The Impact of COVID-19 on Africa: Health and Economic Implications

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1 Introduction

The first case of COVID-19 was reported in China, Hubei province in December 2019 before being declared a pandemic by the World Health Organization (WHO) in January 2020. In Africa, the first case of COVID-19 was reported in Egypt on 14 February 2020. The pandemic is believed to have been transmitted from animals (bats) to humans, making it the 5th zoonotic disease and 3rd coronavirus to infect human-beings over the last 2 decades. At the time of writing, the continent had recorded 1.75 million confirmed cases, 42.17 thousand deaths and 1.43 million recoveries (Africa CDC 2020).

The COVID-19 pandemic presents a difficult road ahead for Africa. South Africa's President Cyril Ramaphosa currently chairs the African Union (AU) and will influence the continent's fight against the virus. A holistic analytical approach must be employed to combat the outbreak and should be tailored toward the continent's complex developmental dynamics and socio-economic issues. This must coherently inform the political-economic policy in the public and private sectors. Doing so may successfully reduce the pandemic's

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peak caseload (flatten the curve), save lives, and better equip the continent for similar, or worse pandemics in the future. This should help curb the probability of Africa experiencing a second wave of infections, as seen in China with the arrival of citizens from overseas travel (Yan 2020).

To this end, this chapter conducts a comprehensive risk assessment on some of the continent's risk factors as informed by the aforementioned and discusses how these are currently, or may inevitably hamper Africa's fight against COVID-19. It also seeks to avert the cataclysmic effects of the pandemic on the continent in both the medium and long-term, should they not be addressed accordingly. The chapter asserts that the risk factors discussed in-depth in subsequent sections to mitigate the continent's vulnerability to the outbreak, despite the continent's slight "head start" in preparing for the pandemic's arrival facilitated by its prompt lockdowns and stringent social distancing measures (Hollington and Bennett 2020).

The analysis will also examine an array of factors to better inform COVID-19 response policy in Africa, namely: availability of physicians, access to basic sanitation and drinking water services. It will discuss the economic impact that COVID-19 has had on the African economy and project potential losses on some of the continent's vital economic sectors and informal economic activities as informed by the continent's travel restrictions, thereafter. It will then conclude with viable recommendations to address some of the continent's shortfalls in its fight against the pandemic.

2 Historical Review of Global Pandemics in Africa

This section serves to review literature on notable episodes of global pandemics over the past century, except for HIV/AIDS as it has been exhaustively documented. The chapter will access the health, social, and economic coping mechanisms that nations deployed to solve problems of the pandemics to better inform nations on how best to cope with the COVID-19 predicament.

Spanish Flu

The Spanish flu was a zoonotic influenza that was transferred from birds to humans during World War I. It has been coined the worst pandemic to affect mankind in recent history, killing an estimated 50 million people within a year and infecting a 3rd of the world's populace at the time (Bootsma

and Ferguson 2007; USCDC 2019; WHO 2018). In Africa, an estimated 2% (2.5 million people) of the continent's populace died during the first 6 months of the outbreak (Phillips 2020). South Africa emerged as not only the most affected country on the continent but constituted as 1 of 5 most affected countries in the world (Phillips 2020). In West Africa, an estimated 4% of Freetown's population in Senegal died during the first 3 weeks of the disease's arrival. In East Africa, around 6% of Kenya's populace at the time died over a period of 9 months.

The pandemic transpired in three waves in Africa spanning from March 1918 to July 1919 (Africa Center for Strategic Studies 2020). Facilitating the spread of the disease was the movement of 150,000 African soldiers and the transportation of an estimated 1.4 million logistical support laborers in Europe to fight alongside their colonizers during the First World War. This imported the disease into Africa via seaports in Freetown, Senegal; Cape Town, South Africa and Mombasa, Kenya. The second wave is believed to have mutated into a more lethal strain that spread through West Africa.

This had a devastating impact on socio-economic issues for affected countries due to a disease-induced reduction in labor causing employee absenteeism and death. Businesses closed and many found it difficult to stay afloat in the absence of adequate labor. No sector in the economy was spared from the devastating economic effects of the outbreak (African Center for Strategic Studies 2020). The third wave was less devastating but had a compounding effect on the continent. Similar to the ongoing 2019-nCoV pandemic, in the absence of a vaccine, mitigation revolved around the imposition of non-pharmaceutical interventions (NPI) such as social distancing measures and quarantines for suspected cases.

Asian Flu

The Asian Flu was the second notable pandemic that occurred during the latter part of the 1950s. Identified as influenza of an H2N2 strain in China, it spread around the world killing nearly 2 million people worldwide (Wilkin 2020). According to Saunders-Hastings and Krewski (2016), the pandemic's mortality curve shifted more toward the young than the old suggesting a pre-existing immunity most likely developed from their previous encounter with the Spanish Flu nearly 4 decades earlier. Similar to the Spanish flu, the Asian flu made its way to Africa primarily via seaports (John Hopkins School of Public Health 2020).

The continent was minimally affected by the pandemic due to its geographic location (Strohm 2020). Many African states did not implement

comprehensive NPIs in response to the pandemic and economies continued to function as normal with employees going to work despite the presence of the pathogen (Taylor 1958). The discovery of a vaccine in 1958 subsequently slowed the spread of the disease and contained it before it evolved into another common cold (Saunders-Hastings and Krewski 2016). Economic recovery, thereafter, was fairly swift bringing about relief to countries (Gavi 2020).

Hong Kong Flu

A decade after the Asian Flu, the Hong Kong Flu emerged. According to Saunder-Hastings and Krewski (2016: 8), the new H3N2 pandemic was an essentially evolved version of the Asian flu that "underwent an antigenic shift, resorting to H3N2 and emerging as a new pandemic known as the Hong Kong flu." This influenza was the first virus to illustrate accelerated global spread rate due to increased global integration. Fortunately, the pandemic had a minimal impact on Africa and only reached continent by 1969 where public health warnings and symptoms had been comprehensively documented in scientific journals and domestic health sectors were prepared to respond. Additionally, a vaccine was approved prior to its inception into Africa, hence, its minimal impact therein (Pancevski 2020). Similar to the Asian flu, the socio-economic burden of the pandemic was minimal. As such, there was no need to implement costly NPIs that would hurt the economy such as those currently being experienced by nations in their efforts to curb the 2019-nCoV pandemic.

SARS-CoV

SARS-CoV is a zoonotic disease that was first identified in China in 2002. The animal reservoir has not yet been established by WHO and scientists are suspecting that the pathogen was transmitted from bats which infected civet cats and subsequently humans (WHO, n.d.; Wang et al. 2006). The pandemic spread to an estimated 26 countries, inflecting 8000 people and killing approximately 800 people with a case-fatality ratio of 9.6%. According to Wilder-Smith and Freedman (2020), to combat the pandemic countries implemented cost-efficient NPIs such as social distancing and quarantines for the infected.

In Africa, South Africa was virtually the only African country that that was affected with a few isolated cases. These did not hamper social and

economic life in the country, the economy continued to operate as normal (The Globalist 2020). To curb imported cases, countries around the world including those in Africa imposed travel restrictions which had negative economic effects for the global airline industry and the world economy due to a decline in export services and international skilled labor (Wilder-Smith and Freedman 2020). Recovery post the pandemic was swift as a result of the pandemic's mild nature which saw economies stabilize around the world (Dvorak 2020).

