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Policy Brief

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Capacity Imperatives of Pandemic Responses: Building resilient health systems and ensuring socio-economic transformation in Africa

Executive summary

This Policy Brief provides insights from the African Capacity Building Foundation-Islamic Development Bank (ACBF-IsDB) technical study, "Capacity Imperatives of Pandemic Responses: Building Resilient Health Systems and Ensuring Socio-Economic Transformation in Africa." The study examines the capacity challenges experienced by African countries in their response to the COVID-19 pandemic and proposes capacity development actions aimed at building resilient health systems and supporting socio-economic transformation for dealing with future outbreaks and pandemics. Although the insights and lessons are mainly drawn from the COVID-19 pandemic, the proposed recommendations are valid for other pandemics or any health crisis.

The Policy Brief aims to provide African policymakers and other stakeholders with clear capacity building options to respond to COVID-19 and prepare for rebuilding post-COVID-19 to ensure that the continent is prepared and ready for future pandemics. The Policy Brief also draws from lessons from "the Health Sector Policy for Affordable Quality Health Services for Human Development" of the IsDB, and a publication by the United Nations Conference on Trade and Development, South-South Cooperation at the Time of COVID-19: "Building Solidarity among Developing Countries."

Some of the key findings include the adoption of best practices by African governments to improve readiness for future pandemics. For example, several African governments demonstrated leadership and management approaches that have played an important role in addressing the COVID-19 pandemic. Other actions included monitoring and maintaining border security, disinfecting roads and public buildings, and operating military hospitals. In addition, the police have been supportive in maintaining public order, enforcing social distancing, and producing and supplying protective masks to the population free of charge. These are decisions and positive measures that can be capitalized upon for future outbreaks.

However, an extensive analysis of the health and the socio-economic impacts of the coronavirus pandemic, along with lessons from the in-depth experience of ten African countries, has revealed significant capacity gaps.[1] Some of the key actions required to address the capacity gaps and reverse the situation include:

- Strengthening human capacity including transformative leadership to drive a significant increase in the government and donor investment required to provide health workers with surveillance and data analytics capabilities, state-of-the-art laboratories, and intensive care units;
- Developing critical technical skills by increasing the numbers of public health workers/ range of health specialists required to build capabilities in surveillance, laboratory testing, data analytics and treatment;
- Enhancing institutional capacity building and renewal to contain future pandemics, including boosting industrial capacity to enhance access to treatments and vaccines and to massively expand access to new rapid diagnostics and treatments;
- Accelerating health sector reforms, such as upgrading and overhauling health infrastructure and systems, to strengthen technical and financial resilience for future pandemics;
- Accelerating socio-economic response measures and policies, including more robust debt management as well as socio-protection programs, to reduce the severe economic impacts of pandemics on businesses and individuals, vulnerable communities and micro, small and medium-sized enterprises; and
- Exploring the South-South Cooperation that will allow African countries to share lessons learned and to scale up the means of implementation of their COVID-19 response programs.

1. Introduction

1.1. Background and pressing questions

The COVID-19 outbreak was declared a global pandemic by the World Health Organization (WHO) on 11 March 2020, owing to its rapid spread across the globe, including Africa. As of 24 February 2021, at 4:06 GMT, 112,754,519 COVID-19 cases had been confirmed, with 2,498,675 deaths and 88,323,208 recovered globally; whereas Africa showed a total of 3,874,338 infection cases, with 102,333 deaths, and 3,423,783 recoveries as of the same date[2].

Pandemics have the potential to cause three waves of morbidity and mortality: the first is due to the disease itself; the second is due to the inability of health systems to maintain adequate and commensurate health services; the third results from the social and economic issues that can be ascribed to the outbreak. The COVID-19 pandemic has proved disastrous for the world's health systems and economies. Many African countries are faced with several pressing questions with respect to the health and socio-economic impacts of COVID-19 and any future pandemics. Among them are the following:

- How did COVID-19 impact the health sector?
- What capacities are needed to build a robust health system including upgrading and overhauling the health infrastructure and systems?

[1] *Botswana, Chad, Democratic Republic of Congo, Egypt, Kenya, Mauritania, Mozambique, Nigeria, Senegal, and Sudan.*
[2] *Worldometers (2021).*

- What capacities are needed to improve disease control and surveillance, speed up laboratory testing, and strengthen data analytics to improve rapid responses?
- How did COVID-19 impact the leading economic sectors and the MSMEs (micro, small, and medium-sized enterprises)?
- What capacities are needed for a resilient socio-economic system to protect job losses, create employment opportunities, and build appropriate social protection services and programs, particularly to address the needs of the most vulnerable, newly vulnerable, the poor, and the elderly?
- What capacities are needed to reduce the fiscal pressures put on governments' budgets as they face restricted finances at the same time as significant additional expenditures are needed?

In this context, generating comparable evidence from multiple African countries and programmatic circumstances is critical to advancing better understanding of the pandemic effects and the recovery process on health and socio-economic opportunities - including broader lessons learned to inform the response towards future pandemics. While cases of COVID-19 in Africa remain comparatively low, the continent remains at risk of sustained or future outbreaks that could quickly overwhelm health systems and push affected countries into crisis. Even without significant outbreaks, COVID-19 has the potential to wipe out a decade of economic growth in Africa. A sustained economic downturn would have far-reaching consequences for social cohesion and human development in the region.

In recognition of the challenges faced by African countries because of COVID-19, the African Capacity Building Foundation (ACBF) and the Islamic Development Bank (IsDB) established a partnership to address the capacity gaps experienced by African countries in their responses to the COVID-19 pandemic and the post-COVID-19 challenges, and then to propose capacity development actions aimed at building resilient health systems and supporting socio-economic transformation.

