SOCIOLGY | REVIEW ARTICLE

Review on socio-economic impacts of ‘Triple Threats’ of COVID-19, desert locusts, and floods in East Africa: Evidence from Ethiopia

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Abstract: East Africa region is facing an unprecedented triple socio-economic threat caused by the combined effects of the ongoing COVID-19 pandemic, the upsurge of desert locusts, and recent severe floods. The socio-economic impacts of the COVID-19 pandemic with the massive economic impacts of desert locust, and flooding resulted in devastating implications on livelihood and food security situation in East Africa. The overall objective of this review is to assess and compile the widespread socio-economic impacts of the three threats in East Africa evidence from Ethiopia. To achieve this objective, in this review, all relevant information were collected through different search engines of PubMed/PMC/Medline, Web of Science, Google Scholar, Scopus, Google, and Science Direct databases. In addition, local media news, reports relevant to the topic from local and national governments, international organizations, and NGOs were used. The review found that the threats do not just have short-term impacts on socio-economic conditions of the people in the region in general and in Ethiopia in particular, they exacerbate prevailing food insecurity and undermine livelihoods and development gains that took years to build. Restriction measures introduced by governments to contain the spread of

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PUBLIC INTEREST STATEMENT

This review article explores the triple impacts of the COVID-19 pandemic, desert locusts, and floods in East Africa mainly focus on Ethiopia. The review revealed that these threats are currently devastating the socioeconomic situations of millions of people in East Africa in general and in Ethiopia in particular. This review found that the worst affected groups by the threats were smallholder households, children, youths, women, migrants, informal workers, and micro-small and medium-sized enterprises. Therefore, this review article calls interventions of governments, international organizations, stakeholders, NGOs and provides possible suggestions for researchers to research in the future to reduce the short and long term devastating socioeconomic impacts of these three threats on the people of East Africa and Ethiopia in particular.
COVID-19 pandemic inside their boundaries would have adverse socio-economic-impacts on the people of their countries. Prolonged cessation in economic activities due to the pandemic with the overwhelming effects of flooding and desert locust will result in a permanent loss in the economy of Ethiopia and its GDP is expected to fall by 3% in 2019/2021. The findings of this review can help and inform that the observed impacts of COVID-19 pandemic, desert locust, and floods call for policy measures to curb future occurrences. Countries’ preparedness for these threats is crucial to prevent the adverse socio-economic impacts and loss of human lives. Therefore, to ensure socio-economic recovery within a reasonable period the governments need to make credible commitments in each country of the region. Particularly, the government of Ethiopia should put in place plans and resources to improve the risk resilience capacity of the people to cope up and minimize the adverse effects of such disasters in the short-term basis and, also to build a more resilient, inclusive and sustainable future in the long-term basis.

Subjects: Development Studies; Sustainable Development; Development Policy

Keywords: COVID-19; desert locust; floods; East Africa; Ethiopia

1. Introduction

1.1. Background of the review
The global COVID-19 pandemic is an unprecedented threat unlike any since the end of the Second World War (WW II) (Catherine, 2020). It is one of the most serious challenges faces by humanity in recent times and is affecting all countries and all sections of society (WFP, 2020a). Besides severe health care crises, the pandemic has already imposed deep scars on the global economy and socio-political stability. The economic fallout from the global pandemic could increase global poverty to include as much as half a billion more people, or 8% of the total human population, reversing 30 years of economic improvement (Sumner et al., 2020). COVID-19 pandemic that has spread rapidly and extensively around the world since late 2019 has had profound implications for the socioeconomic situations of the people especially for food security and nutrition (High-Level Panel of Experts on Food Security and Nutrition [HLPE], 2020b). The World Bank’s most recent poverty and shared prosperity report show the pandemic could push about 100 million people into extreme poverty in 2020 alone, and lead to an increase in global poverty for the first time since 1998 (World Bank [WB], 2020c).

However, the temporal distribution and burden of the diseases vary from setting to setting based on economic status, demography, and geographic location (Adugna et al., 2020). Although there is a general agreement that “COVID-19 does not discriminate … knows no racial, ethnic, gender, or national borders” (Ho & Dascalu, 2020), its impacts are not evenly spread across races, and later, countries and geographical regions. This is consistent that economic impacts resulting from the COVID-19 crisis are expected to have differentiated impacts on a wide range of economic and social indicators (Beyene et al., 2020). People suffering already from social exclusion in various respects have been pushed into a desperate situation by the current forms of COVID-19 response due to the lack of meaningful social welfare and especially income support. The COVID-19 pandemic, and its attendant responses, has led to massive health, social, and economic challenges on a global scale (Kimani et al., 2020). If COVID-19 surges, their situation could rapidly become much worse (Herrings et al., 2020). The COVID-19 pandemic and the attempts to limit its spread have also resulted in profound economic impacts, and a significant contraction in the global economy (Josephson, 2020).
Any analysis aspiring to assess the impact of the COVID-19 pandemic on measures of welfare, poverty, and other social and health indicators must rely on macroeconomic scenarios that consistently evaluate expected trajectories of key macroeconomic variables (Hurnik et al., 2020). Besides the direct socio-economic impacts of the health crisis, the pandemic will affect developing countries through global supply chain disruptions, tourism industry collapse, commodity price falls, falls in remittances by migrants, capital flight, and foreign investment decline (Raga, 2020). The economic impacts of COVID-19 are having dynamic effects on the wellbeing of families and communities (Coaches and Mentors Association of South Africa [COMENSA], 2020). It is obvious that the impact of COVID-19 is high and deep in lower- and middle-income countries as they were already entering recession by late 2019 (United Nations Conference on Trade and Development [UNCTAD], 2020), and that has had particularly dire consequences for impoverished populations such as sex workers, many of whom rely on regular income in the informal economic sector to survive (Kimani et al., 2020). The COVID-19 pandemic is likely to have a substantive effect on African economies. It mainly affected the casual workers and low-wage earners may be the most impacted, including domestic workers, leisure, and hospitality workers (Devereux, 2020).

East Africa’s low per-capita incomes coupled with high-income inequality and high poverty levels make these countries vulnerable and less able to absorb these shocks (Center for the Neural Basis of Cognition [CNBC], 2020). In East Africa, 15.4 million people are facing acute hunger (IPC phase 3 or worse), which will be highly vulnerable to any adverse impact of the Covid-19 outbreak (World Food Program [WFP], 2020a). Moreover, East Africa recently has experienced one of the wettest rainfall seasons in 40 years, causing widespread flooding, displacing hundreds of thousands of people and causing crop (70,000 hectares) and livestock losses (96,000 animal deaths) in the worst affected areas. This abundant rains have promoted the breeding and development of Desert Locusts (DL) and prolonged the outbreak in East Africa, which continues to pose a significant threat to the main crop seasons. The DL is considered to be the most dangerous of all migratory pest species in the world due to its ability to reproduce rapidly, migrate long distances, and devastate crops (Cressman, 2016). A typical swarm can consist of up to 150 million locusts per square kilometer and can migrate as far as 150 km in one day. Even a tiny, one-square-kilometer locust swarm is capable of consuming the same amount of food in one day as approximately 35,000 people (Food and Agricultural Organization [FAO], 2020h). According to (Global Agricultural Monitoring [GAM], 2020), the situation when combined with the COVID-19, floods and the spread of these locusts, East African people find themselves combatt[ing] a “Triple Menace.” Currently, COVID-19, DL, and deadly flooding pose a “Triple Threat” to millions of people across East Africa. The added threat of COVID-19 exposes a sub-region that already was home to about 20% of the world’s population of food-insecure people. These shocks do not just have immediate, short-term effects; they exacerbate prevailing food insecurity and undermine livelihoods and development gains that took years to build (WFP, 2020d). The impacts of these disasters are high in the sub-region since it is predominantly composed of low-income countries.

According to (Famine Early Warning Systems Network [FEWS NET], 2020a), the report from December 2019 to January 2020, Kenya, South Sudan, parts of Eastern and Southern Ethiopia, and Somalia remain under stressed to crisis levels of food insecurity. Particularly, the impact of the DL on the food and livelihood securities in the sub-region is of great concern. The current DL activity in Eastern Africa is extremely alarming (International Federation of Red Cross and Red Crescent Societies [IFRC], 2020a). FAO has warned that the DL outbreak is threatening the food security situation as significant pasture and crop losses across East Africa, mainly in agro-pastoral areas of Eastern Ethiopia, Central Somalia, and Northern Kenya have been reported (FAO, 2020a, 2020c). WFP projects that the number of food-insecure people in a sub-region could increase to 34 million or more in the coming months due to the collective impacts of COVID-19, DL, and flooding. Besides, according to the analysis of Integrated Food Security Phase Classification [IPC] (2020a), the region faces widespread food insecurity, with approximately 12.7 million people in Crisis (IPC Phase 3) and above in Ethiopia, Kenya, and Somalia (8.5 million in Ethiopia, 3.1 million in...
Kenya, and 1.1 million people in Somalia). The drivers of this food insecurity include COVID-19, climate shocks (unusual flooding), conflict, DL, and macroeconomic crises (IPC, 2020a).

