

EFFECTS OF COVID-19 PANDEMIC ON FOOD SECURITY AND HOUSEHOLD LIVELIHOODS IN KENYA

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ABSTRACT

This paper aims to contribute to the understanding of the resultant effects of the new Coronavirus which is known to cause a Severe Acute Respiratory Syndrome in humans (SARS-CoV-2 better known as COVID-19) on food security and household livelihoods in Kenya. This is achieved by providing a comprehensive literature review on past global epidemics, pandemics and natural hazards and disasters; and their effects on food security and household livelihoods. The study reviews articles and reports that have widely discussed the effects of other epidemics that have occurred in contemporary times on food security and household livelihoods. The selection of the materials used in the study was based on authenticity and relevance. The observed impacts of the coronavirus pandemic and previous epidemics, pandemics and natural hazards and disasters call for policy measures to curb future occurrences. Countries' preparedness for pandemics is crucial to prevent adverse economic effects and loss of human lives. There is also a need to put in necessary measures to ensure the sustainability of resources, strengthen infrastructure and food systems to avoid or minimize food crises in the future.

Keywords: COVID-19; Food Security; Household Livelihoods; Epidemics; Pandemics

JEL: C01; C13; C31; Q12

INTRODUCTION

The Novel Corona Virus, causing the Corona Virus Disease 2019 (COVID-19) was first reported in Wuhan, China in December 2019 (**Kumar et al., 2020**). The disease rapidly spread from country to country and across continents and has continued to cause dramatic loss of human life and unprecedented challenges across the globe. The global infection for the COVID-19 had reached 9,296,202 cases with 479,133 deaths as of 25th June, 2020 (**WHO, 2020**), while Africa Continent had so far recorded 337,315 cases, 8,863 deaths and 161,254 recoveries (**Africa-CDC, 2020**). Over the same period, Kenya had 5,384 infections that resulted in 132 deaths with 1,857 recoveries as is shown in Figure 1 (**MoH, 2020**). The World Health Organization (WHO) declared the outbreak of COVID-19 to be a Public Health Emergency of International Concern, on 30th January, 2020. The first case of COVID-19 in Kenya was reported by the Ministry of Health officials in Nairobi on 12th March, 2020. The suspected case was tested and confirmed at the National Influenza Centre Laboratory at the National Public Health Laboratories. The patient had arrived at Nairobi from USA on 5th March, 2020 through London, UK. The fear of the

spread and the resultant effects of the disease has led to the introduction of curfews, quarantines, movement restrictions, and travel bans among others by countries to contain its spread (**Delivorias and Scholz, 2020**). These coordinated measures were to mitigate the impacts, halt the spread of the pandemic, and ultimately hinder future recurrence (**Fernandes, 2020**).

These containment measures are not unique to COVID-19 and have been applied in earlier epidemics and pandemics such as Zika Virus, Ebola Virus Disease (EVD), Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), Spanish Influenza , H1N1 Influenza, among others (**Bloom et al., 2018; Delivorias and Scholz, 2020; Rohwerder, 2020**). Like natural hazards and disasters, disease epidemics have been reported to cause serious negative socio-economic impacts and human loss (**Bloom et al., 2018; Delivorias and Scholz, 2020**). These measures have proven to significantly reduce the spread and effect of epidemics (**WHO, 2015**). However, their socio-economic effects run to post the epidemics (**WBG, 2019**).

Against this background, the latent effects of COVID-19 in Kenya have been compounded by the fact that the economy was operating below the projection of 5.35

percent annual growth. Analysts project the rate to decline to 3.5 percent due to the pandemic (**Obulutsa and Mohammed, 2020**). Furthermore, the country has been hit by the desert locust invasion and long rains which led to floods across the country, leading to massive destruction of crops and livestock (**Ogega, 2020**). These have posed additional tragedies to the already declining economic performance.

The purpose of this study is to contribute to the understanding of the resultant effects of COVID-19 on food security and household livelihoods in Kenya. This is achieved by providing a comprehensive literature review on global pandemics, epidemics, natural hazards and disasters and their effects on food security and household livelihoods. The paper also seeks to provide an understanding of lessons learnt in times of pandemics, epidemics, and natural hazards and disasters, and provide insights into how the economy is likely to evolve about the subject. Finally, the paper offers policy options available to the government to undertake as a measure to mitigate the resultant effects of the pandemic, related epidemics, and natural hazards and disasters in future occurrences.