Swine Flu

The Swine Flu (pH1N1) was first identified in Mexico in April 2009. The virus entered the US as a result of the country's migratory labor relations with Mexican seasonal farm laborers. According to Smith et al. (2014), the pandemic spread to 30 countries in 6 weeks and then to 122 countries by the end of July 2009, killing nearly 800 people. African governments deployed mitigation measures which included the immediate treatment and quarantine of suspected cases, increasing medical personnel at airports to screen passengers, banning the import of pork and pork products in some African countries which had negative economic consequences for poultry traders (BBC News 2009). Countries such as Nigeria opted for stockpiling antiviral treatments and the deployment of task forces to deal with possible swine flu cases (Reuters 2009; BBC News 2009).

Ebola

According to Jan et al. (2015) the Ebola virus (EBV) was discovered in 1976. The worst outbreak occurred in 2014 in West Africa, where the virus spread from remote villages to major cities across the region. Liberia, Sierra Leone, and Guinea emerged as the worst affected countries. In their study of the Bombali virus, Goldstein et al. (2018) provide evidence suggesting that fruit bats are the natural reservoir of EBV making it the 4rd zoonotic pandemic to affect human-beings over the last two decades. Countries such as Liberia, Sierra Leone, Guinea, and Guinea-Bissau promoted social distancing such as the restriction of public gatherings, and good hygiene practices as they emerged as the worst affected (Wright et al. 2014).

Screening at ports of entry such as airports, borders and sea docks were implemented to identify suspected cases, isolate and treat patients immediately across the continent (UNDP 2014). According to the UNDP (2015),

the EBV pandemic disrupted supply chains across West Africa as the supply of labor fell due to deaths, work absenteeism, employee migration and the repatriation of expatriates. The Ebola pandemic exacerbated socio-economic issues such as food insecurity, unemployment, and poverty. Farmers were reluctant to harvest their produce amidst fears of contracting the disease (FAO 2016). The USCDC (2019) suggests that Liberia, Sierra Leone, and Guinea lost an estimated $2.2 billion from the pandemic and recovery post the peak of the pandemic was gradual due to the underdeveloped nature of most West African economies while it was much faster for developed countries.

2019-NCoV

The 2019-nCoV is the 3rd and most lethal coronavirus to infect humans over the last 2 decades. According to WHO (2020b), the 2019-nCoV pandemic emerged from China in 2019. Contrary to the mortality trends of previous SARS-like diseases, the mortality curve of the virus shifted toward the elderly reinforcing the novel nature of the virus (Girard et al. 2010; Saunders-Hastings and Krewski 2016; Lu et al. 2020). Africa's young population, pre-emptive country-wide lockdowns and experience with an array of outbreaks such as Ebola and cholera somewhat fortified the continent against the adverse effects of the virus through preparation (Edward-Ekpu 2020; Hollington and Bennett 2020). In 2019, the continent undertook a Joint External Evaluation (JEE) as part of its bid to honor the International Health Regulations which enhanced its detection, prevention and response capacities to public health threats such as the 2019-nCoV (Edward-Ekpu 2020).

However, the country-wide lockdowns that were implemented across Africa had a devastating effect on the socio-economic wellbeing of 85% of Africans that fall under the "self-employed" category. Street vendors and day-laborers have been greatly affected by the national lockdowns (Deutsche 2020). In response to the social strife experienced by citizens and residents alike, African governments mobilize resources both domestically and internationally in the form of financial aid and protective equipment donations to combat the pandemic. However, as with historic and contemporary trends corruption would soon take root as state officials began to utilize public procurement as an avenue of corruption as they diverted government and donor-aid resources for personal gain leaving millions of people vulnerable to the pandemic (Schipani et al. 2020). Containing the pandemic will prove difficult without a vaccine and with the global economy projected to contract by "$8.5 trillion over the next 2 years" (United Nations 2020). Recovery

post the pandemic may not be as smooth as that experienced in previous post-pandemic situations.

In summary, this section highlighted topical literature on notable epidemics leading up to the 2019-nCoV. Notable pandemics such as the Spanish Flu, Asian Flu, Hong Kong Flu, SARS-CoV, Swine Flu, MERS-CoV, Ebola and the ongoing 2019-nCoV were reviewed to assess the key characteristics of each pandemic as well as the coping mechanisms that countries used to solve the health and economic challenges they encountered depending on the disruptive nature of the respective pandemics. Recognizing the past body of literature to which the chapter contributes better informs the paper's contribution to literature around COVID-19 and provides viable solutions thereof.

3 Methods

The findings presented in this risk assessment chapter draw on risk factor datasets derived from the Global Health Repository of the WHO and The World Bank. This is analyzed against emerging COVID-19 data sourced from the Africa Centres for Disease Control and Prevention herein known as Africa CDC. Complementarily, the chapter employs documentary analysis to find, appraise, and synthesize data in the economic section (Hollington 2018). In addition, to gauge Africa's pandemic preparedness, or ability to combat COVID-19, the chapter made use of the Global Food Security Index (GFSI) to add value to the insights.

Using the data derived from the sources mentioned, a Pearson r correlation test was employed using R statistical modeling software to measure the degree of the relationship between health risk factors, African government responses, and the confirmed COVID-19 cases and deaths using the Pearson r correlation formula below:

$$r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - \left(\sum x_i\right)^2}\sqrt{n\sum y_i^2 - \left(\sum y_i\right)^2}}$$

The scale of the correlation coefficient utilized in this study ranges from −1 (perfect negative downhill linear relationship) to 1 (perfect positive uphill linear relationship), where 0 indicates that there is no linear relationship.

Variables

There are a number of risk factors that make Africa more susceptible to increased infection and the negative consequences of COVID-19. One, the availability of physicians in Africa which provides important insights on how countries can or cannot cope with an increase in confirmed COVID-19 cases or deaths. This factor is particularly important to assess given the continent's rampant socio-economic issues which often drive health professional brain drains. Two, the percentage of people using at least basic sanitation services across the continent is assessed. Herein, the percentage of people with access to at least safe drinking water were incorporated into the analysis as an explanatory variable to enhance the insights provided by the study to gauge the level of risk that a developing continent such as Africa finds itself in during the pandemic.

4 Risks Factors for Africa During COVID-19

The following section provides an analysis of some of the factors that are currently or will influence the manner in which the continent will combat the COVID-19 pandemic. The sample of countries utilized per factor is dependent on the availability of data from African countries. As such, not all African countries will be discussed in the analysis except where data are available. In the event that no data are available at all for some countries, then these will be alluded to on a regional basis.

Availability of Physicians

According to the World Health Organization (WHO) (2020a), over 45% of its member countries have less than 1 physician per 1000 people. Relative to their populations, this is very low. Moreover, of the 194 member countries in WHO, 26% have less than 3 physicians for every 10,000 people, many of them being in Africa (World Economic Forum 2020). This illustrates an uneven distribution of health workers around the world. Africa has the greatest disease burden and one of the smallest healthcare workforces (Gouda et al. 2019). Figure 1 provides insight on the number of physicians available in Africa to fight the pandemic and attempt to save the lives of the infected through available treatment options. The color of the bubbles indicates a country, while the size of the bubble indicates recoveries (see Fig. 1).

