The Impact of Covid-19 Pandemic on Water-Health-Food-Economy Nexus and Sustainable Development in Developing Countries

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Abstract — The SARS-Cov-2 pandemic has raised important concerns regarding sustainable development. With vaccines still on trial and lack of effective treatment, countries must ensure adequate measures are in place to protect and cushion the impact of the virus. In this short review, I examine the impact of SARS-CoV-2 on the Sustainable Development Goals (SDGs). I aim to achieve this by looking at how non-pharmaceutical measures like lockdown, impacts negatively on the water-health-food-economy nexus, and how it affects the realization of the SDGs. The nexus between water, food, health, and economy especially in the context of the pandemic has a strong relationship that will undermine sustainable development. I argue that a large number of people from Sub-Saharan Africa have largely been marginalized economically and socially and that despite having low numbers of positive cases, the region will significantly be impacted due to underlying issues relating to poverty, hunger, poor education and health systems. Although I project to see a relatively improved health sector due to the funds injected into the sector to curtail the pandemic, food-water-economy will drastically impact on sustainable development in the region. There is therefore the need to address the issue by adopting a measure that looks at the nexus between food, water, health, and economy. The root problem underlying the inequity in the health, water and economic sectors, exposed by the pandemic must be addressed, not just to prepare for another pandemic but to care for people in resource-poor settings in non-pandemic times and ensure sustainable development.

Index Terms — coronavirus, food security, water security, health impacts, sustainability, pandemic.

I. INTRODUCTION

The spread of Covid-19 pandemic started in Wuhan China in late 2019 and have since spread to every part of the World. The spread of the virus became inevitable to other parts of the globe due to the World being interconnected through land, sea, and air routes [1]. The pandemic has brought economic activities in almost every country to a near-standstill as most countries have imposed tight restrictions on movement to halt and suppress the spread of the virus [2]. As these restriction in movement of people take effect, it is accompanied with impacts on several aspect of development such as health, water, food security, economic and education. These are all part of the United Nations Sustainable Development Goals (SDGs) which will/or are severely impacted by the pandemic.

Environmental challenges such as climate change have in the past been a major constraint to the SDGs in developing countries [3]. However, with the event of SARS-CoV-2 (Covid-19), developing countries are set to face another major setback in actualizing the SDGs. While this current setback will likely take a while to fully manifest, the impacts are already being felt globally. This is evident in the measures every country is taking to tackle the pandemic. For example, the Nigerian government had to set aside funds in order to tackle the pandemic and while these funds would have been used for other developmental purposes, the government was forced to channel it to the health sector to effectively tackle and cushion the impact of Covid-19 pandemic.

African countries have had poor health infrastructure due to inadequate funding [4], [5]. However, the pandemic has forced most countries to realize the poor situation within the health sector and they have responded by increasing the budget allocations to enable healthcare workers fight the spread of the virus. The healthcare alongside education, agriculture, water, and economy have also been impacted by the pandemic by exposing the systems and revealing the state of affairs within these respective sectors across most developing countries. The relationship between the healthcare, agriculture, education, and water is paramount to sustainable development. Hence the need to investigate the impact of SARS-CoV-2 on the nexus between these sectors and how it relates and undermine the realization of the SDGs especially within developing countries becomes paramount. This short review aims to highlight the impact of the pandemic on each of the sectors and how the nexus between them is severely impacted thereby undermining sustainable development.

II. ECONOMIC IMPACT OF COVID-19

The outbreak of Covid-19 has forced several countries and territories to result in non-pharmaceutical measures by restricting movement and placing ban on international travel amongst others [6]. This is all in a bid to curtail and halt the spread of the virus. These measures however will likely impact on economic activities negatively especially in poor and weak economies in developing countries. For example, the drop in oil prices due to a decline in demand for oil products because of the lockdown in almost every country has forced oil depending countries to deplete their reserves [7]. In addition, the economic challenges are being cushioned by prudent economic measures through direct government
intervention like cash handouts, tax holidays, subsidies to the businesses and provision of food and other essential services to citizens [1]. All these measures will further deplete governments reserves which will likely constitutes to challenges in sustaining governance if the pandemic should last any longer. Already Africa and other developing countries in Asia are facing challenges in curtailing the spread of the virus especially in areas where people have refused to adhere with the non-pharmaceutical measures due to the inconvenience it poses on their businesses and daily source of livelihood.