DATA AND METHODS

To achieve the purpose of this study, the researchers conducted a systematic literature search by following (**Gough et al., 2012**) through CAB Abstracts, Web of Science, Scopus, Econlit and Google (Scholar, Web and News). This was complemented with a snowball in document reference selection which involves identifying other relevant articles referenced in other published papers. The researchers used search terms developed from the five main keywords which are COVID-19, food security, household livelihoods, epidemics and pandemics. These five keywords were identified with synonyms derived from the literature. These keywords were then combined into a complete search term string, connected with the Boolean operators "OR" for synonyms of the same keyword and "AND" for different keywords. This string was then entered into selected databases to retrieve data. The study focussed on articles and reports that have widely discussed the effects of other epidemics that have occurred in contemporary times on food security and household livelihoods. The notable ones include the Zika virus, Ebola Virus Disease (EVD), Spanish Influenza, Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), and H1N1 Influenza. It also considered peer-reviewed journals and government working papers on floods and desert locust that infested the country in the recent times. The criteria used in the selection of the materials used in the study were based on authenticity and relevance. The study restricted the retrieved articles on disciplinary basis and specifically focused on articles and studies in the field of agricultural economics, agribusiness management and health economics with an intention to get insights into the economic impact of an epidemic, pandemic and natural

hazards and disasters particularly on food security and household livelihoods.

RESULTS AND DISCUSSION

Lessons from past epidemics, pandemics and natural hazards and disasters

An epidemic is an outbreak over a larger geographic area. Examples of an epidemic include the 2014-2016 Ebola Virus Disease outbreaks in West Africa, Zika virus, which started in Brazil in 2014 and spread to most of Latin America and the Caribbean and the US opioid crisis among others (**Grennan, 2019**). In the most classical sense, once epidemic spreads to multiple countries or regions of the world, it is considered a pandemic. Pandemic is the highest level of global health emergency and signifies widespread outbreaks affecting multiple regions of the world (**Morens et al., 2009**). Examples of pandemics in world history include Spanish influenza in 1918, H1N1 influenza in 2009 and COVID-19 in 2020. In December 2015 the World Health Organization (WHO) published a list of epidemic-potential disease priorities requiring urgent research and development attention (**Bloom et al., 2018**).

Epidemics, pandemics and natural hazards and disasters such as communicable diseases, tsunamis, floods, droughts, landslides, earthquakes, and locust invasion inflict serious challenges on the economy (**Watson et al., 2007**). Specifically, epidemics impact negatively on the economy at different levels of society, from country to households to individuals (**Kastelic et al., 2015; WBG, 2016, 2019**). Epidemics result in less trade and transportation due to restrictions on the movement of people and goods within a country and between countries (**Mwakalobo, 2007; Rohwerder, 2020**). In 2014, Sierra Leone implemented a 3-days lockdown due to EVD (**Kastelic et al., 2015**). Limited trade and transportation have direct effects on the source of income of farming communities and food supply chains (**Rohwerder, 2020**). This is mainly because of restrictions on the movement of people from high risk areas, quarantines and curfews thus affecting accessibility and availability of food especially if food is produced or sold in the areas regarded as high risk (**Gatiso et al., 2018**). According to the **WBG (2016)**, 43 percent of Africa's population relies on cross border trade which is usually affected the most by imposed travel restrictions. The report further indicates that there was an economic loss of USD 2.8 billion during the EVD outbreak in Liberia, Sierra Leone, and Guinea in 2014-2016.

The EVD epidemic directly or indirectly decreased agricultural production in Liberia, Sierra Leone, and Guinea in 2014-2016 resulting in a significant negative impact on livelihoods (**Gatiso et al., 2018; WBG, 2016**). Agricultural production is the main source of income for most rural households in developing countries but epidemics result in a stall as farm workers' fear to travel and transportation of food to consumption areas is restricted (**Gatiso et al., 2018; Kastelic et al., 2015**).