The cascade of COVID-19 pandemic and the locust-endemic catastrophes may result in a disaster escalating toward famine, health-hazards, and poverty in the regions at risk (Pescaroli & Alexandre, 2018). Available sources indicate that about 130 million people will face starvation at the end of 2020 due to the projected economic impact of COVID-19, mostly in the locust invaded low and middle-income African countries (Rahaman, 2020). The ongoing flooding crisis is also exacerbating other threats caused by Covid-19 and the invasion of locusts. Flooding is a “Threat Amplifier” with regard to the spread of Covid-19 as it makes it hard to implement preventative measures (IFRC, 2020b). Floods are also the most frequent and devastating type of natural disaster worldwide, causing unprecedented deaths, diseases, and destruction of property and crops. Flooding has a greater impact in developing countries due to a lack of sufficient disaster management structures and a lack of economic resources (Abaya et al., 2009).

The current socio-economic situations in East Africa remain extremely alarming due to the dimensionally combined effect of the COVID-19 pandemic, DL, and unusual flooding. This represents an unprecedented threat to the socioeconomic situations of the people, especially the food security and livelihood conditions of the people in the region. In particular, in Ethiopia, the second most populous country in the continent of Africa next to Nigeria, the impact of these threats is very devastating and severely since it has been fading by collective effects of political instability, war, ethnic conflict, drought, famine, and economic hardship over the course of its history. Hence, these factors have aggravated the socioeconomic impacts of these threats and highly deteriorating the risk resilience capacity of the people in the country. However, as far as the author’s knowledge is concerned, to date, there was no single review (research) conducted before on this topic in the East Africa context or a country context. This implied that there is limited complied evidence of the devastating impacts of these threats on the socioeconomics of the people in East Africa in general and in Ethiopia in particular to take short-term and long-term arrangements and measures. In addition, while research on the health impacts of COVID-19 in low-income countries is rapidly emerging (Mbow et al., 2020), there is limited evidence on the socioeconomic impacts of the pandemic (Laborde et al., 2020). Therefore, this review is now vital and can inform decisions by governments and international aid organizations (stakeholders) regarding how best to mitigate the hostile socio-economic impacts of the three threats and bring out the threats in East Africa.

1.2. Objectives of the review

1.2.1. General objective
The overall objective of the review was to assess the socio-economic impacts of the “Triple Treats” of COVID-19 pandemic, DL, and floods in East Africa: Evidence on Ethiopia.

1.2.2. Specific objectives
- To review the socio-economic impacts of the “Triple Treats” of COVID-19 pandemic, DL, and floods in Ethiopia.
- To review and compile the extent of the socio-economic impact of the three threats in Ethiopia.
- To provide possible recommendations to concerned bodies to bring out the threats in Ethiopia.

2. Review methodology
The review covered the socio-economic impacts of “Triple Threats” of COVID-19, DL, and floods in East Africa, evidence from Ethiopia. Preparation of this socio-economic impact review follows a methodology designed to utilize the highest possible degree of robustness through tangible findings and pieces of evidence that apply to the topic. To identify potentially relevant materials, all embracing searches were performed from the following electronic database i.e. PubMed/PMC/
Medline, Web of Science, Scopus, Google Scholar, Google, and Science Direct. The documents were recognized through a combination of searches, using keywords and terms related to the title. These included words such as socioeconomic, impacts, COVID-19 pandemic, Desert locust, Floods, East Africa, and Ethiopia.

In this regard, the relevant information was summarized repeatedly, guided by the keywords already mentioned. Literature that was not associated with the topic was excluded. But, to avoid the risk of missing potentially relevant literature, reference lists of selected articles were scanned for related materials to the topic under study. No date limits were executed on the search as an urgency was assumed to the significance of the materials in terms of their significant contribution to the ongoing discourse on the issue which was raised, regardless of the age of the material. Efforts, however, were made to capture as much current literature as likely to reflect the currency and aggregated relevance of the topic. Therefore, identified materials meeting pre-defined inclusion and exclusion criteria and were coherent with the topic of interest were included in the review. The general inclusion criteria were relevance, authority, and currency (Browning & Rigolon, 2019; Wolf et al., 2014). Relevance had to do with how the material had contributed to the topic discourse, while authority refers to whether it had been published by a reputable source or the material had been peer-reviewed or professionally edited. Currency, on the other hand, was defined in terms of whether the material was still influential regarding the debate on the topic (Browning & Rigolon, 2019).

Therefore, this review included papers that met three inclusion criteria (relevance, authority, and currency) and one exclusion criteria. In this review, we included journals, conference proceedings, working papers, conference papers, newspapers, abstracts, local media-based news, and reports relevant to the study were retrieved from local and national governments, Humanitarian International Organizations, and NGOs. To assure that this review included all the relevant works on the socioeconomic impacts of the “Triple Threats” of COVID-19, desert locust, and floods in East Africa Evidence from Ethiopia, we conducted qualitative literature. After 520 search results, only 101 papers satisfying the full inclusion criteria and were included based on their relevance and related to this review. In addition to narrations, figures and tables were used as reviewing techniques to support the qualitative synthesis quantitatively, shorten and interest the review.

3. Results and discussions

3.1. Socio-economic context of East Africa

East Africa comprises 13 countries that are diverse in many aspects. The socioeconomic context of East Africa is poor economy, low human development. All countries covered by East Africa are low-income countries, except Kenya and Djibouti, which are under the lower-middle-income category (Asian Development Bank [ADB], 2020). In 2018, real GDP in the East Africa region grew by an estimated 5.7%, slightly less than the 5.9% in 2017, but the highest among African regions. Economic growth is projected to remain strong, at 5.9% in 2019 and 6.1% in 2020. The regional average masks substantial variation across countries. Estimated GDP growth in 2018 ranged from –3.8% (contraction) in South Sudan to 7.2% in Rwanda and 7.7% in Ethiopia. The countries with high economic growth are Ethiopia, Rwanda, Kenya, and Djibouti driven by industry, services, and agricultural sectors. Low or negative growth was recorded in South Sudan (–3.8%), Burundi (1.4%), and Somalia (2.9%) mainly due to lack of peace and stability, which has disrupted economic activity (WFP, 2020a).

Moreover, East Africa’s economic structure and growth patterns are characterized by low industrialization including a lack of economic diversification, product differentiation, and sophistication, and insufficient job creation (ADB, 2020). Notwithstanding this poor performance on average, some countries Ethiopia, Kenya, Tanzania, and Uganda have made progress in industrialization recently. All East African countries export mainly primary commodities and import manufactured goods. The terms of trade of primary commodities concerning manufactured goods in
Africa were deteriorating for more than a century before improving between 2003 and 2013, when
global commodity prices started to improve (Pfaffenzeller & Rayner, 2007).

East Africa continues to face various downside risks that could undermine economic growth and
development prospects. The most vulnerable countries have different economic and social char-
acteristics some are small island states, others landlocked but generally depend on a few export
products and suffer from instability in export earnings. Most of the countries are extremely
vulnerable to natural disasters, with large fluctuations in agricultural production (agriculture’s
vulnerability) and a high reliance on the agricultural sector. Another key risk is persistent current
account deficits and related increases in external indebtedness. Finally, state fragility with its
adverse implications for security and economic progress is a risk for Burundi, Somalia, South
Sudan, and, to some degree, Ethiopia. First, since almost all countries depend on primary com-
modities for exports, falling global commodity prices have negatively affected their terms of trade.
Second, the region’s high growth has been achieved through high investment, which is above
domestic savings. The internal investment savings gap is strongly associated with the persistent
current account deficit (or external gap). Furthermore, macroeconomic challenges (high inflation,
currency depreciation, shortage of fuel, and dollar) continue to disrupt economic activity in
Ethiopia, Burundi, and South Sudan. Despite impressive economic growth in most countries in
recent years, a large number of populations are overwhelmed by food insecurity, poverty, and low
human development.

All countries in East Africa except Kenya are in the low human development category. Somalia
has the lowest human development index, followed by Burundi, Djibouti, South Sudan, and Eritrea.
Poverty is also endemic, particularly high in rural areas. Burundi, Eritrea, Somalia, and South Sudan
have the highest poverty levels (ADB, 2020).

3.2. The impacts of COVID-19 pandemic on food and livelihood security in East Africa

COVID-19 was declared a pandemic by the World Health Organization (WHO) on 11 March 2020,
and the first cases in the East Africa region were confirmed on 13 March 2020 (WFP, 2020b). To
date, all countries in Eastern Africa have recorded cases of COVID-19 (FAO, 2020g). As of
29 December 2020, a total of 318,755 COVID-19 cases and 5,907 deaths have been reported in
14 East African countries, this covered (6%) the whole continent of Africa (AFRICA Centers for
Diseases Control and Prevention [ACDC], 2020). Kenya and Ethiopia are the worst affected coun-
tries, accounting for nearly 70% of the cases in the region (WFP, 2020e). The arrival of the COVID-
19 pandemic on the African continent only serves to complicate the response of vulnerable East
African communities. Considering these threats, the path to acute food insecurity and economic
backsliding is ominously clear (The Africa report, 2020). The COVID-19 pandemic is devastating
lives, public health systems, livelihoods, and economies, populations living in food crisis contexts
are particularly exposed to its effects. Countries with existing humanitarian crises are particularly
exposed to the effects of the pandemic, in terms of both direct impacts on people’s health, and
indirect effects, such as disruption of livelihoods, food supply chains and access to food, basic
services as well as humanitarian assistance (FAO, 2020d). Africa faces dual public health and
economic crisis that risks overwhelming healthcare systems, destroying livelihoods, and slowing
the region’s growth prospects for years to come (Organization for Economic Cooperation and
Development [OECD], 2020). Many Africans risk is becoming food insecure as a consequence of
this crisis (United Nations [UN], 2020a).

