



Sciences For Prosperity

UGANDA NATIONAL ACADEMY OF SCIENCES

**2020 ANNUAL SCIENTIFIC CONFERENCE
PROCEEDINGS**

**National Resilience and Recovery: Pandemics,
Emergencies, Crises, and Opportunities**

OCTOBER 2020



Sciences For Prosperity

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Support for this work was partly provided by the Fellows and Members of UNAS through their annual membership subscriptions.

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Suggested Citation: UNAS. (2020). 2020 Annual Scientific Conference Proceedings, Kampala, Uganda: The Uganda National Academy of Sciences.

20th Annual Scientific Conference Proceedings

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UGANDA NATIONAL ACADEMY OF SCIENCES

The Uganda National Academy of Sciences (UNAS) is an autonomous and honorific service organization comprising a diverse group of scientists from the physical, biological, social, and behavioural sciences. These scientists work together in an interdisciplinary and trans-disciplinary manner to achieve their main goal of improving livelihoods, welfare and prosperity of the people of Uganda through the development and enhanced application of integrated knowledge in the sciences and humanities. The success of the Academy lies in the strength and expertise of its membership and its ability to mobilize scientific experts to advise government policymakers and other stakeholders.

The membership includes Founding Members, Fellows of the Academy, Foreign Fellows and Honorary Fellows.

The organizational structure of UNAS consists of the General Assembly, Council, Standing Committees and the Secretariat.

All UNAS Publications benefit from the strategic oversight of the Academy's Council, 2019-2022:

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ACKNOWLEDGMENTS

The Uganda National Academy of Sciences (UNAS) wishes to express her sincere appreciation to the individual presenters of the scientific papers (see Annex 2), organizations and experts who gave their valuable time to provide information through their participation in the 2020 Annual Scientific Conference (ASC).

The Academy wishes further to appreciate the UNAS Standing Committee on Publications and Conferences under the Chairmanship of Prof. Philippa Musoke for overseeing the ASC event and ensuring that the proceedings met the minimum requirements of UNAS publications.

The Academy also wishes to acknowledge the UNAS staff for organizing the conference and ensuring production of this conference report.

Special thanks go to the individual report reviewers who volunteered their time to provide candid and critical comments to ensure that the report is accurate, effective and credible.

Gratefully acknowledged are the sponsors, the Fellows and Members of the Academy, who partly provided financial support for this activity.

PAPER REVIEWERS

All presenters at the conference have reviewed and approved their respective paper in this report for accuracy. In addition, the papers were reviewed in draft form by independent reviewers chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the UNAS Council. The purpose of the independent review is to provide candid and critical comments that assist UNAS in making the published report as sound as possible, and to ensure that the conference proceedings meet institutional standards, including those for objectivity and evidence. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process.

The Uganda National Academy of Sciences thanks the following individuals for their participation in the report review process.

1. **Prof. David J. Bakibinga**, FUNAS, Professor of Commercial Law, Makerere University.
2. **Dr. Sabrina B. Kitaka**, FUNAS, Senior Lecturer of Paediatrics and Adolescent Health College of Health Sciences, Makerere University.
3. **Dr. Sally Stansfield**, FUNAS, and Former Managing Director Social Impact Practice, Deloitte LLP.
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PREFACE

The Uganda National Academy of Sciences is committed to providing an autonomous forum through which scientists can exchange ideas, knowledge and experiences aimed at generating, promoting, sharing and using scientific knowledge and giving evidence-based advice to government and society. This is done annually through various mechanisms such as the Annual Scientific Conference. UNAS has held an Annual Scientific Conference since 2001, on themes ranging from “Sciences for Sustainable Development”, “Science Education for Development”, “Biotechnology for Development,” “Impact of Climate Change to National Development”, “Human Resource for National Development”, and “Urbanisation for Development”, among others.

The 20th ASC was successfully held virtually for two days on October 22-23, 2020. The theme for the conference was, “ **National Resilience and Recovery: Pandemics, Emergencies, Crises and Opportunities**”. Six sub-themes were presented at the conference, including: “Broader Considerations and Pressure Points from National, Continental, and Global Perspectives,” “Health Systems Perspective,” “Psychosocial Perspective,” “Education Systems Perspective,” “Domestic Financing Perspective,” and “Information Systems Perspective.” These sub-themes were presented by individual scientific experts from the selected fields. During the session, papers were discussed by plenary, and after the conference, the authors revised their papers considering comments from plenary and comments from independent reviewers. The ASC was attended by over 100 participants including government officials, academicians, researchers, young scientists, and various stakeholders.

This report is made up of two sections: Section 1 presents the papers presented by individual experts and other contents of the 2020ASC. The views presented in Section 1 are those of the individual authors, and not necessarily those of the Uganda National Academy of Sciences. Section 2 presents the profiles of distinguished Fellows who were inducted into the Academy Fellowship in the year 2020.

SECTION 1: CONFERENCE PAPERS

Broad Considerations and Pressure Points from National, Continental, and Global Perspectives

By

Prof. Mandivamba Rukuni, FUNAS, Director BEAT Academy

“...only human beings can recognise catastrophes, provided they survive them; nature recognises no catastrophes,” writer Max Frisch observed in his 1979 book “Man in the Holocene.”

Glossary

Adaptation: Anticipating the adverse effects of change and taking appropriate action to prevent or minimise the damage they can cause. Dynamic evolutionary process that fits organisms and populations to their environment, enhancing their evolutionary fitness.

Disaster: A sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources.

Emergency Management: A range of measures to manage risks to communities and the environment; the organisation and management of resources for dealing with all aspects of emergencies. Emergency management involves the plans, structures and arrangements that are established to bring together the normal endeavours of government, voluntary and private agencies in a comprehensive and coordinated way to deal with the whole spectrum of emergency needs including prevention, response and recovery.

Emergency Service: An agency responsible for the protection and preservation of life and property from harm resulting from incidents and emergencies. Synonymous with “emergency services authority” and “emergency service organisation.”

Hazard: A source of potential harm or a situation with a potential to cause loss; a potential or existing condition that may cause harm to people or damage to property or the environment.

Mitigation: Measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and the environment.

Preparedness: Measures to ensure that, should an emergency occur, communities, resources and services are capable of coping with the effects; the state of being prepared.

Prevention: Measures to eliminate or reduce the incidence or severity of emergencies.

Recovery: The coordinated process of supporting emergency-affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical wellbeing.

Response: Actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support.

Risk: The probability or likelihood of harmful consequences arising from the interaction of hazards, communities and the environment; the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood; a measure of harm, taking into account the consequences of an event and its likelihood.

Uncertainty: Refers to epistemic situations involving imperfect or unknown information making it difficult or impossible to predict or estimate the probability of future events.

1. Introduction

In this paper I will adopt the definition of disaster as “*a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources.*”¹ On this basis, the Sendai Framework was adopted in 2015, and outlines seven targets and four priorities for action to prevent new, and reduce existing, disaster risks to economic, physical, social, cultural, health or environmental assets and lives of persons, businesses, communities and countries. Every year, disasters take lives, cause significant damage, inhibit development and contribute to conflict and forced migration. The trend is worsening. Floods and landslides killed at least 150 people in Sri Lanka, right in the middle of the Cancun summit in Mexico.² That was a stark reminder to the summit participants’ challenging task of paving the way towards reducing disaster losses “significantly” by the year 2030 based on the Sendai Framework for Disaster Risk Reduction (DRR).

2. Background to Causes of National and International Disasters

Based on literature, disasters can be grouped into 3 categories: a) natural; b) man-made; and c) man-made natural disasters.

Natural Disasters

Floods, storms, earthquakes, droughts, forest fires and volcanic eruptions are among the most devastating types of natural catastrophe. Natural disasters are caused due to different reasons such as soil erosion, seismic activity, tectonic movements, air pressure, and ocean currents and so on. The loss of resources, security and access to shelter can lead to massive population migrations in lesser-developed countries. A natural hazard escalates into a natural disaster when an extreme event causes harm in significant amounts and overwhelms the capability of people to cope and respond.

1 <https://tinyurl.com/4fjpkz9j>

2 Cancun summit in Mexico was held May 2017, bringing together policy-makers and disaster management experts from over 180 countries to discuss ways to counter this trend.

Man-Made Disasters

These include explosions, major fires, aviation, shipping and railway accidents, and the release of toxic substances into the environment. Man-made disasters have an element of human intent, negligence or error involving a failure of a man-made system, as opposed to natural disasters resulting from natural hazards. Such man-made disasters are crime, arson, civil disorder, terrorism, war, biological/chemical threat, cyber-attacks, etc. Man-made disasters are usually the result of carelessness or human error during technological and industrial use e.g., hazardous material spills, fires, and so on. The disasters are in the form of accidents, which occur all of a sudden and take a huge toll on life and property. Mostly such disasters cause injuries, diseases and casualties where they occur. According to Young (2013) the worst man-made disasters in history include: the Bhopal gas tragedy, India; the Deepwater Horizon oil spill, Gulf of Mexico; the Chernobyl nuclear reactor meltdown, Ukraine; the Fukushima meltdown, Japan; and global warming.

Man-Made Natural Disasters

Social characteristics of communities are important for disaster managers because they determine peoples' vulnerability to hazards and the severity of the calamity. A typical example of a man-made natural disaster is when heavy rainfall leads to flooding in a situation where widespread poverty, conflict-induced migration and problematic land-use practices trigger considerable disruptions in the functioning of the community. Man-made natural disaster characteristics are not homogeneous; different places and people are affected differently. The added fact that war, along with epidemics and famine, is classified as one of the most significant types of disaster makes it yet more surprising that little disaster study of war has been reported. Causes of war are known to include: economic gain, or one country's wish to take control of another country's wealth; territorial gain; religion; nationalism; revenge; civil war; revolutionary war; and defensive war.

Understanding which parts of society are susceptible to natural hazards, and why, is key knowledge for emergency services and risk managers. Across all stages of the disaster cycle—*preparedness, response, and recover*—knowledge about the nature and location of socially vulnerable

groups is critical for effective disaster risk reduction (DRR). Before an event, knowing which groups have low levels of preparedness is essential for planning tailored risk communication and support initiatives. During a disaster, information on vulnerable groups can help to increase the effectiveness of response measures, for example, by establishing priorities during evacuations. Finally, an in-depth understanding of vulnerability can be used to support disadvantaged social groups during the recovery process.

3. The Nature of Disasters and Preparedness in Africa

Disasters in Africa often take a huge toll on vulnerable populations. Loss of life and livelihoods in the face of already existing challenges sets communities back many years leaving them at risk should another natural hazard occur.

Attempts at Disaster Risk Reduction Framework

African countries generally suffer from inadequate information to enable risk-informed decision making. While the magnitude and intensity of disasters is increasing in the region, national capacity to systematically record disaster losses and damages is low. The “Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities Programme” was launched in July 2015 to provide effective implementation of an African comprehensive disaster risk reduction (DRR) and disaster risk management (DRM) framework. Africa is the world’s second-largest and second most populous continent, after Asia. With about a billion people in 61 territories, it accounts for about 14% of the world’s human population. In the period 2000-2008, Africa accounted for over 20% of all weather- and climate-related disasters that occurred globally, while the economic set-back was only 0.6% of global economic losses (UNISDR, 2011).³ The relatively low level of economic impact is probably due to the fact that Africa has less infrastructure and other assets exposed to disasters, as well as the fact that a number of impacts, such as loss of human life, cultural heritage, and ecosystem services, are insufficiently measured or reported and thus are poorly reflected in estimates of losses. It is widely believed that in Africa the impacts of natural hazards on the

³ Summary for Policymakers of the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (IPCC/SREX, 2011).

informal or undocumented economy may be important in some areas and sectors, but these impacts are not generally counted in reported estimates of losses.

Africa has the highest mortality-related vulnerability indicators for droughts. In the last thirty years, seven out of the 10 worst drought disasters in the world have taken place in Africa. The number of people exposed to floods in the region grew from 500,000 per year in 1970 to almost 2 million people per year in 2010. Flood mortality risk is still increasing consistently in Africa, despite a downward global trend.⁴ The famines that hit parts of Africa from the mid- to late-eighties account for the larger part of the burden regarding the number of casualties (Ethiopia: 300,000; Sudan: 150,000; Mozambique: 100,000; Somalia: 600). What is striking is that all these instances are characterized by having occurred during a period of civil conflict, as well as in the context of high levels of poverty.

Another important factor behind the levels of vulnerability is the dynamics behind the rapid urbanization of African cities. While growing urban populations in Latin America and Asia are partially driven by industrialization processes, studies show that this economic basis for urbanization is weaker in Africa. This is one of the possible elements that consequentially lead to insufficient levels of urban planning and government investments in infrastructure. The high proportion of informal settlements in African cities is one of the factors behind the high impacts of recurring floods in Nairobi slums, for example.

Risk Drivers in Africa

A direct implication of the above is the need to address the underlying risk drivers of poverty, rapid urbanization, desertification and environmental degradation in Africa, maybe more than anywhere else, by ensuring basic development, urban planning and infrastructure are in place. Factors such as access to irrigation, markets, credit and choice of crops in rural areas, and investment in basic infrastructure in urban areas are critical factors for reducing disaster risk.

While key sectors such as transportation, infrastructure, water, and tourism are sensitive to extreme events in Africa, it is the agriculture sector that

⁴ See: Global Assessment Report on Disaster Risk Reduction, 2009 and 2011.

is particularly exposed and vulnerable (IPCC, 2011). It contributes approximately 50% to Africa's total export value, and approximately 21% of its total GDP (Clements, 2009). With the least efficient agriculture industry in the world, sub-Saharan Africa is extremely vulnerable to extreme climate events. The economies of many African countries rely heavily on rain-fed agriculture, dominated by small-scale and subsistence farming.

Africa has a long history of regional political commitment to disaster risk reduction—often acting as a pioneer in recognizing the importance of preventive action to reduce disaster risk. Africa acted on the impetus provided by the global blue-print for disaster risk reduction, the *Hyogo Framework for Action 2005-2015: Building the Resilience* to adopt its own *Africa Regional Strategy for Disaster Risk Reduction*. The topic is now discussed between finance ministers in Africa, who a decade ago called for ‘institutionalizing effective financial and other instruments such as strategic grain reserves, budgeted contingency funds as well as through sharing risk across [sub]regions’ (African Ministers of Finance in Lilongwe, Malawi, 29-30 March 2010).

Shortly afterwards, at the Second Ministerial Conference on Disaster Risk Reduction, held in Kenya in April 2010, governments came closer to making a commitment to allocating a certain percentage of their national budgets and other revenue to disaster risk reduction, and reported on progress in this area at the next Ministerial Conference in 2012. At the same event, ministers decided to initiate a study into the establishment of a regional funding mechanism for disaster risk reduction to allow member states to access existing, and future, regional and global funds for climate change adaptation and disaster risk reduction.

Local authorities in Africa are also demonstrating some commitment to addressing climate change and disaster risk reduction. The mayors of Cape Town, Durban, St. Louis, Maputo, Dar Es Salaam, Kisumu, Nairobi, Arusha, Bujumbura, and Kigali, for example, have all signed on to an international campaign called “Making Cities Resilient: My City is Getting Ready,” that holds them accountable to 10 principles that strengthen the resilience of their urban populations (www.unisdr.org/campaign).