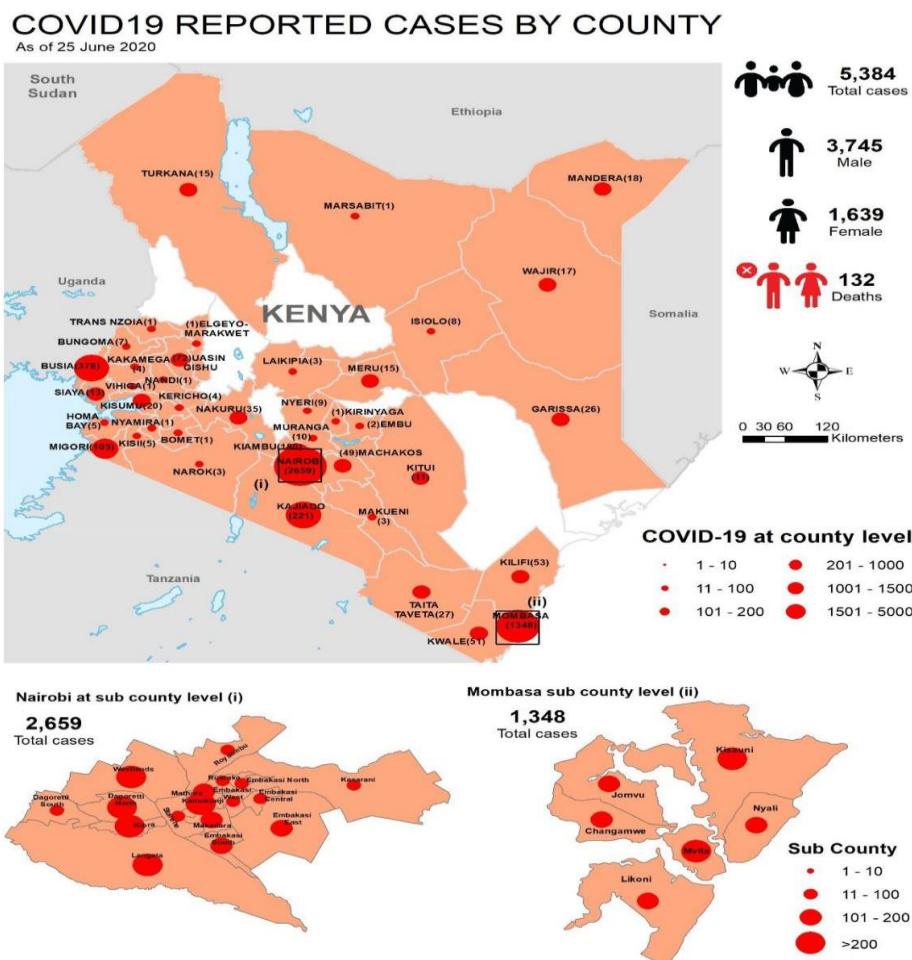


Figure 1: Map of Kenya showing the distribution of COVID-19 cases as at 25th June 2020
Source: MoH (2020)

The EVD epidemic in West Africa resulted in a 20 percent decrease in workers, farmers' incomes, and unstable food prices (Gatiso *et al.*, 2018). In 1991, the cholera outbreak in Peru resulted in a loss of USD 770 million due to a food trade embargo (Gatiso *et al.*, 2018; Kastelic *et al.*, 2015; WBG, 2016).

Following the outbreak of EVD in West Africa, the WHO developed guidelines on preparedness for countries to adapt to avert global epidemics (WHO, 2015). This involves the ability of countries to respond timely, detection of infections, containment, and treatment of cases (WHO, 2015). The report further states that effective, accessible, and efficient local health systems are essential for the prevention and control of infectious diseases. Adoption of these recommendations contributed to early detection of the Zika virus in 2016, the first EVD case in Uganda, and new EVD cases in the Democratic Republic of Congo (DRC) in 2018 (WBG, 2019). Key aspects of preparedness in the health sector include surveillance, laboratory capacities, and mobile health units and community involvement. These, coupled with political will, enabled Korea to contain a potential second MERS outbreak in 2018 and India was able to identify and contain the Nipah virus in 2018 (WBG, 2019; WEF, 2019).