Economic Scholars around the globe will as a matter of urgencies undertake intensive risk evaluations of the negative fallout of Covid-19 pandemic on economies of both developed and developing countries [1]. Although developed countries will likely show some resilience to the impact the pandemic will exact on their economies, most countries will likely fall into recession. For instance, the World Bank global economic outlook for 2020 projected that every region will be subjected to substantial growth decline thereby plunging most countries into recession in 2020 [2]. Furthermore, the downgrade growth will see East Asia and the Pacific having a scant growth of 0.5%, South Asia will contract by 2.7%, Sub-Saharan Africa by 2.8%, Middle East and North Africa by 4.2%, Europe and Central Asia by 4.7% and Latin America by 7.2% [2]. These downward growths will likely reverse the years of progress recorded by most countries towards the sustainable development goals (SDGs) and tip tens of millions of people back into extreme poverty [2]. In addition, there has been record of a fall in the global stock market due to the significant rise in the number of confirmed cases of Covid-19. Stock markets have registered their largest single-week declines since the 2008 financial crises thereby crashing the market with falls of several percent [2], [7].

Developing countries will likely be the least equipped to fight the pandemic due to poor infrastructure, bad governance, poor healthcare system and over dependency on aid, and climate – rainfed agriculture. For example, an economic model used on the Nigerian economy shows that Nigeria’s GDP suffered a 34.1% loss due to the lockdown in several states [8]. This loss amounts to USD 16 billion with two-thirds of the losses coming from the service sectors [7], [8]. Consequently, several other sectors were also impacted directly or indirectly due to the restriction on movement and total lockdown in many parts of the country [9]. Nigerian agricultural sector suffered a 13.1% loss in output, amounting to USD 1.2 billion and household’s loss of 33% [8]. In addition, Andam, [8] estimated that around 27million additional Nigerians fell below the poverty line during the lockdown period. These are devastating consequences on livelihood and the economy which will likely see any nation fall into recession.

III. IMPACT ON THE EDUCATION SECTOR

The Covid-19 pandemic is firstly a health crisis that has subsequently impacted other sectors such as economic, education, transport etc. Most countries reacted by closing services from all the sectors (except for essential services). This disruption affected the education as schools must close to reduce contact and save lives. Even though education is paramount in every society, the protection of lives (in this case) becomes more important [10]. Education at all level is one of the best public policy tools that can be used to improve skills and raise awareness. In addition to raising social skills and social awareness, schools can improve a child’s ability significantly [11]. Therefore, a relatively short period of missed school can likely impair skill growth in children. Although it is unlikely to estimate how much the lock down due to Covid-19 has impacted on schools, any extended time for school resumption will likely impact the education sector negatively in the long-term.

The closure of several education institution will result in an unlikely and unequal impact on the students learning [12]. While some schools (especially those in developed countries) will be able to switch to virtual learning [13], others in Africa will likely fail to effectively implement virtual learning [14], [15]. This is most likely due to the interrupted supply of power (electricity), poor and expensive internet services and lack of infrastructure in schools. Although some states in Nigeria are resulting in using radio stations to encourage learning, it will still not be possible for some subjects especially those in the pure sciences. Consequently, several school pupils from countries in Sub-Saharan Africa are due to sit for their final assessment and examination but will likely miss out due to the lockdown. Although schools are gradually returning specifically for graduating classes in Nigeria, there has since been recorded cases of Covid-19 among students and teachers in some schools across the country.

