The Role of Policy Interventions in shaping the Four Dimensions of Food Security in select Developing Countries.

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Abstract

This paper systematically reviews literature on Food Security in Developing Countries, synthesizing the existing evidence and identifying the ongoing practices among those countries as they seek to address this widespread and pervasive issue. The literature reviewed is diverse and includes The Role of Agricultural Extension Officers in Production; Factors affecting Food Accessibility in low- and middle-income residential areas in urbanizing environments of Developing Countries; Urban Agriculture; Transition from Traditional Foods to modern ultra-processed foods in Food Utilization; and Economic, Environmental and Political factors affecting food stability so as to synthesize the existing evidence, and ongoing policy interventions. A systematic literature review was undertaken using Google Scholar and Science Direct, resulting in a final number of eight articles meeting the selection criteria. The studies revealed the variance in the challenges bedeviling the four dimensions of food security in the developing world. The uniqueness of the studies means that drawing any generalizations is inappropriate, rather, the specific cases should be treated specifically as they help understand the ongoing situations and practices. The paper reiterates the interlinkages among the four dimensions of Food security and reiterates that all the dimensions must be given equal attention. In conclusion, the paper highlights an aspect that is overlooked in current food security discourse, that is growth of the population. Population growth complicates the proposed solutions to the quandaries of food in/security. As population growth will certainly muddy the food security landscape, it is an evolution that must be addressed by ensuring sustainable and resilient food systems.

Keywords: Accessibility; Availability; Utilization; Stability; Population Growth

Introduction

Food security is a fundamental concept that entails ensuring that every person, at all times, has access to enough safe and nutritious food to sustain a healthy and active life. In addition to that definition, food security now encompasses four dimensions which are **availability, accessibility, utilization**, and the **stability** of food sources (Food and Agriculture Organization, 1996). From that understanding, food insecurity is a situation where one or a combination of the above-mentioned four dimensions cannot be achieved.