Investments in Disaster Risk Reduction in Africa

Overall, investments in disaster risk reduction in Africa remain low. Twenty-nine African countries have reported on progress in implementing the Hyogo Framework for Action and just over half have reported some form of resources dedicated to the implementation of disaster risk reduction, demonstrating the burgeoning move from policy to practice. Most countries reported funds allocated to disaster management institutions, and a small number were referred to investment in planning and development sectors.

Ailsa Holloway and Gillian Fortune (undated) foreground an important tension between the inspirational intent of the Sendai Framework, and its prospects for realisation. They argue that while the Sendai Framework's complex, interlinked components imply availability of skilled human capital (at national and sub-national scales), many of the countries most exposed to complex, recurrent and interlinked threats lack access to the evolved, "future-ready" and integrated skill-sets that underpin the Framework's implementation. This is specifically the case for countries with sustained levels of fragility that face higher levels of disaster risk than those with robust governance capabilities. Purposeful investments in high-value disaster risk-related human capital and human resources enable progress towards strengthened risk reduction capabilities at national and sub-national levels—especially in variable, complex, high-risk contexts. It intends to sharpen understanding on the role of high-value human capital in resilience creation, particularly in chronically at-risk countries facing multiple threats.

Human Capital Composite Index results for 2017 also show that the high-end regional performers, North America and Western Europe, have been successfully able to leverage more than 70% of their available human capital. This contrasts starkly with results from South Asia and Sub-Saharan Africa, in which neither region was able to optimise more than 54% of its respective talent pools. The report largely attributes this to shortcomings in formal education attainment and skill diversification. The authors argue for advancing skilled human resources that are "future-ready" through:

- Focus on fast-tracking higher education capacity in disaster risk reduction in developing countries; and,

- Keeping pace with changing risks by building skilled human capital for disaster risk reduction in fragile contexts.

On average, 4% of national budgets are allocated to disaster risk reduction (DRR) in Africa.⁵ However, there are notable variations between countries: for example, Eswatini spends over double the average. In most countries, a greater proportion of DRR investments are indirect (76.5%). National planned budgets are estimated at 67% pre-disaster, and ODA 68% post disaster. Economic and social sectors dominate the directly planned budgets—public safety and administration at 16.6%; social spending at 28.6%; infrastructure spending at 21.7%; and economic spending at 33.2%.

Natural hazards disproportionately affect lower-income countries and those who benefit least from wealth creation owing to economic globalisation. During 1990-2012, Africa faced an average of 152 disasters per year, majority triggered by hydro-meteorological hazards. In 2012 alone, over 37 million people in Africa were directly affected by a total of 147 recorded disasters.

5 UNDRR Disaster Risk Reduction Investments in Africa: A Summary of Findings, from “16 Risk-Sensitive Budget Reviews.”

Table 1. Ten deadliest natural disasters by highest estimated death toll, excluding epidemics and famines

Rank	Death toll (highest estimate)	Event	Location	Date
1.	4,000,000	1931 China floods	China	July 1931
2.	2,000,000	1887 Yellow River flood		September 1887
3.	830,000	1887 Yellow River flood		January 23, 1556
4.	655,000	1976 Tangshan earthquake		July 28, 1976
5.	500,000+	1970 Bhola cyclone	East Pakistan (now Bangladesh)	November 13, 1970
6.	316,000	2010 Haiti earthquake	Haiti	January 12, 2010
7.	300,000+	526 Antioch earthquake	Byzantine Empire (now Turkey)	May 526
8.	300,000	1881 Haiphong typhoon	Vietnam	October 8, 1881
9.	273,400	1920 Haiyuan earthquake	China	December 16, 1920
10.	229,000	Typhoon Nina		August 7, 1975

Table 2. Ten deadliest natural disasters since 1900, excluding epidemics and famines

Rank	Death toll (estimate)	Event*	Location	Date
1.	400,000–4,000,000	1931 China floods	China	July 1931
2.	500,000+	1970 Bhola cyclone	East Pakistan (now Bangladesh)	November 1970
3.	100,000–316,000	2010 Haiti earthquake	Haiti	January 12, 2010
4.	273,400	1920 Haiyuan earthquake	China	December 16, 1920
5.	242,000–655,000	1976 Tangshan earthquake		July 28, 1976
6.	229,000	Typhoon Nina—also contributed to Banqiao Dam failure		August 7, 1975
7.	227,898	2004 Indian Ocean earthquake and tsunami	Indian Ocean	December 26, 2004
8.	145,000	1935 Yangtze flood	China	1935
9.	143,000	1923 Great Kantō earthquake	Japan	September 1, 1923
10.	138,866	1991 Bangladesh cyclone	Bangladesh	April 29, 1991

Note*: This list does not include industrial or technological accidents, epidemics, famines or the 1938 Yellow River flood.

Table 3. Ten deadliest pandemics /epidemics

Rank	Death toll (estimate)	Event	Location	Date
1.	75–200 million	Black Death	Europe, Asia and North Africa	1346–1353
2.	50 million+ (17–100 million)	1918 flu pandemic	Worldwide	1918–1920
3.	32 million+ (23.6–43.8 million)	HIV/AIDS pandemic		1981–present (death toll data up to 2010)
4.	30–50 million	Plague of Justinian	Europe and West Asia	541–542
5.	12 million+ (India and China)	Third plague pandemic	Worldwide	1855–1960
6.	5–15 million	Cocoliztli Epidemic of 1545–1548	Mexico	1545–1548
7.	5–10 million	Antonine Plague	Roman Empire	165–180 (possibly up to 190)
8.	5–8 million	1520 Mexico smallpox epidemic	Mexico	1519–1520
9.	2.5 million	1918–1922 Russia typhus epidemic	Russia	1918–1922
10.	1–4 million	1957–1958 influenza pandemic	Worldwide	1957–1958

Death counts are historical totals unless indicated otherwise.

4. When the Music Changes, So Will the Dance...

The Social Root Causes of Disaster

Understanding *social vulnerability* is ultimately central for disaster management. Disasters tend to harm predominantly those social groups that were already disadvantaged before a disaster. For example, while studying the social aspects of food insecurity during droughts in the Sahel region in the mid-1980s, scientists showed that low-wealth families with many children were particularly susceptible to chronic food insecurity. Additionally, research conducted in the wake of Hurricane Katrina's impact on New Orleans in 2005 has shown that socio-economically disadvantaged households and communities were disproportionately affected by the hurricane. These people lacked the capabilities to prepare for, respond to, and recover from the disaster event. What drives social vulnerability in one place might play no role in another. Instead, vulnerability should be understood as a dynamic concept—"a product of specific spatial, socio-economic–demographic, cultural and institutional contexts," that intersect in everyday life.

But groups of people living in places where the overall socio-economic status is higher can also be vulnerable to disasters. When such disasters occur, society is less prepared to deal with these cases given that society has less experience and prior knowledge to work with. The COVID-19 pandemic is the most significant recent example, and one that is useful to discuss in this conference. The assumption that all members of affluent societies are somehow immune to disasters seems to be broadly shared, perhaps because vulnerability may be less obvious. This (mis)belief seems to be reinforced by various attempts to index and compare the vulnerability of communities, regions or whole nations. In fact, making inferences about disaster vulnerability based on aggregated economic characteristics often leads to misleading conclusions. This problem is known as the *ecological fallacy*, where relationships at the aggregate level do not necessarily hold at the individual level. For instance, research from the 1990s demonstrated that homeless people in Tokyo (at the time one of the wealthiest cities in the world) were far more vulnerable to earthquake hazards than the average resident. Problematically, emergency planning by government overlooked this "invisible" sub-population. In this case, the ecological fallacy meant there was a tendency for emergency planning activities to be directed towards a higher socio-economic class.

COVID-19 Changes the Rules Overnight

COVID-19 has dealt the knock-out punch to those of us who continue to doubt that the world is just getting smaller and smaller. *The virus*, in my opinion, has also sent another significant message—that is—as the world gets smaller—it needs to urgently recreate brother/sisterhood—*Udugu, Hunhu, Ubuntu!* It has to be *Udugu* in all societal institutions—between nations and governments, businesses, organizations, in villages, townships, families and households. *Udugu* for me is summed by 3 mutualities: *mutual respect, mutual benefit, and mutual responsibility*—among all nations and societal entities—on all issues of our common heritage and destiny as humans.

While the COVID-19 virus is invisible to us humans, that virus, just as with many other natural phenomena, has no respect for many of the man-made rules, doctrines and ideologies—however we label or justify these, be it science, religion, or/and especially these artificial political ideologies and boundaries. All our governments on earth have responded. For most of us, a significant change occurred in our lifestyles, which have evolved further and further away over time from what we experience today as the new “lockdown syndrome.” All sorts of “freedoms” and “human rights” have been frozen, or downright stripped away—leaving Western-style civilization begging for a new definition of *democracy*.

I have not travelled beyond Zimbabwe’s borders for 8 months now (my longest period in 40 years or so!) and have been officially “locked-down” in Harare for most of that period. There are several new lessons I have picked up. First is the realization that “forced intimacy” can work—if you give it chance—and we should give it a chance! I also find that “lockdown” is the proper initial response for more than the reasons given by governments and medics. It is free Afrikan wisdom that rather than blindly follow the one running away from whatever, it is better rush to your *own* home, your house—to your “base.” This is where you are most likely surrounded by those you know, love and trust. It is additional free Afrikan wisdom that as long as the enemy is not within, it is more difficult for the enemy out there to get in! Yes, we are afraid of this virus and quite rightly so—it is not a joke. But, think about it, it is not only us ordinary citizens who are afraid; every government is in “afraid” mode right now. My message therefore is that we have no choice but to quickly get over our fear, and accept this new

pathogen, so that we can deal with it more effectively. Fear is inevitable, but life only resumes where fear ends.

As scientists, therefore, we must invest less and less time in groups and exchanges that heighten fear while throwing little light on the subject. Lockdowns should be the natural defense—step one in reducing fear. Lockdown is what we have done before—science or no science, government or no government—that is how we Afrikans used to deal with adversity since time immemorial. We learnt this from the tortoise: as soon as you sense insurmountable danger, retreat into that hard impenetrable shell—only to zoom out, head first, when things are a bit clearer!

Afrikans also generally abide by the wisdom that when the music changes, so does the dance! Coronavirus has changed the music, definitely, and for a long time to come. So, the dance has to change accordingly. We have to change habits and beliefs. Since the advent of human civilization here on the Afrikan motherland eons ago, the human race has intermittently faced such formidable adversaries, and we are still here.

A more important reason for lockdown is to deepen conversations among ourselves as scientists, families, households, work groups, and citizens, on this virus and its broader impacts on society. The art of conversation was the key to Afrikan civilization, and we have but lost a good chunk of this art. We now delegate this important function to a few “privileged ones” in our society. But when it comes to new challenges that society has not seen before, such as the Coronavirus, there really is very limited amount of delegation possible. This is because we are all affected, yet we all suffer varying degrees of ignorance about this virus and its potential impact on society.

We all have to chip in. There is no good or bad idea, big or small idea, there is only the heightened intention to contribute, for you never know how and when your contribution will make a decisive difference in dealing with this challenge. And if you still feel like you are too small to make a difference, you cannot be an Afrikan, because you obviously have not spent a night with a mosquito! Throw in what you have, what you think, how you feel, what you have observed, experienced—there is no straight route to solutions. Major scientific discoveries in history emanated from intuition, gut-feel, as well as from pure accidents turning into solutions.

All of us—and I mean ALL—have the capacity to elevate our state of being and periodically access inspirational insights and ideas.

One area that is poorly researched, debated and published is on herbal and natural remedies for such viruses. This is largely because of colonial and religious baggage and trauma that has made such important applications and discoveries a taboo. The Coronavirus challenge is an example of times in which all those with herbal solution capabilities—from professors to practitioners—come out with guns blazing, and put natural solutions on the formal pathway. We now know, for instance, that for almost every condition you may have, you probably have an herbal solution right at your door step or a “weed in your garden that you are not aware of as a remedy. Meanwhile, so many sell all their life savings to go for an operation in India, or fly off to consult a prophet in some far away country. These are times when, typically, only fools are the ones who know everything. This virus poses questions most of which no one has ready-made answers to.

COVID-19 therefore is but one in an endless cycle natural phenomenon that defines the universe. No matter how much we don't know, no matter the length of the period of darkness in front of us, dawn will surely come—light will eventually shine through. What is not helpful is to sit back and close down one's faculties, waiting for the government to provide all the answers—scientific, social, and so forth. Someone said to me recently that “only God will save us from this.” I did appreciate his very good intentions, but I mused back at him: “...but what if God has seriously bigger fish to fry... is too busy to notice? What makes you think we are that important?” For me, the future of humanity is facing a self-evident reality. The universe is not concerned about our self-generated beliefs, doctrines, fears, doubts, or mountains of self-inflicted guilt. These are times when we have to question everything, especially our outdated notions of the human experience in a very intelligent universe. After all, life without battles is life without victories—life not worth living.

5. Building Resilience and Recovery Capabilities

Resilience is the capability of a people to generally adapt well over time to life-changing situations and stressful situations. Psychologists define resilience at a personal level as the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress—such as

family and relationship problems, serious health problems, or workplace and financial stressors. As much as resilience involves “bouncing back” from these difficult experiences, it can also involve profound personal growth. At a philosophical level, disasters, while painful and difficult, don’t have to determine the long-term outcome of civilisation and human endeavour. Just as we strive to control, modify, and grow many aspects of life, there continues to be many aspects that human agency cannot fully control or modify. Building resilience at community, national and global levels is therefore an on-going agenda, and is best approached with the wisdom that society cannot control or modify everything. Rather, getting through difficult circumstances should be an empowering process, learning to grow, even improve peoples’ lives, no matter what the universe throws at us. Being resilient doesn’t mean that a society won’t experience difficulty or distress. In fact, the road to resilience is likely to involve considerable emotional distress.

Resilience involves behaviours, thoughts, and actions that any society can learn and develop. The literature is generally agreed that the three main qualities of a resilient society are:

1. Embracing change;
2. Building problem-solving capabilities; and
3. Learning from mistakes and failures.

A way to reduce the impact of disasters on the nation and its communities is to invest in enhancing resilience—the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events. Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses—rather than waiting for an event to occur, and paying for it afterward.

The Government of Australia’s Disaster Resilience Framework (GOA, 2019) as an example is built on the following principles:

1. Information

- a. Accessing information that is authoritative and usable for decision making;
- b. Providing information usable to assess current and future risk;

- c. Improve ability to assess alternatives and options in addressing the risks; and
- d. Strengthen ability to assess status and report progress.

2. Integration

- a. Integrated analysis and planning;
- b. Build overarching vision and strategy;
- c. Promote coordination; and
- d. Recognize relationship between infrastructure and ecosystems.

3. Incentives

- a. Attracting long-term forward-looking risk reduction investments;
- b. Provide financial and non-financial incentives; and
- c. Reduce disincentives.