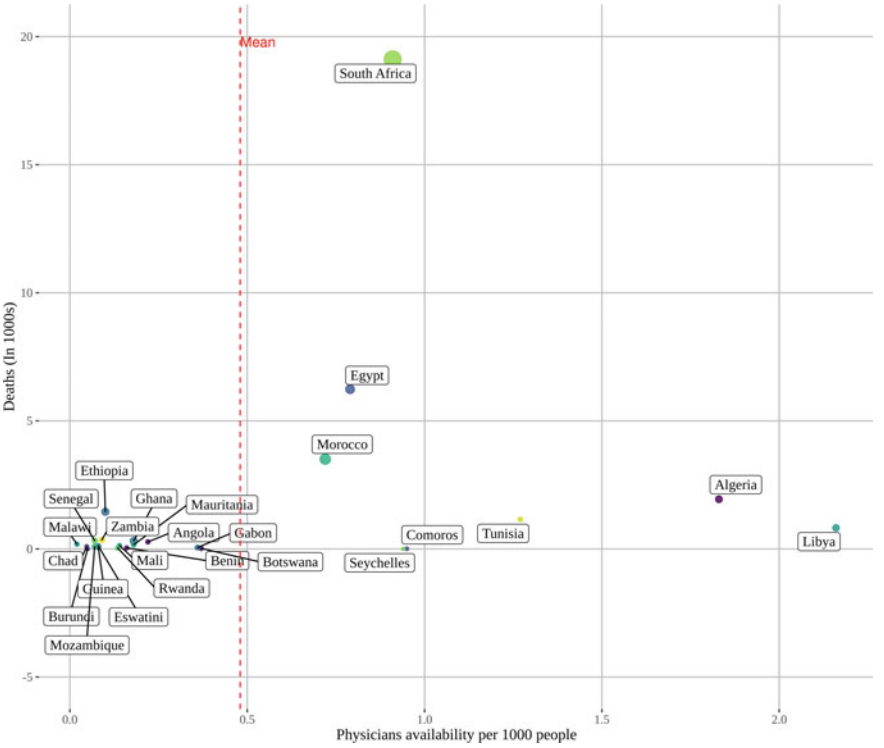
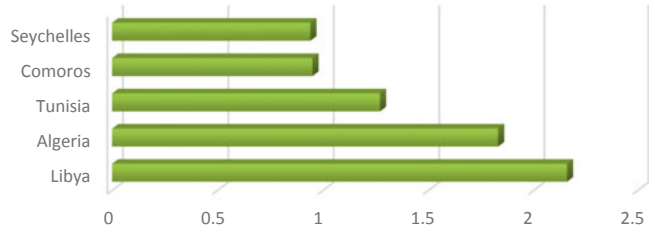


Fig. 1 Physician Availability (*Source* Africa CDC and World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

As such, the larger the bubble, the higher the number of 2019-nCoV recoveries in a country. A correlation test reveals a positive relationship of 0.27 or 27% between lack of physician availability and COVID-19 deaths.

According to Fig. 1, North African countries have the highest number of physicians available to tackle Covid-19 cases in their respective geographical territories. Theoretically, this should put them in a position to better reduce the peak caseload of the virus in their countries. While Egypt, South Africa, and Algeria have some of the highest COVID-19 deaths in Africa, overall the continent has managed to keep the death toll and indeed the number of confirmed cases at a minimum as a result of screening, social distancing, and costly lockdown measures (Africa CDC 2020).

These solutions are temporal and might see positive cases and deaths escalate should more efficient measures such as scaling up testing, treating, and fumigation not be implemented on a continent-wide scale. The former plays a pivotal role in bringing to light the infection status of a country and better



	Libya	Algeria	Tunisia	Comoros	Seychelles
Top 5 Africa countries with most available number of Physicians per 1,000 people	2.16	1.83	1.27	0.95	0.94

Fig. 2 Top 5 African countries with the highest number of physicians per 1000 people (*Source* World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

inform the manner in which it should implement measures to combat and curb the virus.

Despite the continent not having adequate resources to effectively combat COVID-19, some African countries are more protected from the virus than others due to their availability of physicians. Figure 2 represents the best and well-resourced countries in the segment with Libya ranking 1st followed by Algeria, Tunisia, Comoros, and the Seychelles, respectively. While these are in a much better position to combat COVID-19, Libya's ability to administer services to its populace despite being a leading country in this category is questionable. This assertion comes after years of armed conflict and state failure which has left its health system in near collapse despite its robust health labor-force (Raghavan 2020; WHO 2019). This puts the citizens of Libya and other African countries in similar conflict situations at a hybrid risk of fatality, not only to the pandemic, but to conflict, or in the event that both mediums are utilized to facilitate victory for either side of the conflict resulting in high civilian casualties.

Sanitation

Washing hands with soap and water has been identified as one of the most effective ways to prevent the spread of COVID-19. Access to basic sanitation is crucial if countries are to prevent the spread through hand washing. Access to sanitation services in Africa is fragmented, with an average of only 42.1% having basic access to sanitation services. Figure 3 explores the relationship between confirmed COVID-19 cases as well as levels of basic sanitation access

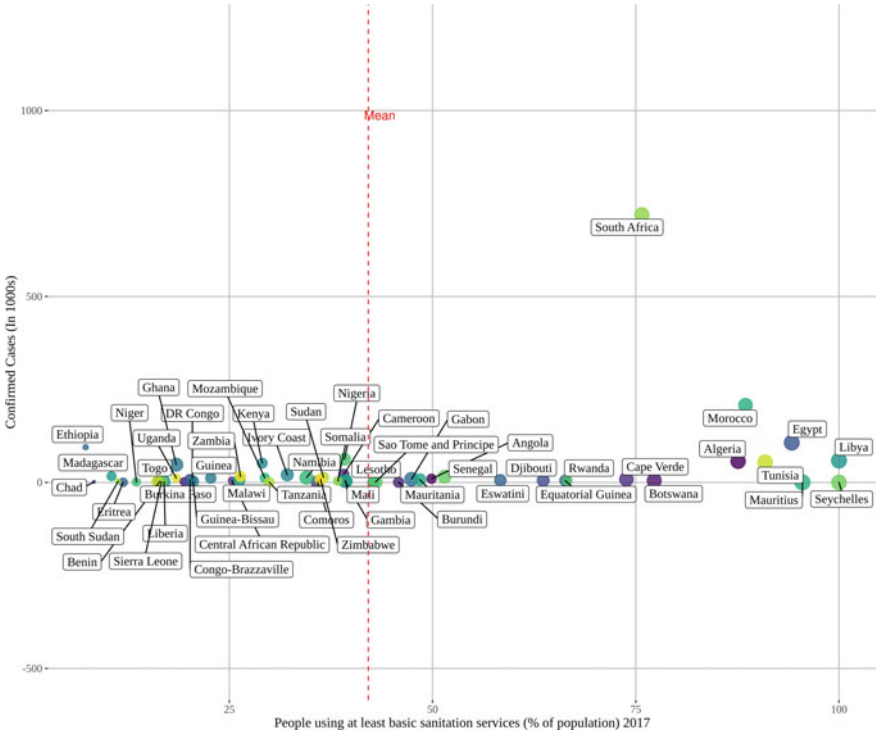
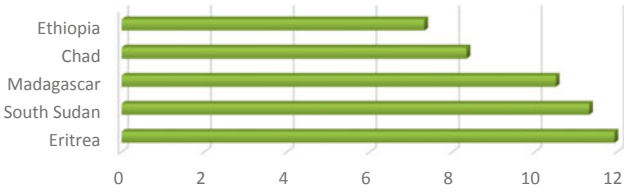


Fig. 3 Sanitation and confirmed COVID-19 cases (*Source* Africa CDC and World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

for Africans in their respective countries. The size of the bubble represents the percentage of people making use of at least basic water services per country. A correlation test revealed a positive relationship of 0.28 or 28% between access to basic sanitation services and confirmed COVID-19 cases.