Although classes were conducted virtually in many developed countries, developing countries still struggling with the provision of electricity and internet connections have not been able to continue with studies virtually. The poor infrastructure in most educational institutions in Nigeria for example have resulted in the inability of most government schools to switch into online classes during the lockdown because of the pandemic. Furthermore, the cost of internet bundle and lack of devices to be used by the low-class Nigerian parent means that their wards are unable to attend classes virtually even if it is to hold. This will likely result in a long-term impact on the education of certain students especially those who will not be able to afford the switch to online mode of learning.

IV. IMPACT OF COVID-19 ON HEALTHCARE SECTOR

At present, the non-pharmaceutical measures are the most effective in curtailting the spread of the virus. These non-pharmaceutical measures include, washing of hands with soap under running water [16], use of face mask, use of hand sanitizers, social and physical distancing, and isolation of suspected persons. The treatment for Covid-19 has been that of symptoms and boosting immune systems of patients [17]. However, adhering to all these measures especially the non-pharmaceutical measures comes with its cost and challenges [18]. For example, restriction of movement is accompanied with economic hardship especially for the poor who depends on the daily activities for their family needs. The healthcare sector in many countries have been exposed because of the

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outbreak of the virus [19]. Developing countries with a generally poor healthcare system will likely be facing numerous challenges in managing the spread of the virus and although this problem is not only peculiar to developing countries, the prolonged outbreak of the virus will likely devastate the healthcare sector especially in many developing countries.

Africa has so far recorded the least number of cases, compared to Europe, Asia, and America. And although, several scholars’ attributes this to several factors like poor testing [17], the impact of the virus on other sectors like the economy, food and agriculture has been significant. Even though Africa’s testing capacity is far below other regions [20], Africa, remains at higher risk to a devastating healthcare sector if a treatment or vaccine is not found soon. Africa’s healthcare system is already burden with infectious diseases such as Ebola, Lassa fever, HIV, malaria, and tuberculosis [19], [21]. The addition of Covid-19 to an already burdened healthcare system will likely lead to a devastating outcome.

Another health impact alongside the poor health infrastructure and funding is the rise in number of cases among healthcare workers. Over the last few months, it has been recorded globally that a significant number of frontline workers (health workers) are becoming infected with the virus.

However, there have also been a positive impact of the pandemic on the healthcare system in some Sub-Saharan countries. For instance, the attempts to curtail the spread of the virus have had the most interesting moments in the African continent in that for many countries, the politicians who often pay lip services to public health have taken a different approach by ensuring they head the campaigns themselves [21]. There has been budget adjustment to the health sector and several donations from philanthropist within the continent as against the dependency on aid from foreign donations. In addition and most importantly, the rich and high-income citizens who fall ill from the virus are now being forced to seek healthcare from within their countries rather than find their ways to the developed countries for treatment as in the past when the poor and vulnerable groups fended for themselves with poor and inadequate health facilities [21]. This positive turn of events will likely see a portends potential for a better African health sector. In addition, there is also the likelihood that the current health measures being put in place in many African countries will benefit other challenges in health-such as other infectious disease control [21].

V. IMPACT OF COVID-19 ON FOOD SECURITY

Food security has been key to development in most developing countries especially in Sub-Saharan Africa. The stability of food supply is crucial to the food security of people globally [22]. The four pillars of food security enumerated by the Food and Agriculture Organization (FAO) has severely been impact by the current global pandemic and this will be felt disproportionately due to inequality especially in developing countries in Africa and Asia. While the spread of SARS-CoV-2 has not been attributed to being foodborne, the disruptions to everyday life due to the lockdown measures imposed by countries to stop the spread of the virus has negative repercussion on food production, food processing and food transportation [23]. This can be seen on the four pillars of food security which include availability, accessibility, utilization, and stability of food systems. Availability corresponds broadly to the supply of food, accessibility relates to the demand for food (economic access) as well as the proximity of market (physical access), while utilization refers to the biological processing of food which usually relates to dietary quality and stability takes into account the dynamic aspects – as food is considered to be a daily necessity [24], [25].