Even though some African countries have a wealth of relevant lessons from dealing with
previous HIV/AIDS and Ebola epidemics on engaging communities, communicating risks, adapting
local, and innovative methods, they did not escape out their people from the disruption of COVID-
19 pandemic (UN, 2020a). COVID-19 is exerting additional pressure to an already fragile situation
in the region following various shocks resulting from consecutive climate-related shocks (droughts
and floods), conflicts and politically instigated insecurity in some countries, refugees and human
displacements, and invasion by desert locusts since the end of 2019 (WFP, 2020a). These shocks
have negatively impacted the livelihoods of affected populations and continue to increase vulnerability and weakening of resilience. The COVID-19 pandemic has had a profound adverse impact on the overall economy, as well as the livelihoods and income of populations, and consequently on food security and nutrition. This is particularly true in East Africa, a region with widespread poverty, eroded livelihoods, and serious hunger and malnutrition rates due to multiple shocks (Kansiime et al., 2020).

In the region, the negative impact on livelihoods is expected to bring the direct consequence of household welfare losses of 7%, and in the event of a lengthy crisis, this could increase to 10% due to loss of employment and decreasing terms of trade. If borders are closed, this could increase further to 14% (WFP, 2020a). According to (UN, 2020a), the COVID-19 pandemic began to impact African economies heavily and destroy livelihoods well before it reached the shores of the continent due to falling demand for Africa’s commodities, capital flight from Africa, a virtual collapse of tourism and air transport associated with lockdowns and border closures. Movement restrictions have had the effect of decreasing livelihood opportunities for both urban and rural populations, driving unemployment. The erosion of livelihoods by both the COVID-19 pandemic and the desert locust outbreak reduces the ability of communities and individuals to absorb further shocks, heightening the risk of poverty. Given the existing vulnerabilities in the sub-region, the impact of the crisis on lives, food security, job and livelihoods, food security, social services, and economic activities are expected to be particularly severe (Table 1). Table (1) below displays the simplified consequences of COVID-19 in East Africa in terms of first-order effects, second-order effects, and third-order effects under the economic and social categories.

Besides, the implementation of strict lockdown and physical distancing policies in several countries caused a serious slowdown in economic activity and disrupted supply chains, unleashing new dynamics with cascading effects on food systems and people’s food security and nutrition (HLPE, 2020a). Lockdowns and business closures have exacerbated the precarious nature of their livelihoods (Robin et al., 2020). The most vulnerable are those who are already facing acute hunger and malnutrition, internally displaced persons and refugees, low-income urban households, market-dependent rural households, elderly and people already suffering from medical conditions, and the children unable to access schools and school meals (WFP, 2020a). According to (International Labour Organization [ILO], 2020b), more than the equivalents of 400 million full-time jobs have been lost in the second quarter of 2020 with countries enforcing lockdown measures.

| Table 1. Simplified consequences of COVID-19 in East Africa |
|------------------------------------------------------------|
| **First-order effects**                                    | **Second-order effects**               | **Third-order effects**               |
| Economic                                                  | Domestic supply chains collapse       | Debt crises                           |
|                                                           | Increased non-formal activity          | Financial disasters                   |
|                                                           | Economic activities stalls             | Economic recession                    |
|                                                           | Loss of livelihoods                   | Food insecurity                       |
|                                                           |                                          | Desperate insecurity                  |
| Social                                                    | Widespread deprivation                | Social unrest                         |
|                                                           | Social disaffection                    | Human development                     |
|                                                           | Breakdown in social services           | Increased inequalities                |
|                                                           |                                          | Losses                                 |
|                                                           |                                          | Vulnerable groups victimized          |

*Source: Own Survey (2020)*
The number of people who could be pushed into extreme poverty in 2020 may reach as high as about 49 million people, with around half of this increase occurring in Sub-Saharan African (Caolina, 2020). The most recent estimates indicate that between 83 and 132 million additional people (FAO et al., 2020), including 38–80 million people in low-income countries that rely on food imports (Torero, 2020), will experience food insecurity as a direct result of the pandemic. Sub-Saharan Africans, including Ethiopia, are unlikely to escape the direct and indirect effects of the pandemic and attendant global crisis (Catherine, 2020). According to (United Nations Economic Commission for Africa [UNECA], 2020), the economic impact of COVID-19 was felt before the virus reached the region, following the restrictions put in place in China and Europe, which led to an overall reduction in trade and the plummeting of the demand for tourism.

Before the COVID-19 pandemic, food insecurity in East Africa was already alarmingly high, with over 15 million food-insecure people (IPC Phase 3+) (WFP, 2020a). For a region that still has already suffered from the 2019 drought and subsequent floods and then the ongoing DL outbreak, additional public health, and economic shock resulting from the COVID-19 crisis could have serious implications on already critical hunger and malnutrition situation. The number of acutely food insecure people estimated in East Africa could increase by 73% from 24 million pre-COVID-19 to 41.5 million before the end of 2020 (WFP, 2020e). The impacts of food insecurity under Covid-19 were multilayered and complex impacts reached far beyond missed meals, people experiencing complex and interlocking physical, emotional, social, and financial challenges (Connors et al., 2020).

Countries with high levels of food insecurity are generally more vulnerable and less prepared for an epidemic outbreak than those which see a rapid spread of the disease at present. COVID-19 hit the Eastern Africa sub-region at a particularly critical time when the economies of several countries in the sub-region were recovering from the impacts of recent droughts and severe flooding and dealing with the worst DL invasion in 25 years (FAO, 2020h). The cumulative effect of these shocks has eroded the resilience of large segments of the population and strained governments and humanitarian agencies (United Nations High Commissioner for Refugees [UNHCR], 2020). Due to multiple, compounding hazards (e.g., COVID-19, DL, and climatic shocks), there was general pessimism amongst people about harvest prospects and current rangeland conditions. Given already high levels of food insecurity across the region, these challenges threaten to drive further food security and livelihoods deteriorations in the coming months (Food Security and Nutrition Working Group [FSNWG], 2020a). The latest data shows that the food security of 135 million people was categorized as a crisis level or worse (United Nations Ethiopia [UNE], 2020). That number could nearly double before the end of the year due to the impacts of COVID-19. A large portion of the population in East Africa has fragile livelihoods and up to 80% of non-agricultural employment is informal. Informal work requires frequent social interactions and cannot be performed remotely. Consequently, a large number of low-skilled workers have lost their employment, raising concerns over people having to sell productive assets to meet their basic needs (WFP, 2020b). Movement restrictions related to COVID-19 will likely impact agricultural production in the region and increase food insecurity, in particular in urban areas where subsistence farming is not an option (Global Native American Flute Circle [GNAFC] & Food Security Information Network [FSIN], 2020).

Furthermore, the impact on the livelihood of daily wagers and informal workers could be huge if the situation persists for a much longer period (ADB, 2020). Accordingly, several overlapping and reinforcing dynamics have emerged that are affecting food systems, food security, and nutrition thus far, including disruptions to food supply chains; loss of income and livelihoods; a widening of inequality; disruptions to social protection programs; altered food environments; and uneven food prices in localized contexts. Given the high degree of uncertainty around the virus and its evolution, there may be future threats to food security and nutrition, including the potential for lower food productivity and production, depending on the severity and duration of the pandemic and
measures to contain it (HLPE, 2020b). Figure (1) above depicted a brief overview of the dynamics already mentioned.

### 3.3. The overall situations and the impact of DL on food security in East Africa

The current locust swarm, which began in July 2019, has become endemic in Africa, and alongside the COVID-19 pandemic, it is a disaster with a cascading risk (Pescaroli & Alexandre, 2018). In East Africa, DL outbreak is threatening livelihoods, food security, the environment, and economic development in the region (Abubakr et al., 2020). The current upsurge in East Africa is the worst in 25 years in Ethiopia and Somalia and the worst in 70 years in Kenya (FSNWG, 2020a). Pastures and croplands have already suffered damage in Ethiopia, Kenya, and Somalia and there are potentially severe consequences for the region where nearly 12 million people are coping with acute food insecurity, and many rely on agriculture for their survival (FAO, 2020b).

The worst DL outbreak in 25 years has caused significant crop and pasture losses across the East and Horn of Africa, mainly in agro-pastoral areas of eastern Ethiopia, central Somalia, and northern Kenya (IPC, 2020a). In the region, the DL caused an estimated cereal loss of 3,562,856 quintals (356,286 MT) affecting about 806,400 farming households, 197,163 hectares of cropland, and 1,350,000 hectares of pasture and browse (50% pasture damage) (FAO et al., 2020). As result, an estimation of 20 million people is food insecure in nine East African countries of Ethiopia, South Sudan, Kenya, Somalia, Uganda, Rwanda, Burundi, Djibouti, and Eritrea (WFP, 2020e).