Worrying is the fact that more than half of the sample of African countries analysed provide basic sanitation services to less than 50% of their populations. Emerging studies on the pandemic have indicated that there is a possibility that the virus can be transmitted through feces as the alternative to cough, sneeze, and contact transmission (Wu et al. 2020, Zhang et al. 2020). Without adequate sanitation services the majority of the continent is at the risk of a continued spread COVID-19. Figure 4 shows countries with the highest risk of COVID-19 transmissions based on poor sanitation services with Ethiopia and Chad being the most vulnerable in the segment as they only provide basic sanitation services to 7.32 and 8.34% of their populations. The deficit in basic sanitation services in the aforementioned as well as other



	Eritrea	South Sudan	Madagascar	Chad	Ethiopia
African countries with the worst sanitation services	11.94	11.32	10.51	8.34	7.32

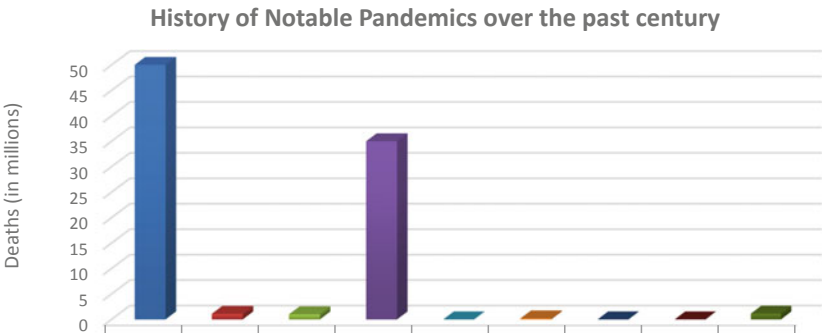
Fig. 4 African countries with the least accessible basic sanitation services (*Source* WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene 2017. Accessed December 2020)

African countries struggling to provide basic sanitation services to their populaces puts them in a situation where they do not only have to contend with the threat of the virus, but also risk contracting diarrhoea, cholera, dysentery, and typhoid as result thereof (The Conversation 2016).

Address Health Risk Factors to Prepare for the Next Pandemic

As the continent mobilizes to contain COVID-19, it is important that it looks at the bigger picture and considers the possibility of another pandemic occurring in the near future as the global outbreak of COVID-19 is no coincidence. The last century has been characterized by the emergence and re-emergence of pandemics at an alarming rate (see Fig. 5). As such, it is important that the continent addresses the risk factors assessed in this paper to, not only combat COVID-19 but to better prepare for subsequent pandemics. Between 1980 and 2010, the global number of disease outbreaks rose from 1000 to just over 3000, with the leading drivers thereof being bacteria and viruses representing 70% of diseases (vector-borne) and causing 88% of outbreaks over the period of analysis. Zoonoses accounted for 56% of outbreaks with the 2019-nCoV pandemic presenting itself as the latest zoonotic disease (Smith et al. 2014; Mackenzie and Smith 2020).

Communicable diseases such as HIV/Aids, TB, Cholera, Ebola kill hundreds of thousands of Africans every year. These outbreaks disrupt economies and cause panic globally. COVID-19 has exposed the vulnerability of Africa's health system, public service delivery, and deficits in government and non-governmental organizations' coordination and inefficient disease



	Spanish Flu	Asian Flu	Hong-Kong Flu	HIV/Aids	SARS	Swine Flu	MERS	Ebola	COVID-19
2019-Present									1.13
2014-2016								0.011	
2012-Present							0.00085		
2009-2010						0.2			
2002-2003					0.000077				
1981-Present				35					
1968-1970			1						
1957-1958		1.1							
1918-1919	50								

Fig. 5 History of notable pandemics over the past century (*Source* Centers for Disease Control and Prevention, WHO, Historical Records, John Hopkins University updated as of 28 October 2020 14:54 CAT)

monitoring. The wake of Ebola should have triggered a radical shift toward the redressing of the aforementioned inadequacies across the continent.

Change the Paradigm

Africa needs to invest in stronger health systems that are capable of monitoring, detecting, and swiftly containing diseases. This would mean developing an integrated disease monitoring system that connects laboratory data with demographic data and health measures so that health organizations and research firms, as well as think-tanks, can adequately monitor, analyze and predict outbreaks. This is important as a country's probability of coming into contact with a pathogen, identifying it, and reporting outbreaks is influenced mostly by its monitoring capabilities (Smith et al. 2014).

To achieve this, the continent will have to increase investment for the treatment of existing pandemics such as HIV/Aids and TB to lower their risk of fatality by novel pandemics. Additionally, Africa will have to invest heavily in

discovery science to develop vaccines intra-continentally, enhance diagnostics, and treatment. It should also bolster information sharing and coordination. In addition to the Africa CDC, the continent would benefit greatly from supporting independent infectious disease structures. This would complement its efforts and provide an array of insights and solutions to enhance how the continent responds to existing and prospective viruses.

The continent should encourage innovation in combating COVID-19. Senegal, for example, developed cheap $1 testing kits and $60 ventilators that have been leveraged by the country's experience with Ebola and Aids (Sylvester 2020). This is cost-effective and should be integrated into the continent's pandemic response efforts. Such structures would need to be led by public health and policy experts with experience in addressing pandemics through emerging data analytics. These structures would have to operate external of the political landscape to avoid being used as a tool for political advancement and being corroded.

Additionally, the continent must embark on a robust infrastructural development program that seeks to enhance its populace's access to basic sanitation and drinking water services. Currently, only 24% of African countries provide over 60% of their populace's with access to basic sanitation services (World Bank 2017). While the continent has made progress in the provision of these services, deficits in access continue to make the continent susceptible to novel contagious pandemics such as COVID-19. We are of the assertion that until such a time that African governments provide basic sanitation and drinking water services to their citizens in their entirety, the continent will remain susceptible to pandemics that require access thereof to effectively contain and defeat.

5 Impact on the African Economy

The COVID-19 pandemic has affected the global economy negatively with the German economy experiencing a technical recession as its economy shrinks by 2.2% while the Eurozone's GDP has declined by 3.8% for the first time in decades (Nagarajan 2020). Africa's key sectors such as merchandise trade, agriculture, tourism, and oil are feeling the adverse effects of the continent-wide lockdown as intra-Africa and international trade regresses in an effort to curb the spread of the virus. While these measures are necessary for combatting the COVID-19 pandemic, the economic effects are disproportionately affecting the continent as a result of its rampant socio-economic issues that are dependent on economic activity to address as this section shall illustrate.

