or poverty, climate change affects all three parts of food security. It is an unusual way to think of it, but food security is like a tripod (Mason et al., 2015). The most correlations between climate change and food insecurity lie under availability. Appropriately, the most solutions for food insecurity in light of climate change lie under availability.

Climate change is a complex issue affecting all dimensions of food security and nutrition. From food production to the availability of food, land, and water, all components of food security are affected (Tibesigwa & Visser, 2016). Changing climatic conditions have already affected the production of some staple crops, particularly in the most vulnerable and food-insecure countries, and future climate change may exacerbate it (Lobell et al., 2011). Empirical evidence suggests that temperature increases over the period 1980-2008 have already resulted in an average reduction in global maize and wheat yields of 3.8% and 5.5%, respectively, compared to a non-climate scenario (Lobell et al., 2011). Higher temperatures impact yields, while changes in precipitation affect both crop quality and quantity.

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 on 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.

5. Conclusion

This review article has sought to explore the diverse literature on the nexus be-

tween climate change and food security in developing countries. Food security has become one of the most pressing issues our planet faces. The need to research the causes of this food shortage is more urgent than ever, and if we fail to act, the situation will only grow direr. Climate change and food security are both highly intricate, but their common ground is the area of greatest importance (Tibesigwa & Visser, 2016). Climate change has proven too much for global food production systems to bear, and as a result, climate-stressed regions are now experiencing food insecurity as well. Climate change has shaken the three pillars of food security availability, access, and utilization, and it will be an enormous undertaking to shore them up. As diverse as the three components of food security are, they are all interdependent.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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