In addition to focusing on the two components of the study, consisting of the health and socio-economic impacts of the pandemic on African countries and their populations, specific questions were explored during the study relating to the two capacity dimensions of human and institutional capacity as defined by ACBF[3].

1.2. Objectives and target audience

The aim of this Policy Brief is to examine the capacity challenges experienced by African countries in their responses to the COVID-19 pandemic and propose priority capacity development actions aimed at building resilient health systems and supporting socio- economic transformations for dealing with future outbreaks and pandemics. The findings are useful to a wide range of stakeholders including (1) governments and their various institutions and agencies responsible for creating an enabling regulatory and policy environment to tackle pandemic challenges; (2) international, continental, and regional organizations interested in supporting African countries as they tackle pandemic-related issues; and (3) researchers.

1.3. Approach

The Policy Brief draws from the key findings of a research study based on an extensive review of the literature and online surveys targeted at selected African countries. The scope of the study is mainly centered on the ACBF and IsDB implementation countries in the five regions of Africa. This study, although concerned with the entire continent of Africa, draws on the in-depth experience of ten countries[4] to provide insights and recommendations with respect to the capacities that are necessary for countries to enhance their preparedness and response to COVID-19 and future pandemics. Moreover, although the insights and lessons of the Policy Brief are mainly drawn from COVID-19, the proposed recommendations are still valid for other pandemics or any health crisis. The ten selected study countries representing each of the five subregions of Africa are: Botswana, Chad, Democratic Republic of Congo, Egypt, Kenya, Mauritania, Mozambique, Nigeria, Senegal, and Sudan. In addition to the regional and linguistic diversity, the selected countries are representatives of the membership of both ACBF and IsDB.

The following are the key findings that are of strategic importance for policy making as the continent confronts the COVID-19 pandemic and prepares for future pandemics.

2. Key findings and lessons learned

2.1. Health component

Adoption of swift responses, learning from prior experience with pandemics such as Ebola. At the onset of the pandemic, aware of the weaknesses in their health systems and building on prior experiences with epidemics such as Ebola and Lassa fever, African countries did not wait for the situation to get out of hand before reacting swiftly to the threat of coronavirus. Though most African countries had low numbers of confirmed COVID-19 cases, they nevertheless adopted swift and effective responses such as declaring states of emergency in compliance with the global health regulations (see Table 1). In the end, these responses may have saved millions of lives when compared to the initial predictions from several international and continental institutions.

Table 1: African Countries: Emergency Declarations in Response to COVID-19

Country	Type of Emergency Declaration	Date of Announcement	Number of Confirmed Cases
Botswana	Public Health Emergency [*on 10 April (13 confirmed cases) the President declared a national State of Emergency]	31 Mar 20	13
Chad	State of Emergency	19 Mar 20	1
DRC	State of Emergency	24 Mar 20	26
Egypt	State of Emergency [Extension]	19 Mar 20	3,032
Kenya	State of Emergency	13 Mar 20	1
Mauritania	Public Health Emergency	14 Mar 20	1
Mozambique	State of Emergency	27 Mar 20	7
Nigeria	State of Emergency	27 Mar 20	1
Senegal	State of Emergency	24 Mar 20	79
Sudan	State of Emergency	16 Mar 20	1

Source: Milken Institute (2020).

Limited testing, contact tracing, and early diagnostic capacities. Africa needs more than 15 million test kits than it has been able to acquire, according to an estimate by the Africa Centres for Disease Control and Prevention in April 2020. Because testing capacity has been so limited, the continent's testing rate is the lowest in the world (see Table 2).

Table 2: Testing Capacity/Testing Carried out for COVID-19 in the Ten Sample Countries

Country	Number of Tests Carried	Date
Botswana	778,246	22 Feb. 2021
Chad	3,743	29 Sept. 2020
DRC	10,937	28 Sept. 2020
Egypt	25,000	10 April 2020
Kenya	1,269,346	22 Feb. 2021
Mauritania	165,635	24 Jan. 2021
Mozambique	406,550	22 Feb. 2021
Nigeria	50,000	30 April 2020
Senegal	375,452	22 Feb. 2021
Sudan	300,958	31 Jan. 2021

Source: Compiled by the authors using data from Alhas (2020); Pathologists Overseas (2020); WHO (2021); and Worldometers (2021).

[3] *ACBF and AUC. (2016).*
[4] *Mauritania, Egypt, Nigeria, Senegal, Congo Democratic Republic, Chad, Kenya, Sudan, Botswana, and Mozambique.*

Most African countries do not manufacture diagnostic tools domestically; with pharmaceuticals, for instance, 94% are imported from abroad. Moreover, most of the medical supplies and equipment needed to identify, trace, and treat infected persons, and protect frontline healthcare workers are imported. Testing capacity is important and relevant for future pandemics, as it is one of the key requirements for effective disease control in the early stages. To address the issue, African countries need to enhance their manufacturing capacity and ensure that most of the medical supplies and equipment are produced in the continent.

Limited fiscal support to acquire testing materials and build diagnostic capacity. African countries currently have inadequate surveillance and laboratory capacity to perform testing due to limited fiscal support to acquire the testing materials and build the diagnostic capacity necessary to decentralize testing. As a result, the number of COVID-19 cases was acutely underreported and a significant proportion of cases remain undetected. Table 3 indicates that most of the study countries had insufficient capacity to handle COVID-19 cases with reference to availability of ventilators per country. However, as of 6 July 2021, Egypt had about 3,000 to 6,000 ventilators to serve a population of 104,258,327. On the other hand, Mauritania had one ventilator available to handle all COVID-19 cases in the country against population of 4,775,119. To reverse the situation, African countries need to build world-class laboratories and/or upscale existing ones.