Macroeconomic Outlook

The African Union (AU) has projected macroeconomic declines of -0,8% (optimistic) and −1.1% (pessimistic) as a result of economic inactivity in vital sectors like tourism, merchandise trade, and agriculture among others due to COVID-19 (AU 2020). However, the World Bank has projected an even worse economic outlook of between −2.1 and −5.1% that would result in the continent facing its first-ever recession in 25 years (World Bank 2020). Whichever forecast yields the most accuracy, one thing is for sure; Africa stands to perform poorly in 2020 with the pandemic poised to disrupt the economy as supply chains weaken and commodity prices abruptly decline amid the pandemic (World Bank 2020). Likely to be affected the most are 2 of Africa's fastest-growing trade blocs, namely: West African Economic and Monetary Union (WAEMU) and the East African Community (EAC) (World Bank 2020) (Fig. 6).

Africa is projected to lose an estimated $270 billion in trade while the funds required to effectively curb the spread of the pandemic and treat patients are estimated to be $130 billion (AU 2020). Three of Africa's largest economies, namely: Nigeria, South Africa, and Angola have been suffering the devastating effects of COVID-19 with poor growth and investment as well as falling oil and industrial metal prices (World Bank 2020). As such, the year 2020 is projected to be bleak for most African countries and will take years to redress post-pandemic given the continent's long-standing socio-economic challenges with as many as 210 million people living in countries affected by conflict and over 600 million people living without electricity (World Bank 2020).

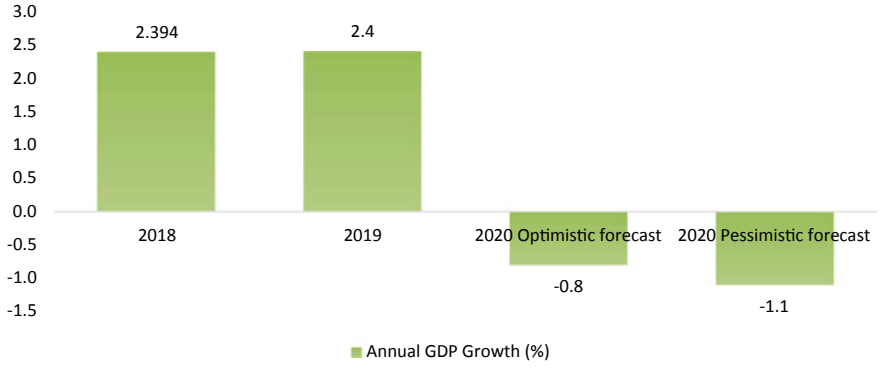


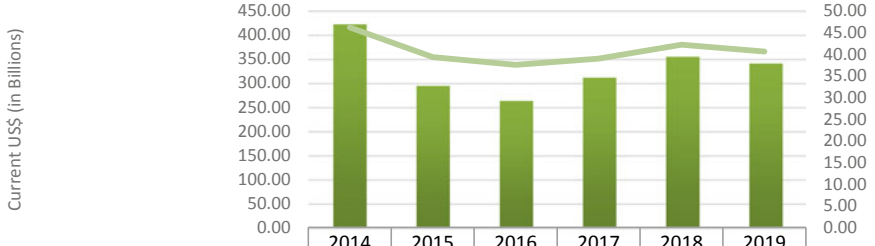
Fig. 6 GDP growth forecast for 2020 (*Source* World Bank and African Union 2020. Accessed December 2020)

Loss of Business in Merchandise Trade

The period between 2014 and 2018, total Africa merchandise export value was $329.99 billion per year on average (see Fig. 7). Yet, despite its importance, intra-Africa trade remains relatively low in contrast to other regions around the world at 17% (African Union 2020). Poor intra-Africa monetary integration and deficits in infrastructure and industrial investment, among other things, are at the center of the continent's low levels of intra-Africa trade. South Africa pioneers trade in the continent accounting for 27% aggregate intra-Africa exports and 12% imports in 2019. South Africa's exports into the continent amounted to $24 billion in 2019 while imports from the continent amounted to $10.20 billion, resulting in a balance of trade (BoT) of $13,8 billion in favor of South Africa.

With one of the strictest lockdowns in the world, South Africa finds itself in a technical recession (Tralac 2019). The country's deep economic integration into the continent's economic system, particularly in the Southern African Development Community (SADC) and Southern African Customs Union (SACU) where two-thirds of the continent's intra-trade takes place makes African countries susceptible to any trade measures adopted by South Africa in its fight against COVID-19. Travel restrictions, as well as border delays in South Africa and the continent at large have disrupted Africa's supply chain, exacerbating the adverse effects of COVID-19 on economically fragile countries across the continent.

This could potentially amplify economic-migration in the region and the world at large as those negatively affected by the pandemic are likely to seek better economic opportunities elsewhere. Figure 8 shows countries that are



	2014	2015	2016	2017	2018	2019
Merchandise exports (current US $)	422.98	295.3	264.27	312.44	355.73	341.75
Merchandise Trade % of GDP	46.17	39.296	37.53	38.95	42.21	40.6

Fig. 7 Africa merchandise exports (Current US) and Merchandise trade (% of GDP)—Sub-Saharan Africa (*Source* World Trade Organization, and World Bank GDP estimates 2019. Accessed December 2020)

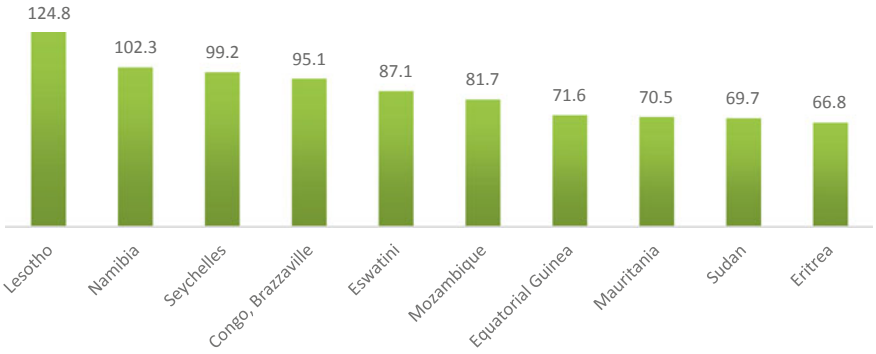


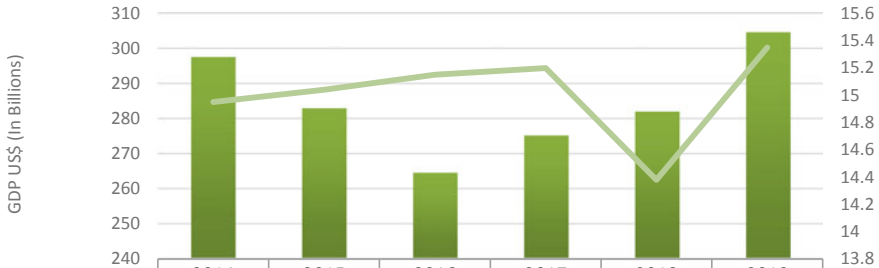
Fig. 8 Top 10 African countries most reliant on merchandise trade (% of GDP) (*Source* World Trade Organization, and World Bank GDP estimates 2019. Accessed December 2020)

most likely to be negatively affected by the pandemic due to their GDP dependence on merchandise trade. The GDP of Lesotho, Seychelles, and the Republic of Congo are entirely dependent on merchandise trade and are most likely to disproportionately suffer the adverse effects of the continent's lockdown which hampers trade. To this end, the AU has noted that it fears that 20 million people might lose their jobs by the end of 2020 due to the economic inactivity and a loss of business across all economic sectors (Martin 2020).