The overriding factor is that resilience and recovery capabilities are a collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. If all these sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector. Governments, at all levels, have a significant role in strengthening the nation's resilience to disasters by developing and implementing effective, risk-based land management and planning arrangements and other mitigation activities; having effective arrangements in place to inform people about how to assess risks and reduce their exposure and vulnerability to hazards; and having clear and effective education systems so people understand what options are available and what the best course of action is in responding to a hazard as it approaches. Businesses can and do play a fundamental role in supporting community resilience to disasters. They provide resources, expertise, and many essential services on which the community depends. Businesses, including critical infrastructure providers, make a contribution by understanding the risks that they face and ensuring that they are able to continue providing services during or soon after a disaster. Disaster resilience is also based on individuals taking their share of responsibility for preventing, preparing for, responding to and recovering from disasters. They can do this by drawing on guidance, resources and policies of government and other sources such

as community organisations. Similarly, non-government and community organisations are at the forefront of strengthening disaster resilience.

Governments, corporations, civil society organisations, and individuals all need leaders who understand the nature of change, understand risk and uncertainty, and lead change and coordinating efforts. With a view to building a holistic approach to disaster resilience for securing development gains in Africa, based on accurate risk information and improved decision support systems.

To achieve this, Holloway and Fortune (2019) argue for purposeful investments in high-value disaster risk-related human capital and human resources enable progress towards strengthened risk reduction capability at national and sub national levels—especially in variable, complex, high-risk contexts. It intends to sharpen understanding on the role of high-value human capital in resilience creation, particularly in chronically at-risk countries facing multiple threats—going beyond the often blunt and un-nuanced observations on “mainstreaming disaster risk reduction” and “DRR capacity building.” The paper then examines the contribution of purposive, collective higher education engagement in advancing disaster risk reduction education regionally from the African perspective. Institutions of higher learning in Africa therefore ought to teach, research and innovate in areas of managing risks, effective response to and recovery from emergencies and enabling, empowering, and supporting community resilience. One of the rarest skills is that of scenarios analysis.

6. Proposed Theory of Change in Addressing Disasters

As the Swiss writer Max Frisch observed in his 1979 book *Man in the Holocene* “...only human beings can recognise catastrophes, provided they survive them; nature recognises no catastrophes.” At the quantum mechanical level, scientists agree that everything is connected, one “ocean” of energy. All permutations are already out there as possibilities. Any permutation can be realised through the usual wave function collapse processes that eventually, in theory, can manifest anything that the mind can imagine. It is therefore not to us as scientists to prescribe what is not possible. That is nature’s role.

It's on that basis that I would like to offer to the conference the elements of a theory of change in strengthening existing DRR frameworks into more a holist approach. At a scientific level, my main premise is the distinction between (a) risk, and (b) uncertainty.

In general, *risk* can be differentiated from *uncertainty* by the ability to assign a probability estimation of the event occurring, including, as needed, probability estimations of the effects and outcomes. *Uncertainty*, on the other hand, refers to epistemic situations involving imperfect or unknown information making it difficult or impossible to predict or estimate the probability of future events. As scientists we still have very limited scope for estimating both the probability of occurrence, as well as probability of certain outcomes when it comes to extreme events. Even as scientists we are still people and therefore encumbered by considerable conflicts of interest. A ridiculous but arguable example is the asteroid that 70 million years ago obliterated the dinosaurs, paving the way for *homo sapiens to emerge*. While as scientists we can argue that a similar asteroid today could possibly pave the way for a higher civilisation down the road, we at the same time do not wish the universe to perform such an experiment.

Through science and higher learning, therefore, we can advance systematic approaches to gathering data and information that can be used in more holistic ways to address the continuum of future disasters—from predictable to unpredictable. Offering along the continuum, knowledge and skills for all stages of the disaster cycle: ***preparedness, response, and recovery***. In other words, as we master the types of disasters that we have become accustomed to, we now need to invest in embracing the uncertain, beyond our imagination types of disasters, because therein may lie deeper answers to long-term preservation for the planet earth, with people as the main beneficiaries.

7. Conclusions

Having distinguished types of disasters as natural, man-made, and man-made natural disasters, I went on to argue in my proposed theory of change that, ultimately, all these categories are connected at a higher level. When disaster strikes today, disaster managements frameworks rely mostly on the social characteristics of communities to determine peoples' vulnerability to hazards and the severity of the calamity. I also argued, conversely, that there are some disasters that appear to leave the more developed parts of society more vulnerable. These also tend to be the less predictable types of disasters. Covid-19 appears to fall into this category. For Africa and the less "developed" parts of the world, the big lesson is to go beyond copy-cat approaches to the strategies of the developed counties. Rather, what planet earth specifically, and the universe generally, strives for is greater and greater diversity of belief systems, physical and biological ecosystems, social and political institutions, and so on. That way, the probability of communities, nations and the global system surviving extreme events are greater, if we maintain and expand social and cultural diversity. All that requires recasting global systems of cooperation for mutual respect, mutual benefit and mutual responsibility.

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**National Resilience and Recovery from Pandemics and Emergencies
in Africa: the Health System Perspective**

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Abstract

This paper analyses the disease burden in Africa and Uganda in particular, and health system resilience with a focus on the COVID-19 pandemic. Examples of resilience during the COVID-19 response are presented, as well as measures of resilience and gaps in evidence that should be addressed. The paper also highlights the broad and complex health determinants and the need for multi sectoral interventions to promote health, prevent disease, and deliver quality promotive, curative, and rehabilitative services. A comprehensive multi-sectoral recovery and resilience plan is needed to fully exploit the opportunities presented by the COVID-19 catastrophe towards sustainable health.

1. Introduction

Development Challenges and Health Determinants

Uganda and other African countries face many complex health and development challenges, including poverty, rapid population growth, rapid urbanization, climate change and environmental degradation, insecurity and the associated displacement of people within and across countries, and disasters including flooding. For example, Uganda has a very high population growth rate currently estimated at 3.32%. The rapid population growth and increased human activity such as deforestation for agricultural purposes and hunting, leads to exposure to habitats of disease reservoirs, and has been associated with outbreaks of emerging and re-emerging infectious diseases (Nyakarahuka et al., 2017). In addition, environmental

degradation, climate change and increased temperatures lead to ecosystem changes that result in natural disasters and increased vulnerability to infectious diseases (Labbéet al., 2016). Rapid urbanisation strains the available infrastructure and creates disparities between the urban rich and poor sections, with low-quality housing, overcrowding, poor sanitation and hygiene, and unclean water, among other health challenges (Bodo, 2019).

Globally, 86% of migrants who have suffered forced displacement are hosted in developing countries (Abubaker, 2018). In Africa, Uganda has the second largest refugee population, estimated at about 1.4 million people, largely from South Sudan and the Democratic Republic of the Congo (DRC). These movements of people have been associated with emerging and re-emerging infectious diseases and disruptions in the delivery of health and other social services. The deprivation of basic services such as water and sanitation and congestion within refugee settings provide an environment of easy spread of infectious diseases, including diarrhoeal and respiratory tract infections such as COVID-19. Yet, the COVID-19 restrictions including lockdowns and disruption of services interrupted the continuity of services within refugee and other settings for displaced persons.

These interconnected development challenges are key drivers of health outcomes, and a failure in social and other services may lead to ill health and stresses to the overall health system. Public health interventions may also have negative unintended consequences to other sectors such as the catastrophic social and economic impacts due to COVID-19 restrictions (Josephson et al., 2020). This interconnectedness across sectors highlights the need for multi-sectoral responses and improvements in health and other social systems to address health challenges and emergencies.

2. Health Challenges in Africa and Uganda

Africa has a heavy burden of infectious diseases, despite the steady decline in disease burden over the past decade. The 2018 burden of disease estimates show a reduction in disability life years lost (DALYs) to maternal, neonatal, communicable, and nutritional conditions across Africa (Gouda et al., 2019). However, the burden remains unacceptably high. Persistent endemic infectious diseases and neglected tropical diseases (NTDs) still

pose a major challenge, while Africa bears the brunt of emerging and re-emerging diseases and epidemics, more than any other continent. The World Health Organization Africa Region (WHO Afro) reported 96 infectious disease outbreaks in 2018 alone. Countries within and neighbouring the congo basin, including Uganda, Central African Republic, South Sudan, and DRC had the largest number of public health events (Mbousouet al., 2019). These countries also often have concurrent disease out-breaks. For example, DRC had the Ebola epidemic for two years, overlapping with the COVID-19 pandemic in 2020 (Nachega et al., 2020), while Uganda had overlapping outbreaks of cholera and the COVID-19 pandemic.

Between 2000-2016, Uganda experienced five Ebola virus disease outbreaks and three Marburg virus disease outbreaks (Nyakarahuka, 2017), more than any other country in the world. In the past 2-3 years, Uganda has successfully contained Crimean Congo haemorrhagic fever, Marburg virus disease, Rift Valley fever, Anthrax, Meningitis, Measles, Cholera, and Ebola (Kisakye et al., 2020; Ario, 2019). This emphasizes the need for resilient and sustainable health systems with the capacity to detect and effectively respond to disease outbreaks, and that can withstand shocks and sustain quality preventive, curative and rehabilitative health services. However, assessments of Uganda's capacity based on the Joint External Evaluation (JEE) and the Global Health Security Agenda (GHS) indicate some capacity gaps in programmatic coordination, sustainable funding and costing of the national action plan among others that should be addressed.

Health challenges in Uganda, and most of Africa, are largely infectious in nature. However, there is increasing evidence of health challenges due to diseases of lifestyle. The health challenges follow the continuum of life and are worse at both ends of the spectrum, with neonates and under-fives as well as the elderly being most at risk of poor health. There are also gender disparities in terms of health status and health seeking behaviour and outcomes. Africa and Uganda in particular has a young population, which impacts the health challenges faced. Challenges in health should be considered with the current desire for universal health care, and the priority lists considered in the Sustainable Development Goals.

3. Health systems capacity in Africa and Uganda

Africa has major gaps in health systems. With 11% of the world population, Africa has 24% of the global disease burden, and only 1% of the global health expenditure and 3% of the global health workforce (Anyangwe, 2007). Overall, 60% of health care financing comes from private sources, and 50% of total health expenditure (THE) goes to private providers. Health insurance has remained grossly low and stagnant in Africa, with most of the population exposed to catastrophic health expenditure (World Bank, WHO, 2018). The major gaps in production and distribution of health commodities and technology have been very evident in the COVID-19 pandemic, with severe shortages in testing commodities, personal protective equipment (PPEs), and emerging challenges with equitable distribution of vaccines, among other challenges.

LMICs' health systems are not well equipped to address infectious diseases and the growing NCD disease burden. Major gaps exist in preparedness and response to health emergencies. The 2019 Global Health Security Index (GHI) showed weak health security globally, with an average score of 40 (out of 100). The gaps are more pronounced in African countries; most of the African countries were among the least prepared, with an average score of 30.8. The East African region, including Rwanda, Uganda, Kenya, and Tanzania, was among the more prepared regions. Uganda, for instance, had a score of 44.3, above the African and global average, and ranked 63rd of 195 countries globally (Cameron et al., 2019). However, Uganda has several gaps which should be urgently addressed given the frequent epidemics that the country continues to experience. The weakest components in the analysis were the health capacity in clinics and hospitals, infection prevention and control practices and equipment, communication with healthcare workers in epidemics, medical countermeasures and personnel deployment. Other significant gaps included dual use of research, and a culture of responsible research and data integration between animal and human sectors (Cameron et al., 2019). The seven pillars of health care, as defined by the WHO, should be critically examined and improvements made based on the lessons from the current pandemic and burden of disease trends. There is need for a broader discussion and strategy to address the protracted human resource challenges, including sustainable mechanisms for integration of community systems and community health workers.

4. Effect of the COVID-19 response strategies in Africa

COVID-19 prevention measures, and especially the lockdowns, curfews and other restrictions, had a severe negative impact on economies across the world. The restrictions led to increased unemployment, reduced or total loss of income—especially for informal sector workers and the lowest wage earners—and introduced challenges with meeting basic needs, including shelter and food, and interruption of education especially in the most vulnerable communities with limited access to internet and technology (Josephson et al., 2020; Matovuet al., 2021). Other effects of the COVID-19 response strategies in Africa have been increased levels of violence, a diversion of personnel and resources away from priority diseases, and the exacerbation of mental health conditions (Ogunleye, 2020; Katana, 2021; Ozili, 2020; Villiers, 2020). These negative effects further exacerbate existing socioeconomic inequities and impacts on health and health outcomes and emphasize the need for comprehensive multi sectoral interventions with safety nets to ensure balanced outcomes and mitigation of the negative effects of public health interventions. A comprehensive multi sectoral COVID-19 response that cuts across various sectors including health, the economy, education, agriculture, water, sanitation and hygiene, media, information, communication and technology, energy, and environment, and involves the public, non-governmental and private sectors with community engagement in a whole-of-government and whole-of-community approach is necessary for adequate control strategies and mitigation of negative outcomes on health and other sectors. Multi sectoral response strategies should include an anticipation and mitigation of the negative consequences of the interventions, especially on the most vulnerable populations. For example, several countries have integrated a stimulus package to support communities to ensure basic needs such as food and shelter, while others have catered for selected businesses, among others (Ogunleye, 2020; Ozili, 2020; Villiers, 2020). In some countries, the response strategies also included improvement in access to clean water for hand hygiene as a COVID-19 prevention measure (Ogunleye, 2020; Ozili, 2020)—which also has broader health benefits in term of prevention of other diseases.

5. Resilient health systems: Examples of adaptations during the COVID-19 pandemic

The COVID-19 pandemic is one of the greatest disruptors of the century, severely affecting health and other systems globally. First reported in China in late 2019, the disease rapidly spread across the world due to expanded global travel and other underlying vulnerabilities that drove the rapid transmission within and across countries, with a heavy burden of disease and mortality. The pandemic caused huge disruptions to health and other sectors and the impact was severe, especially in fragile health systems with a heavy burden of disease due to other disease conditions. Continuity of essential and quality health services is thus a major concern during the COVID-19 pandemic. Studies from previous epidemics, such as the Ebola epidemic in West Africa, have shown the devastating effects of epidemics on health systems and increased mortality due to other health conditions (WHO Ebola Response Team, 2016; Camara, et al., 2017; Delamouet al., 2017).

Although data is still limited, several studies show major disruptions to infectious disease and non-communicable disease programs globally and in Africa due to the COVID-19 pandemic. A study modeling the impact of COVID-19 estimated an 8.3–38.6% increase in maternal deaths per month in 118 low- and middle-income countries (Robertonet et al., 2020). Another study estimated that a 10% decrease in the use of short- and long-acting reversible contraceptive methods could result in an additional 49 million women with unmet need for modern contraceptives, and 15 million unintended pregnancies in a one-year period (Riley, 2020). The UNAIDS 2020 global update estimated that a 20% ART disruption among patients in Africa would lead to an additional 110,000 deaths, while a halt in prevention of mother-to-child transmission (PMTCT) services for six months would lead to a doubling of HIV infections among infants in Uganda (UNAIDS, 2020).