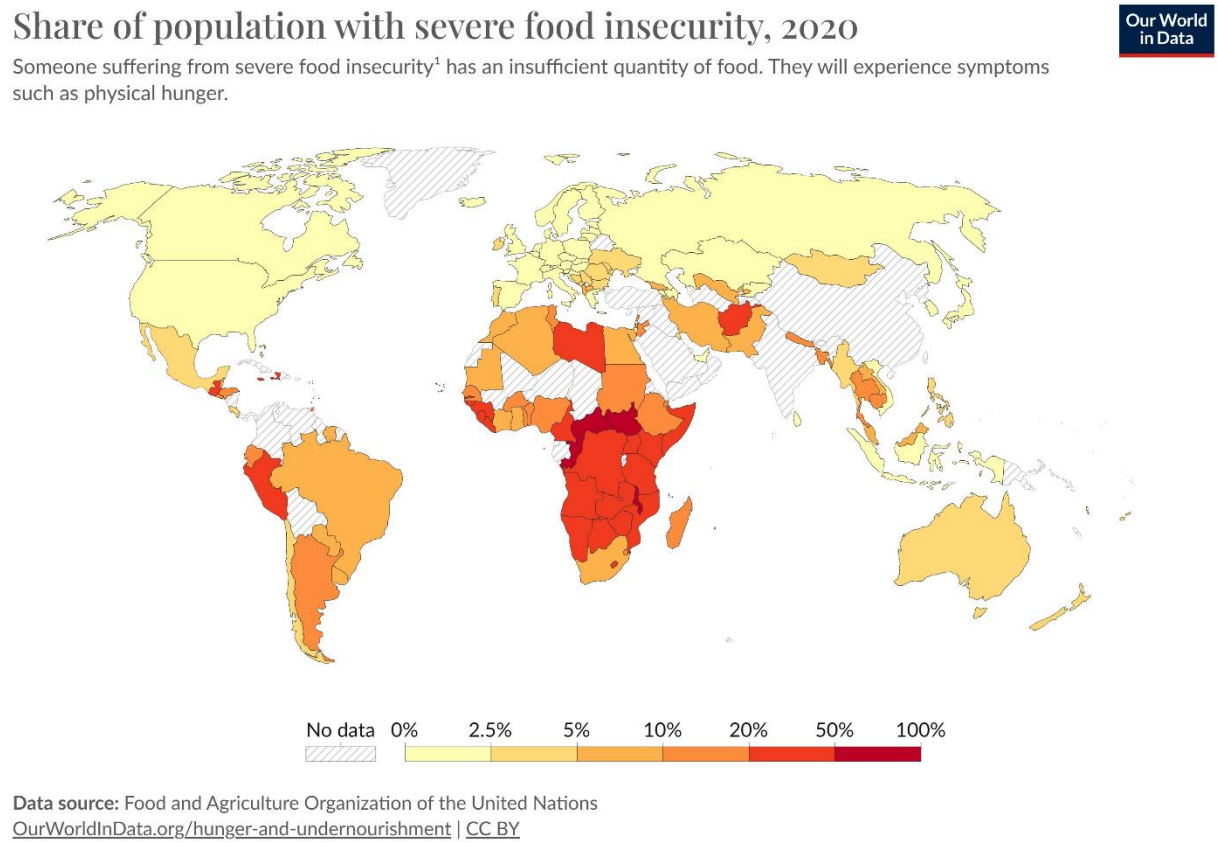
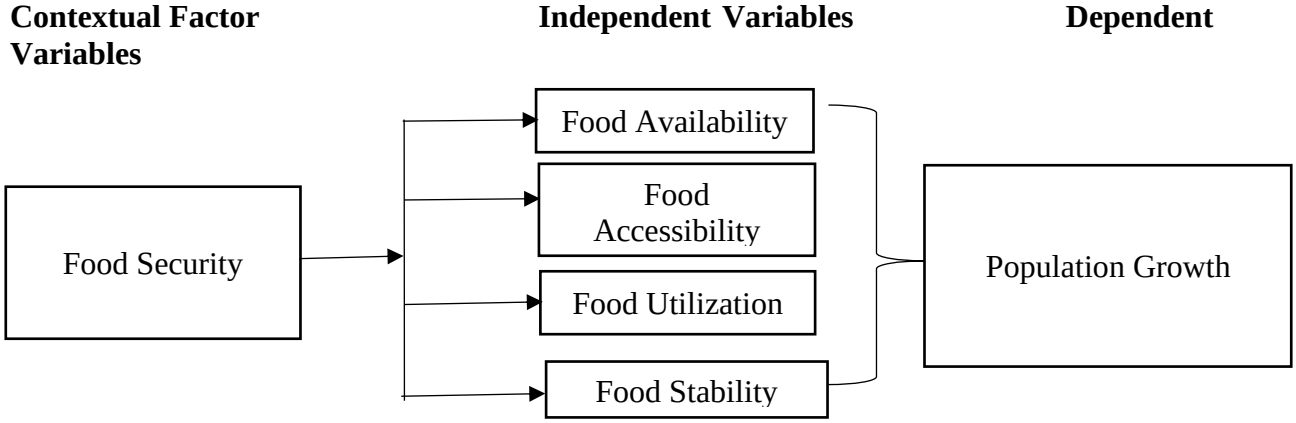


Figure 1: *A visual representation of the prevalence of food insecurity, and how the Developing countries compare to the rest of the world*

This paper desires to understand the food security phenomenon, and in so desiring, food security is viewed as the dependent variable, and the independent variables are the four dimensions of availability, accessibility, utilization and stability. Ultimately the paper underscores population growth as a contextual factor that should not be ignored in the food security discourse because it will greatly influence food security outcomes, in line with the Malthusian theory of Population growth. The aim of the paper is to examine the core factors that sustain the independent variables, and the policy interventions in place and their adequacy, to effectively pursue food security. Recognizing that food insecurity is a widespread issue, this paper draws from a few select developing countries, and occasionally looks at the situation in Kenya.

From the onset, it should be noted that food security is a complex and multi-faceted issue and the four considerations are interrelated and interdependent, rather than static and separate. (Berry et al., 2015)



Research Question

The central question guiding this systematic literature review is: What is the role of policy interventions in shaping the four dimensions of food security in select developing countries.