Additionally, informal cross-border trade (ICBT), a common trade practice that is rarely illegal and is under-documented in trade statistics, plays a significant role in merchandise trade has been greatly affected by the disruption caused by COVID-19 (Tralac 2020). The lack of formal employment opportunities across the continent contributes to the rampant nature of ICBT as an avenue of generating income. Tariff and non-tariff barriers (NTBs) as well as rules of origin create an enormous pool of informal traders that are currently being affected by the continent's border closures in its efforts to combat the virus.

Loss of Business in Agriculture

The African agricultural sector contributes to just over 60% of the continent's jobs many of which are smallholder and subsistence farmers (Diop 2020). Figure 9 shows between the period 2014–2018, the average revenue generated from agriculture, forestry, and fishing was $293.08 billion per year, constituting 15.55% of the continent's GDP. Agriculture supports millions of families in ICBT and is currently less active due to border closures across the continent and will exacerbate hunger and poverty. Moreover, greatly



	2014	2015	2016	2017	2018	2019
Current ($)	297.48	282.9	264.52	275.13	281.93	304.58
% of GDP	14.95	15.04	15.15	15.2	14.38	15.35

Fig. 9 Agriculture, forestry, and fishing, value added (Current US$ and % of GDP—Sub-Saharan Africa (*Source* Authors own calculations based on World Bank national accounts data, and OECD National Accounts data files 2019. Accessed December 2020)

affected are smallholder farmers as their ability to sell, or purchase inputs by social distancing measures. This will result in the loss of revenues, yields, and potentially impair future agronomy seasons as seen with the case of China (Zhang et al. 2020).

Exacerbating the effects of COVID-19 in Africa's agrarian and fishery sector is the continent's long-existing food security issues. According to the Food and Agriculture Organization (FAO) as of 2018, an estimated 20% of the continent's population are undernourished. Africa's food security is among the worst in the world (FAO 2019). Only 6 of Africa's 32 countries ranked on the GFSI, namely: South Africa, Egypt, Botswana, Ghana, Morocco, and Tunisia have reliable food security while the rest ranked moderate to weak putting the continent at severe risk of hunger during the pandemic. South Africa ranks 48th yet it is the best performing African country on the index with a score of 67.3 (Fig. 10).

The effects of the lockdown have exacerbated South Africa's socio-economic issues. Many have turned to looting for subsistence as government feeding programs are falling short (Roelf 2020). This puts the rest of the continent at a heightened risk of hunger as many are less developed than South Africa. Countries most likely to suffer the adverse economic effects of COVID-19 in the agrarian, forestry, and fishing sector are presented in Fig. 11 Somalia ranks first with 62.7% of its GDP comes from agriculture, forestry and fishing followed by Sierra Leone with 58.9% of its GDP stemming from the sector. GDP dependency for the remaining 8 countries ranges from 31.5 to 47.5%. This puts them at risk of suffering negative revenue shocks due to social distancing measures imposed by governments to combat the pandemic.

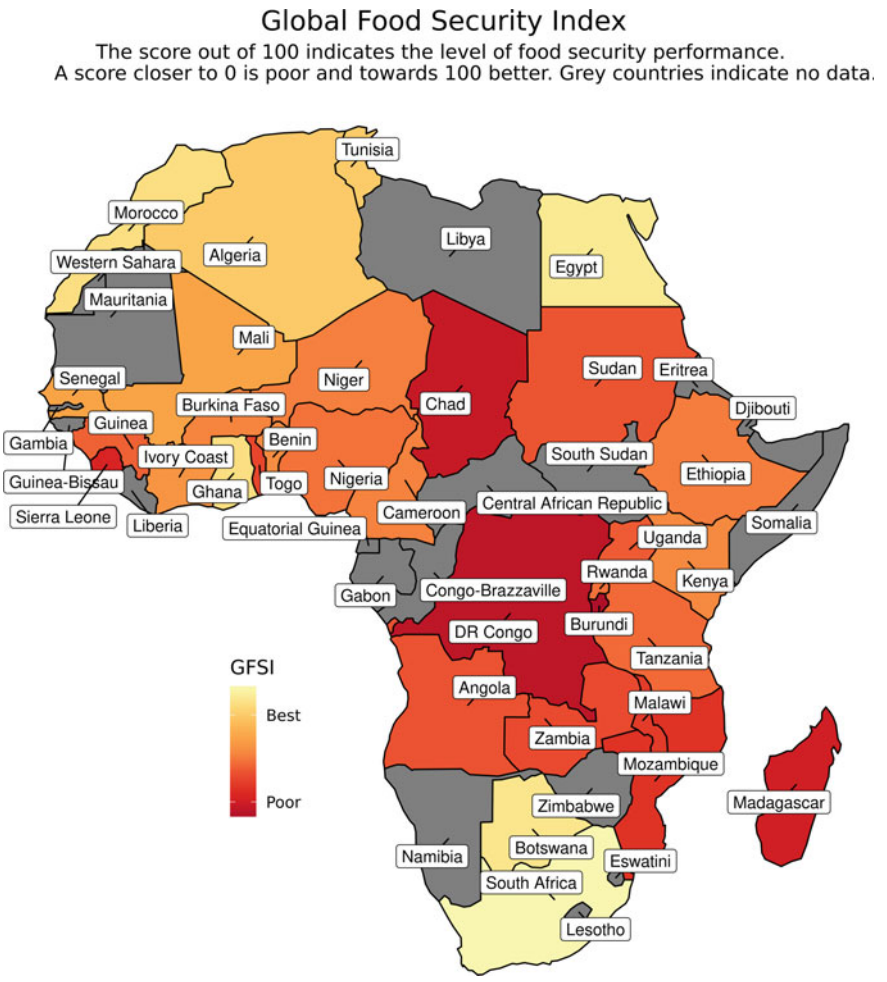


Fig. 10 Global Food Security Index (*Source The Economist Intelligence Unit*, December 2019)

East African countries are at an even higher risk of hunger and malnutrition owing to the impact of COVID-19 on food security and the unprecedented locust outbreak. The latter has resulted in over $8 billion in damaged crops and dead livestock due to a deficit in grazing grass (Kray and Shatty 2020). The Sahel and the Lake Chad region are plagued with water scarcity, usually a source of conflict in the region (Pai 2014). This synergy of factors coupled with the social distancing measures implemented by African governments is most likely to exacerbate the continent's socio-economic issues as a 3rd of its populace live below the global poverty line, survive on less than $2 a day and represent 70% of the world's poorest people (Hamel et al. 2019).