The effects of COVID-19 in Kenya and especially in her agricultural sector cannot be over-emphasized. The fears of the spread and socio-cultural interruptions, as well as change in factors of production such the agricultural labour force and input supply, have been mentioned to be affected. However, it must be noted that as a country, there are also serious health challenges that have been witnessed and seem to pose a greater challenge in the agricultural sector than the COVID-19. They include cholera which has claimed 37 lives across the country over the same period of COVID-19, floods that resulted in 250 deaths, among other illnesses such as typhoid, malaria, cancer among others. In as much as the government tries to stop the spread of the disease by injecting billions of Kenya Shillings, there is also a need to address these other outbreaks if the agricultural sector is to be re-energised.

Impact of COVID-19 on Food Security

Food insecurity remains a major concern for numerous rural households in Sub-Saharan Africa who rely on agriculture as their main source of livelihood. The 1996 World Food Summit defines, food security as existing „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,” as in (Mutea *et al.*, 2019). In the past two

decades, epidemics and natural disasters have claimed millions of lives, adversely impacted dozens of people, and resulted in significant health, social, and economic consequences (UNESCO, 2007). The report further states that there were 404 disasters between June 2005 to May 2006 with nationwide consequences in 115 countries, including the death of 93,000 people and economic losses totalling 173 billion US dollars. Infectious diseases such as COVID-19, Ebola Virus Disease (EVD), Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), their associated mortalities, and desperate control and prevention measures, remain a significant threat throughout the world, thereby deteriorating the production capacity of the world food chains as well as food and nutrition security status of many households (Bloom et al., 2018). Since the first case of the COVID-19 was reported in Kenya, the pandemic continues to deepen pre-existing inequalities as well as exposing vulnerabilities in social, political, and economic systems which are in turn amplifying the impacts of the pandemic on food and nutritional security (Cytonn, 2020).

As COVID-19 continues to advance, it is difficult to know the extent of the impact on food production and distribution systems. Looking at past infections as well as China's way of dealing with COVID-19, might guide policymakers and development partners in future policy formulation and programming. Also, many studies have been conducted to evaluate the impact of epidemics and natural disasters on food security. Most studies posited that many households are most likely to be hit due to negative impact of epidemics on crop production, incomes, movements and food chains which increases the problem of food and nutritional insecurity throughout the world (Kodish et al., 2019; Agrilinks, 2020). For instance, the 2013-2016 Ebola outbreaks in West Africa negatively disrupted the food system and markets, primarily in Sierra Leone, Guinea, and Liberia (Gatiso et al., 2018; FAO, 2015a). Research conducted by the Food and Agriculture Organization on the effect of the Ebola Virus Disease outbreak in West Africa revealed that the epidemic significantly impacted food security, where approximately half a million people were declared severely food insecure in the three worst-hit western African countries in 2014 (FAO, 2015a).

Kodish et al. (2019) on a related impact study of Ebola Virus Disease revealed that the epidemic effects and the accompanying response measures, especially forced community quarantine, and movement restriction policies, directly and indirectly, contributed to the disruption of food value-chains in Sierra Leone. The Ebola Virus Disease outbreak negatively affected agricultural production, food storage, processing, and distribution, transportation, trade in agricultural commodities, and retailing in Sierra Leone. According to Kodish et al. (2019) and Gatiso et al. (2018), as governments' Ebola Virus Disease response strategies were being implemented to curtail people's movements via forced quarantines and police road blockages, food markets were disrupted which led to less food availability, fewer varieties of food, as well as higher food prices, especially on scarce and staple foods. For example, when Ebola

Virus Disease began to hit these West African counties, the prices of major staple food such as rice and cassava skyrocketed by 30percent and 150 percent, respectively (Chen et al., 2020). Gatiso et al. (2018) reported that the impact of the Ebola Virus Disease outbreak is not limited to communities directly affected, but also affect communities in areas where it was not reported. They added that community-level incidence of Ebola Virus Disease negatively affected crop production and incomes of farm households thus increasing the problem of food insecurity throughout the country.