Besides, during January 2020, the following number of hectares have been treated by country Ethiopia 700,000 ha; Kenya 20,000 ha, Sudan 18,714 ha, Eritrea 15,068 ha, and Somalia 15,000 ha. East and Horn of Africa region are currently facing one of the worst infestations of DL whose destructive impact is likely to cause large-scale crop damage and worsen food insecurity in countries already affected by recurrent drought, conflict, and high food prices (IPC, 2020a). Over 10 million people already facing a severe food insecurity crisis (IPC Phase 3) or worse in Ethiopia, Kenya, Somalia, and Sudan are located in areas currently affected by the desert locust infestation. A further 3.24 million in Uganda and South Sudan are under threat from expanding swarms (IPC, 2020a). The DL infestation is occurring in the context of consecutive seasons of climatic shocks including the 2018–2019 drought that significantly eroded the household coping capacity in the
region, leaving an estimated 18 to 22 million people facing a crisis due to worsening food insecurity (IFRC, 2020a).

Destroying hundreds of thousands of acres of crops, the outbreak is impacting the region’s food insecurity. Agricultural production losses in DL affected areas tend to be significant for affected households. In the affected areas, the losses can drive food insecurity, particularly in contexts of multiple shocks and already high vulnerability (FSNWG, 2020a). The UN agency urged for a collective campaign to deal with the crisis, concerned over the risk that the swarms spill over into more countries in East Africa, “if efforts to deal with the voracious pest are not scaled up across the region” (UN news, 2020). Figure (2) below shows the situation at glance in East Africa Desert locust crises. Figure (2) shows nine East African countries included in the UN Food and Agriculture Organization (FAO)’s regional response plan and addendum as of late May 2020 (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, Uganda, and Tanzania) (FAO, 2020g). It also reflects combined estimates of populations in Ethiopia, Kenya, Somalia, South Sudan, Sudan, Tanzania, and Uganda currently experiencing Integrated Food Security Phase Classification (IPC) 3, crisis or higher levels of acute food insecurity (27.1 Million estimated acutely food-insecure population). IPC data are not currently available for Djibouti or Eritrea (United States Agency for International Development [USAID], 2020).

A regional DL impact in Ethiopia, Kenya, Somalia, and Uganda found that amongst respondents who either 1) currently had crops in their fields or 2) owned livestock, roughly a third experienced desert-locust-related pasture or crop losses (FSNWG, 2020b). More specifically, roughly half of impacted cropping and livestock-rearing respondents experienced high or very high losses to their crops and rangeland (Table 2).

### Figure 2. Situation desert locust crises at glance in East Africa.

*Source: USAID (2020).*

### Table 2. Percentage of respondents reporting having observed desert locusts and experiencing losses, by country and livelihood activity

| Country  | Cropping Respondents | Livestock Respondents |
|----------|----------------------|-----------------------|
|          | % Observed DL        | % DL Losses           | % Observed DL | % DL Losses |
| Ethiopia | 80%                  | 56%                   | 84%           | 65%         |
| Kenya    | 27%                  | 17%                   | 35%           | 24%         |
| Somalia  | 54%                  | 36%                   | 60%           | 36%         |
| Uganda   | 32%                  | 29%                   | 47%           | 41%         |
| Total    | 43%                  | 30%                   | 57%           | 41%         |

*Source: FSNWG (2020b)*
Due to multiple, compounding hazards (e.g., COVID-19, DL, and climatic shocks), there was general pessimism amongst respondents (both those affected by DL and those who were not) about harvest prospects and current rangeland conditions. Given already high levels of food insecurity across the region, these challenges threaten to drive further food security deteriorations in the coming months.

East Africa is currently experiencing a DL outbreak of an unprecedented nature. The outbreak, which began in January 2020, is now in its second phase, this phase could be 20 times worse than the first one. Already, tens of thousands of hectares of farmland and pasture have been damaged by locusts in Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, and Uganda (WFP, 2020d). Given that most of these countries are heavily reliant on agricultural production, this outbreak could not only threaten the livelihoods and food security of residents but the respective countries' economies as well. Swarms have now increased in Ethiopia and Somalia, moving southwest to Kenya, and are within 200 km of northeast Uganda and southeast South Sudan (IFRC, 2020a). In Somalia, over 70,000 hectares of cropland have been damaged with the swarm migrating to the southern crop-producing areas. In Kenya, 13 counties are now affected, threatening pastoral areas and marginal agricultural areas. In terms of epidemic risk and Proteus composite index, Somalia and South Sudan are most vulnerable (with highest values for both Proteus index as well as epidemic index), while other countries in the region are also generally very vulnerable compared to countries in the rest of the world (WFP, 2020a).

3.4. The impact of floods on agriculture in East Africa
Floods are recognized to be the most frequent and devastating types of natural disaster worldwide, accounting for 40% of all natural disasters (Ohl & Tapsel, 2000; Osti et al., 2008). Socio-economic development and livelihood activities in most of the developing countries, including East African countries, are strongly affected by climate variability and change (Anande & Luhunga, 2019; Chang'a et al., 2020). In most of the East African countries, the production and productivity in agriculture and livestock sectors are largely influenced by the availability and variability of rainfall amount of a particular season. These observed extreme rainfall events have been causing devastating socio-economic impacts in many parts of the regions, and their dynamics are consistent with global patterns of extreme events that are comprehensively characterized in recent (Chang'a et al., 2020).

Flooding is currently being experienced in most parts of East Africa and further complicates the COVID-19 response (WFP, 2020b). Excessive rains led to massive flooding and landslides in parts of Kenya, Ethiopia, Uganda, Rwanda, Somalia, Djibouti, and Burundi affecting over 1.6 million people, destroying farmlands and planted crops, and killing livestock through drowning and increased disease infestation. Currently, more than two million people across South Sudan, Ethiopia, Somalia, and Kenya are affected by heavy floods, which are especially affecting already vulnerable groups including women and children. The immediate consequences include causalities, displacement, loss of livelihoods, the outbreak of livestock diseases, crop losses, the upsurge of water-borne diseases, and damaged infrastructure negatively affecting the access to basic services. This is expected to severely exacerbate the food security and nutrition situation in the affected areas until the end of the year (WFP, 2020f).

According to Welt Hunger Hilfe (2020), heavy rainfall has also caused flooding in East Africa. Just in Ethiopia, Sudan, and South Sudan, around 2.5 million people have been left with no defense against the mass of water. It has been estimated that at least 1.3 million people have been affected by flooding, an estimated 481,000 people have been displaced, and 360 people have died following disastrous floods across the region (Relief Web, 2020a). Many weather stations have recorded their highest amounts of rainfall in 40 years. Since the beginning of the long rains season in March 2020, over 1.3 million people have been affected by flooding in the sub-region, including at least 481,000 displaced, in Burundi (around 50,000 affected, most of whom are displaced); Djibouti (over 110,000 affected in the capital in the last week of April);
Ethiopia (219,000 affected, including nearly 107,000 displaced); Kenya (233,000 affected, including 116,000 displaced); Rwanda (thousands affected); Somalia (546,000 affected, including nearly 217,000 displaced); Tanzania (31,000 affected, including 13,500 displaced); and Uganda (hundreds of thousands affected) (United Nations Office for the Coordination of Humanitarian Affairs [OCHA], 2020a).

The above-average rainfall led to widespread floods in the region, resulting in the displacement of people and adversely affects the activities of Agriculture. While the early onset and above-average seasonal rains have had significant beneficial impacts for agricultural production, water resources recharge, and environmental and hydro-power regeneration across the region, they have also resulted in localized flooding, mudslides, flash floods, and river overflows over the past months causing casualties, high levels of population displacement, infrastructure damage, and crop damage in parts of Kenya, Ethiopia, Somalia, Uganda, Tanzania, Rwanda, Burundi, and Yemen (FEWS NET, 2020a). While the rains bring benefits for planting and crop development, localized losses, and crop damage are expected in areas worst affected by flooding (GAM, 2020). Due to the plague of locusts and the coronavirus pandemic, people's reserves have run out. The situation is particularly dramatic in Ethiopia, where more than a million people have been affected. “This is the worst flood in living memory. Some villages have been waiting over a week for food aid. According to Welt Hunger Hilfe (2020) farmland and pastures have been destroyed, a lot of livestock has drowned.” The most affected areas due to this heavy rainfall were throughout Tanzania, western and southern Kenya, parts of Uganda, and Southwestern Ethiopia. In April, above-average rainfall continued across much of the region resulting in flooding in Kenya, Somalia, Ethiopia, Tanzania, Rwanda, and Burundi.