Covid-19 has shown to be a threat to food sufficiency by directly and indirectly undermining food security. The pandemic has directly affected food systems and indirectly, through the impact of lockdown on household incomes and physical access to food [24]. Covid-19 through the lockdown measures imposed by most countries has also affected food production thereby impacting on the availability of food locally. Most local farmers could not go out to their farms during the restrictions and consequently this affected the yield and productivity as crops were overwhelmed by invasive weeds and pest. There will likely be a significant increase in hunger due to an unavoidable rise in the cost of food and this will affect food-sufficiency [26]. Increase in cost of food will be due to the low supply and rise in demand for food commodities globally. Developing countries will likely be impacted severely because of the increase in vulnerability of its population. The poorest and most malnourished populations are from developing countries and hence, will likely be the worst impacted by hunger due to the covid-19 pandemic.

Globally, it is evident that the pandemic will impact on food security by negatively affecting the four pillars of food security enumerated by the FAO. However, there is a likely impact on food safety which should be considered and taken seriously especially since SARS-CoV-2 has been detected in several mediums of the environment including wastewater [27], [28], [29]. Food safety especially meals that are prepared by restaurants for the public can become a likely path to spreading the virus. Utensils used to serve meals and the packaging of food can likely be undermined, thereby contributing to the spread of the virus [23]. The concerns over possible contamination of packaging materials and grocery items in supermarkets is high, since customers often pick and drop items thereby increasing the likelihood of transmitting the virus during shopping.

VI. IMPACT OF COVID-19 ON WATER ACCESS AND QUALITY

The pandemic has resulted in human life coming to a standstill in most countries. All types of industries, organizations, vehicle movement and people’s activities suddenly came to a halt [30], [31]. This will certainly impact on the water industries especially those packaging and distributing water in developing countries. The impact on access will certainly be felt because some of the water packaging and distribution industries have will also been home due to the pandemic. Consequently, water quality will likely be impaired due to the presence of the virus in wastewater [29], [30]. Detecting the virus in the environment
is now raising concerns to the water treatment industries, especially the wastewater industries [27], [28]. However, this might likely not be the case within the developing countries because most developing countries lack adequate treatment facilities to treat and dispose of wastewater. In addition, with the emergence of the virus in wastewater and in several mediums in the environment, including sewage, there is a high risk of water contamination thereby resulting in severe impact on water quality. Groundwater contamination through seepage of soak-away and runoff of feces due to open defecation are few among the mediums of water contamination that needs urgent attention in developing countries.

Although, Yunus et al. [30] suggested a positive outcome of the lockdown on water quality, the need to treat and eliminate SARS-CoV-2 from wastewater and hospital and isolation centers waste is paramount. Several industries and sectors that are known to pollute and contaminate the atmosphere, hydrosphere and biosphere are either not operational or operate at a very low state [30]. This is believed to have improved the general quality of water. According to a study by Yunus et al. [30], lake water quality improved by 15.9% due to business lockdown. The outcome displayed eleven out of 20 zones showing significantly low levels of contamination since April 2020. This indicates that business activities have significant impact on water quality within the area. However, even though the result shows positive impact on lake water quality, several factors like the distance of the business to the lake, waste disposal and many more must be taken into consideration and hence cannot be a general concept. Therefore, we cannot say that this is certain generally across every surface or ground water source. In addition, access to water cannot be said to have improved-rather, it has become increasingly difficult for people living within water stress areas to access water especially during the lockdown [32].

Access to water is a fundamental right of every citizen. However, this basic right has not been met in many developing countries and with the outbreak of SARS-CoV-2, access to potable water is becoming threatened [17], [32]. Water, Sanitation and Hygiene (WASH) services have been one of the non-pharmaceutical measures recommended by the World Health Organization to help curtail the spread and transmission of the virus [17], [33]. However, with poor WASH services especially in most water stressed areas, it will be difficult to effectively implement hand washing and other sanitation and hygiene measures. This can retard progress in curtilating the spread of the virus and exacerbate the problems of accessing potable water and sanitation services.