Several factors drive these poor outcomes during the COVID-19 pandemic, including lockdowns and restricted access to health services due to transport challenges, displacement of other non-COVID care due to a shift in focus to COVID-19 care with limited attention to other conditions, and patients abandoning health facilities due to fear of contracting COVID-19, among others (Roberton et al., 2020).

Yet, underlying chronic diseases such as NCDs exacerbate COVID-19 morbidity and mortality, and thus its control should integrate the management of underlying conditions and the shielding of those most affected to mitigate the impact and reduce mortality. Improvements in health systems and ensuring resilience are critical to the control of the COVID-19 pandemic, the immediate and long-term recovery, and resilience. A resilient system would be one that can detect and effectively respond to disease outbreaks to mitigate their effects, while simultaneously maintaining other essential health services and continuing to address poor health outcomes (Nuzzo et al, 2019).

Critical ingredients of resilience include leadership, innovation, and creativity underlying the ability to detect and institute appropriate adjustments to maintain quality health services (Biddle, 2020; Blanchet et al., 2017). Strategies to enhance resilience range from the absorptive, to the adaptive, to the transformative. Absorptive capacity refers to continuity of health services at the same level (quantity, quality, and equity) with the same level of resources and capacities, despite external shocks, for example disruptions due to epidemics and epidemic response strategies (Blanchet et al, 2017). Adaptive capacity refers to the adaptation of the systems to deliver the same level of healthcare services with fewer and/or different resources. Transformative capacity, on the other hand, refers to changes or transformation of functions and structures of the health system to respond to a changing environment.

Examples of system resilience and modifications in service delivery during the COVID-19 pandemic in Uganda and other countries include the adaptation of HIV service delivery models to ensure continuity of care (UNAIDS, 2020). Such models include client- and community-centered approaches for the delivery of HIV drugs (drugs delivered to clients within their homes, and within communities by health workers or by other patients), and relocation of HIV clients to the nearest drug refill centers to overcome transportation challenges during lockdowns. Multi-month antiretroviral drug refills, including providing drug stocks for 3-6 months, preceded the COVID-19 pandemic as part of the differentiated service delivery models to decongest facilities and ensure treatment continuity, and were accelerated during the COVID-19 response to ensure continuity of service and to reduce multiple clinic visits. Other self-care models such as HIV self-testing and peer-led interventions help to decongest facilities

and reduce provider load, and have also been used to ensure continuity of care during the COVID-19 pandemic. Online support mechanisms for clients and providers, for example by telephone and online, and harm reduction support were also introduced or enhanced in various settings to bridge gaps during COVID-19. Community health workers have also been used widely in the delivery of family planning commodities, and supported continuity of these and other services during COVID-19.

6. Measurement of health systems capacity to prevent, detect and respond and resilience

Health system resilience is a growing area of focus given the frequency of emergencies and shocks to the health system (Meyer, 2020). The WHO has described core capacities for epidemic preparedness and response, and these capacities and checklists are used by countries in the JEE to accelerate the implementation of the International Health Regulations (IHR), and to strengthen health security (WHO, 2016). The JEE, however, does not evaluate the capacities and capabilities necessary for health system preparedness and response which is an important role of health systems (Nuzzo et al., 2019). Several authors have described key themes in health system resilience and capacities needed for resilience to infectious disease outbreaks (Meyer, 2020; Nuzzo et al., 2019). Various metrics have been designed to measure preparedness and response, but they have largely focused on health sector capacities, despite the multi sectoral nature of disease outbreaks and response strategies. Previous predictions and capacity assessments have indeed been challenged during the COVID-19 pandemic (Oppenheim et al., 2019).

The Global Health Security Index (GHI) integrated the context for biological risks in each country, geopolitical considerations, and health systems, and whether a country has tested its capacities to contain outbreaks, and to enhance political will and financing. The GHI also has an emphasis on transparency, the regular measurement of health security capacity, and coordination and collaboration among sectors (Cameron et al., 2019). The index, however, is skewed towards the priorities of high-income countries, such as its high emphasis on bio safety with some of its indicators invalid for lower income countries, and its scoring system inconsistent (Razavi, 2020). A discrepancy between countries' GHI scores and their performance in responding to COVID-19 has recently been highlighted (Abbey, 2020).

Health system resilience combines the capability to effectively respond to disease threats, while also maintaining other essential health services, and should integrate capacity to mitigate the negative socioeconomic effects of the disease and the response strategies on other sectors. A comprehensive measure of resilience should thus integrate the ability of the other relevant sectors, such as education, social security, safety nets, and financing, to effectively respond to and mitigate the effects of disease outbreaks. Thus, more work is needed to enhance the definitions and measurement of health and linkages with other systems beyond health.

7. Post COVID-19 recovery, towards sustainable health

The COVID-19 pandemic is both a challenge and an opportunity to revisit the Sustainable Development Goals (SDGs) and the global development agenda. Given the complex, interlinked drivers of health and health outcomes, long-term recovery and resilience will require more comprehensive multi sectoral capacities and interventions that place priority on equitably improving determinants of health and wellbeing at the local and global levels (Goran et al., 2021). This will require close collaboration across sectors holistically in line with the 2030 Agenda and resilient health and other sector systems that meet the needs of the present, without compromising the ability of future generations to meet their own needs. The move towards more resilient health systems should include attention to political, economic, commercial, socio cultural, environmental, and legal determinants of health, with multiple actors across the promotive, preventive, curative, rehabilitative, and palliative services with appropriate governance and financing strategies for universal health coverage and sustainable health (Stenberg et al., 2017). Innovative strategies are needed across all levels, including community empowerment and building trust in the systems and services to enhance access to and use of those services. Bringing COVID-19 to an end and achieving post-COVID recovery towards resilient health systems will require reorienting the health sector towards current and future challenges. An all-sectors approach is needed, with attention to health and other sectors and underlying social inequalities and vulnerability, with sustainable and equitable investments in research and technological advancements, including diagnostics, drugs, and vaccines, among others. A critical step towards recovery and resilience is multi sectoral engagement in the development of comprehensive resilience and recovery plans with immediate and long-term goals and accountability

mechanisms, and revisiting critical enablers including financing and transparency mechanisms. The COVID-19 and post-COVID-19 recovery period presents an opportunity to rethink and reorient health systems, with health at the centre of development and multi sectoral strategies to address challenges and minimise their impact. There is a need to generate more evidence to drive these multi sectoral collaborations and to expand the measures of health system resilience to address these linkages.

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National Resilience and Recovery: The Psycho-Social Perspective

By

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By killing millions of people in short periods of time, epidemics have crumbled empires, defeated armies and irrevocably changed the way we live. Although mass die-offs are often portrayed as natural disasters, they do not arrive uninvited. It takes a good dose of civilized provocation to get germs to go on a killing spree, and an even stronger effort to stop them once the dying has begun. With their ever-changing engines of progress, human beings have always started the process of devastation themselves, and blindly selected the germs of their undoing... The Book of Revelations called them the "Fourth Horseman of the Apocalypse: Pestilence and Death.....who had the power to devastate the world with hunger, sickness and beasts of the earth.

Andrew Nikiforuk, "The Fourth Horseman," Viking Penguin Books, 1991.

1. Introduction

In the COVID-19 pandemic, the world today is facing a global public health crisis of immense magnitude, the full effects of which, we have yet to see or even forecast. Global health emergencies have been part of humanity from times immemorial, often causing unimaginable suffering and misery, and a heavy death toll. The biblical writers of the Book of Revelations called them the "Fourth Horseman of the Apocalypse: Pestilence and Death; who had the power to devastate the world with hunger, sickness and beasts of the earth."

Pandemics and other global health emergencies are often propelled by globalization forces which result in effects on global health and have resulted in an unprecedented interest in global health studies of which global mental health is but one. They present health challenges calling for solutions to the health problems both locally and globally. **Globalisation** is defined as "Global connectedness; the increased interconnectedness and interdependence of peoples and countries with issues and concerns

which emerge that transcend national boundaries and are influenced by circumstances and experiences in other countries.” Global health is one such issue and is defined as “Health problems, issues and concerns that transcend national boundaries, may be influenced by circumstances or experiences in other countries and are best addressed by combined cooperative actions and solution by all nations of the world”. Infectious pandemics fall into this category. They constitute global health crises to which no nation is immune and isolationism does not work. Poor health in one country affects other countries, making health the defining characteristic of global society in the 21st century. **Glocalisation** is when local and global forces work together, often cyclically, to drive and perpetuate a situation or condition as local interests or events/activities trigger international activity. Increased international travel and tourism propels infectious diseases between humans which soon become epidemics and pandemics as the diseases soon spread across continents. COVID-19 is a classic example of a modern infectious pandemic.

Infectious epidemics and pandemics of highly fatal organisms create Complex Health Humanitarian Emergences (CHEs) which cause situations of disrupted livelihoods, pose threats to life, cause civil disturbances and often lead to large-scale movements of people, creating difficult political and security environments. An epidemic is defined as an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. It is usually limited to a specific geographical area, region or country. In an epidemic the disease affects a large number of people within the community, population, region or country. On the other hand, a pandemic is defined as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people in many countries and/or continents. COVID-19, which started as an epidemic, soon became a pandemic.

2. Recent Modern Pandemics

Today’s pandemics cause global health (disease) emergencies because of the increased global connectedness caused by international travel, trade, population displacements, and migration, as people flee wars, poverty, famine, political persecution, overpopulation and other human disasters. Most are caused by infectious agents—viruses. Examples include: HIV (human immune deficiency virus), SARS (severe acute respiratory

syndrome), MERS (Middle Eastern respiratory syndrome), Ebola and COVID-19 (Coronavirus Disease 2019). All these recent pandemics have some common characteristics. They:

1. Are caused by viruses
2. Are linked to destruction of animal habitats
3. Represent viruses that crossed from animals to humans (zoonotic)
4. Originated in heavily populated areas
5. Have no effective curative therapeutics
6. Need epidemiological preventive strategies (including vaccines) to stop them
7. Have massive psychosocial (mental health) fallout

Coronavirus Disease 2019:COVID-19

COVID-19 is the name given to a relatively new severe acute respiratory syndrome caused by coronavirus. Coronaviruses belong to the family of *Coronaviridae*. They are zoonotic viruses, causing mild to severe disease in both humans and animals similar to a common cold. They include some recently emerging flu-like respiratory viruses, such as the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002, and the Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012. Towards December 2019, a novel Coronavirus was identified as a cause of upper and lower respiratory tract infections in Wuhan, a city in the Hubei Province of China. It rapidly spread, resulting in an epidemic throughout China and then gradually spread to other parts of the world. It has now affected almost every continent on earth, except Antarctica. The World Health Organization (WHO) designated it as Coronavirus Disease 2019, or COVID-19. In January 2020, the World Health Organization (WHO) declared the outbreak of this novel (new) coronavirus disease, COVID-19, as a “Public Health Emergency of International Concern,” stating that there was a high risk of COVID-19 spreading to all countries around the world. On March 11th 2020, WHO made the assessment that COVID-19 should be characterized as a pandemic.

Transmission and Prevention of COVID-19 Infection Spread

The coronavirus that causes COVID-19 is shed through droplets that are expelled when people who are already infected with the virus cough, sneeze, talk or just exhale. If non-infected people come into direct contact with these droplets, they are at risk of acquiring the infection. It is for this reason that medical scientists are calling on people to: (a) maintain a “safe” physical distance of two meters between each other, (b) not touch surfaces that droplets may have fallen on and were not disinfected, (c) wash hands frequently with soap and water or alcohol-based hand disinfectant/sanitizer, and (d) cover their nose and mouth with a mask and when coughing or sneezing. Asymptomatic carriers are people who have been infected but are not experiencing or showing symptoms of the disease, but they nevertheless have the capacity to spread the coronavirus. Of the infected, over 80% have mild disease, 15% severe disease, and 5% critical disease. The death rate is somewhere between 2.5% and 5%. All ages are susceptible to infection, but most deaths occur in those above 60 years old or among those with pre-existing physical conditions such as diabetes, hypertension, heart disease, cancer, etc. Treatment is supportive and symptomatic. As of this writing, there is no cure yet for COVID-19, making containment and prevention paramount, including vaccination.

Individual and Community Psychological Reactions to COVID-19

Epidemics and pandemics are psychologically traumatic. A worldwide highly infectious disease outbreak with high fatality, such as COVID-19, causes extreme uncertainty, feelings of helplessness and hopelessness, and a fear of impending death individually and at a large scale. Communities fear that they cannot control the situation, or their destiny. This causes much anxiety and later stress to almost everyone. Such mass anxiety may lead to mass panic. The WHO, governments and health authorities around the world, including Uganda, have embarked on epidemiological crisis management to contain the COVID-19 pandemic. Of recent, vaccination has been added to this response. However, the COVID-19 crisis has generated much stress and anxiety throughout the population, although people’s and community reactions may differ in different countries, cultures and settings. Severe prolonged stress fails coping mechanisms in one, thus causing Post-Traumatic Stress Disorder (PTSD) and depression and may lead to other maladjustments including substance abuse, panic or violence.

Anxiety is a normal stress response to danger and uncertainty. Stress may negatively influence our perceptions and behaviours. When well-being and physical health are threatened or negatively impacted, the stress becomes a distress. Distress negatively influences our perceptions and behaviours. Everyone reacts to stressful situations differently. It is important to be aware of the signs and symptoms of stress and distress in oneself, in loved ones, or in others. Frontline workers, including health workers, need to know not only how to help others but also how to relieve stress and distress in themselves. Amidst this COVID-19 pandemic, the issue of mental wellbeing for all has assumed an all-out importance. It is of utmost importance to address the mental wellbeing of frontline health workers, in addition to the general public at the individual, family and community levels, and in all socio-economic groups, ethnicities, genders, and ages. The disease and the measures taken to contain COVID-19 may seem drastic, but are necessary, yet they are often of mental health concern.

Researchers have now formalized a definition for the long-term mental maladies associated with the pandemic, collectively calling them “coronaphobia.” The term is a catch-all phrase for the fear and the emotional and social strain experienced by the general public in response to COVID-19. Obsessive behaviours, distress, avoidance reaction, panic, anxiety, hoarding, paranoia, and depression are some of the responses associated with coronaphobia.

International Reaction and Response to COVID-19

The world’s countries, Uganda inclusive, were caught unprepared for the COVID-19 pandemic. The World Health Organization has played a big role and shown steadfast leadership in responding to this pandemic. As a global Complex Humanitarian Emergency (CHE), no country has been immune to the effects of COVID-19, and all countries needed to work together to mitigate them. However, different countries have shown differing patterns in the mitigation response, despite all public health experts giving the same containment message of social distancing, avoid crowds, wash hands frequently with soap or sanitizer, and wear masks. The world has seen a re-emergence of nationalism, protectionism, catastrophizing, false prophecies, big power political rivalries, and opportunistic untruths. The worst affected countries have been the United States, Brazil, India, UK, France, Spain and Italy. It is noteworthy that countries led by women heads

of states have fared the best, followed by African countries. As vaccines have emerged, the world has seen how rich countries have hoarded them to almost the total exclusion of poor countries. COVAX, the global initiative to provide vaccines to poorer countries, has attempted to buy some of these vaccines and distribute them equitably to developing countries. However, big power politics and vaccine hesitancy has played havoc in this exercise.