On natural disasters, many studies have reported direct and indirect impacts of droughts and floods on food security (Awange et al., 2007; Kotir, 2011; Week and Wizor 2020). However, it is worth noting that the agriculture and food sector absorbs about 22 percent of the total damage and losses caused by natural hazards such as floods (FAO, 2015b). Devereux (2007) categorized the impact of droughts and floods on food security in Malawi as follows; failures of production-based entitlement (harvest failure), labour-based entitlement (a decline of employment opportunity and real wage), trade-based entitlement (market failure and declining terms of trade) and transfer-based entitlement (Food and informal settlement failure). In a related study, Akukwe et al. (2020) opined that the flooding exacerbates food insecurity by increasing the number of already food-insecure households in the South-Eastern region of Nigeria. They added that flooding results in food insecurity hotspots and can weaken the efforts to achieving Sustainable Development Goals (SDGs), especially SDG 2 which emphasizes ending hunger, achieving food security and improving nutrition, and promoting sustainable agriculture.

Based on historical documents from 1978–2014, Jingpeng et al. (2019) studied the spatial-temporal variation of five major kinds of natural disasters and grain losses in China and found that drought and flood were the most serious types of national disaster over the last four decades which accounted for over 50 percent grain loss that subsequently led to food insecurity in China. This is not different in other countries but the intensity of the impacts is not similar between developed and developing countries due to disproportionate differences in infrastructure, resources, and disaster preparedness (Agrilinks, 2020). This is so particularly because vulnerable populations in developing countries such as children, women, the elderly, and the poor are most affected by epidemic induced food and nutritional insecurity because they lack the power and resources to adapt to unpredictable crisis events (Chen et al., 2020).

As noted by (IFPRI, 2020), unlike developing countries, China has maintained stable food prices since the beginning of COVID-19 in December with supplies of fruits, vegetables, other staples, and meats being sufficient. This could be attributed to the sustained and continuous supply of agricultural produce to towns under lockdown. However, price hikes and shortages have been reported in some isolated locations. In other countries, studies have shown that the poultry industry has been adversely affected, and it is expected to worsen over time without proper response strategy (Chen et al., 2020). This

results from input shortages, transportation blockages, difficulties in product delivery, and labour shortages. According to **Agrilinks (2020)**, market input estimates indicate that the supply of ducklings and chicken has decreased by about 50 percent following a ban on the movement of live poultry. This implies that supplies of meat and related products could reduce. Like the case of the 2003 SARS outbreak, it is estimated that if the virus is not controlled quickly, the associated food panics can increase thus prolonging temporary food shortages (**Chen et al., 2020**); many lessons can be learned from China's food availability especially in Wuhan, where COVID-19 was first detected. In Italy on the local consumer front, there was an immediate instinctive response in the hoarding of basic necessities and food (**Barcaccia, 2020**). According to (**Zurayk, 2020**), in regions of conflict and crisis, such as the Middle East and East Africa, the COVID-19 threat is compounded by sieges and embargos and obstacles to food access created by political and military pressures. Millions of Syrian refugees live in camps in Turkey, Lebanon, Syria, and Jordan over this COVID-19 period, where they rely on food aid and are unable to practice social distancing.

Before the emergence of the COVID-19 pandemic, food insecurity was already on the rise in Kenya due to factors such as climatic shocks and livestock pests and diseases (**Okoth et al., 2020**). The desert locust outbreak added to the already growing concerns. COVID-19 has worsened the situation by hampering efforts to fight one of the largest locust swarms in recent times (**UN, 2020**). This reflects vast spending on response measures and humanitarian food assistance. According to (**Kariuki, 2020**), the Kenya National Bureau of Statistics estimates that about 12 million people are food poor. These are people whose income doesn't enable them to consume enough calories for a healthy lifestyle and two-thirds of the food poor individuals are found in rural areas. In most Sub-Saharan Africa countries, the pandemic has already crippled the entire food system and Kenya has not been left behind. This is because of restricted movement which affects the entire aspects of food security (availability, affordability, utilization, and accessibility). Similarly, the movement of agricultural labour has been hampered, which will adversely affect food production. Much as agricultural-related logistics have been largely considered essential, not all people can afford logistical services, and this may ultimately result in high post-harvest losses. However, a significant reduction in the export market also has significant challenges in agriculture since most of the Kenyan export is agricultural output (**Odhiambo, Weke and Ngare, 2020**). This means that the government through the ministries concerned needs to have concerted efforts to reinforce inter-country cooperation through proper policies, at least in the short run to address these challenges.