Table 3: Number of Ventilators Available to Fight COVID-19 in the Ten Sample Countries

Country	Number of ventilators	Year of data point for ventilators	Population size (as of 2020)
Botswana	70	2020	2,351,627
Chad	22	2020	16,426,000
DRC	60	2020	92,377,993
Egypt	3,000 to 6,000	2020	104,258,327
Kenya	259	2020	102,334,000
Mauritania	1	2020	4,775,119
Mozambique	34	2020	31,255,000
Nigeria	169	2020	206,140,000
Senegal	20	2020	16,744,000
Sudan	74	2017	43,849,000

Source: Compiled by the authors using data as of 6 July 2020 from Craig, Kalanxhi and Hauck (2020)

Need for effective risk communication and behavioral changes. African Health Ministries need to limit transmission of COVID-19 in communities by employing risk communication tools and measures for behavioral changes to ensure usage of preventive and protective practices. These include use of masks, hand hygiene, respiratory etiquette, social distancing, and stopping the spread of misinformation and false rumors to reduce local COVID-19 transmission cases to zero. In addition, the myths about COVID-19 testing, isolation, contact tracing and quarantining need to be addressed to further reduce the number of cases and deaths.

Africa's capacity to provide critical care health services to victims of the pandemic was severely limited at the outset. COVID19-related infections and fatalities have steadily or exponentially risen in Africa since the beginning of the pandemic. Table 4 shows the number of infections and COVID-related deaths in the ten countries with some regional differences in the coronavirus infection rates in Africa. Based on data collected between 23 March 2020 and 23 December 2020, the highest number of COVID-19 infections and deaths occurs in Egypt[5], followed by Nigeria, Kenya, Senegal, and Sudan. Chad has the fewest infections and deaths in this sample. However, for all countries the percentage of deaths with respect to the population is very low (see Table 4).

Table 4: Percentage of Deaths per Confirmed COVID-19 Cases and per Capita in the Ten Study Countries.

Country	Population size	Confirmed cases of COVID-19	Deaths	Percentage deaths per confirmed cases	Percentage of deaths per capita
Botswana	2,351,627	26,524	254	0.96	0.011
Chad	16,426,000	3,868	135	3.39	0.001
DRC	92,377,993	25,079	700	2.79	0.001
Egypt	104,258,327	178,774	10,404	5.82	0.010
Kenya	102,334,000	104,306	1,827	1.75	0.002
Mauritania	4,775,119	17,110	435	2.54	0.009
Mozambique	31,255,000	56,160	599	1.07	0.002
Nigeria	206,140,000	152,616	1,862	1.22	0.001
Senegal	16,744,000	33,099	172	0.52	0.001
Sudan	43,849,000	30,205	1,871	6.19	0.004

Source: Authors, Compiled from ACDC and WHO data (23 March to 23 December 2020).

The COVID-19 outbreak revealed the frailties and weaknesses in health systems across Africa. Looking at data published as of 6 July 2020, Mozambique offers an example. The pandemic hit the country especially hard, yet it lacks intensive care unit (ICU) beds; one of the treatments for COVID-19 is to put the patients on oxygen, which is best done in an ICU. As well, the country has only seven ICU beds to serve a population of 31,225,000 (see Table 5). Generally, the remaining countries also had an insufficient number of ICU and hospital beds per 10,000 population to handle the number of COVID-19 cases they had. Egypt and Kenya each have a slightly greater number of intensive care unit beds, but their COVID-19 population per 100,000 is extremely high as compared to the available resources to manage these patients in their countries.

Table 5: Number of Intensive Care Units (ICU) and Beds in the Ten Study Countries

Country	Hospital bed density	Number of ICU beds	Population size (as of 2020)
	Data per 10,000 population	Year of Data Point/Estimate	
	2010-2019	2020 for all countries (2017 for Sudan)	
Botswana	18	150	2,351,627
Chad	4	60	16,426,000
DRC	8	60	92,377,993
Egypt	14	11,000	104,258,327
Kenya	14	518	102,334,000
Mauritania	4	10	4,775,119
Mozambique	7	Not available	31,255,000
Nigeria	5	169	206,140,000
Senegal	3	20	16,744,000
Sudan	7	74	43,849,000

Source: Compiled by the authors using data as of 6 July 2020 from Craig, Kalanxhi and Hauck (2020)

Urgency of upgrading health facilities in urban and rural areas to increase functionality. The study identified a significant need for African countries to develop national strategies for upgrading health facilities in both urban and rural areas to increase their functionality. This would allow communities to be adequately prepared to provide critical and emergency care, particularly in the face of epidemics and pandemics, and prevent higher mortality in the future. Increasing the functionality in urban and rural areas will require substantially increasing investment in emergency and critical care equipment such as ICU equipment, ventilators, oxygen supply systems, isolation centers and wards, and personal protective equipment (PPE).

[5] *For Africa as a whole, South Africa maintains the highest number of infection cases and deaths, having crossed the one million infection cases mark.*

Building robust diagnostic infrastructure, laboratory centers, and equipment for disease control and surveillance. African countries' health systems continue to show significant weaknesses and vulnerabilities with respect to their readiness for pandemics and epidemics, as measured by the Global Health Security (GHS) Index. These vulnerabilities cut across all categories of the GHS Index, including prevention, detection and reporting, rapid response, robustness, and financial capacities. In addition, many lack robust diagnostic infrastructure for disease control and surveillance, laboratory centers, equipment, and support structure such as the WHO National Laboratories Board.