3. Africa's Response to COVID-19

It was very much feared that Africa would be devastated by COVID-19 due to poor health infrastructure, poor health funding, absence of diagnostics and therapeutics, political insecurity, poor governance systems, poverty, illiteracy and the presence of many other infectious diseases. However, most African governments heeded the WHO guidelines, had early lockdowns, called upon their past experiences with epidemics (e.g., Ebola, HIV, etc.) and were endowed with much younger populations with few comorbidities and people who mostly have outdoor lifestyles. The most affected countries in Africa are those with the biggest economies, including South Africa, Nigeria, and Egypt. The biggest missing link in the African response to COVID-19 has been and continues to be the absence of psychosocial mitigation.

Uganda's Response to COVID-19: Observations

On 29th January 2020 the Uganda government, through its Ministry of Health (MoH), set up a National Task Force (NTF) that activated the COVID-19 Incident Management System to coordinate the implementation of preparedness activities for the possibility of COVID-19 coming to Uganda. Its mandate was to “detect, prevent and respond” to COVID-19. The measures taken, had three key principals:

1. Stopping all activities except for essential work;
2. Ensuring access to food;
3. Ensuring access to healthcare, medicines and treatment.

The government worked multi-sectorally through its Ministries of Health, Finance, Transport, Disaster Preparedness and Law enforcement to set up the national response to the COVID-19 pandemic based on science, medical, and WHO guidelines. These guidelines were supported by the Uganda

Medical Association. It should be noted that the instituted measures have changed as the pandemic has unfolded and also changed. The measures included the following:

- Screening, upon arrival, of all international travellers and mandatory 14-day self-isolation or institutional quarantine at own cost for international travellers from highly affected countries. It also mandated testing, treating and isolating all those that screened positive, even if asymptomatic; and contact tracing.
- Later, all passenger international travel by air, land or water was banned and all borders were closed with testing of all cargo transporters and their crew at border crossings and airports.
- Public transport, and later private cars and motorcycles, including boda-bodas, were banned from carrying people, and all motorcycle transport was banned after 2pm.
- There was no returning to villages, even on foot.
- A public advisory was mandated of social physical distancing of at least two metres, with frequent hand washing with soap or use of hand sanitizer and disinfecting surfaces touched by others
- People were told to go to hospital for any flu-like or COVID-19 symptoms for testing.
- People were required to stay home and self-isolate if one had flu or the common cold.
- There was banning of all mass gatherings and events: political, social, cultural, religious, conferences, or funerals; also, restaurants, bars, nightclubs, discos, festivals, music shows, theatres, sports, jogging, beaches.
- Day-care centres, schools, universities, colleges and all institutions of learning were closed.
- There was a stop to all “non-essential” work except for healthcare (hospitals, clinics, pharmacies, labs), banks and financial institutions, media, tax collection (Uganda Revenue Authority), hotels, law enforcement, petrol stations, cargo, and farming.
- There was increased funding for the Ministry of Health to recruit more care providers and to buy drugs and equipment, including personal protective equipment (PPE) for health workers, plus their transport and for patients.

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- All shops, businesses, and markets except food markets/shops were closed.
- Initially, there was an imposed 14-day stay-at-home lockdown order with a curfew from 7pm to 6.45am, which was sequentially extended and reviewed.
- Food distribution was implemented to the urban needy and institutions of childcare, baby homes and orphanages.
- Prisons were ordered to decongest by releasing selected prisoners.
- Lastly, law enforcement was involved (police, army, prisons, local defence) to ensure that the public followed the guidelines.
- Media was used to publicize the guidelines and government directives. This included radio, TV, newspapers and social media.

These measures were drastic, stringent, and strictly enforced. But they were not out of line from what most other countries were doing. The emphasis of the Ugandan response was to prevent community spread of the COVID-19 virus. The Ugandan President correctly emphasized that the issue was not one of inconvenience to people, but that this emergency had dictated that life now was not business as usual. It was a matter of life or death on a large scale. Most Ugandans accepted the measures and heeded them, even though they were difficult. However, they and COVID-19 itself were bound to cause psychosocial hardships, but these hardships were not addressed. Nevertheless, these measures greatly slowed down the occurrence of COVID-19 in Uganda, with the first case appearing as late as March 21st 2020, and community spread has been limited. This led the government to start a gradual easing of the restrictions, including stopping the hard lockdown and gradually easing the opening up of the country for business. With the advent of vaccines, there is hope for more opening up of the country. However, the unaddressed mental health fallout continues. In Uganda, death from COVID-19 infection has been limited, but death from the mitigation measures and their enforcement has caused much alarm and hardship in the population. This became more evident around election time.

With the arrival of vaccines, Uganda set up a COVID-19 Vaccine Scientific Committee. This committee included a psychiatrist and a sociologist to help in overseeing the psychosocial response to the vaccine, thus preparing

to combat looming vaccine hesitancy, as has been seen elsewhere in other (Western) countries.

4. The Psychosocial Gap: Mental Health Omissions in the Ugandan Response

The Ugandan government's response to COVID-19 has been to enforce the WHO recommendations, under the guidance of the Ministry of Health. In the effort to curb the situation, some omissions affecting people's mental health have been realized. These are discussed in Uganda's unique economic, social and cultural situation and how they have caused psychological distress. Much of it has made breaking news on national radio and television stations, as well as on social media. Compared to many countries, Uganda's efforts to contain the spread of COVID-19 have been commendable. The following is a critique (not criticism) of some omissions in this response and their repercussions:

- 1. Absence of a national psychosocial response:** Generally, in Uganda, the gist of the individual and community reaction to the COVID-19 pandemic was acceptance, but it also caused uncertainty, panic, stress and anxiety resulting in much mental distress in the population. This widespread mental anguish needed a national psychosocial response to mitigate it, but Uganda did not initiate a national psychosocial response.
- 2. No measures to mitigate the fallout of economic downturn.** The worldwide measures taken to curb the spread of COVID-19, including in Uganda, caused an economic downturn, a slowing of business activity, and an increase in healthcare expenditure. For individuals and families, this has meant a reduction in or even cessation of monetary income necessary for survival. The vast majority of Ugandans who live in towns are self-employed or work in the informal sector without salaries, or are under-employed. They work for their daily bread... "kagwiirawo," or the so called "double Z: ZenkolaZendya." Many urban dwellers are migrant workers, transients, and some are refugees. Staying at home and a curfew created unemployment. Ugandans don't have economic or social security networks or fall-backs such as unemployment insurance, or government cash bailouts. They depend on family

and relatives. Many town hawkers and dwellers just walked back to their villages, even if this took days or weeks.

- 3. Difficulty accessing food:** The lockdown and stopping of all activities except for essential work meant stopping all travel, including public transport. The immediate stress and reaction to this was to worry about how one could get money to survive, and how to physically access food and healthcare. Many town dwellers eat from markets/street food vendors: the “tonninyiramukange.” Government distribution of food to the urban poor and needy came late. Moreover, the disorganized urban high-density dwellings (“ggeto”) of Uganda’s towns made the food distribution exercise chaotic, not to mention the “get-rich” corrupt schemers, some of whom were arrested. A planned food distribution system using local chiefs (LC-chairpersons) was lacking.
- 4. School and college closures—looking after children and dependants:** Universities, colleges, schools and day care centres were closed. All learners were ordered out of school. Parents/guardians worried about how to look after their children who were now at home after the school closures. Children need to play. Older students worried about their futures after education closures. Initially, there were no announcements from the Ministry of Education on what would happen to candidates with national or professional examinations or those who would run out of school fees. Child abuse, teenage sex, defilement and pregnancies increased. Many stopped studying. Students took to street hawking of commodities to eke out a living.
- 5. No space for physical distancing:** Most of the town dwellers in Uganda stay in high density accommodation, often sharing one- or two-room houses or apartments, including shared toilets or bathrooms. For them, physical social distancing is a privilege and a luxury they just cannot have. Tensions and violence increased in homes and neighbourhoods.
- 6. Domestic Violence:** Staying at home “doing nothing” was and is socio-culturally very difficult, especially for men in Uganda. Family tensions and domestic arguments were bound to occur.

Domestic violence increased, with many men beating up their intimate partners and children, some even resulting in death. There were no programs to mitigate this domestic and partner violence. There were no crisis intervention centres.

7. **Suicides and homicides:** were reported. Loneliness increases depression. Staying at home, especially with limited space in a dwelling, increases tension and depression and has resulted in suicides and homicides. There were no distress crisis intervention centres or phone lines in place.
8. **Substance abuse:** This was especially true of alcohol and drugs, which increased in the curfew hours within peoples' dwellings. This affected many, including young people who were now out of school and idle. The evening news became full of police reports of intoxication incidents with the police spokesperson cautioning families and communities about this vice. Some arrests were made.
9. **No care for the vulnerable:** These included migrant workers, the homeless, street children, refugees, elderly, the disabled (physically and mentally), island peoples or those living in remote and isolated communities and in refugee camps. Care hostels for the disabled and orphanages cried out for help as assistance to them dwindled.
10. **Socio-cultural void:** Socially and culturally, Ugandans talk to each other nearly all the time. They greet each other daily, even as strangers on the road. They visit each other as neighbours, friends or relatives. This ensures our communalistic cohesion, a feeling of security/safety and mental wellbeing, as demanded by social and cultural custom. No one lives alone. The late Prof J.S. Mbiti put it well: "I am because you are". A stay-at-home order, not even to visit or greet a neighbour, is culturally alien. To not **physically** know about the welfare of family, relatives or neighbours caused much mental distress. A phone call is not enough in our African ways. It is a common adage that a grandfather/mother who is not visited often will not live for long.

11. Poor Access to healthcare: The ban on public transport became a big issue in the lockdown and curfew hours. Uganda has no universal public ambulance service. The ban on public transport and the lockdown did not take care of the many demanding health issues such as the following:

- a. No public provision or private access to health facilities or care in case of emergencies which could occur at any time, e.g., falls, fractures, strokes, heart attacks, appendicitis, intestinal obstruction, convulsions, etc.
- b. Pregnant women who went into labour were advised to go to the Resident District Commissioner (RDC) for permission to move during the lockdown or curfew hours. Many got emergencies ,e.g., ruptured ectopic/uterus, eclampsia, bleeding, etc. How could one reach the RDC in that case?
- c. People with pre-existing conditions who needed regular reviews, including medication refills, were not catered for, e.g., those living with HIV, diabetes, hypertension, cancer, mental conditions, sickle cell disease, Tuberculosis (TB), respiratory, heart, or kidney problems, on dialysis, etc.
- d. The common daily physical illnesses which, if not promptly treated, could become serious and may even result in death, e.g., Malaria, pneumonia, typhoid, etc., became more difficult to treat in a timely fashion.
- e. Children's physical illnesses such as severe diarrhoea, tonsillitis, convulsions were not attended to. Children immunizations could not be accessed.
- f. There was no care for acute mental illnesses such as epileptic attacks, acute psychosis, attempted suicides, etc.
- g. The homeless in towns (many have severe mental illnesses) or extreme poverty were not catered for. Many mental health units in the country were turned into COVID-19 isolation units. The plight of those helpless mentally ill patients especially who had no families was not addressed, including those who wandered the streets/villages.

12. Limited consideration for healthcare workers: Of topmost concern was the case of the health work force. Health workers can breakdown as they became distressed, especially over the following:

- a. Fears of exposure to the virus without adequate PPE. Indeed, many health workers caught COVID-19. Some died.
- b. Being overwhelmed and overworked, resulting in acute exhaustion/burnout at seeing so many sick and dying patients. Many developed anxiety, post-traumatic stress disorder (PTSD) and depression, with even suicidal ideation and suicide attempts. Some broke down, others took to drinking.
- c. Lacking transport and security at work. Some health workers were roughed up by inconsiderate and overenthusiastic security agents. Car stickers came late.
- d. Lacking adequate medical staff and equipment, e.g., safe isolation facilities/measures. Some health facilities initially rejected COVID-19 patients.
- e. No transportation of health workers. This included doctors, nurses, laboratory attendants, pharmacists, and all people who work in hospitals, including cleaners, food dispensers, etc. Most health workers in Uganda do not own cars.
- f. Not enough income/salary to also look after their families in this crisis. There was no hazard pay.

13. Poorly supervised use of force: Law enforcement was used to ensure that the public followed the COVID-19 guidelines in many countries. Uganda deployed the police, Uganda Peoples Defence Forces (UPDF), prison guards, Local Defence Units (LDUs), and local chiefs in this exercise. Unfortunately, some law enforcement officers became overzealous and used undue force in enforcing the guidelines. They beat people up (including pregnant mothers), kicked others, used tear gas, and even shot at people. They entered people's houses and compounds during the lockdown and curfew. They arrested people, impounded cars, motorcycles and confiscated people's goods and properties. They even manhandled health workers on their way to hospitals and clinics. Thanks to the media (television, radios, and Smartphone social media), which publicized this brutality, the public was able to learn about these

abuses. The President cautioned these errant law enforcement officers, and directed that they be arrested. Indeed, the military and police spokespersons did announce some arrests.

The Mental Health Fall Out

There have been very limited studies regarding the mental health fallout of the COVID-19 pandemic in Uganda, yet all these situations caused much anxiety, panic and stress in the population. With the lockdown, people worried that they could get medical emergencies and not be able to get help. The public got alarmed as their psychological distress escalated with the increasing uncertainty and loneliness. Anecdotal reports and the daily newscasts showed that there was and still is considerable unaddressed mental distress in the country. There has been no national psychosocial task force or effort to help Ugandans to psychologically cope with the pandemic. In some past crises in Uganda, psychosocial interventions were proposed for disasters, e.g., NUPSANA (Northern Uganda Psycho-Social and Needs Assessment), or following the Lugogo terrorist bombings. The following are some of the COVID-19 mental health fallouts that have been heard, especially in mass media on TV, radio, newspapers and social media:

1. There was increased domestic violence in communities during the lockdown and curfew.
2. Homicides and suicides were reported. There was/is no crisis hotline or rescue response.
3. As people's anxieties and tensions increased, they turned to alcohol and drugs, especially in the curfew hours. Loneliness, depression, anxiety and panic disorders increased.
4. Some people had turned to public jogging and exercises but this contravened the social/physical distancing guidelines and they were stopped. The President advised on exercising in compounds or indoors, with a video recording of himself doing home exercises.
5. Mental health units in regional referral hospitals were turned into isolation units for possible COVID-19 cases, e.g., in Masaka,

Hoima, Mubende, etc. However, there was/is silence on the plight of the mental patients who usually got treatment from there. An example is the case of a mentally ill patient who was widely reported in the news. He missed his drugs as he could not go to hospital during the lockdown, relapsed into psychosis, started wandering the streets, was picked up, arrested and beaten badly by the police/LDUs. Only his sister rescued him.