In early May, several parts of East Africa continued to receive heavy rain, resulting in riverine flooding and flash flooding in Uganda, Burundi, Rwanda, western and central Kenya, and Somalia. While Sudan and South Sudan were significantly affected by flooding in 2019, they were less affected by above-average 2020 MAM rains, except in parts of South Sudan where the rains have protracted the DL outbreak (Relief Web, 2020b). In many cases, the floods have affected the highly populous and agriculturally productive regions of East Africa (OCHA, 2020a). Besides, since late January, the worst affected areas of flooding include parts of Somalia, Kenya, Ethiopia, Uganda, Tanzania, Rwanda, and Burundi. The above-average rains have also created a conducive environment for the breeding and development of DL and have protracted the outbreak, which remains a significant concern in Somalia, central and northern Kenya, southern Ethiopia, eastern Uganda, southern South Sudan, and Yemen.

4. Socio-economic impacts of “Triple Threats” of COVID-19, DL, and floods in Ethiopia

4.1. Impacts of COVID-19 crises on lives and food security in Ethiopia

In Ethiopia, the first case of COVID-19 pandemic was reported on 13 March 2020, the number of infected cases reported is increasing daily (Ethiopian Public Health Institute [EPHI], 2020). Ethiopia, East Africa’s most Covid-19 affected country and Africa’s fourth most-affected country, has so far 122,864 confirmed cases and 1,909 COVID-19-inflicted deaths (ACDC, 2020). Table (3) below shows the confirmed covid-19 new cases, percent change in new cases, number of deaths, percent change in new cases and deaths, and Epidemic phase in East Africa countries. As shown in the Table (3) the number of cases, number of deaths, percentage changes in new cases and deaths, and the epidemic phases are different from one country to the others due to the health system and the economic capacity of the countries in the sub-region. The number of cases and number of deaths have remained rapid yet because most of the people have been negligent in some of the preventive measures such as social distancing and mass gathering. On the other hand, population movement across the border from the neighboring countries like Sudan, Djibouti, Kenya, and Somalia has a lion share for the recent trend of rapid transmission of coronavirus in Ethiopia. Consequently, COVID-19 transmission would get serious in Ethiopia particularly and East Africa generally, and its future trend is also expected to depend directly or indirectly on the transmission
of COVID-19 inside and outside of all those East African countries (Rediat, 2020). Ethiopia still has the first caseload in East Africa (OCHA, 2020b).

The extent and its socioeconomic impact of the coronavirus spreading were increased from time to time and is expected to continue quicker than before for the coming months, in Ethiopia, while the peak will remain unknown yet (Rediat, 2020). Before the pandemic hit the country in March 2020, the major drivers of humanitarian need in Ethiopia were, and continue to be today, food insecurity, displacement, disease outbreaks, drought in some parts of the country, and seasonal floods in others. In addition, the worst desert locust infestation reported in 25 years hit Ethiopia and neighboring countries in late 2019 and continues to affect many communities to date, leading to livelihood loss and food insecurity. COVID-19 excavated these already existing vulnerabilities (Catherine, 2020). Measuring the impacts of the COVID-19 crisis, including the deep economic recession and on food security is challenging because the full effects are not yet clear (UN, 2020b). As of now, there is no doubt that the COVID-19 global pandemic will have nontrivial consequences for developing economies (Hurnik et al., 2020). The COVID-19 pandemic is already affecting food systems directly through impacts on food supply and demand, and indirectly through decreases in purchasing power and in the capacity to produce and distribute food, which will have differentiated impact and will more strongly affect the poor and vulnerable (Rahman et al., 2020). The resulting drop in purchasing power among those who lost income has had a major impact on food security and nutrition, especially for those populations that were already vulnerable (WB, 2020b). The broader economic crisis that is emerging because of the COVID-19 crisis poses enormous challenges for food security and nutrition in the country. Humanitarian assistance needs in Ethiopia are notably higher than in recent years and months, driven largely by compounding effects of COVID-19 related restrictions, continued drought recovery, atypically high food prices, conflict, weather hazards, and DL (WFP, 2020c). According to Alliance for a Green Revolution in Africa (AGRA et al., 2020), unusual high assistance needs persist due to multiple drivers exacerbated by COVID-19.

Table 3. Confirmed COVID-19 cases, deaths and recoveries reported in East Africa

| Country     | Number of cases (new) | Percent change in new cases | Number of deaths (new) | Percent change in new deaths | Epidemic phase |
|-------------|-----------------------|-----------------------------|------------------------|-----------------------------|----------------|
| Comoros     | 715 (22)              | −66%                        | 7 (0)                  | −100%                       | 3              |
| Djibouti    | 5,813 (32)            | −40%                        | 61 (0)                 | −100%                       | 3              |
| Eritrea     | 1,039 (285)           | 563%                        | 1 (1)                  | −98%                        | 3              |
| Ethiopia    | 122,864 (2,913)       | −8%                         | 1,909 (56)             | 112%                        | 3              |
| Kenya       | 95,923 (1,423)        | −45%                        | 1,658 (19)             | −30%                        | 3              |
| Madagascar  | 17,714 (81)           | 76%                         | 261 (1)                | −67%                        | 3              |
| Mauritius   | 527 (3)               | −67%                        | 10 (0)                 | −100%                       | 3              |
| Rwanda      | 7,970 (677)           | 7%                          | 74 (11)                | −79%                        | 3              |
| Seychelles  | 211 (6)               | −67%                        | (0)                    | −100%                       | 3              |
| Somalia     | 4,690 (28)            | −66%                        | 127 (3)                | No change                   | 3              |
| South Sudan | 3,491 (257)           | 818%                        | 62 (0)                 | −100%                       | 3              |
| Sudan       | 23,316 (0)            | −100%                       | 1,468 (0)              | NA*                        | 3              |
| Tanzania    | 509 (0)               | NA*                         | 21 (0)                 | NA*                        | 3              |
| Uganda      | 33,973 (2,589)        | −28%                        | 248 (10)               | −82%                        | 3              |

Source: ACDC (2020).
*No new cases/deaths reported in the previous week.
In Ethiopia, COVID-19-related mitigation measures, in combination with recent flooding and crop losses caused by DL, are projected to result in below-average secondary season harvest in June-July. This is likely to worsen the food security situation in the country (AGRA et al., 2020). The number of food-insecure people has increased to 16.5 Million, due to COVID-19, the impact of DL infestation, floods, and changes to the displacement persons' landscape. Food inflation registered a two-percentage-point rise, while non-food inflation has shown a slight dip of 0.8 percentage points. According to a World Bank household COVID-19 monitoring survey, the potential impacts of the COVID-19 pandemic in Ethiopia are also expected to be severe on households' life, livelihoods, and welfare (AGRA et al., 2020). According to Mercy Corps (2020) Somali Regional State of Ethiopia has suffered the highest number of COVID-19 cases, and infections are rapidly rising.

4.2. Impacts of COVID-19 at the farm level: disruptions in input supply, extension services, and labour availability in Ethiopia

The COVID-19 pandemic is likely to have adverse effects on the key sector of the Ethiopian economy. COVID-19 is expected to directly reduce some households’ capacity to engage in agricultural activities, putting upward pressure on input prices, as households with an infected or quarantined member will likely have a reduced pool of labor available to work and may need to prioritize purchasing health-related goods and services over buying inputs (FEWS NET, 2020b). The effect of the pandemic on agriculture is much larger when we introduce a disruption in the import supply of fertilizer and other chemicals and a reduction in export demand for Ethiopian coffee (Beyene et al., 2020). Agricultural production declined by 7.4% and 7.6% in FY 2019/20 and 2020/21 in the mild case (Beyene et al., 2020). Within the agriculture sector, producer prices are lower, input prices are up or inputs not available, and migrant labour supply has been affected (Tamru et al., 2020). The procurement of inputs for agricultural production is at risk because of more general disruptions to supply chains and delays in transportation (Bundervoet & Finn, 2020). Besides, the COVID-19 pandemic coincided with the start of the long/Gu/Belg rains in Ethiopia which is the peak season for labor-intensive staple food and vegetable production across the country (FAO, 2020g). In the country, human movement restrictions due to COVID-19 have resulted in farm-labour shortages, especially for high-value crops and sharecropping farmers. The agriculture sector is at risk of disruption if travel restrictions are maintained and lead to labour shortages, reduced access to agricultural inputs, or barriers to transporting produce (Pangestu, 2020).

In rural areas of the country, significant majorities of the youth depend on daily labour, and restrictions on movements will destine them to a life of desperation. Many rural markets have been or likely to be closed, thus drying up income from the sale of agricultural produce and livestock for rural households (WFP, 2020a). Movement restrictions due to the pandemic have coincided with the first rain planting season and limited farmers’ access to inputs (GNAFC & FSIN, 2020). The restrictions imposed by the country to contain COVID-19 are creating logistical challenges to the supply of agricultural inputs like pesticides, bio-insecticides, and delays in obtaining equipment for control operations (WFP, 2020d).