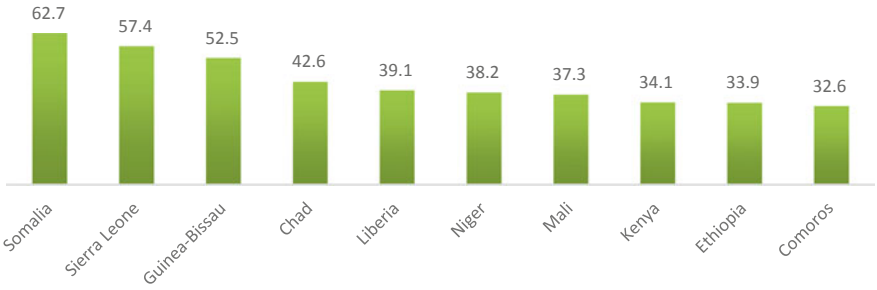


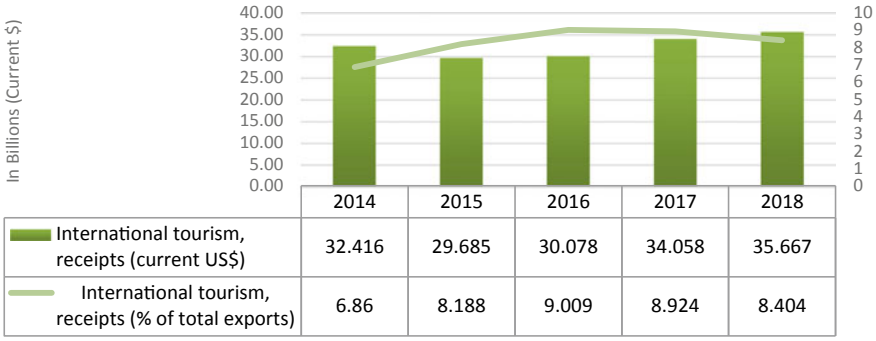
Fig. 11 Agriculture, forestry, and fishing revenues in the GDP (%) of Top 10 African countries (*Source* World Bank national accounts data, and OECD National Accounts data files 2019. Accessed December 2020)

Tourism

Tourism is among the worst affected sectors hit by COVID-19 globally. The Policy Center for the New South projects losses of $300–$450 billion in global tourism receipts (exports) (Maniga 2020). According to the World Trade Organization (WTO), the current trajectory in international tourist travel points toward a decline of up to 78% in scenario 3 (December) of 2020. This is dependent on how swift countries contain the pathogen, and commence the relaxation of travel restrictions (UNWTO 2020). The future remains uncertain as cases continue to rise globally. Currently, available data points show a decline of 22% with arrivals declining by 57% equating to an estimated loss of 67 million global arrivals, or $80 billion.

These scenarios potentially put the jobs of an estimated 100–120 million people at risk, disrupting the constant growth that the industry has enjoyed over the last decade (WTO 2020). In Sub-Saharan Africa, the pandemic threatens revenues generated from the sector. As illustrated in Fig. 11, between 2014 and 2018 international tourism receipts (from exports) contributed $32.38 billion to the region's economy. With the pandemic causing global economic shocks, Sub-Saharan Africa will be disproportionately affected as 1 in 20 are employed within tourism (United Nations 2020). According to a study by the AU (2020), an estimated 2 million jobs in both the formal and informal sector in Africa might be lost as a result of the pandemic.

Countries like Sao Tome and Principe, Cabo Verde, Comoros, Gambia, and Ethiopia are projected to suffer the worst of COVID-19 disruption in the sector as it constitutes a significant percentage of their tourism receipts (exports) as illustrated in Fig. 12. African airlines are also projected to suffer



	2014	2015	2016	2017	2018
International tourism, receipts (current US$)	32.416	29.685	30.078	34.058	35.667
International tourism, receipts (% of total exports)	6.86	8.188	9.009	8.924	8.404

Fig. 12 International tourism, receipts (Current US$ and % of Total Exports)—sub-Saharan Africa (*Source* Authors own calculations based on World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files 2018. Accessed December 2020)

the effects of COVID-19 with the African Airlines Association (AFRAA) estimating revenue losses of $8.103 billion for 2020 (AFRAA 2020). AFRAA does also project recovery in the industry to commence from the 3rd quarter of 2020 with domestic and subsequently international flights. The top 5 African airlines whose operations have been affected the most by the pandemic some of whom have already started retrenching employees due to a loss of business are Ethiopian Airlines, Egypt Air, South African Airways, Royal Air Maroc, and Kenyan Airways (AFRAA 2020) (Fig. 13).

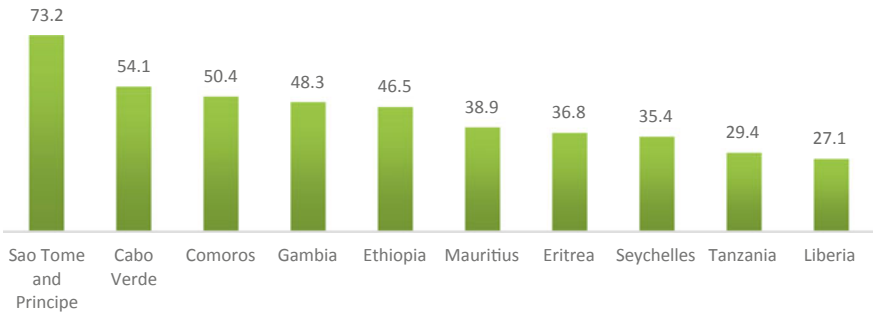


Fig. 13 Top 10 African countries with the highest International tourism, receipts (% of total exports) (*Source* World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files 2018. Accessed December 2020)

Oil

The economic prospects of oil-producing countries in Africa are projected to be bleak and disproportionate to non-oil-producing countries across the continent. Their reliance on international market demand makes them vulnerable to unexpected disruptions in international trade. Revenues generated from oil exports are essential for the international commitments and national budgets of countries like Nigeria, Angola, Algeria, Congo, Gabon, and Chad. They are facing a crisis much worse than that of 2014, wherein the last oil shock due to failures by the aforementioned to diversify their economies. According to Akalpler and Bukar (2020), in 2014, oil prices declined from $110 to less than $40 per barrel.

In 2020, oil prices fell from $66.03 to $25.54 per barrel in April, the lowest in 18 years. It increased to $42.11 per barrel as of 1 July 2020, the lowest since 2014 as a result of not only COVID-19 which led to a decline in demand due to measures implemented by governments to overcome COVID-19. Saudi Arabia oil price war in March 2020 resulted in a fatal disagreement between the aforementioned and Russia which later left the Organization of the Petroleum Exporting Countries (OPEC) as a result thereof (Defterios 2020).

Russia's rationale was that the organization's strategy to cut oil supply by 2.1 million barrels per day to stabilize oil prices globally inadvertently facilitated growth for American oil producers. The outcome was an all-out oil war that resulted in Saudi Arabia disrupting the oil market by slashing oil prices to a historic $4–$7 per barrel amidst collapsing global demand reducing the oil revenues of major oil-producing countries with African oil producers being disproportionately affected due to poor economic diversification and rampant socio-economic issues (Defterios 2020). Oil rents refer to the profits that countries get from the production of oil that is revenue generated after subtracting production costs (see Fig. 14).