Methodology

This study used a systematic literature review (SLR) approach, which involved identifying and critically reviewing research findings with the ultimate end-goal of having a cross-cutting understanding of food security in a few select developing countries. In this paper I analyze different aspects of food security in developing countries.

Inclusion criteria

This study was not overly extensive, and did not draw from a wide range of literature. The inclusion criteria were also fairly broad and not rigid. Articles were subjected to a screening to determine whether they met predefined inclusion criteria. An article would be considered for this review if (a) it addressed food security concerns (b) the article must have been conducted or focused on any of the developing countries/regions and (c) the article must have discussed policy interventions. In the screening and information extraction, the main consideration was on the policy interventions proffered and their effectiveness, as against the factors affecting food security.

Food Availability

Food availability is the availability of sufficient quantities of food. According to Grote et al., it hinges upon domestic production and/or imports.

Productivity

Increased productivity of food crops ensures increased availability of household food. Increasing the productivity of farmers can be done through the application of appropriate knowledge in response to production challenges such as pests, diseases, and changes in weather patterns (FAO, 2017)

A surveyed literature by Raidimi & Kabiti, looks at sustaining food security by reviewing the role of Agricultural Extension Officers and training them. The literature holds that smallholder farmers are important drivers of the agriculture sector as they grow most of the food, and have become the mainstay of food supply for millions of people in South Africa, and that situation is likely to progress for several years, yet they are endowed with limited resources, including

inadequate education. The literature posits that Training and Extension Services is needed to ensure that farmers and other stakeholders can access appropriate skills for the development of agriculture as an industry, and is inadequately provided. The Extension Officers lack in professional qualifications; formal skills that address food security issues; communication skills; project management skills; computer skills; and people management and empowerment. Considering those shortfalls, improvements are needed in both pre-service (universities and colleges) and in-service training for extension agents, while training programmes need to emphasize new extension concepts and methodologies, as well as expand attention to marketing, communication, computer training, people management and empowerment, farm management, technical training, environmental issues, and the development of farmer and other client organizations. (Raidimi & Kabiti, 2019)

Grote et al also suggest that small hold farmers are very key in ensuring availability of food. They suggest that there should be investments and provision of public goods (i.e., infrastructure) by the governments to promote technological innovations adapted to smallholder needs. To further build on their case, they give an example in Ghana, where start-ups Farmerline and AgroCenta use mobile and web technologies that bring advice on farming, weather forecasts, market information, and financial information in different languages to illiterate farmers in remote areas. The new enterprise Sokopepe offers market information and farm record management services via SMS and web tools to farmers. They also give a Kenyan example where the start-up M-Farm offers pricing data to farmers to remove price information asymmetry.

In the coming decades, world agriculture will need to undergo major changes to meet the future food demands of a growing and increasingly rich and urbanized population and smallholders in developing countries play a key role worldwide in this food security (Fan & Rue). More than 80% (475 million) of the world's farms operate on less than two hectares of land. Although these farms account for only 12% of the world's farmland, they provide an estimated 80% of the food produced in Asia and in sub-Saharan Africa (SSA) (Lowder et al. 2014).

According to Abraham & Pringali, since the 1960s, economists have argued that crop productivity per unit of land declined with an increase in farm size and that has led to the emergence of the 'small farm paradigm', which states that there is an inverse relationship between farm size and productivity. They write that studies therefore conclude that small farms have an advantage over large farms in per capita productivity, due to higher labour utilisation (e.g. using family labour) and higher input utilisation (e.g. using intensive farming practices)

To this end and considering the empirical evidence in place, Governments need to equip their extension services with access to, and understanding of, a diverse portfolio of flexible farm-level interventions, with affordable technologies aimed at farmers with low capabilities or to increase yield (Gassner et al., 2019)

Importation

As things stand, a majority of developing countries are net importers of agricultural products. After COVID-19, the World Bank predicted that African economic growth would contract by -2.1 percent to -5.1 percent in 2020 (Arouna et al., 2020). Weakening African economies will therefore translate to weakening African currencies, which will raise the price of imports in local currencies, including food (Arouna et al., 2020). This only means that the first limb of food security, which is food availability will be difficult to attain through imports.