Importance of building responsive health systems including e-health infrastructure. COVID-19 exposed the fragility of health systems in Africa, and that fragility was evident in a variety of ways. The Democratic Republic of Congo faced challenges in system centralization and a decrease in governance and leadership, while Nigeria's experience highlighted mistrust in the healthcare system. Other healthcare support systems such as ambulatory services, referral systems, and digital systems for e-health are of critical importance but are lacking in African countries. Most of the African health systems rely on donor aid to supplement public health budgets, and some were able to start COVID-19 testing after receiving donated testing kits from the Jack Ma Foundation. To overcome these fragilities, a top priority should be strengthening the capacity of the health systems in terms of technical and financial resilience to effectively respond to emerging and re-emerging disease outbreaks and pandemics.

Building capacity for vaccine production. African countries currently do not produce vaccines; this means Africa depends on imports, leaving the continent's health security extremely vulnerable. To address the issue, it will be vital to build capacity for vaccine production in Africa through a network of laboratories and partnerships – critical steps in fighting future pandemics.

Strengthening institutional and human capacities is an urgent priority. Preparation and readiness for future pandemics must be informed by a proper assessment of health care needs and capacities. A study carried out by ACBF on critical technical skills required for the implementation of the first Ten-Year Implementation Plan of Agenda 2063 shows that Africa lacks capacity in the health sector, with an average ratio of physicians/medical doctors of about 0.307 per 1,000 population (ACBF and AU, 2016). The estimated ratio of medical doctors and specialists in Brazil is 1.89 per 1,000 population, and the ratio in the United Kingdom is 2.79 per 1,000 population. For an African population of slightly over a billion, the target number of medical doctors and specialists in Africa should be approximately 2.5 million based on the internationally accepted norm of 2.5 per 1,000.

Table 6 shows the availability of doctors and nurses per 10,000 population in selected/case study countries.

Table 6: Availability of Doctors and Nurses in Case Study Countries

Country	Number of Doctors per 10,000 population	Number of Nurses per 10,000 population	Year of data point
Botswana	5.27	41.15	2016
Chad	0.43	2.32	2017
DRC	0.74	0.23	2016
Egypt	4.52	19.26	2018
Kenya	1.57	11.66	2018
Mauritania	1.87	9.25	2018
Mozambique	0.84	6.85	2018
Nigeria	3.81	11.79	2018
Senegal	0.69	3.13	2017
Sudan	2.62	7	2017

Source: Compiled by authors' data (from WHO, 2020; UNDP, 2020).

It is imperative for African health ministries to build and strengthen the human capacities of their health systems. National disease-control institutions should be strengthened, and their coordination enhanced, by significantly ramping up investment in cutting-edge laboratory equipment and supplies (including PPEs; oxygen-related production; and water, sanitation, and hygiene facilities). In Africa, the shortage of oxygen is even more severe, and there is a need for equipment that is simpler to use than a ventilator. Challenges still exist, because each country's ratio of respirator -to- population is almost zero. For example, many countries lacked national institutions and centers for disease control for humans, animals, and crop diseases of all sorts, including bacterial, viral, mycogenic, and those stemming from pollution. Training is pivotal in building capacity for ICU personnel, laboratory technicians, cardiologists, infectious disease experts, and other emergency and critical care medical personnel.

2.2. Socio-economic impact component

Negative impact of COVID-19 on economic activities, particularly in the informal sector. The COVID-19 pandemic has inflicted high and rising human costs worldwide. The necessary protection measures - including lockdowns and restrictions on trade, travel, and movements of persons - are severely hampering economic activity. Most assessments of the disease's economic impacts have focused on urban and formal sectors. Due consideration of the impacts on the informal economy, which normally is adversely affected by disease burden in sample countries, has been limited; this oversight needs urgent redress. Populations and businesses felt the financial and economic impact of COVID-19. Some of the responses are shown in Box 1.

Box 1: How populations and businesses felt about the socioeconomic impacts of COVID-19

- Transport became a bit more expensive given the reduction in the number of people that taxis and buses were permitted to carry at one time. Access to markets became difficult.
- This year's educational curriculum could not be followed because of the COVID-related disruptions. School closures had a tangible, negative impact on households.
- Manufacturing was impacted by supply chain problems and production was severely reduced due to the financial crisis.
- Curfews and restrictions on movement negatively impacted industrial activities and were hard on people.
- The scarcity of foreign exchange and restrictions imposed on sectors exacerbated the financial crisis.
- The necessity of remote work fostered advancements in digital solutions and the use of information technology.
- Insufficient investment curtailed activities in the construction sector.
- Lockdowns and restrictions on movement hurt the hotel and restaurant sectors, deepening the financial crisis in those sectors.
- Border closures negatively impacted trade.

Disruption to trade and regional supply chains. COVID-19-related trade restrictions severally disrupted trade routes, including cross-border trade, and affected many micro, small and medium-size enterprises. These restrictions directly impacted revenues and livelihoods. By disrupting supply chains, COVID-related trade restrictions have also forced Small and Medium Enterprises (SMEs), particularly, to face lower demand for raw materials and intermediate goods; given that many SMEs are highly dependent on trade, they were forced to operate on the margins of poverty.