In terms of agricultural production, COVID-19 could disrupt the availability and affordability of agricultural inputs, particularly as devalued currencies and higher-cost logistics may make inputs more expensive. At the same time, contraction in remittances might impede farmers' ability to purchase inputs, and disruptions in port and inland logistics could affect distribution.

The long-term effects of new coronavirus deaths, curtailment of movements, the disruption of food production and systems, and among other factors are not yet known. However, many lessons can be learned from past epidemics and natural disasters and management strategies that have been undertaken by Wuhan, China. The immediate effects have been witnessed in many areas where people scramble and kill one another during the distribution of humanitarian aid. Additionally, many food processing enterprises have been forced to shut down due to strict response strategies, and this can further escalate the food insecurity in the country if these firms cannot restart production soon.

Regardless of the effects of COVID-19, several beneficial inventions have been improvised to support business operations. One of the most embraced innovations is online businesses between farmers and customers, especially in cities or aggregators. Social media has also been used in marketing activities. Home deliveries from agricultural shop outlets as well as fresh horticultural product supplies are among the ideal mechanisms that have been used during the pandemic and may aid in future business transactions. Beyond addressing the immediate concerns surrounding health and food emergencies, COVID-19 pandemic offers an opportunity for decisive collective action towards building resilient food systems (**Shikomboleni, 2020**). Thus, as various policy-makers in different countries engage on how to meet the food security demands of their nations considering disruptions caused by the COVID-19 pandemic; this is also the time to consider system-wide reconfigurations that can build greater resilience in local and national food systems.

Impact of COVID-19 on Household Livelihoods

Livelihoods are the assets, capabilities, and the activities through which an individual acquires necessities of life (**Mutea et al., 2019**). A sustainable livelihood is considered when it can cope with shocks such as pandemics while maintaining or enhancing its capabilities and assets without undermining the natural resources. Since WHO declared COVID-19 a global pandemic on 11th March, 2020 a lot of changes have been instituted throughout the world to curb the spread of the virus including lockdowns, curfews, flights ban, closure of borders between countries and restrictions of movements which in turn has affected the livelihoods of a large population. The uncertainty as to when the global pandemic will end and predictions of exponential growth of the number of infections in Africa further renders the livelihoods of households unsustainable as economic impacts are predicted to last until 2021 (**IMF, 2020**).

The vulnerable people living in densely populated slums, peri-urban, and urban areas are hardest hit in developing countries since urban areas were an entry point of the disease. With the inception of COVID-19 virus containment measures such as curfew, quarantine, lockdown, isolation, cessation and restriction of movements, comes the ripple effect of diminished livelihoods of households. These restrictions have led to socio-economic repercussions through disruption of

economic activities; trade, loss of jobs, both formal and especially informal jobs.

About 61% of the world's population and 86% in Africa are involved in the informal economy therefore vulnerable to economic shocks if unable to work. Approximately 5 to 25 million people are estimated to lose jobs whereas loss of labour income is estimated at USD 860 billion to 3.4 trillion due to the pandemic (**ILO, 2020a**). Countries like Kenya with large informal sectors coupled with minimal social protection programs are hardest hit. The pandemic has led to the loss of jobs for both employed and self-employed individuals in the service industry, hospitality, tourism, transport, and SMEs. The majority of households in the urban areas are dependent on informal jobs characterized by low skill labour that require face to face interactions (**Brookings, 2020**). Partial closure of hotels has reduced the demand for agricultural products hence loss of farm income for farmers who supply their produce. Workers sent on compulsory unpaid leaves and those on pay cuts have also been negatively affected.