Kramer notes that when there are too many imports coming into a country in relation to its export, it can distort a nation's balance of trade and devalue its currency. The devaluation of a country's currency can have a huge impact on the everyday life of a country's citizens because the value of a currency is one of the biggest determinants of a nation's economic performance and its gross domestic product (GDP). Maintaining the appropriate balance of imports and exports is thus crucial for a country (Kramer, 2023).

Food Accessibility

The accessibility dimension looks at two angles. Firstly, that food can reach the consumer (transportation infrastructure) and secondly, that the consumer also has enough money for purchase (food purchasing power) (Peng & Berry, 2019). In a surveyed literature, research on factors affecting food accessibility was conducted on low- and middle-income residential areas throughout Accra, in Ghana. Results showed that educational attainment, household assets, and the demographics of a house-hold affect a household's ability to access food (fewer than 3% of household's source food from farming, gardening, or fishing, the ability to afford food thus ultimately underpins household-level food access). (Tuholske et al., 2020) The literature reiterates that higher educational levels, in case studies from around the world, have been shown to strongly correlate with decreased levels of poverty.

The above pattern is seen in other Urban centers as well. A research conducted in Kisumu, Kenya on Urban Agriculture by Opiyo & Agong found that only 14.5 percent of sampled households sourced food from their own production in the city. (Gassner et al., 2019)

According to Tuholske and colleagues, poorer, and less educated households regularly experience situations and anxieties related to the inability to access food. Should food prices increase, all else being equal, these households' food access situation will therefore likely worsen.

The economic status of households thus is a big determinant of food access as urban agriculture is quite insignificant as a source of food. (*Cup-Policy-Brief-No4.Pdf*, n.d.)

The work done by Opiyo & Agong, as cited by Gassner et al, thus suggests among others, the following policy issues, so as to ensure physical access and economic access:

i) Infrastructure and services: Policy should place food on the agenda of city infrastructural planning, including provision of fresh-produce markets with adequate food storage and preservation facilities, improvement of road transport networks, and integrated planning of food retail sites and transport nodes. The provision of affordable housing with requisite services also links directly to improved food security. The concept of food-sensitive urban design is an emerging trend and one that could prove a useful tool in ensuring a food-security-oriented planning response.

ii) Embrace the informal economy: The informal economy appears to be the primary source of food for most Kisumu residents, through the approved market areas as well as street vendors. All typologies of food vending play a critical role in enabling food access, particularly for the food insecure in Kisumu. Embracing the informal food sector implies more than acceptance, but also the provision of facilities such as adequate water, sanitation and storage facilities.

Food Utilization

The FAO defines this as "the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water, and adequate sanitation. Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper childcare" (FAO 2006:1).

Food utilization is reflected by the quality and diversity of diets (Grote et al., 2021). Grote et al, write that many people across the developing world still face challenges in terms of securing caloric intake and/or securing a diverse quality diet. That in countries such as Lesotho, Malawi, Zambia, or Zimbabwe, people cover large shares of total calories only with maize and micronutrient malnutrition thereby persists.

Among the four dimensions of food security, utilization is fairly cross-cutting, as even those living above poverty line may be lacking in food utilization. Traditional foods, such as dried or smoked meats and fish, dried beans, and maize meal, which were adapted to these lived conditions, are being increasingly replaced by modern ultra-processed foods, which are typically higher in sugar, fat, and salt than traditional foods (Thow et al., 2015). Substitution is determined by among others, the increasing importation of these foods, marketing and advertising, and increasing time poverty as urban commutes extend in length.

The transition has been studied in Southern Africa Development Community by Thow et al. where they conclude that there is significant intra-regional trade in products associated with the nutrition transition. In that study, they write that an increased access to processed foods and soft drinks within SADC facilitated by growing intra- and extra-regional trade and investment is a significant cause of the transition.