The country has reported COVID-19-related disruptions to access to agricultural inputs which will likely drive a reduction in crop yields (FAO, 2020f). The COVID-19 pandemic reduces supply and demand (production and consumption) simultaneously at multiple points in the economy (Baldwin, 2020). The negative impact of the crisis on household welfare would be severe. The country real consumption expenditure could be between 4.6 and 12% in the short term (Beyene et al., 2020). Agriculture extension and advisory services have also faced severe disruptions since lockdown measures have been imposed, reducing farmers’ access during this critical growing period (FAO, 2020f). Preliminary analyses of the impact of the pandemic revealed distractions to access to agricultural inputs (including labour), extension and advisory services, and output markets for many farmers, fisher folk, and pastoralists. In pastoral regions, livestock-rearing households are also negatively impacted by movement restrictions, especially those preventing cross-border movements, which have interrupted their access to grazing and watering points (FAO,
The COVID-19 related restrictions have also most notably led to declines in income from local labor and labor migration in the country (WFP, 2020c). In Ethiopia, employment is likely to be hit hard and the employment level is between 8.6% and 16.5% lower than the baseline. Job losses would be severe in all the export-oriented sectors (Beyene et al., 2020). Rural employment is slightly more affected than urban employment and the unskilled workers are negatively affected more than the skilled and semi-skilled. This may lead to a shortage of labour to harvest crops and the closure of or lack of access to markets may prevent farmers from selling their produce, thus reducing food supply and leading to an increase in food prices.

Moreover, people with low-income living in dense urban areas depending on informal, casual workers are highly vulnerable to the risk of COVID-19, as well as food insecurity due to likely loss of income and rise in the price of food and other essential needs. Among the rural populations, people with little income who depend on wage labor, with little or no land or livestock, and dependent on markets for their food needs could also be highly vulnerable, particularly if the outbreak also spreads to rural areas (WFP, 2020a). The closure of markets also reduces people’s access to food, and the poorest households may not be able to purchase goods from supermarkets, where the prices are higher (GNAF & FSIN, 2020). Following travel bans, border closures, and quarantine measures, many workers cannot move to their places of work or carry out their jobs, which has knock-on effects on incomes, particularly for informal and casually employed workers (ILO, 2020a). The direct impacts of the pandemic also continue to be visible with below normal domestic and international trade and low engagement in the informal sector resulting in continued difficulty for poor households’ access to income (WFP, 2020c). The closure of the border with Sudan continues to limit migratory labor, a key source of income for many poor households in Ethiopia.

In the country, the COVID-19 economic crisis is increased due to the closing of industries and the closing down of importation of intermediate products, with significant supply side consequences. Normally, crises are associated with unemployed labor and excess productive capacity, making it relatively easy to restart economies by boosting demand. But now, industries cannot easily be restarted until the medical crisis is over. Even then, we cannot go for broke because many industries will lack inputs and capital, most of which need to be imported (Barneveld et al., 2020).

4.3. Impact of DL on agriculture and food security in Ethiopia

More than 80% of people in Ethiopia rely on agriculture and livestock for their livelihoods (FAO, 2020e). However, the Intergovernmental Authority for Development expects desert locust infestations to continue threatening crop production and pasture regeneration significantly in most affected areas of Ethiopia (USAID, 2020). Desert locusts have spread rapidly in the South and North Eastern, Eastern pastoral parts of Ethiopia since December 2019 and, threatening crops and pasture critical to the livelihoods of local populations. Ethiopia remains the most heavily impacted, with bands of hoppers immature, wingless locusts, and swarms of adult locusts devouring vegetation in multiple areas; mature desert locusts continue to breed in the South and North East parts of the country as of early March. Since mid-2019, the country has been affected by a severe desert locust outbreak, the worst in 25 years. Until early 2020, it mainly affected North Eastern, Eastern pastoral, and agro-pastoral areas in Afar, Somali, and Eastern Oromiya regions (FAO, 2020i). The UN Food and Agriculture Organization (FAO, 2020a) warns that the next generation of the pest will likely form swarms in late March and into April, coinciding with seasonal rains and the upcoming planting season. While locust infestations have not immediately impacted food security, relief actors anticipate increased emergency food assistance needs during the latter half of 2020.

The increasing frequency and magnitude of climate disasters and plant pests over the years have left many communities particularly vulnerable to food insecurity (FAO, 2020e). Ethiopia registered the worst invasion of desert locust infestation in the last 25 years in 2020, in which 76 districts in both Belg and Meher seasons were affected. Ethiopia is now the epicenter of the East and Central Africa region as new swarms of desert locusts have been detected in provenance from Yemen (OCHA,
A survey conducted in mid-July on 1,345,591 hectares of land across Afar, Amhara, Oromia, Somali, Tigray regions and Dire Dawa City Administration also identified that 452,966 hectares were found to be affected by DL infestations. All the six analyzed regions have reported infestations of DL (IPC, 2020a). The acute food security analysis of the second projection period (February-JUNE, 2020) for six regions of Ethiopia indicates that, despite ongoing assistance, an estimated 8.5 million people (26% of the 32.7 million people analyzed) were likely to be severely food insecure in IPC Phase 3 (Crisis) or worse between February and June 2020. Infestations continue to threaten food security and livelihoods in northeastern Ethiopia and northern Somalia (USAID, 2020).

In Ethiopia, the desert invasion has affected over 700,000 hectares of land across different parts of the country in the past few months (IFRC, 2020a). Locusts have caused significant damage to sorghum and teff crops, as well as pastureland, in northeastern Ethiopia in recent months, damaging or destroying nearly 700,000 acres of crops and pasture in Afar and Tigray regions as of early September (FEWS NET, 2020a; USAID, 2020). About 350 000 MT of food crops have already been lost due to the DL invasion and additional loss of harvest is also anticipated in the coming Meher harvest season (Catherine, 2020). As of late August, DL is most concentrated in the northern and northeastern parts of the country (FAO, 2020a). However, since January 2020, 180 districts in seven regions have been impacted by the desert locust infestation (WFP, 2020d). The rapid incursion of DL across many regions in Ethiopia has resulted in significant cropland losses and jeopardized the livelihoods of smallholder farmers who depend on crops and livestock. By the start of the school year in September 2020, the infestation will have likely led to a considerable drop in agricultural production, which will further exacerbate the existing food insecurity situation and malnutrition in the region (WFP, 2020d).

Impacted areas are particularly in belg crop-producing areas such as Southern Nations, Nationalities, and Peoples’ Region (SNNPR), zones in eastern Amhara and southern Tigray regions, and all pastoral areas (WFP, 2020c). In the country, DL has damaged different crops but the worst affected was cereal especially Sorghum where 113,639 hectares were affected followed by maize (41,341 ha) and wheat (36,188 ha). Oromia was the worst affected region with a total cereal loss of 1,228,352 quintals (122,835 MT) on 41,051.4 hectares of cropland. Somali region experienced the second-largest cereal crop loss of 1,026,132 quintals (102,613 MT) on 90,076 ha of cropland. Tigray region was third with 843,241 quintals (84,324 MT) lost on 40,577 ha of land. In Tigray, a significant loss was also due to post-harvest losses. Afar region lost 202,882 quintals (20,288 MT) from 4421 ha and SNNPR lost 134,420 quintals (13,442 MT) from 4158 ha (Table 4). Dire Dawa and Amhara lost a total of less than 100,000 quintals (10,000 MT). In Afar, Somali, SNNPR, and Oromia vegetables, legumes, chat, coffee, and fruits also affected (FAO et al., 2020). Table 4 below depicts the estimated cereals losses by region due to DL (in quintals) in Ethiopia. According to Table 4, Afar region is highly affected relative to other regions by the desert locust because the region is very suitable for desert locust infestations.

4.4. The impact of floods on household food security and livelihoods in Ethiopia

Floods are the most common natural disaster in both developed and developing countries causing loss of life and economic damage in various parts across the globe. Floods associated with extreme climate events, have very devastating effects on almost all socio-economic activities, ultimately affecting food security and market distribution systems, and are very common in many parts of Africa. On natural disasters, many studies have reported direct and indirect impacts of floods on food security (Awange et al., 2007; Katar, 2011; Week & Wizor, 2020). Floods often show a devastating impact on human life and both physical and natural assets (Ramakrishna et al., 2014). In rain-dependent agricultural economies, erratic rainfall causing unexpected floods can create devastating impacts on the food security of the people and their livelihoods.