Fiscal measures accompanied by monetary policy measures. Fiscal measures also were often accompanied by monetary policy measures that, in most countries, consisted of policy rate cuts. In addition to the stimulus and health spending packages, all ten countries surveyed adopted corporate tax deferral and exemption measures along with other support measures for businesses - including guarantees and subsidies. Additional social protection measures adopted by countries included direct cash transfers to citizens and unemployment benefits. Chad, Kenya, Senegal, and Sudan also implemented food assistance programs as COVID relief measures (see Table 7).

Table 7. Selected African Countries' Fiscal Policy Response to COVID-19

Country	Announced Economic Stimulus (USD million) (excl. new health Spending)	Announced Stimulus (% GDP)	Announced COVID-19 Health Spending (in US million)	COVID-19 Health Spending % of General Government Total Expenditure	Corporate Tax Deferrals and Exemptions	Additional Corporate Support (incl. guarantees, subsidies etc	Cash Transfers to Citizens (including unemployment benefits)	Food Assistance
Botswana	124	0.70	39	0.80	•	•	•	
Chad	165	1.50	69	5.30	•	•		•
DRC	-	-	135	2.70	•			
Egypt	6,329	2.50	316	0.40	•	•	•	
Kenya	534	0.60	377	1.80	•	•	•	•
Mauritania	260	5.00	80	6.20	•	•	•	
Mozambique	700 [request]	4.86	49	1.20	•	•	•	
Nigeria	1,771	0.40	1,362	3.00	•	•	•	
Senegal	801	3.40	130	2.70	•	•	•	•
Sudan	415	1.20	542	14.70		•	•	•

Source: Milken Institute (2020).

Implementation of fiscal packages with limited social protection components. Most African countries, including those in the study sample, have currently adopted fiscal packages with some social protection components. However, the survey responses indicate that countries still have a lot of work to do to reach a significant number of the vulnerable populations in need of social protection. Most governments have yet to consider offering their citizens either universal health insurance or free, high-quality medical care. This has exposed the challenges countries face in the management, control, and prevention of COVID-19 and its socio-economic impacts.

Constraints in external funding. African countries faced a particularly tough situation, as the global nature of the pandemic meant that traditional sources of external funding quickly dried up. Further, these funding constraints affected the scale-up and expansion of resilient and pro-poor social protection systems. Additional funding could have facilitated the adoption of job-protection measures such as incentivizing the micro, small and medium-sized enterprises (MSMEs), and protecting the most vulnerable productive actors of society in the formal and informal sectors.

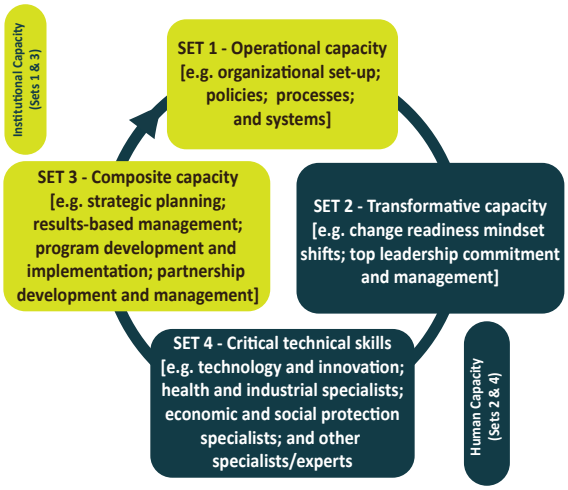
Debt burden. As for the debt burden prior to the pandemic, the debt service to export ratio for Egypt stood at 11.70%, on average, between 2010 and 2019, while it amounted to 10.72% for Mauritania (see Table 8). Senegal faced a heavier debt burden during the 2010-2019 period, where the average debt service to export ratio was 9.75%. Botswana is in a relatively more favorable position with an average debt service to export ratio averaging 1.95% over the period, while Mozambique and Kenya faced the heaviest debt burden at 14.52% and 12.60% respectively.

3. Key capacity development issues identified

3.1. Framework for analyzing capacity issues and gaps

The ACBF framework (ACBF and AUC, 2016) in Figure 1 illustrates clustered capacity issues in two dimensions – institutional (relating to operational and composite capacities) and human (relating to critical technical skills and transformative capacity).

Figure 1: Capacity framework



Source: Adapted from ACBF and AUC (2016).

Table 8: Key Macroeconomic indicator on debt service/export

Year	Botswana	Mozambique	Senegal	Nigeria	Egypt	Mauritania	Kenya	Sudan	DRC	Chad
2010	1.41	24.74	8.91	1.50	6.21	4.94	4.40	4.21	3.08	-
2011	1.06	18.32	8.90	0.51	7.90	4.04	4.31	4.87	2.46	-
2012	0.79	9.99	7.68	1.34	6.62	5.19	4.80	7.13	3.08	-
2013	2.15	10.73	8.89	0.49	7.65	5.79	4.91	4.91	3.33	-
2014	0.66	16.00	7.83	5.27	12.67	10.87	11.53	4.31	3.22	-
2015	3.33	15.12	8.77	3.21	9.98	14.15	8.47	10.65	3.74	-
2016	2.00	14.06	9.05	6.28	19.50	15.02	11.20	6.34	4.02	-
2017	2.47	9.39	13.39	6.73	15.35	15.72	14.64	4.02	3.39	-
2018	2.44	10.40	14.33	7.88	15.05	17.41	23.55	4.20	2.33	-
2019	3.17	16.42	-	7.09	16.10	14.07	38.20	4.92	8.39	-
Average	1.95	14.52	9.75	4.03	11.70	10.72	12.60	5.56	3.71	-

Source: World Bank (2021).