Without stifling trade, they suggest that the trade patterns in soft drinks and processed snack foods mean that regional policy action is needed to stem the flood of high calorie and nutrient-poor processed foods, snacks and beverages into the region, and thus contribute to reducing obesity and diet-related Non-Communicable Diseases.

With regard to marketing and advertising, the International Journal of Advertising called for papers to understand the power of advertising in society. Stafford and Pounders synthesized the papers received and whereas they noted that the collection noted that advertising has both positive and negative effects, they also appreciated that some may harm consumers in their overall well-being, because some advertisers may simply seek to sell a product with little regard to the consumer's best interests.

Concerning poverty, Siddiqui posits that Poverty contributes to malnutrition. Without adequate nutrition, human capital starts to decline because malnutrition negatively impacts physical and mental development, intellectual capacity, productivity, and the economic potential of an individual. A vicious cycle thus exists through which both poverty and malnutrition fuel and reinforce each other (Siddiqui et al., 2020). In the literature, they argue that it is imperative to intervene early in life in order to maximize the effectiveness of interventions and break the cycle. Interventions should be Nutrition sensitive, addressing intermediate and underlying causes of malnutrition and helping to improve access to nutritious food, clean water and sanitation, education and employment, and health care. These include interventions in the sectors of agriculture, social safety nets, early child development, education, and women's empowerment

Further they posit that community engagement need to reach the poorest of the poor to break the cycle of malnutrition and poverty and should also incorporate disease and infection prevention as a part of their strategy.

Stability

As a dimension of food security, stability pertains to the regularity of food supplies (Moseley & Battersby, 2020). Stability ensures that food can be accessed by individuals at all times (FAO, 2006). It is driven by economic, environmental and political factors (Grote et al., 2021). Chen considers the economic aspect and posits that Food security is guaranteed only when unexpected shocks, e.g., epidemics, and economic crises (job losses) can be well responded to.(Chen et al., 2023)

James Deaton & Lipka consider the political aspect and posit that Food Security is obtained through three primary pathways: food production, exchange for food, and food transfers (e.g., food aid). The effectiveness of each of these pathways requires institutions that successfully coordinate future expectations; hence, it is unsurprising that political instability and food insecurity go hand-in-hand. (James Deaton & Lipka, 2015)

Anderson considers the environmental bit, and posits that unpredictable variations in weather that influence agricultural productivity, the uncertain incidence of pestilence and natural disaster or the uncertain outcomes of human-determined farming processes affect food stability (Anderson, 2018).

The promotion of food system-based livelihoods and economic activity, environmentally sustainable practises and political stability are thus a crucial piece of the puzzle for moving towards greater food stability. Considering the above drivers of food stability (some can be prevented while some are more difficult to prevent), it is imperative to have more resilient households, communities and food systems.

Three aspects that define a food systems resilience approach are: (*Independent Dialogue | Food Systems Resilience in Protracted Crises*, n.d.)

- Firstly, it bridges the timeline cycle of relief, recovery, resilience and development. Addressing the awareness that humanitarian assistance is not a solution to ending food crises.
- Secondly, it takes a food systems perspective – based on an understanding that issues cannot be dealt with in isolation and solutions for programming lie in cross-cutting humanitarian-development-peace (HDP) approaches that respond to dynamics of food system behavior.
- Thirdly, it builds on the perceptions and existing resilience capacities of local communities and actors. By analyzing a food system and its resilience capacities together with local communities the approach breaks through aid siloes. While working with local actors in an evidence-based, adaptive approach ensures a good understanding of the interaction between food systems dynamics and resilience capacities as the programme is implemented.

Wageningen Centre for Development Innovation (WCDI) conducted a study to understand how food stability can be impeded by natural disasters. COVID-19 impacts were assessed in Ethiopia. Due to mobility restrictions, casual labourers were unable to travel to places where work was available and a robust social safety net for these groups was lacking. Other severely affected groups were the ultra-poor, acutely malnourished women and children. The response strategies were also assessed and the national response strategy prioritized crop production with a strong focus on cereals and cash crops. Those were selected for their ease and reliability of production, export value or import substitution value, but not nutritional value. Immediately, this shows that the utilization dimension was being compromised during the COVID-19 period and thus stability was impeded. Stability means that no food security dimension is compromised at any time.