Ethiopia is one of the largest countries in East Africa, and its topography has made the country vulnerable to floods and the resulting destruction and damage to life, economics, livelihoods, infrastructure, services, and health systems (Federal Disaster Prevention and
| Region     | Total lost | Maize | Sorghum | Wheat | Barley | Vegetable | Total  |
|------------|------------|-------|---------|-------|--------|-----------|--------|
| Afar       | 202,882    | 3633  | 175     | 614   | 0      | 453       | 4874   |
| Amhara     | 96,780     | 0     | 15,430  | 614   | 0      | 0         | 15,430 |
| Dire Dawa  | 31,050     | 300   | 1150    | 0     | 0      | 0         | 1450   |
| Oromia     | 1,228,352  | 3813  | 32,238  | 0     | 0      | 0         | 41,051 |
| SNNP       | 134,420    | 1748  | 2410    | 500   | 0      | 0         | 4158   |
| Somali     | 1,026,132  | 30,000| 41,271  | 0     | 0      | 0         | 90,076 |
| Tigray     | 843,241    | 1847  | 20,956  | 18,805| 0      | 0         | 40,577 |
| Total      | 3,562,856  | 41,341| 113,630 | 11,769| 6005   | 453       | 197,615|

Source: FAO (2020a)
Preparedness Agency of Ethiopia [FDPPAE], 2006). Ethiopia is vulnerable to climate variability, and climate change is likely to increase the frequency and magnitude of disasters. Adverse impacts of climate change may worsen existing social and economic challenges of the whole country, particularly where people are dependent on resources that are sensitive to climate change and rain-fed agriculture (Birhan, 2020). Floods have increased in frequency and magnitude in Ethiopia due to global warming. This means floods like the one that has just devastated the country will be more frequent and catastrophic. For example, many people have lost their homes and lives. Floods damage crops, property, and inundate farmlands, which can lead to food shortages. Floods have also displaced those living in the flooded area (Osti et al., 2008). An extended rainy season has led to flooding that has destroyed livelihoods, services, road infrastructure, and caused displacement. The National Flood Task Force estimates that by December 2020, over 2 million people will have been impacted by flooding, and over 500,000 people will be displaced in 2021 (United Nations International Children’s Emergency Fund [UNICEF], 2020).

The terrible and extreme disasters COVID-19, DL, and now floods as well are coming one after another (Ramakrishna et al., 2014). The situation is particularly dramatic in Ethiopia, where more than a million people have been affected. “This is the worst flood in living memory. Some villages have been waiting over a week for food aid. Farmland and pastures have been destroyed, a lot of livestock has drowned,” (Welt Hunger Hilfe, 2020). Flood is to be a concern during the kiremt (summer) season in most parts of the country, especially in northwestern, central, and southwestern Ethiopia. In 2019/2020, recurrent heavy rainfall has resulted in flooding in many areas of Afar, Somali, Oromia, SNPP, Gambela, and Amhara regions (WFP, 2020c). Heavy summer season (June—September) rains continue to cause flooding across six regions of the country. As of 23 September, some 1,095,358 people were affected, including 482,100 displaced across six regions of the country (Table 5). Afar region is worst affected so far with flooding due to the overflow of Kesem, Tendaho, and Koka dams on Awash River affecting some 240,425 people and displacing 313,179 across 17 districts. The floods also caused over US$135 million in damage, including crops on 41,000 hectares of land, and 18,000 hectares of land readied for planting (OCHA, 2020b).

In addition, floods demolished 105 schools, 200 rural roads, six bridges, and killed over 21,000 domestic animals. The flooding displaced more than 69,831 people and damaged 20,500 hectares of cropland and killed 15,818 sheep and 986 cattle, severely affecting the lives and livelihoods of pastoralists in affected areas. All displaced people lost their assets, including their shelters, water collection utensils, and clothing (OCHA, 2020b). At least 10 USD million is required to provide relief aid and rehabilitate the displaced persons, of which 2.7 USD million has been mobilized so far. Preparedness for potential cholera and malaria outbreaks and lack of personal protective equipment and water treatment chemicals for COVID-19 prevention remains to be challenging (OCHA, 2020b).

In SNPP region, floods and landslides affected over 90,120 people and displaced 56,111 others in 34 districts, the Dosenech district being the most affected. The floods destroyed crops, property, social and economic infrastructures. At least 22 people were reportedly killed by flooding in Gamo, Keffa, and South Omo zones. In other regions, Amhara (144,490 affected and 10,313 displaced, 6,653 houses have been flooded, 18 schools damaged, 3,428 hectares of crop-areas have been covered by water, and 2 people dead), Oromia (447,565 affected and 46,028 displaced), Gambela (31,865 affected and 18,819 displaced), and Somalia (Ethiopia Somalia) (140,892 affected and 37,650 displaced) regions (Table 5). Table (5) below shows a summary of the number of people affected and displaced by flood in a different region of Ethiopia from June—September 2020.

Figure (3) above shows the devastating effects of unusual flooding on households’ livelihood in different parts of Afrar National Regional State of Ethiopia in the summer season of 2020 due to
the over flow of Awash river (Disaster Prevention and Food Security Program coordination office DPFSP, 2020).

4.5. Impacts of covid-19 on industrial parks in Ethiopia

The Government of Ethiopia has invested massively into enabling infrastructure and set up a series of special economic zones, industrial parks (IPs) to encourage Foreign Direct Investment (FDI) into the manufacturing sector to promote exports and job creation. Before the pandemic, 14 industrial parks across the country employed about 88,000 workers (Mengistu et al., 2020). In Ethiopia, the number of textile and garment factories operating in the country was estimated at 122 in 2019. Ethiopia counts about 37,000 formal workers, while about 450,000 people are informally engaged in activities across the sector. In addition, according to the United Nations Ethiopia (UNE, 2020) Ethiopia has secured

| Region  | Number of people affected | Number of people displaced |
|---------|---------------------------|----------------------------|
| Afar    | 240,425                   | 313,179                    |
| Somalia | 140,892                   | 37,650                     |
| Oromia  | 447,565                   | 46,028                     |
| SNNP    | 90,120                    | 56,111                     |
| Gambela | 31,865                    | 18,819                     |
| Amhara  | 144,490                   | 10,313                     |
| Total   | 1,095,357+                | 482,100                    |

Source. Compiled from own review (2020)
more than 100 USD million in export earnings from products manufactured in the industrial parks over the last fiscal year. While the overall purpose is to transform the sector as a driver of growth with private sector engagement, specific objectives include value addition, increased foreign exchange earnings, and, ultimately, the creation of millions of jobs for a young and growing population. However, in line with the broader impacts of COVID-19 on industries and value chains around the world, production in Ethiopia's industrial parks has been heavily affected. According to Baldwin and Di Mauro (2020) mainly manufacturers of durable goods are likely to be affected by a sharp, short-term drop in demand because purchases are more easily deferrable than non-durable goods.

As global demand for key industrial park exports such as garments and textiles fell to unprecedented lows, factories in Ethiopia's industrial parks were hit with order cancellations due to the pandemic. Most firms have seen their sales and production fall significantly, with firms oriented towards the domestic market hit hard. The COVID-19 pandemic is likely to have adverse effects on the key sector of the Ethiopian economy. Not all sectors are equally affected by the crisis with higher contraction of manufacturing activities followed by agriculture. Export intensive industries such as textile and leather manufacturing (Beyene et al., 2020). According to Baldwin and Di Mauro (2020), the manufacturing sector is affected by mandated shutdowns, labour shortages, supply chain, and transportation disruptions, and declining demand as customers cancel or delay purchases and investments due to restrictions measures of the pandemic. In Ethiopia, lack of labor and the inability to afford and access inputs, both from abroad and domestically, have constrained firms in meeting their production targets (Mengistu et al., 2020). Industrial parks also operate at minimum or very low capacity due to reduced availability and increased costs of manpower and inputs (as a result of containment measures and disruption in domestic and global value chains) and sharply reduced exports. Several firms decide to shutter or leave Ethiopia, a process associated with large-scale capital flight and a major contraction of FDI in key productive sectors (Catilizori, 2020).

The pandemic could also jeopardize Ethiopia's industrialization agenda and illustrate the need for targeted and sustained support to firms and workers over the coming months. The rapidly increasing number of confirmed cases of COVID-19 in Ethiopia, including in industrial parks, may cause a further shock to the domestic labor supply and cause employment layoffs and redundancies (Figure 4). Overall, firms in Ethiopia's industrial parks were heavily impacted by the COVID-19 pandemic. Over three-quarters of firms have seen a decline in sales and in their production volumes. On average, sales decreased by 42% and production by 40%. For the firms that report

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**Figure 4. The impact of COVID-19 on the manufacturing sector in Ethiopia.**

*Source.* Modified from (UNE, 2020)
a decline, average sales decreased by 57% and average production volumes by 56% (Mengistu et al., 2020). Figure (4) above shows the impacts of COVID-19 on the manufacturing sector in Ethiopia.

The Ethiopian manufacturing sector is already showing serious signs of suffering from COVID-19 even at this initial stage, with the strongest effects felt in sub-sectors exposed to disruptions in global value chains and shrinking demand in export markets. One-third of imports come from China and approximately two-thirds of exports go to Asia and Europe both heavily affected by COVID-19 and still several months away from a recovery (UNE, 2020). The manufacturing and construction sectors are expected to decline by 2%, reflecting lower demand for Ethiopian goods (garment) and lower investment in the country (Hurnik et al., 2020).

5. COVID-19 and measures adopted by the government
COVID-19 has continued to be a global threat to public health. As the matter of fact, it needs unreserved effort to monitor the prevalence of the virus. However, applying an effective prediction of the prevalence is thought to be the fundamental requirement to effectively control the spreading rate. Therefore, effective implementation of the preventive measures and rigorous compliance by avoiding negligence with the rules such as prohibiting public gatherings, travel restrictions, personal protection measures, and social distancing may alleviate the spreading rates of the virus in Ethiopia (Rediat, 2020). In response to the outbreak of the COVID-19 pandemic, governments around the world began implementing a variety of measures to control and slow the spread of the disease, reducing the likelihood of overwhelming national health systems (Asymptomatic Carotid Artery Plaque Study [ACAPS], 2020). For example, to curb the spread of the virus, the Kenyan government instituted several measures including administrative, economic, and behavioral. Administrative measures have included the closure of produce markets, international borders, and dawn-to-dusk curfews. These have been highly disruptive for food delivery (Ouko et al., 2020).