Remittances are a source of income for households in Africa, directly for urban households and indirectly to rural households. According to **GAIN (2020)**, remittances to Sub-Saharan Africa are expected to decline by 23.1% due to COVID-19. In Kenya for instance, remittances amounted to USD 259.4 million in January 2020 (**CBK, 2020**). A significant drop in volumes of remittances is expected following the loss of jobs and containment measures such as lockdown, illness, and disruption of economic activities, therefore, migrants are unable to support the livelihood of their families (**IFRC et al., 2020**). This is likely to impact households whose livelihoods rely largely on remittances hence posing threat to essential services, access to healthcare and food items. Households, therefore, face potential food and nutrition insecurity, increased poverty levels due to low purchasing power. Household and business spending is estimated to fall by 50% in 2020 as a result of disruptions caused by COVID-19 according to a global report by **McKinsey and Company (2020)**. The absence of social protection programs to cushion households against loss of income is evident in developing countries like Kenya, and, the ability to adopt coping strategies such as subsistence farming is not possible in urban slum areas. The households may be forced to engage in livelihood coping strategies that predispose them to contract the virus or sale of their productive assets to afford a living.

Recent reports by OXFAM indicate that COVID-19 could push about half a billion people into poverty. Urban slum dwellers' livelihoods are at risk following the pandemic. The densely populated slums are characterized by poor sanitation, high prevalence of poverty, and dependent on informal sector employment which makes them more vulnerable to the effects of the virus. The containment measures have significantly impacted their livelihoods hence loss of income, the reduced purchasing power of essential food items, and inability to provide essentials for their families following the absence of social protection programs to cushion against loss of jobs. In major African cities such as Nairobi, Kinshasa and Lagos where up to two-thirds of the population rely on the

informal sector for their livelihoods, millions of people have been left without income to purchase food due to the abrupt loss of jobs that often provide daily earnings (**Shikomboleni, 2020**). The potential impact of the pandemic on rural livelihoods is yet to be felt following the lockdown of high-risk urban areas and the implementation of curfew, restriction of movements at border points. Farmers face a potential risk of losing farm incomes through reduced demands and perishability of farm produce. Restriction of movements and closure of markets also limit access to essential farm inputs hence could potentially result in a reduction of agricultural production and loss of income for casual farm labourers (**IFRC et al., 2020**).

Kenyan Level Initiative

To curb the spread of the virus, the Kenyan government instituted several measures including administrative, economic, and behavioural. Administrative measures have included the closure of produce markets, international borders, and dawn to dusk curfews. These have been highly disruptive for food delivery. This is because Kenya's food system is heavily dominated by small, independent transporters as the link between producers and consumers. Produce markets, which are at the heart of distribution in urban areas, serve consumers, and smaller retailers. This traditional informal system accounts for about 90 percent of the market. The closure of many of these markets in the urban and peri-urban areas, while a reasonable measure to avoid crowding, has disrupted food supply systems, especially for fresh produce. The impact is felt most in low-income urban households that rely on these informal food markets. The ministry of agriculture agreed to categorize the transport of foodstuff as an essential service, to improve food supply in urban areas.

The border restriction, especially from neighbouring countries such as Kenya-Tanzania and Kenya-Uganda borders, is also reducing fresh food supply in Kenyan markets. This is because of the more time needed in border screening of goods on transit as well as drivers before getting into the country, to avoid further spread of the pandemic. Delays have also been reported due to a shift from manual documentation to online working as some employees are currently working from home. Again, there has been a partial closure of internal container depots due to lean staff handling cargo. These constraints eventually affect the competitiveness of the produce being transited to the destination markets. There are also losses due to delays in logistics before delivering goods to the destination markets, brought about by the nature of the high perishability of agricultural products (**Okoth et al., 2020**). The border restrictions have been overcome by negotiations between Kenya and the affected countries on the modalities to allow the free flow of agricultural produce while minimizing and curbing the spread of COVID-19.

The Kenyan government through its various stakeholders has established the Kenya COVID-19 Fund called GiveDirectly which is an emergency cash transfer. GiveDirectly is aimed at delivering cash to low-income Kenyans to help them get through COVID-19, as part of the Shikilia initiative. Shikilia is a collaboration between

Kenyan private sector and non-profit organizations to raise funds and provide emergency cash transfers to low-income Kenyan communities to replace lost income due to COVID-19 and prevent a widespread humanitarian crisis. Shikilia initiative coordinates with community organizations and geographic targeting data to identify and prioritize vulnerable communities and groups.