WCDI recommended that monitoring can add to ongoing initiatives by including a focus on pro-active work through informing people to support their capability to anticipate and respond in such calamities. (*Fs-Cop201008-Hcss-52impact-Blackshore_report.Pdf*, n.d.)

Another study conducted in Adana, Turkey sought to understand the impact of economic factors on food stability. It found that food instability ratio in households was 69.1% to 39.6% for families with children and those without children. The study also found that poverty is the major cause of food instability and recommended policies that promote poverty eradication, such as educating and ensuring labour force participation of women. (Esturk & Oren, 2013)
A further study was conducted on developing countries to understand how political factors affect food stability. The study found that Food production and distribution activities, as well as the economy, will run well when there is political and security stability. Food will be available in large quantities, and people can access it easily. The study recommended maintaining political stability and the absence of violence. (Mulyo et al., 2023)

Population Growth: Contextual factor
Amidst the precarious food insecurity situation that developing countries are in, the population is also increasing. Simply put, if it is already challenging to feed the current population, what will happen when the population increases? The Malthusian theory on population growth provides answers on the relationship between population growth and food security, that whereas the former may grow exponentially, the growth of food supply and the supply of other resources is linear.

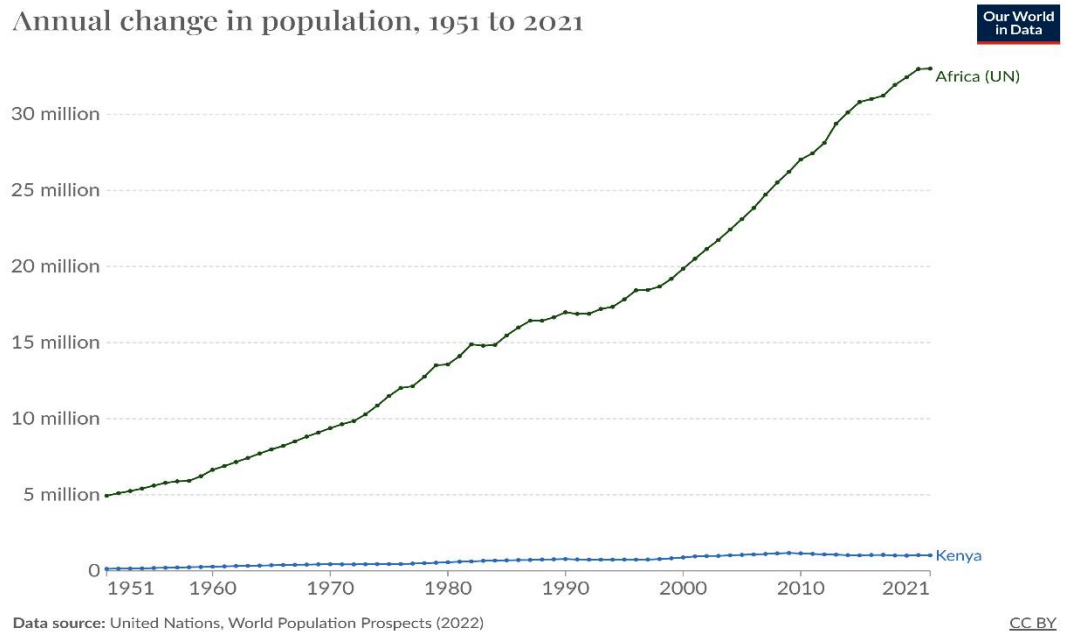


Fig. 1 The graph illustrates the dynamic changes in population for both Africa and Kenya, revealing distinctive trends and variations over the years(Ritchie et al., 2023)