6. Health workers felt frustrated at the lack of PPE, transport, personal security and support as they geared up to combat the COVID-19 pandemic. Many opted to stay at home. Some frontline health workers caught COVID-19 and even died. This included doctors.
7. Many chronically mentally ill patients are relapsing. Some mental health workers tried to help their patients by telephone, but this proved frustrating and had limited reach.
8. In mitigation, some psychiatrists and other mental health workers went to the media to talk about mental stress in this pandemic. They also tried to organize themselves into response teams to go out to the regional hospitals to give advice and guidance on how counselling could be carried out to COVID-19 victims and their families. There was no national mental health initiative for the COVID-19 pandemic; and there was no direct mental health input from the President who led/leads the effort to combat COVID-19 spread in Uganda.

5. Suggested Psychosocial Remedies and Recommendations

In the past, Ugandans have faced many national crises/disasters touching on health. Examples include insurgency and civil war, HIV/AIDS, Ebola virus disease outbreaks, terrorist attacks, landslides, floods, storms, mass cult deaths (Kanungu), famines and earthquakes. However, the COVID-19 pandemic poses a global Complex Humanitarian Emergency (CHE). All nations, Uganda inclusive, need their unique individualized psychosocial intervention to help their citizenry to psychologically cope. For this COVID-19 pandemic, the following are suggested recommendations for a national psychosocial response based on WHO and Uganda's past/present unique circumstances.

A. Immediate Psychosocial Response

1. Crisis Counselling and Support: This needed to be instituted and addressed to:
 - i) Identified individuals who test positive for COVID-19, including the hospitalized.
 - ii) Families and contacts of individuals who test positive for COVID-19.
 - iii) People in quarantine.
 - iv) People affected by stigma outbursts, e.g., recent returnees from abroad, people of Asian/Chinese ethnicity, recovered COVID-19 positives who are now home.
 - v) COVID-19 infection suspects, including recent returnees from abroad and truck drivers.
 - vi) Grief and anger therapy for people who lose loved ones to the COVID-19 virus.
2. Debriefing of frontline health workers who are directly managing COVID-19 patients.
3. Debriefing of law enforcement officers deployed to enforce government guidelines in response to curtail the spread of COVID-19, including the need to use humane approaches.
4. Debriefing of anybody in the COVID-19 response, including food distributors, government officers, and to cooperate with helping agencies, e.g., Red Cross, UNICEF, etc.
5. Setting up emergency mental health interventions in hospitals, health centres or health clinics for anyone who acutely breaks down. This is especially important as mental health units in some regional hospitals have been converted into COVID-19 isolation centres. Private hospitals should be supported to offer usual mental healthcare to Ugandans.
6. All Ugandan and related mental health NGOs need to be critically involved in the psychosocial response to the COVID-19 pandemic. This includes the Uganda Medical Association, the Allied

Professionals Association (nurses, paramedics, psychologists, pharmacists, laboratory technicians, etc.), the Uganda Counselling Association, Basic Needs, etc. Their involvement should include advising on setting up psychosocial care based on the WHO MhGAP and Psychological First Aid (PFA) interventions in disasters, as well as the WHO's recent COVID-19 mental health guidelines.

7. A national COVID-19 Psychosocial Response Initiative should be set up, with briefings to the President through and working closely with the National Task Force.
8. With the arrival of vaccines, the set up National Vaccine Scientific Committee should have outreach to all regions in the country and include social scientists as members to advise on proper implementation of the vaccine roll out program to match the specific circumstances in local communities. This helps offset vaccine hesitancy.

B. Short-Term Response

1. There should be Training of Trainers for psychosocial responders going to regional referral hospitals. This makes it easier to accept treatment of COVID-19 victims in their communities, and helps reduce stigma and vaccine hesitancy.
2. Supervising structures of psychosocial responders going to the regional referral hospitals should be set up.
3. There needs be a system of protection for vulnerable populations, e.g., the homeless, orphans, mentally ill, elderly, refugees, street children, those with extreme poverty, slum dwellers, the disabled, etc.
4. There should be a system of preparing and equipping mental health clinics in hospitals, health centres and private clinics to deal with patients needing mental health treatment at any time.

5. There is a need for procuring Epi-tents for the isolation and treatment of uncomplicated COVID-19 infected individuals who do not require intensive interventions, such as ventilators. This will circumvent the need to convert mental health units into COVID-isolation units. Moreover, Epi-tents can be stored for future use after the pandemic is over. They are also cheaper than building new hospitals as has been seen in some developed countries.
6. There is a need for psychosocial training of vaccinators in preparation for mass COVID-19 vaccinations now that vaccines have become available. This helps in preparing the population to accept the vaccines and guard against vaccine hesitancy.

C. Long-term Response

1. It is imperative to set up and follow plans for frontline workers to check on their mental well-being and to address any possible long-term mental complications, such as vicarious traumatization, PTSD, depression, addictions or family problems. This includes health workers, law enforcement officers, and media personnel, as all these people are always involved in mass disasters and face re-traumatization. They face the daily possibility of getting infected with the virus and are thus traumatized by their daily work. Many develop panic disorders.
2. There is a need to set up a permanent coordinator position for a Psychosocial Response Strategy in the Ministry of Health to handle mass public health emergencies. There is a need for harmonization of the national strategy and hospital disaster plans as well as logistics and a budget for a psychosocial response in case of disasters or other CHEs.
3. There is a need to build capacity of health staff in regional referral hospitals in mental health and psychosocial support and empower them to carry out rapid psychosocial needs' assessments and lead intervention teams in case of disasters and other CHEs as was the case with NUPSANA.

4. There is a need for integration of psychosocial support knowledge and practice into the training curricula of all health workers, psychologists, social workers, counsellors and law enforcement officers.
5. Finally, there should be a family service division/secretariat at all levels of administrative units: Local councils (LC) LCI, II, III and IV and district (LC V). This helps cater for domestic family issues including extreme poverty, orphans and domestic problems which always increase in disasters.

6. Conclusion

As in all complex humanitarian emergencies, providing and ensuring mental health interventions safeguards humane treatment for all. Epidemics and pandemics are psychologically traumatic, and present huge mental health fallout and unique challenges. Ugandans have experienced and continue to experience this in the COVID-19 pandemic. In Uganda, deaths from COVID-19 infection may be few, but tragically, those from botched or failed psychosocial mitigation have caused much community alarm, and yet are preventable, e.g., LDU shootings.

There is a lack of research regarding the mental health fallout of COVID-19 in this country. This pandemic is still ongoing. There is no cure yet, although vaccines are now available. The population needs to be educated and psychosocially accept long-term measures to mitigate COVID-19 spread, including wearing masks, social distancing and continued hand washing/sanitization. With the easing of the lockdown and a gradual opening of the country to business, the community spread of the virus and its new variants could shoot up. The healthcare sector could become overwhelmed and preventable deaths may increase. A new phase of getting used to “living with the virus” is setting in, especially with the availability of vaccines. Life in the world of COVID-19 will be very different compared to before. This calls for local psychosocial research to devise new coping mechanisms in living in this new reality; just like what happened when we learned to live with HIV/AIDS. This research needs to be trans-disciplinary, not just multi-disciplinary or interdisciplinary. This is because COVID-19 cuts across disciplines with much overlap, e.g., healthcare and business, education, transport, and governance, etc. It needs

to be transnational, with broad cultural competencies, and to address all ages, genders, races, ethnicities and ideologies. Pandemics don't respect borders or human barriers. Finally, the research effort must be integrative as opposed to reductionist. Researchers must look for determinants of ill-health and not just causes. It must follow the four principles of Scope, Integrate, Collaborate and Apply (SICA).

There has been very limited mental health research in Uganda in pandemics, and especially in the COVID-19 pandemic. This disease is new and there is limited knowledge about it or its effects, e.g., diagnostics, therapeutics, vaccines, long-term outcome, etc. Moreover, the situation is fluid and changing all the time. Opening up of the country poses new challenges: for example, how will schools cope with the containment guidelines and SOPs? What will the advent of vaccination be on the community? Will everyone have equal chance to access the vaccine? What are the long-term neuropsychiatric effects of Covid infection on an individual? These scenarios/questions are true worldwide. Currently, some of the ongoing mental health research in Uganda includes the following:

1. The impact of the COVID-19 pandemic and its response on the mental health of people with pre-existing mental conditions in Uganda (Seggane Musisi and Noeline Nakasujja).
2. Developing the Uganda National Mental Health Response to Disasters (Paul Bangirana).
3. Incorporating mental health and psychosocial support in the Ugandan Police Child and Family Protection Department and addressing sexual and gender-based violence (SGBV) (Catherine Abbo and Raymond Odokonyero)
4. Effectiveness of psycho-education on stress, anxiety, depression and PTSD delivered by Village Health Teams (VHTs) in communities affected by COVID-19 (Dickens H. Akena and Noeline Nakasujja)
5. Children-friendly spaces for people affected by COVID-19 (Juliet Nakku)

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As at present in Uganda, there is an absence of an official national psychosocial intervention initiative to COVID-19 or to pandemics in general. As we respond to this COVID-19 pandemic it is imperative that we set up one to safeguard the mental wellbeing of everyone, including patients, frontline workers and the community. As is the case with the rest of Africa, Uganda is far from being out of the woods. Things must not be allowed to get worse. This may be so with the spread of new mutant strains which may be resistant to current vaccines. This makes a compelling case for instituting a national psychosocial intervention for the COVID-19 pandemic and for future pandemics.

Of all the riders of the Apocalypse, the Fourth Horseman has been the busiest. During the Middle Ages, the Black Plague killed 30 million people in two years, defeating feudalism and subverting the authority of the Catholic Church. By targeting homeless soldiers and whores, syphilis hopped from bed to bed during the Renaissance, introducing menace to sex and to society. Smallpox conquered the New World with such force after Columbus that its political scars have not yet healed on the face of the Natives' cultures.

Contemporary society has forgotten that it is a product of past epidemics, and certainly does not consider itself as candidate for future scourges. But crowded cities, polluted waters, burning forests, and the deteriorating atmosphere are all resolute allies of the Fourth Horseman. Death, and death in great numbers, has always been the way that life has been renewed on earth. Whatever the means, the Fourth Horseman always takes his quarter.

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The Economic and Domestic Financing Policy Perspective

By

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Abstract

The global outbreak of the COVID-19 pandemic and the response to the crisis has had economic consequences of historic proportions. This paper discusses the consequences of the shock and the challenges for economic and financial policy in Uganda. In addition to outlining the key aspects of the policy response to the crisis, it identifies some emerging opportunities that the country can position itself to take advantage of—key among them the need to accelerate the government’s import substitution and export promotion drive in the context of enhanced investments in areas where comparative advantage exists. Building economic resilience against future shocks will require strengthening risk management practices, resolving barriers to trade integration, and harnessing technological innovation.

1. Introduction

The outbreak of the Coronavirus pandemic has, without exception, impacted lives and economic activity across the world, which has resulted in increased uncertainty and has damaged near-term economic prospects. Many countries are facing a multi-layered crisis comprising of a health shock, domestic economic and financial flow disruptions, plummeting external demand, capital outflows, and a collapse in commodity prices.

In Uganda, the pandemic continues to test the resilience of the economy. The economic impact was being felt well before the first case was confirmed on March 22; trade activities were on the decline, tourist arrivals were dwindling, and consumption demand was slowing down. In addition, the decline in the pace of global economic activity negatively impacted our exports, remittances, and foreign direct investment. Beyond the inevitable impact of the global disruptions on Uganda, the government’s response to the outbreak—key amongst which included closure of all borders and a partial lockdown—dampened economic activities, with the effects of

the lockdown mostly felt in the informal trade sector, domestic transport, and retailers, amongst others. Lower economic growth affected household incomes and hampered domestic revenue mobilization, resulting in a revenue shortfall during financial year 2019/20. Lower domestic revenues and the additional expenditure requirements to support the health sector and vulnerable populations further dented public finances, leading to an expansion in the budget deficit. Despite the challenges, the pandemic presented unique opportunities that government has drawn on to craft the economic policy response for a post-COVID-19 recovery.

This paper examines the impact of the COVID-19 pandemic shock and other emergencies (e.g., locust invasion and floods) on the economy, and highlights the measures put in place to contain the health challenge as well as to mitigate the impact on households and businesses. Finally, it identifies the lessons and emerging opportunities that the country can position itself to take advantage of.

2. Economic Impact of COVID-19 and Other Recent Shocks

The Global Situation

With more than two-thirds of the global economy under some form of lockdown, the impact of COVID-19 has been felt globally in the following ways:

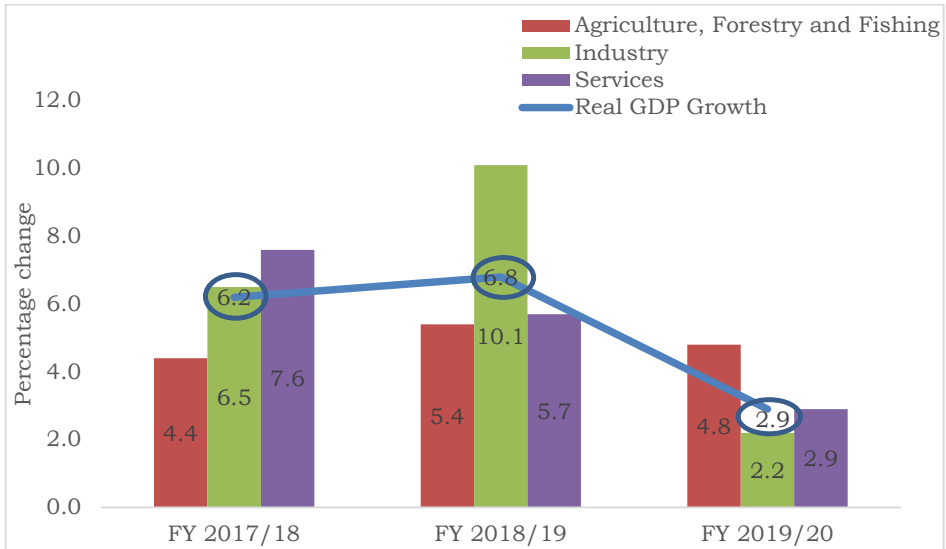
1. Disruptions in global supply chains, with significant supply shortages that have resulted in inflationary pressures.
2. Slowdown in foreign investment flows and remittances and resulting job losses.
3. Decline in tourism and international travel, resulting in jobs and income losses in the tourism and hospitality sectors.
4. Limited fiscal space, with many countries unable to adequately respond to the crisis.
5. Tightening in the global financing conditions, despite interventions through monetary policy to cut interest rates.

The pandemic outbreak has, with alarming speed, delivered a global economic shock of unprecedented magnitude, leading to steep recessions in many countries. According to the recent World Bank forecasts, global GDP is projected to contract by 5.2 percent, representing the deepest global recession since the great depression, despite unprecedented policy support (World Bank, 2020). Beyond the staggering economic impacts, the pandemic is expected to have severe and long-lasting socio-economic impacts that threatens long-term growth prospects. For Sub-Saharan Africa (SSA), the fall-out from the pandemic is expected to slow the region's growth prospects to 1.6 percent during 2020, the lowest level on record (IMF, 2020). The tightening of global financial conditions has affected investment flows to the region, ultimately reducing financing needed for growth. The uncertain global trade environment further exposes the region to reduced external demand and disruption of supply chains, all of which will affect revenues, firms, and livelihoods.