As reported by **Wanjala (2020)**, other fiscal economic policy measures instituted by the government include individual income tax reduction from 30 percent to 25 percent; corporate income tax reduction from 30 percent to 25 percent; 100 percent tax waiver to individuals earning less than USD 240; VAT reduction from 16 percent to 14 percent; injection of a USD 10 million social protection stimulus package for the elderly and underprivileged citizens; and a temporary delisting of loan defaulters from the Credit Reference Bureau (CRB). Other measures included reduction of turnover tax rate from three- percent to one percent for all micro, small and medium enterprises

Despite the country's effort to impose tax laws and instigate safety nets and related incentives to vulnerable families, the implementation mechanism has been reported to be inadequate, untargeted, and benefitting the wrong people. This is probably due to poor planning, corruption, and embezzlement of public coffers by those entrusted to manage public funds. The humanitarian and recovery assistance to vulnerable groups has also proven to be unsustainable in the long run. This is so because most agricultural communities are in interior parts of the country, most of whom are not easily accessible by road (**Okoth et al., 2020**)

The behavioural measures have included an indefinite closure of recreational facilities such as bars; imposition of a dusk to dawn curfew; ban of public gatherings and events; issuance of a directive to Public Service Vehicles (PSVs) to implement social distancing among passengers; as well as suspension of international flights from landing or flying out of Kenya except for cargo flights (**Wanjala, 2020**). These have greatly affected the free flow of agricultural commodities in the country.

CONCLUSION

The observed effects of the COVID-19 pandemic and previous epidemics and pandemics call for policy measures to curb future occurrences. The exceptional extent and duration of the 2014 Ebola Virus Disease (EVD) outbreak in West Africa had significant adverse effects on food security in Guinea, Sierra Leone and Liberia, the countries most affected. Countries' preparedness for pandemics is crucial to prevent adverse economic effects and loss of human lives. Developing countries for instance need to enhance their preparedness through establishing efficient, accessible health systems, mobile health units, and increased laboratory facilities, to improve prevention, early detection, treatment and containment of diseases. This will reduce the fatalities in future occurrences and pandemics.

The pandemics largely impacts on food security and nutrition. Therefore, it is necessary to ensure sustainability of resources, strengthen infrastructure and food systems to

avoid or minimize food crises in the future. Governments need to put measures geared towards promoting smallholder farming, which accounts for the highest percentage of production for developing countries, such as accelerating e-commerce platforms connecting farmers and consumers. Sustainable, resilient food systems need to be established to boost food safety and minimize transmission of pathogens. This will also reduce future food and health crises worldwide. One of the key ways in which the Kenyan economy can build resilience to mitigate and manage shocks is to create buffers with one vital safeguard being strategic food reserves. Food reserves are required as a buffer to support adjustment in times of drought and subsequent famines that put pressure on fiscal reserves, as well as for other crisis situations such as the current COVID-19 pandemic. The government should also decide whether to reconsider biotech seeds, which might provide greater resilience against climate and pest threats to improve the overall health of the system in the longer term.

Additionally, emphasis should be placed on protecting supply chains from any form of disruptions in the short term. This is especially so with the current partial lockdown, there is also need for facilitated inter county and inter country border crossing through a coordinated approach of testing and social distancing measures to ensure free flow of staple food commodities.

Social protection programs need to be enhanced in developing countries. This is important in maintaining livelihoods and reducing food and nutrition insecurity among households as well as complementing effectiveness of containment measures such as lockdowns and curfews that are meant to reduce social interactions in the community. Among them should include targeted emergency cash transfers and distribution of food items to the most vulnerable in society. Fiscal policy measures such as tax reliefs to avoid disruption of food supply chains; revision of budget for healthcare to enhance disaster preparedness; providing stimulus packages for SMEs and other businesses also reduce the economic impacts of pandemics.

Conflict of Interest: The authors declare no conflict of interest.

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