For example, there are weak institutional arrangements characterized by a lack of national institutions and centers for disease control for humans. This means that there is a need for institutional strengthening and coordination to fight against pandemics. Also, the lack of critical care equipment - such as ICU equipment, ventilators, oxygen supply systems, isolation centers and wards, and Personal Protection Equipment (PPEs) - was identified as a major capacity challenge. A further strengthening of the capacity of the health systems to effectively respond to emerging and re-emerging disease outbreaks and pandemics is urgently needed, which will involve a review of the organizational set-ups, policies, processes, strategic plans, and partnerships to build resilient health systems.

Similarly, lack of or inadequate social protection components in fiscal packages and limited universal health insurance schemes were noted as key gaps in capacity. Addressing these socio-economic challenges in the context of pandemics will require human capacity development and institutional renewal or strengthening and to widen the provision of social protection and universal health insurance schemes. At the same time, SMEs and the informal sector, which often includes people who are among a country's most vulnerable, should be strengthened and supported through business development, entrepreneurship, and innovation to stimulate their growth and build future financial resilience.

3.2. Key capacity issues and actions required

Low readiness capacity based on the Global Health Security Index. Table 9 shows the GHS Index scores and rankings of the ten selected sample countries. The GHS Index is determined based on six capacity dimensions: (1) Prevention; (2) Early Detection and Reporting; (3) Rapid Response; (4) Robustness of Health Sector; (5) Commitment to Improve National Capacity, Financing, and Adherence to Norms; and (6) Risk Environment and Vulnerability.

The GHS Index assesses the overall readiness capacity of countries, as well as the capacity based on the six dimensions. Each country's score is out of 100 possible points, and rankings are based on 195 countries. In the current country sample, Kenya shows the highest level of overall pandemic readiness with a score of 47.1/100 and a ranking of 155/195. The country showing the lowest level of pandemic readiness in the sample is Sudan, with a score of 26.2/100 and a ranking of 163/195.

Low GHS Index scores, which are characterized by weaknesses in the six capacity dimensions, are linked to the significant institutional and human capacity gaps faced in the health sector in African countries. Health systems in Africa are, therefore, not well prepared to respond to pandemics. For example, the outbreak of the coronavirus has revealed weak prevention, detection, reporting, and rapid response capacities which are strongly connected to the limited diagnostic infrastructure for disease control and surveillance, inadequate laboratory centers and equipment, and the lack of requisite manpower in the health sector to effectively deal with the pandemic.

Table 9: Readiness for Pandemics and Epidemics in Selected African Study Countries Using GHS Index, WHO-IHR, and WHO-ASPAR Response Readiness[6]

Country	Overall GHS Index (out of 100)	Overall Rank (out of 195 countries)	Prevention Capacity	Prevent Rank	Detection and Reporting	Detection Rank	Rapid Response Capacity	Rapid Response Rank	Robust Health Sector	Robust Health Sector Rank	Improving National Capacity, Financing & Norms	Norms Rank	Risk Environment and Vulnerability	Risk Rank
Botswana	31.1	139	22	152	28.2	133	23.9	160	13.3	138	46.3	107	62.4	62
Chad	28.8	150	23.2	145	36.5	109	34.5	103	6.6	186	46.2	110	23.7	189
DR Congo	26.5	161	24	137	25.1	141	31.3	119	11.8	150	113	45.9	20.1	194
Egypt	39.9	87	36.5	79	41.5	96	45	63	15.7	128	46.4	104	57.5	86
Kenya	47.1	55	45.9	48	68.6	36	37.1	92	20.7	103	67.1	16	40.7	155
Mauritania	27.5	157	9.9	186	39.5	100	24.2	159	17	120	36.3	157	39.5	156
Mozambique	28.1	153	26.5	122	29.3	130	18.2	188	17	120	43.8	125	38.4	163
Nigeria	37.8	96	26.3	123	44.6	78	43.8	68	19.9	107	56.7	50	33.7	174
Senegal	37.9	95	25.4	126	35.1	114	45.4	61	18.5	116	57	47	48.2	128
Sudan	26.2	163	31.8	97	7	185	37.3	91	14.3	135	37.6	153	33	178
Average	33.09	125	27.15	122	35.54	112.2	34.07	110	15.48	130.3	55.04	91.5	39.72	149

Source: GHS Index 2020.

Importance of human and institutional capacities to tackle the pandemic-related challenges. The study identified several key human and institutional capacity needs that must be addressed to ensure the continent's readiness for future pandemics.

Human capacity

Key among these is transformative leadership required from African Governments to upgrade, overhaul, and prepare their health and socio-economic systems for future pandemics. Without political commitment, the weaknesses and fragility detected in African countries is not likely to be addressed, leaving countries vulnerable to future outbreaks. By developing leadership capacity and changing mindsets, African countries will be better positioned to upgrade their national health strategies, thereby elevating the functionality, robustness, and responsiveness of their health systems. Transformative leadership to drive a significant increase in government and donor investment is required to provide public health workers with critical technical skills.

Building human capacity in critical skills to effectively respond to emerging and re-emerging disease outbreaks and pandemics such as technicians, ICU nurses, cardiologists, and infectious diseases experts should be a top priority. Institutionalization of community health workers and the immediate upgrading of skills among the broader health care workforce is also needed, as most African countries are facing chronic shortage of health workers. Investing in knowledge, research, and development is essential for African scientists to be fully equipped not only to deal with the challenges of COVID-19 but to be better prepared for future epidemics.

The study also revealed the need for human capacity building to reduce the negative socio-economic impacts on certain groups. For example, strengthening human capacity through training, business development, and entrepreneurships will build resilience among MSMEs as well as among the most vulnerable segments of society, such as women in the agriculture sector.