Impact on the Economy

In Uganda, the effects of the COVID-19 pandemic were most keenly felt in the second half of financial year 2019/20 through disruption to key service sectors such as tourism and hotels, while manufacturing and trade were affected by disruptions to supply chains. Consequently, the pace of economic output slowed to 3.1 percent during financial year 2019/20, which was slower than the pre-pandemic projection of 6 percent, and the 6.8 percent recorded in the previous year. All the major sectors of the economy recorded a slow-down in growth, with outputs from services and industry sectors the hardest hit. Figure 1 shows the sectoral performance of real GDP.

Figure 1: Real GDP growth by sector



Source: UBoS

In addition, the outbreak contributed to the worsening of Uganda’s position with the rest of the world, by adversely affecting inflows from exports, foreign direct investments, tourism, and remittances. Weaker external demand translated to lower export earnings, while travel restrictions dented earnings from the tourism sector. Between January and June 2020, export earnings amounted to US\$ 2,522 million, reflecting a 24 percent decline as compared to the same period last year, while remittances from Ugandans in the diaspora declined by 20 percent over the two periods (BoU, 2020). The fall in private remittances represents a loss of a crucial financing lifeline for many vulnerable households (World Bank, 2020). The crisis is already having a significant impact on tourism, threatening direct and indirect employment. Pandemic-related travel restrictions affected tourist arrivals, which significantly contributed to the 62 percent fall in earnings during the second half of the financial year, as compared to the same period last year, and wiped out the gains achieved in the first half. While the focus has mainly been on the pandemic outbreak, at the onset government was already grappling with the twin challenges of a locust invasion in the north-east and flooding in several parts of the country, which threaten agricultural production and food security as well as loss of livelihoods.

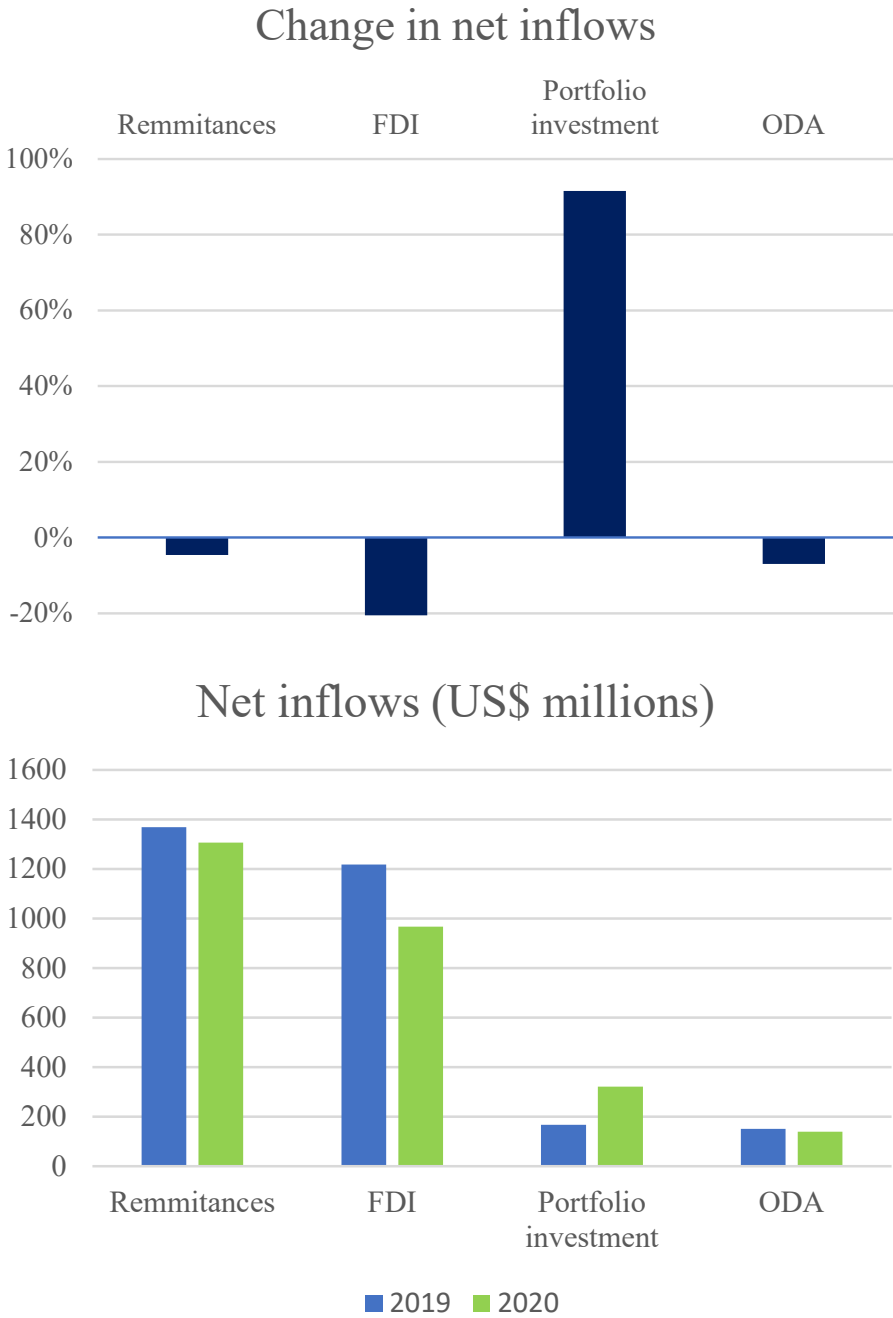
Impact on Domestic Resource Mobilization

The health and economic shock hampered domestic revenue mobilization efforts during financial year 2019/20, resulting in revenue shortfalls. The restrictions put in place by government to control the spread of the virus caused disruptions in business operations and economic activity, and negatively affected all the major tax categories. More than two-thirds of the shortfall was realized in the last four months of the financial year (March-June 2020), a period in which the effects of the COVID-19 pandemic on the economy were most pronounced. Overall, revenue collection registered a shortfall amounting to Shs 3,361 billion, or 16.3 percent against the target for the year. Going forward, a slow recovery in the pace of economic activities coupled with the fiscal measures on deferring some tax payments for the COVID-19 ravaged sectors could further complicate revenue mobilization efforts, and thereby impede implementation of the Domestic Revenue Mobilization Strategy, which targets raising domestic revenues by half a percentage point of GDP each year over the medium term.

Impact on Other Financing Flows

At the onset of the COVID-19 crisis, net inflows of external financing towards low- and middle-income countries remained below peak levels received prior to 2015, when there was a sudden stop (OECD, 2020). Early observations indicate a continued decline in financing flows should be expected due to the high degree of economic uncertainty, global contraction of economic output, and volatilities in international financial markets. The response mirrors the fall-out from the 2008 global financial crisis, where remittances, foreign direct investment and portfolio investment all declined (OECD, 2020).

Figure 2. Net inflow of external financing



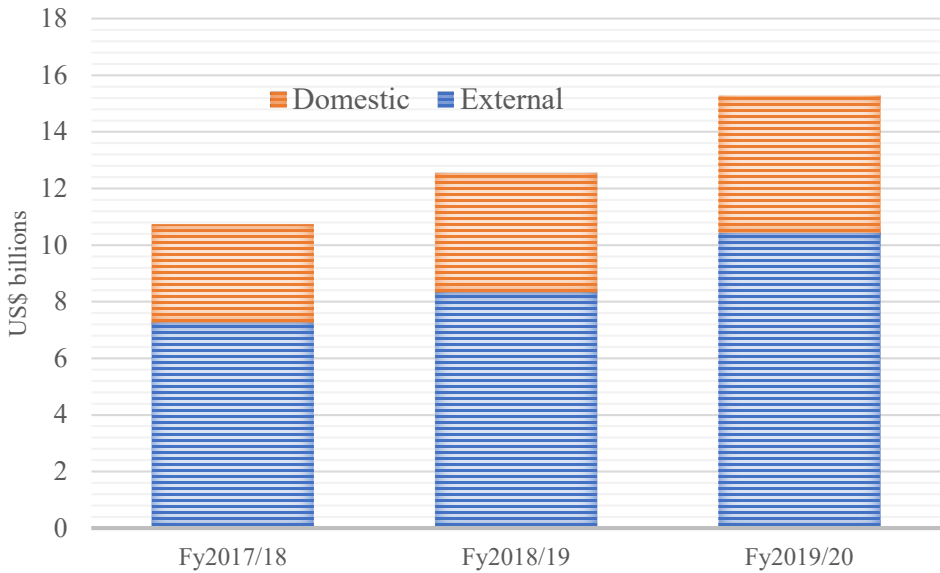
Source: Bank of Uganda

As shown in Figure 2, except for portfolio investments, the other components of external financing declined between financial years 2018/19 and 2019/20, with foreign direct investment flows the most affected. Between January and June 2020, FDI flows fell by 43 percent compared to the same period a year ago, and was down 31 percent on performance of the first half. The COVID-19 impact on remittances and official development financing was less severe, which is partly explained by a lag-effect. The change in net inflows for remittances and development financing was a decline by 5 percent and 7 percent, respectively, between financial years 2018/19 and 2019/20. As most countries providing development financing would have finalized their budgets by the time of the outbreak, the full impact could manifest overtime.

Impact on Public Debt

Both the health crisis and the socioeconomic shock necessitated large and immediate increases in public spending on health, social protection, and economic relief, all of which increased pressure on already strained public finances. The additional spending requirements and revenue shortfalls further constrained the fiscal space in the budget during the year, which necessitated additional government borrowing. A total of Shs 2,286.4 billion was borrowed from the Trade and Development Bank and Stanbic Bank to cushion the budget against revenue shortfalls, while the IMF extended a loan amounting to Shs 557.4 billion to support government's efforts in the fight against the COVID-19 pandemic. The increased rate of debt accumulation translated into an increase in the stock of public debt from US\$ 12.55 billion in financial year 2018/19 to US\$ 15.27 billion in financial year 2019/20, as shown in Figure 3.

Figure 3. Public debt composition



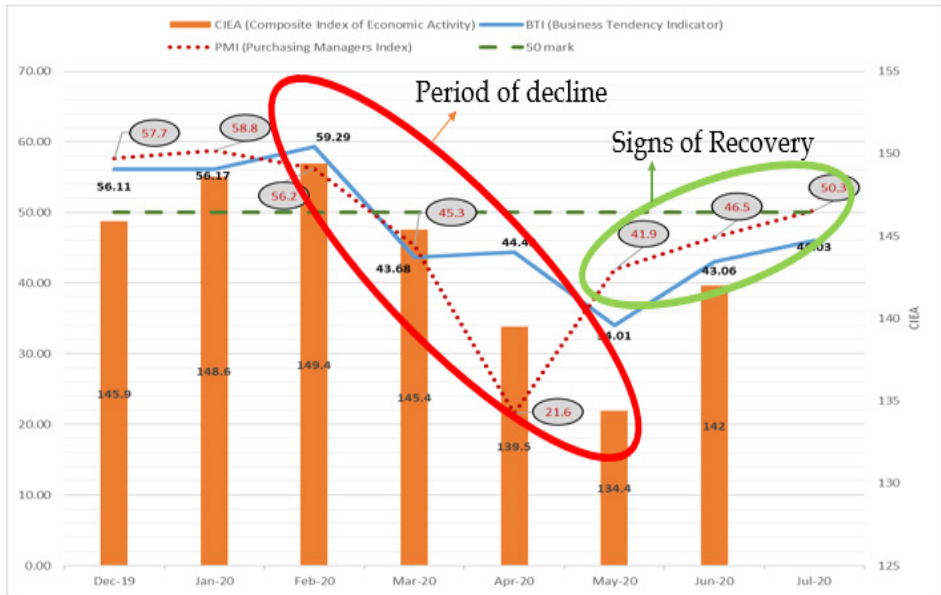
Source: MoFPED

As a proportion of GDP, public sector debt rose to 41 percent during the year from 35.3 percent in financial year 2018/19. In spite of the increase, public debt remains sustainable in the medium- to long-term, as the bulk of the debt outstanding was borrowed on concessional terms.

3. Near-Term Economic Outlook and Prospects for Recovery in FY2020/21

In May 2020, government commenced easing of some of the containment measures, which has enabled a reopening of some sectors of the economy. Consequently, there have been signs of economic recovery—though this is expected to be gradual and uneven across sectors. Recent data on the high frequency indicators (see Figure 4) used to gauge the health of the economy shows improvements in the pace of economic activities, with now more Ugandans back to work and engaging in productive activities. Figure 4 shows monthly trends performance of the indicators of economic activity.

Figure 4. Monthly trends in indicators of economic activity



Source: Bank of Uganda, Stanbic

For financial year 2020/21, economic output is projected to accelerate to 3.1 percent, driven by public sector interventions that offer short- to medium-term returns by supporting the private sector to generate growth, jobs and other opportunities for household income generation activities. In addition, favourable weather conditions are expected to support agricultural production, while the easing of lockdown restrictions will gradually lead to an improvement in service sector performance. Over the medium-term, the pace of economic activities is expected to accelerate further to an average of 6 percent per annum, supported mainly by enhanced private sector activity due to increased consumer demand post COVID-19, and increased returns from public infrastructure investments.