The response to the COVID-19 pandemic varied significantly between different countries. Among the variable factors were divergences in healthcare system capabilities and organization, emergency response availability and preparedness, underlying economic conditions in each country, the prevalence of different social behavior patterns, and last but not least, the differences in individual assumptions and preferred approaches of the policymakers (ILO, 2020a).

However, in Ethiopia, since 24 January 1930 public health measures have been introduced or extended across the country, such as isolation and quarantine policies, health screenings, testing policies, and awareness campaigns. In Ethiopia, 18 governance and socioeconomic measures have been introduced or extended, including the activation of emergency administrative structures, military deployment, economic measures, and the declaration of a state of emergency. In addition, some of the control measures that the government has implemented to slow the spread of the virus, include closing international and domestic borders and schools, limiting domestic transportation services, and banning public gatherings (IPC, 2020b). While Ethiopia took several steps to keep COVID-19 infections low and mitigate its economic impact, it is still severely affected by the virus (WB, 2020c).

6. DL and measures adopted by the government
Desert locust response in East Africa is typically coordinated by the Ministry of Agriculture in affected countries, in coordination with regional bodies and specialized international organizations, such as the FAO. With technical support from FAO, with for example, the Government of Uganda (GoU) has embarked on locust control activities such as monitoring observed breeding and egg-laying areas to inform early action and conducting ground surveys and other data collection to assess the locust (WB, 2020a). Ethiopia, like other countries of East Africa, has been at forefront of the desert locust surveillance and control operations in the country. The government quickly identified local solutions, such as hiring airplanes, organizing minimum but essential supplies of pesticides, and mobilizing people on the ground to start surveillance operations or sprayed on resting swarms either using
aircraft or from the ground via handheld or vehicle-mounted sprayers (ACAPS, 2020). This is consistent with the actions which have been taken by the Somalia Government have also sprayed a total of 3,415 hectares with the direct support of FAO. The majority of control operations in Somalia are being undertaken using metarhizium biopesticide (FAO, 2020g).

Currently, to successfully respond to this crisis the government increases emergency funding to this cause, increases focus on country-led efforts to strengthen short and long-term pest surveillance and strengthens smallholder farmers’ long-term resilience beyond the use of chemical pesticides (FAO, 2020e). Besides, the Ministry of Agriculture has set a platform to provide information on the nature of the desert locust, what is being done to combat it, creating awareness and advice for farmers especially for pastoralists on safety measures associated with locust control operation. The Government of Ethiopia warned that if not controlled, the current situation would be seriously amplified by new locust infestations, with a high possibility of further spread to Eritrea, South Sudan, and Uganda (which has since happened).

7. Floods and measures adopted by the government
Ethiopia has been identified as one of the most vulnerable countries to climate variability and change and is frequently faced with climate-related hazards, commonly drought and floods. As result, the Government has put in place policies, strategies, and programs that enhance the adaptive capacity and reduce the vulnerability of the country to climate variability. In 2012, the Climate Resilient Green Economy (CRGE) initiative was launched to protect the country from the adverse effects of climate change and to build a green economy that will help realize its ambition of reaching middle-income country status before 2025 adaptation measures are also employed at different levels of the country. The long-term consequences of floods will be severe if no immediate coordinated action is taken (Gashaw et al., 2014).

In addition, Ethiopia’s National Disaster Prevention and Preparedness Agency has announced that the government has set up new measures to protect inhabitants from river flooding in flood-prone areas as the country expects above-normal rainfall in the annual rainy season, locally known as the “belg” rains. The Water Resource Bureau, charged with overseeing all matters relating to water, has begun to construct flood diverting canals, with early warnings being issued to those exposed to floods by National Disaster Prevention and Preparedness Agency. Old canals have also been renovated in areas likely to be hit by the deluge. Somali, Amhara, Siltie, southern, and Afar regional states will also carry out all measures necessary for the country to resist the above-average rains. In the context of the Ethiopian Water Policy, flood management is viewed as an integral part of integrated water resources management. As the sequel to these commitments, Government is now progressively carrying out master plans for all the river basins of the country.

8. Conclusions
This review assessed the socio-economic impacts of “Triple Threats” of COVID-19, Desert Locusts, and Floods in East Africa: Evidence from Ethiopia. East Africa countries are currently battling the three disasters of the COVID-19 pandemic, the worst desert locust outbreak in decades, and the unusual flooding simultaneously. Especially the two large-scale crises (COVID-19 pandemic, the worst desert locust) have many parallels: they are transnational issues that do not adhere to borders; left uncontained each has the capacity to spread exponentially; it is difficult to estimate the extent of each crisis, and both have the potential to cause devastating impacts for the socioeconomic situations of the people. Together, the two crises are posing significant risks to the public health and wellbeing of the population in East Africa, by impacting the economy, affecting livelihoods, and further worsening the food security situation. Simultaneously, current seasonal rains in East Africa are likely to bring moderate to heavy rainfall to the region, triggering floods that may deepen existing needs and complicate ongoing responses to both crises. The combination of the COVID-19 pandemic and the locust outbreak is
challenging the capacity of countries to respond to these emergencies and address pre-existing crises and vulnerabilities.

On the other hand, government measures to control its spread, such as movement restrictions, border closures, and social distancing efforts have slowed down the socioeconomic situations of the people, inhibiting livelihood access and decreasing household income level. Hence, this review found that safeguarding the lives, food security, and livelihoods of the most vulnerable people is important in the short term in the region. According to the review, the worst-affected groups by the “Triple Threats” of COVID-19, DL, and floods were smallholder households (especially farmers and pastoralists), children, youths, women, migrants, and informal workers, and micro-small and medium-sized enterprises.

Throughout East Africa, the threats are continuing to have an impact and Ethiopia, like other East African countries, faces serious resource constraints, fragile health systems and infrastructure, and a lack of a clear strategy to fight the threats. Currently, COVID-19 and DL situations have a significant impact on the socio-economic situations of the people in country. The situation is alarming and rapidly progressing that could spread further if the current conditions performance are as continue as predicted. Additionally, there is a continued risk of flooding especially in the rainfall season.

In Ethiopia, the combined impact of the three threats would change the precarious socio-economic condition for the worst. This implies that the severity of the global recession driven by the COVID-19 pandemic combined with the impact of DL and floods caused crises on the lives and livelihoods of people and a significant slowdown of the Ethiopian economy in upcoming years. In the country, it is almost certain that GDP growth will be below 3% in 2019/20, and the probability of growth is close to zero or even negative in 2020/2021. Humanitarian assistance needs in Ethiopia are notably higher than in recent years and months, driven largely by compounding effects of COVID-19 related restrictions (measures) and the continued devastating effects of DL and unusual floods occurring frequently in most parts of the country.

9. Implications
Based on the results of the review the following recommendations are forwarded:

- Effective implementation of preventive measures should be taken by the government with the rules such as prohibiting public gatherings, travel restrictions, personal protection measures, and social distancing, control the population movement across all the border areas, and to strengthen border quarantining to alleviate the spreading rates of the virus.
- Provide flexible support to a holistic COVID-19 response in all countries of East Africa, particularly where the problem is highly persistent to reduce the COVID-19 socio-economic impact.
- The government of Ethiopia and concerned institutions should advocate for national and regional COVID-19 responses and consider the potential impacts of the pandemic on already existing conflict and peace drivers in fragile and conflict-affected areas in the country.
- Continued Desert Locust assessment, surveillance, and control operations should be carried out to better understand the full extent of Desert Locust impacts across the region and to prevent further Desert Locust-related crop and pasture losses in the region in general and in Ethiopia in particular.
- The Ethiopian government should build a strong early warning system to early intervene, prevent their spread to new areas, and reduce the size of upsurges and plagues of locusts.
- Floods should be well managed through effective institutions, structural, and non-structural measures, community participation and awareness, early warnings to reduce the hazardous effects on the lives and livelihoods of the people. This calls for a coherent national policy on how to adapt and mitigate the impact of floods, to put in place policies that specifically address flooding and the management of flood-related impacts.
Raising awareness specifically in the most-affected areas of the country among the population on the cycle of floods which are now almost happening every year, and provision of climate disaster early warning system and climate information services should be the principal responsibility of governments.

Sustaining local industries (micro, small and medium businesses) that provide jobs to people living in poverty should be prioritized in the short and medium-term. This could be through access to loans, waiver of license fees, and taxes.

However, this review providing valuable evidence about the socio-economic impacts of the triple threats of COVID-19, DL, and floods in East Africa: Evidence from Ethiopia, which forthcoming research including representative and longitudinal samples or alternative survey approaches can build upon and extend. Therefore, further research is needed to know the actual socioeconomic impacts of the threats in-country and provide tangible evidence for policy interventions.

In general, government, international organizations, and policymakers will do together to mitigate the triple threats and build a more resilient, inclusive, and sustainable future in the country.
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