Institutional capacity

The COVID-19 pandemic exposed the institutional weaknesses in the health sector. There is a need for institutional strengthening of African ministries of health to ensure readiness and preparedness for future pandemics through the provision of adequate laboratories, ICU equipment, infectious disease hospitals, quarantine and isolation centers and wards, PPEs, pharmaceuticals, ventilators, and oxygen supply systems among other items. Testing capacity should be improved for early detection and diagnosis and the physical infrastructure needs to be strengthened for the proper functioning of healthcare facilities. In Chad for example, only one in every three health facilities had access to electricity and two in every three had access to improved water sources. In addition, laboratory capacities and essential medical equipment such as scales, thermometers, and stethoscopes were substandard.

[6] *The table is considering the Readiness for Pandemics and Epidemics in ten Selected African countries Using GHS Index, WHO-IHR, and WHO-ASPAR Response Readiness etc.*

Similarly, the study revealed the need for institutional strengthening to reduce the negative socio-economic impacts of the disease in the ten study countries. Institutional strengthening focusing on debt management strategies to build resilience to the COVID-19 pandemic is critical as the most effective means of achieving financial resilience for Africa. Considerable attention must be paid to new and innovative sources of resource mobilization, but also to developing better and more efficient use of the existing resources. These measures will strengthen the macroeconomic readiness as budget stability is necessary to effectively confront future pandemics. Given the vulnerability of most MSMEs and women and youth-led businesses, there will be a need to significantly reinforce social protection capacity in Africa to reduce the severity of the economic impacts of pandemics on businesses and individuals.

Building operational and composite capacities through partnerships and resource mobilization efforts. Governments should establish organizational arrangements, results-based management systems and strategic planning processes and mechanisms for building partnerships and developing sustainable ways of mobilizing resources in responding to future pandemics and to prepare countries to respond swiftly and effectively to future outbreaks and pandemics.

Operational capacity

Investments should be made in building and sustaining strong national public health capabilities, infrastructure, and pre-service and in-service training sessions for health workers and operational processes. Other measures include prioritizing expanding health budgets and accelerating health sector reforms that have been underway since before the coronavirus pandemic struck. Improving data management capability in health care systems is also necessary to eliminate weak and inaccurate data reporting and to guide decision making during COVID-19 and during future pandemics.

On the socio-economic aspect, response measures and policies, including fiscal and monetary/financial measures, as well as socio-protection programs need to be strengthened across the board to reduce the severe economic impacts of pandemics on businesses and individuals, particularly the most vulnerable.

Composite capacity

On the health aspect, Africa needs more investment in ONE-HEALTH collaborative activities across the continent to meet the challenges of current and future public health threats. On the health aspect, the African Union needs to have a well-planned strategy that can add value for consolidating African leadership of public health capacity-building, training, and research. Building robust and adequately funded emergency preparedness and response mechanisms for future outbreaks is essential to securing the resources required to respond to health emergencies that are complex and expensive, particularly when the health care system is ill-prepared.

On the socio-economic aspect, given the dire financial and economic conditions in which several African countries found themselves at the outset of the COVID-19 pandemic, governments need to develop sustainable ways and means of resource mobilization, in partnership with the private sector and development partners, to bolster their ability to quickly develop and fund response plans for future pandemics. Such resource mobilization measures should further explore both domestic and innovative sources to maximize the potential for building financial resilience.

Partnerships - including governments, non-governmental organizations (NGOs), multilateral, and bilateral partners - must be formed and strengthened very early on in a crisis; lessons learned from the COVID-19 pandemic show that strong partnerships will better prepare African countries to respond swiftly and effectively to future outbreaks. In addition, the governments need to encourage private sector partnerships to boost technical capabilities and innovation as well as improve quality standards.

4. Role of key actors

Different actors are needed to address the capacity gaps that have been identified and build transformative leadership skills, critical technical skills, and operational and composite capacities. Enhancing capacity for pandemic preparedness will require collaboration from governments, regional economic communities, continental organisations, regional development banks, multilateral development partners, and specialized agencies.

Governments must play a key role in developing effective policies and strategies regarding public engagement to inform their populations about pandemics. Across all African countries, governments created presidential task forces for public health and pledged millions of dollars to fight the COVID-19 pandemic. For instance, the Government of Kenya had a 3-D company making 3-D face shields and printing a prototype for a ventilator adaptor that could allow doctors to treat two patients at the same time.

The **private sector** can support governments by raising funds and supporting national responses. For instance, in the poorest and most fragile countries with limited fiscal space, private sector efforts complement government efforts to help citizens cope with the impact of the pandemic. Civil society can support the fight by combatting misinformation during a pandemic and ensuring availability of information in local languages critical for preserving the health of local communities.

The **African Union (AU)** established a regional investment fund through the Africa Centres for Disease Control and Prevention to support projects that will strengthen disease surveillance, prevention, and emergency response systems across the African continent. Technical support and financial resources to strengthen the capacities for pandemic responses to build robust health systems and to ensure the socio-economic resilience of the regional member countries can be offered through the following channels: **regional development banks, such as the African Development Bank and the Islamic Development Bank (IsDB);** specialized agencies of the United Nations, such as **WHO, and UNICEF**; and other development actors and NGOs.

5. Concluding remarks

The study found significant gaps in health and socio-economic capacity in the fight against the coronavirus. For example, about 80% of health facilities are ill-equipped. Coordinated efforts are, therefore, needed to address both the human and institutional capacity gaps to improve the readiness of African countries for future pandemics. This includes the need to build, equip, and sustain infectious disease hospitals, WHO-certified testing laboratories, and train professionals to avoid new episodes of COVID-19, reinfections, and future outbreaks of deadly diseases. Clearly, the continent needs transformative leadership and the political will to drive robust investments and to continue its upward path to align public health resources and scientific expertise to prevent, control, and manage future outbreaks through public-private partnerships.