More so, the pandemic has successfully revealed the importance of WASH in preventing the spread and transmission of diseases, therefore there is need to design and implement WASH services within the developing communities in the global south. In addition, measures to integrate the pandemic into the sustainable development goal on provision of water will enable water managers and environmental planners to design projects that will aid in tackling the general problems of water access and water quality.

VII. REVERSING THE PROGRESS MADE ON THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

Previously, climate change and environmental challenges have been predicted to reverse the progress made in attaining the SDGs. However, the pandemic is beginning to be another deterrent to the realization of the SDGs especially in developing countries across Africa. Although the spread of the virus seems to be lower in most developing countries in Africa [20], there is a likelihood that the pandemic will impact several sectors resulting in a significant impact on the realization of the sustainable development goals. The United Nations Sustainable Development Goals was established in 2015 shortly after the target year of the Millennium Development Goals (MDGs) elapsed. The MDGs was hindered in many developing countries and climate change is said to have been a major reason: although several other factors have been attributed to the failures. Seventeen goals were established cutting across several developmental sectors with the aim of leaving no one behind [34].

However, achieving these goals requires a collective effort from every region, country, and people. The uneven distribution of resources, like water and minerals have resulted in impacts being felt disproportionately across the globe and within countries. Climate changes have further exacerbated these impacts and increased inequalities among people leading to hunger, poverty and many more ills within the environment. Recently, the spread of the SARS-CoV-2 virus have affected every country with devastating consequences on the SDGs. Economic hardship imposed on people due to lockdown measures and suspension of business activities have led to severe impact on ending poverty, zero hunger, achieving good health and wellbeing, achieving quality education, gender equality, clean water and sanitation, industry innovation and infrastructure, reducing inequalities and taking climate action. These are goals that are meant to be achieved by 2030 [34] but however, there is a likelihood that these goals will not be achieved in many developing countries due to the impending climate and health challenges we are facing.

Economic impacts are considered the most pressing issues countries will be facing especially with poorer countries unable to provide bail out funds to employees and the private sectors. More so, the coming years will likely push several countries to recession [2], thereby undermining the realization of the SDGs. Sub-Saharan countries will likely see a rise in debt due to increased borrowing to help stabilize the economy. Although the health sector will see an increase in funding and subsequent infrastructural improvement, the setbacks in achieving food security, access to water, education and tackling poverty will likely impact the region significantly. And unlike climate change were developed countries offer support to developing countries, the pandemic has shown to impact even the most industrialized nations. The WHO figures show Europe, America and Asia having significant rise in positive cases thereby reducing the likelihood of countries from these areas to render assistance to Africa. These countries will have to tackle and halt the spread of the virus and ensure they themselves have stabilized their economy by providing adequate resources to their citizens before they can provide aid to other countries.

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SARS-CoV-2 pandemic has severely affected the survival of human beings. The pandemic impacted on economic activities thereby affecting other sensitive sectors like education, agriculture, healthcare, and water. The impacts on all the developmental sectors within the society will likely result in undermining the realization of the Sustainable Development Goals. Although every sector is impacted differently, the relationship between each sector will lead to a total setback in the general wellbeing of every country. Africa, although with lower number of positive SARS-CoV-2 cases will severely be impacted due to underfunded health sector, high rate of poverty and lack of WASH services required to curtail the spread of the virus. The economy of Sub-Saharan countries will also experience a setback due to the lockdown measure that has impacted significantly on economic activities. There is therefore the need for Sub-Saharan Africa to redesign and implement measures aimed at cushioning the effect of the pandemic especially on economic activities. Funds need to be introduced into the economy to boost every sector and help countries avoid plunging into recession.

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