The top 5 countries whose oil rents have been greatly affected by both the oil price war and stalled trade by COVID-19 are Libya, the Republic of Congo, South Sudan, Equatorial Guinea, and Angola. Libya is perhaps the most affected due to the presence of conflict in the country as highlighted earlier. The current series of events have seen production declines from 1139 BBL/D/1 K (thousands of barrels per day) in December 2019 to just 82 BBL/D/1 K in April, or an 867.07% decline in production resulting in a loss of much-needed revenues in the state. As of June 2020, production had risen to 7% from the record production decline of 867.07% in May. However,

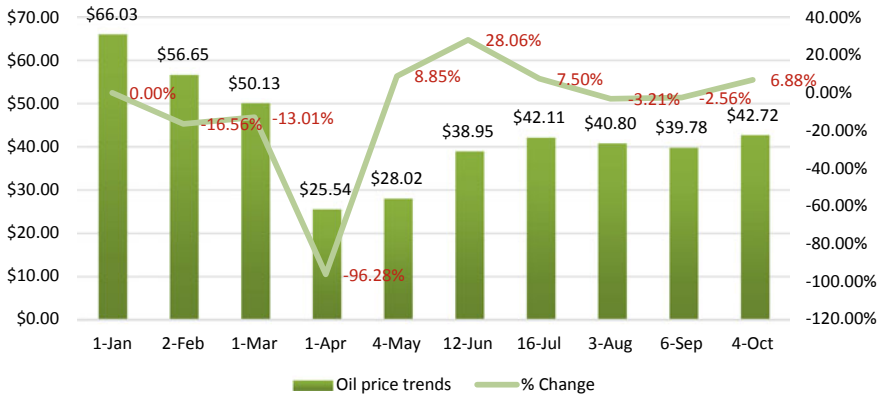


Fig. 14 Monthly 2020 oil price trends leading up to August (*Source* Authors own calculations based on SAshares database, 2020)

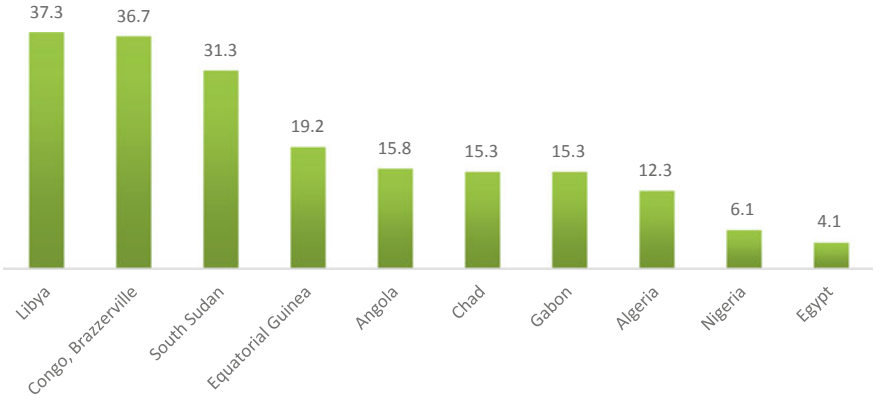


Fig. 15 Oil rents (% of GDP) 2017 (*Source* World Bank staff estimates based on sources and methods described in the World Bank's The Changing Wealth of Nations 2017. Accessed December 2020)

this is significantly lower than the October 2019 peak of 1166 BBL/D/1K (Figs. 15 and 16).

Plummeting oil prices may lead to capital flight for African countries due to the uncertainty associated with the current oil price war and the pandemic as investors shift toward safe assets like medical supplies. This could contribute to a decline in financial inflows. This will most certainly affect the fiscal positions of oil-dependent countries like Ghana, Nigeria, and South Africa where investors purchased local currency securities (World Bank 2020). Nigeria is projected to be the biggest loser in the pandemic as it could lose an estimated $14–$19 billion as it could reduce oil exports in 2020 (AU

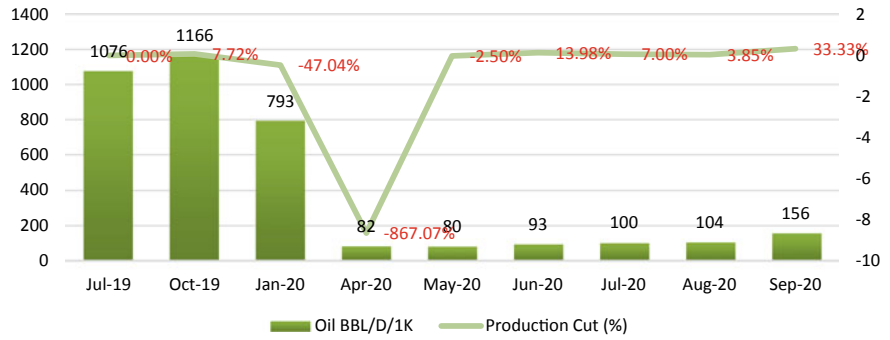


Fig. 16 Impact of Conflict, oil price war and COVID-19 on Libya oil production (*Source* Authors own calculations based on Trading Economics database, 2020)

2020). Overall, the decline in oil demand and prices will reduce the financial capacity that African oil producers have in provisioning fiscal socio-economic assistance to citizens during the pandemic.

6 Conclusion and Recommendations

The COVID-19 pandemic threatens to worsen healthcare systems and existing socio-economic challenges across Africa. The consequences of a novel virus are projected to be extensive, despite all measures implemented by countries globally. The world economy is in decline from reduced economic activity in efforts to combat the pandemic. The spill-over effects from the global community with broken supply chains will hamper growth and development in its social, political, and economic landscapes due to its susceptibility to economic shocks. Though the pandemic has exposed Africa's socio-economic inadequacies like poor public service delivery and fragile socio-economic security, the continent is faced with an unprecedented opportunity to learn from COVID-19 to draw lessons for the future.

Understanding the risk factors will help equip the continent to overcome the current pandemic, but also better prepare for future outbreaks. To mitigate the impacts, African can make use of artificial intelligence (AI) and information and communication technologies (ICTs) to effectively combat the pathogen with minimal risk to Africa's small and under-equipped health force. To mitigate the economic impact of COVID-19, the continent will need to maintain the momentum and ambition that it had in the African

Continental Free Trade Area (AfCFTA) prior to the emergence of COVID-19. The trade agreement will act as a stimulus package to facilitate economic recovery and create conditions for accelerated industrialization.

Post the pandemic, Africa will need to urgently invest in infrastructure, particularly its energy sector. This sector remains dependent on fossil fuels while the world shifts toward cleaner renewable energy in its fight against climate change. According to Cust and Manley (2018: 98), revenues generated from the trade of fossil fuels constitutes 9% of Sub-Saharan Africa's GDP. To adapt, African countries can utilize rents generated from the export of fossil fuels and minerals to accelerate their transition into the green economy, subsequently diversifying their energy portfolio and expanding their electricity grids facilitating energy security for Africa's growing population.

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