Transformational leadership skills will also ensure that governance and accountability structures are further strengthened in government-driven projects in Africa to prevent poor performance and responses to the COVID-19 pandemic, and misappropriation of COVID-19 funds. A continent-wide leadership for pandemic control activities involving the medical and scientific communities may play an important role in the national strategies and decision-making processes in this regard.

On the socio-economic aspects, countries must strengthen their capacity in widening the fiscal space to better prepare to face future pandemics like COVID-19. Countries need to rebuild their economies to maintain a strong macroeconomic environment, as was the case prior to the pandemic.

Additionally, building financial resilience will be crucial through robust debt management strategies, prudent budget management, heightened resource mobilization, and strengthened partnerships with private and non-state actors - including bilateral and multilateral partners, think tanks, academia - and taking advantage of opportunities offered through South-South cooperation.

6. Recommendations

The study has uncovered significant institutional and human capacity challenges in African countries that need to be addressed to improve preparedness and build resilience to respond to future outbreaks and pandemics. Specific recommendations for action on capacity development for policymakers and other stakeholders are as follows:

Building human and institutional capacities to ensure resilience for pandemics

Human capacity. Key actions include:

Investing in critical technical skills and the right institutions. There is a need in each country to fund and increase the numbers of committed and dedicated public health care workers, epidemiologists, laboratory analytic specialists, researchers, and infectious disease experts, along with national institutes for disease control. Furthermore, there is a need for strengthened CDCs, vector control and disease departments, and research and training portfolios to combat future outbreaks.

Health Ministries need to increase their per capita expenditure, for human capital development. This would require an increase in per capita health budgets in all African countries.

Upskilling workforces in technical and vocational education and training. There is a need for the WHO to create new National Laboratories Board per every region supported by training more infectious disease experts and establishing and supervising their institutes.

Fostering transformational leadership. African countries need political commitment from their governments to address any future infectious disease outbreaks before they attain epidemic proportions. Transformative leadership is critical to drive a significant increase in government and donor investment that is required to provide public health workers with surveillance and data analytics capabilities, and for state-of-the-art laboratories, and intensive care units (ICU).

Institutional capacity. Key actions include:

Institutionalization of community health workers and the immediate upskilling of the broader health care workforce has become an imperative. This must include - in each of the five regions in Africa - the creation of new infectious disease hospitals and laboratories equipped to handle approximately 10,000 pandemic cases regionally.

Building operational capacity through policies, processes, and systems. Investments should be made in building and sustaining strong national public health capabilities, infrastructure, operational processes, and pre-service and in-service training sessions for health workers.

Boosting industrial capacity to enhance access to treatments and vaccines. Governments need to regulate and provide opportunities to boost industrial capacity in Africa to locally produce vaccines, pharmaceuticals, PPEs, oxygen plants, ICU equipment, masks, and other vital supplies. This will reduce the costs of providing equitable health to all and is an essential task for achieving the health target in the United Nations Sustainable Development Goal 3.

Governments need to *massively expand access to new rapid diagnostics and treatments* and ensure future COVID-19 vaccines are a global public good with equitable access for everyone everywhere. Additionally, governments need to ensure equitable access to new COVID-19 tools by fully funding the Access to COVID-19 Tools Accelerator (ACT-Accelerator) as emphasized in the ONE-HEALTH program.

Socio-economic response measures and policies, including fiscal and monetary/financial measures, as well as socio-protection programs, need to be strengthened across the board to reduce the severe economic impacts of pandemics on businesses and individuals, particularly for informal economies (MSMEs) and vulnerable communities.

In addition to the need to absorb pandemic shocks, there should be *mandatory insurance policies for informal economic sectors* with the cooperation of governments, global financial institutions such as IsDB, World Bank, International Monetary Fund, AfDB, etc., and underwriters in health.

Building composite capacity through partnerships and program development

It is recommended that countries substantially *increase their investment into ONE-HEALTH collaborative activities across the continent* to meet the challenges of current and future public health threats as well as to: reduce community COVID-19 transmission; create opportunities for universal testing, isolating and contact tracing; ensure access to care for COVID-19 patients; and minimize infections and deaths.

Governments need to *develop sustainable ways and means of resource mobilization in partnership* with the private sector and development partners, to bolster their ability to quickly develop and fund national response plans to future pandemics.

Exploring the potentialities offered by South-South Cooperation. South-South cooperation can present an optimum platform allowing African countries to scale up the implementation of their COVID-19 response programs and find mutually beneficial solutions to their capacity needs to reduce vulnerability and shocks and assure their readiness for future pandemics.

WHO Africa should reinforce its partnerships with UNICEF, ACDC, CDC, CDC Europe, China CDC, and establish country CDCs and five testing laboratories in every region of Africa to enhance COVID-19 pandemic prevention, management, and control efficiency in Africa and, most importantly, to ensure equitable vaccine development and production in Africa to avoid a threat of global vaccine nationalism.

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Further Reading

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The **Islamic Development Bank (IsDB)** is an international financial institution with a current membership of 57 countries. Its mission is to promote comprehensive human development, with a focus on the priority areas of alleviating poverty, improving health, promoting education, improving governance, and prospering the people. IsDB supports its member countries to enable them to grow their economies and societies, so they are ready to embrace the challenges and opportunities of the modern world.

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