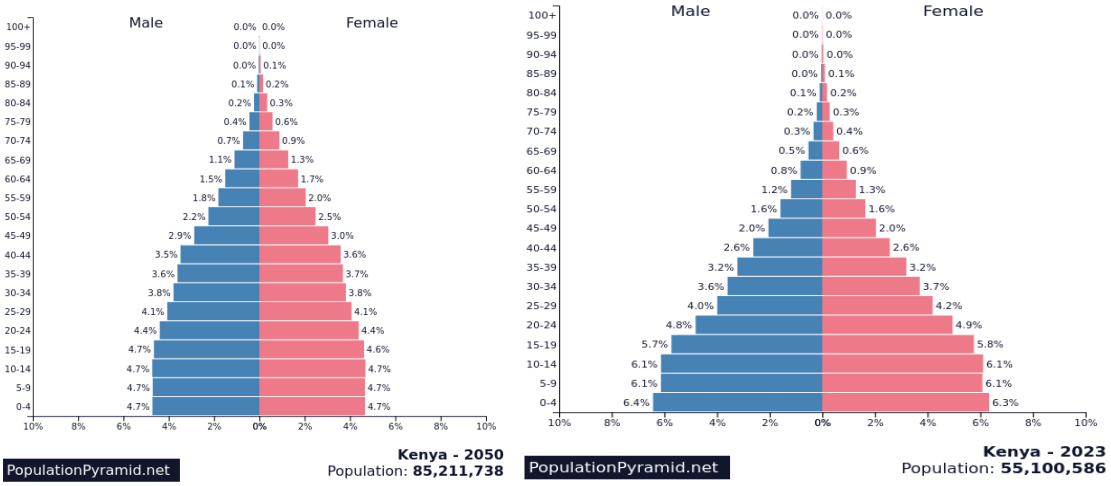


Fig. 2 Population pyramid for Kenya in 2023 and 2050 (*Population Pyramids of the World from 1950 to 2100 - PopulationPyramid.Net*, n.d.)

The population growth in the African continent has increased rapidly over the past two centuries and shows no signs of slowing down. In Kenya, since the turn of the twenty-first century, there is an average change of around 1 million every year. With that trend, the projection is that by 2050, the population is going to increase by another 30 million people, being a percentage change of about 50% and indicates a significant projected population increase. Rapid population growth will have implications for various sectors, including Agriculture and specifically food security, which is already a present concern. The total number of undernourished people in Africa has increased from 182 to 287 million, largely caused by the rapid growth in population. Further in middle Africa, the number of undernourished people has more than doubled since 1990 as a result of population growth (Hall et al., 2017).

According to a study by Hall et al, rapid population growth is the driving force behind food insecurity, which in that study, even overshadows the potential impact of climate change.

In a forward-looking manner, recognizing that food insecurity is only going to be more challenging as population increases, they suggest the following major solution:

a) Closing the yield gap.

Africa's yields have lagged behind most of the world. Most countries have achieved a significant rise since 1961. But across much of Africa, yields have stagnated. As a consequence the global inequality in yields has increased (Ritchie, 2022).

Hall et al., however warn that increasing yields is not a panacea to food security because if such an increase were possible, it may satisfy regional food security at present, but would not satisfy needs in the future, since production would not keep pace with the demand driven by population growth. It is therefore imperative that environmentally sensitive techniques are made an integral part of the intensification process and the most destructive practices are not carried into the future. In other words, the transition should be from 'intensification' to 'sustainable intensification.'

Conclusion

This study examined the dimensions of Food security, and placed the phenomenon in the context of population growth. It comes out that food insecurity can be experienced at various levels including regional, national, household, or individual. As per some of the studies conducted and policy issues suggested, it is clear that tackling food insecurity will require ingenuity, as the goal is sustainability. All the dimensions of food security must be sustainable and the pursuit towards food security should not only be about today but crucially about

tomorrow as well. For instance, rural urban migration is deemed to be an intrinsic part of success, policies that encourage urban to rural migration, and discourage rural to urban migration by opening up rural areas would unlock the key to sustainability, as urbanization is plainly unsustainable.

Further research should equally be conducted and policy formulation, implementation and evaluation be evidence-based and borrow from best-practises.

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