4. Policy Response to the COVID-19 Pandemic and other Shocks in Uganda

Globally, the response to the COVID-19 pandemic was swift, as governments and multi-lateral institutions responded with a mix of fiscal and monetary policies mainly to stimulate economic growth and mitigate economic and social costs. In Uganda, government put in place measures to address economic and health challenges caused by the COVID-19

outbreak and other recent shocks (locust invasion and floods). In addition to making available—through a supplementary budget—additional public resources for health spending, government prioritized providing support to the most vulnerable among the population and took key fiscal and monetary policy actions to mitigate the impact of the pandemic on businesses and households. The specific actions that have been undertaken or are being implemented in this regard are the following:

i. Enhanced healthcare provision

Government made available additional resources to strengthen health systems to promote health for all Ugandans. In this regard, an additional Shs.176 billion was added to health spending to cater for the recruitment of additional health workers and provide for their welfare. In addition, as a measure to deal with the Coronavirus pandemic and other similar epidemics that may occur in the future, government prioritized the purchase of Personal Protective Equipment (PPE) and provided additional funding to increase intensive care beds at national and regional referral hospitals. Additional resources amounting to Shs.31 billion have been directed towards supporting scientific research and innovations, especially in vaccine development.

ii. Providing Emergency Social Protection

Uganda's vulnerable population, including the elderly, require protection, more especially to address the aftermath of the recent emergencies. Government was able to provide relief aid amounting to Shs.45 billion in response to the Coronavirus crisis, and natural disasters such as the locust invasion and climate change crisis—floods and landslides. In addition, the Social Assistance Grant for the Elderly (SAGE) has been rolled out nationwide to persons aged 80 years and above, including the elderly aged 65 years in the piloted 15 districts.

iii. Restoring Household incomes and Safeguarding Jobs

The following interventions were implemented with the aim of restoring household incomes and safeguarding job loses:

- a. Provision of improved agricultural inputs using an e-voucher scheme for farmers, and up-scaling agriculture extension services to boost production of key agricultural commodities.
- b. Creation of jobs for the vulnerable but able-bodied persons affected by Coronavirus by expanding labour-intensive public works in urban and peri-urban areas.
- c. Provision of seed capital to support organized special interest groups targeted mainly towards the youth and women.

iv. Re-Igniting Business Activity

To address the liquidity constraints facing small, medium and large-scale enterprises, affordable lines of credit will be availed through enhanced capitalisation of the Uganda Development Bank (UDB), Uganda Development Corporation (UDC), Agricultural Credit Facility (ACF), and Micro Finance Support Centre Limited (MSCL). This coupled with the payment of domestic arrears and various tax reliefs to business enterprises will enable Ugandan private investors to weather the COVID-19 storm.

v. Tax Response Measures

Government is also implementing the following tax measures to mitigate the impact of the pandemic on businesses and households:

- a. Temporary deferment of payment of Pay-As-You-Earn (PAYE) taxes for tax compliant businesses facing liquidity constraints.
- b. Six (6) month extension of due dates for filling corporation tax or presumptive tax returns for qualifying companies and SMEs in the most affected sectors with a turnover of less than 500 million Shillings.
- c. Grant of waiver of penalties on principal tax liabilities accumulated before 1st July 2020 to lessen the tax liability of businesses who voluntarily comply with their tax obligations.
- d. Tax waiver (for a limited period) on medical items required in the fight against COVID-19.

v. Financial Sector Stability

To ensure that the financial sector remains resilient in the face of vulnerabilities from the economic disruptions caused by COVID-19, the following interventions were undertaken:

- a. Make available through the Central Bank exceptional liquidity assistance for a period of up to one year to supervised financial institutions that need it.
- b. Defer payments of all discretionary dividends and bonus payments for three months to boost capital buffers for financial institutions under Central Bank supervision.
- c. Waiver on limitations on restructuring of credit facilities for supervised financial institutions (SFIs).
- d. Promote and facilitate the use of digital payments.

5. Lessons and Opportunities

In dealing with the challenges of the pandemic, we need to accelerate planning for what will be the “new economic normal.” The country cannot aspire to go back to the way things were before the crisis, but instead must find ways to adapt existing measures to restore business confidence and work towards a recovery that is inclusive for all. Lessons and opportunities for this new economic normal include, among others:

1. The pandemic provides great opportunities to accelerate the government’s import substitution and export promotion drive in the context of enhanced investments in the areas where comparative advantage exists. The guiding principle involves creating production efficiency using locally available resources, minimizing costs, and maximizing profitability, while increasing production and the productivity of enterprises. The priority areas of focus for import substitution include: enhancing food production—for domestic consumption, food security, and export; expanding agro-based industrialization; production of textiles for clothing and leather goods; production of pharmaceuticals and veterinary drugs; manufacture of ICT equipment; human development—education and health; manufacturing motor vehicles, plants and machinery. Some of the areas where opportunities for increased exports have opened up include: horticulture and coffee export to Europe, as

well as pharmaceutical and sanitary supplies within the EAC region. Government will continue working with the private sector to harness this potential.

2. The pandemic has shown increased scope for digital transformation. The crisis has brought to the fore the important role of digital transformation in revolutionizing employment and production processes. Digitalization has the potential to enhance business productivity, diversification, improve the business climate, communication, and governance. Online retailing and e-commerce have emerged as a key growth area, which calls for the need to increase public and private investments in ICT infrastructure and e-commerce strategies to harness these technological innovations.
3. Strengthened risk management practices, including establishing early warning and detection mechanisms, are essential. The rapid spread of the COVID-19 virus has demonstrated that local, national, and international warning systems for pandemics are grossly underdeveloped. The crisis necessitates the need to update country contingency planning measures to mitigate the risks, and to protect the most vulnerable persons. Beyond country responses, greater collaboration and coordination will be required to build resilience, address existing challenges, and prepare for future pandemics and other shocks by adopting standardized and robust early warning and detection mechanisms.
4. There is a need to urgently resolve barriers to trade integration. The COVID-19 pandemic and its associated economic costs have shifted the international trade debate towards advocating building domestic industrial capacities and for countries to prioritize regional (rather than global) production networks. Policies that focus on boosting domestic production and shortening supply chains (through intra-regional trade) will be a key facet to building economic resilience against future epidemics and other shocks (O'Reilly, 2020).

A holistic approach to resource mobilization is required for “building back better.” With limited fiscal space and less access to financing, domestic resource mobilization remains the only long-term viable source

of sustainable financing for many public services. In a post-pandemic economy, the policy tool-kit should focus on increasing progressive taxation and improving tax compliance, while ensuring that adjustments are growth-friendly.

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COVID-19 and the Library Response in Uganda

By

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1. Introduction

At the end of 2019, news of a respiratory disease in Wuhan China started spreading all over the world. The disease, Coronavirus, also interchangeably called COVID-19 on 11th February 2020, has spread to almost all countries on the planet. By 11th March 2020, it had been termed a pandemic. As a result, several countries went into lockdown by mid-March, curtailing all public transportation except for essential services. At home in Uganda, on 18th March 2020 the President had declared the closure of all educational institutions and by 1st April 2020 a lockdown had taken effect. This declaration brought the pandemic experience close to home, as movement was limited. This disrupted all sectors of life, including education under which the libraries covered in this paper fall. It was unprecedented that life as we knew it—worldwide—nearly came to a standstill. On 19th October 2020, there were 10,590 confirmed cases of COVID-19, 97 deaths, and 384 active cases in Uganda (MoH, 2020).

2. COVID-19 and Library and Information Sciences

Library and information sciences (LIS), broadly speaking, deals with the production of information, how it's disseminated, evaluated, selected, acquired, used, organized, maintained, and managed. It is not limited to librarians, but includes archivists, documentalists, record managers, web editors and, with some hesitations, publishers and museologists. The one thing in common for all information professionals is that they have to organise collections, both physical and/or virtual. In this paper, I will focus on libraries as part of the broader LIS structure.

In society, libraries play different roles for different people. To some, the library is a quiet place to study, a storytelling place, a place to access the Internet/Wi-Fi, or a place to borrow books (White, 2012). For others, it is a place to escape everyday life (Begum, 2011). There are different types

of libraries, and therefore different target groups, e.g., public libraries, school libraries, and academic libraries. The UNESCO Public Library Manifesto defines the public library as an organization that helps to create a democratic, equal, and peaceful society (UNESCO and IFLA, 1994). The public library is intended to cater for all. This is where reading habits among children are nurtured, providing services for self-education, and the professionalization of individuals, among other services.

In the education sector, libraries offer services in line with their parent organisation. As such, school libraries support the goal of the school to grow a community of enthusiastic readers by making accessible a wide range of different reading material that reflect both the learners' interest and their reading abilities (Mahwasane, 2017). Librarians have a great understanding of what it means to be a library; however, the challenge is usually in letting the public, who are our users, know how we can be of service. Traditionally, libraries are associated with physical books, and therefore the conception of the library is tied to the location or space (Evans and Baker, 2013). It is also largely thought that libraries are only book repositories. But when pandemics happen, as in the case of COVID-19, requiring public offices including libraries to close, did services stop? Did librarians sit back and wait for the next decree to open?

3. Library Services in Uganda during COVID-19 lockdown

By February 2020, the media was rife with news of the deadly disease and indeed the deaths ensuing from it, in Iran and Italy especially. The news rallying people to wash hands, and to stay away from crowded areas proliferated amidst a lot of fake news regarding the prevention and treatment of the COVID-19 disease. Despite the fact that the news of the spread of COVID-19 kept getting closer each day, most sectors, including libraries, even here in Uganda, seemed clueless as to what else we could do except for sharing COVID-19 awareness messages (WHO, 2020a). There were no clear guidelines on how libraries should respond besides promoting the public health measures of wearing face masks, physical distancing, hand washing and sanitisation (Guo et al., 2020). It was incomprehensible that the country would be under a COVID-19 total lockdown in a few weeks, inline with the advice from the WHO.

As such, when President Museveni addressed the nation on 18th March and ordered all educational institutions to close, the general thought was that the closure would be for a few weeks, and we therefore had no strategy for continued delivery of service. While schools closed on 20th March, universities handled their closure at their discretion. For example, Makerere University closed to both students and staff on 20th March, whereas at Kyambogo University closed the university to students on that same date, but staff cautiously remained on duty.

In the public library sector, the libraries completely closed and services were discontinued. It should be noted that mostly school-going children in day schools and adults in continuous professional development programmes patronise the public libraries. For example, professionals pursuing certification courses like the Association of Chartered Certified Accountants (ACCA) use public libraries for quiet reading, access to the Internet, or as meeting places, and for access to core textbooks for their programs. The closure of the physical space and services disrupted their educational pursuits. However, to library staff, housekeeping duties resumed work behind the doors when the lockdown was eased in June 2020.

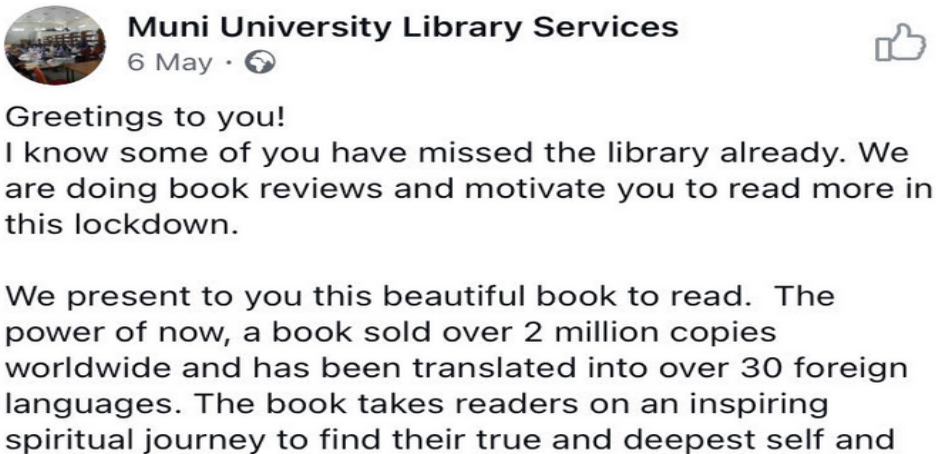
In the education sector, academic libraries did not fare any better. Libraries closed and library staff went home at the end of March 2020. Though the physical spaces were locked up, the digital library—commonly referred to as online resources—remained open, and could be accessed by users. The university and research libraries in Uganda have access to e-resources through the Consortium of Uganda University Libraries (CUUL), mostly funded by SIDA (Kinengyere, Kiyingi and Baziraake, 2012). University students and staff could still access the e-resources from the confines of their homes remotely if not Internet Protocol (IP) restricted. Librarians in these institutions remained on-call to respond to requests from students and staff.

To foster access to e-resources during the lockdown, one university library created guides to accessing library resources remotely, while others sent e-mails informing the university community on how to request the online delivery of full-text documents in case of restricted access to subscribed to content. Library users, staff and students were able to continue with their research endeavours, even when libraries remained physically closed.

However, no study has been conducted to assess the usage of e-resources during the COVID-19 lockdown in Uganda.

In another scenario, librarians took to social media to invite the general public to request e-books. A case in point: On 21st April 2020, a librarian at Muni University sent out a call on Facebook to individuals in quarantine who needed books on strategic management, risk management, marriage counselling, monitoring and evaluation, or general fiction (Buruga, 2020). Several people responded to the invitation, and their requests were delivered by e-mail (Buruga, 2020b). Relatedly, libraries also posted book reviews on social media to encourage people on the particular platforms to read. Below is a book review posted to Facebook on 6th May 2020.

Figure 5: A Facebook post from Muni University on a book review



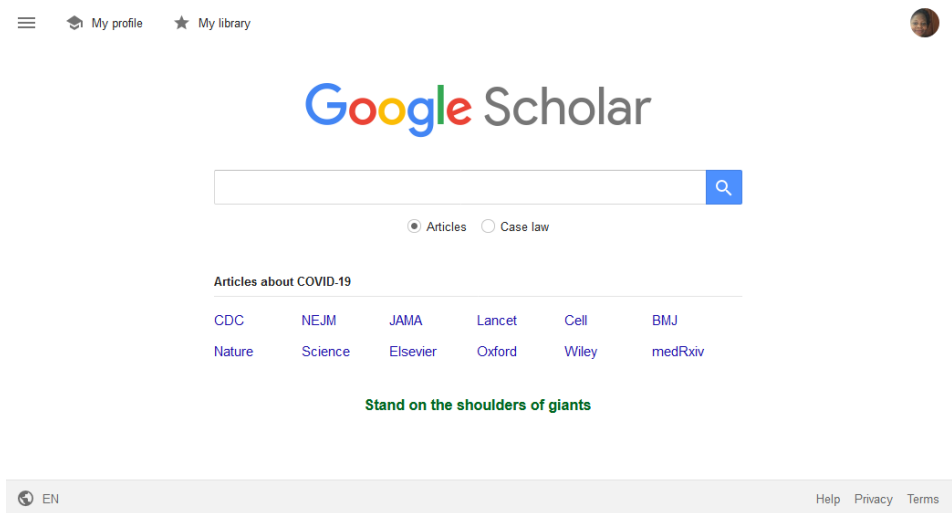
Libraries today are playing a larger role in research information management at institutions worldwide, and can offer considerable expertise to support researchers in scholarly writing. During this period, while lecturers were out of the classrooms, they devoted a lot of time to scholarly writing. However, several of them needed information on locating credible journals in which to publish. Thus, librarians provided support in identifying credible journals to publish in and also provided support in creating visibility for their research.

The research support provided to the graduate students included assistance with reference management, using software like Mendeley and Endnote

to organize references, and the self-archiving of their dissertations in institutional repositories. Most of this support was given over the phone in the form of calls and WhatsApp chats, as physical libraries remained closed.

Access to the right information at the right time is critical for COVID-19 research. This information not only bridges the gap in vaccine development, but also fights against misinformation. Several publishers have provided free COVID-19 related information (see Figure 6), but these resources are likely to remain underutilised if librarians do not bring it to the attention of researchers.

Figure 6: Free COVID-19 resources available via Google



Libraries are looked at as a social institution ensuring the provision of up-to-date and reliable information. Thus, evaluation of information sources is one of the core tasks in LIS that librarians help their users with. Such skills are usually shared during information literacy sessions. In the COVID-19 lockdown, online training sessions were conducted on topics like how to access several databases subscribed to by the universities, including the free resources by different publishers via Google Scholar, were covered.

4. The future of Libraries after the COVID-19 Lockdown

It has been communicated that COVID-19 can be transmitted through direct contact with infected people, and indirect contact with surfaces in the immediate environment or with objects used by the infected person (WHO, 2020b). With this kind of disease and the nature of traditional library services that require direct contact with people and resources, namely: reading materials, computers, and furniture, extra care and caution to safeguard the lives of library users and staff are required. So how are the libraries preparing to provide the physical service?

So far, educational institutions are opening to students who are in their final year of study. This is being done with caution, and in strict adherence to the Standard Operating procedures (SOPs) against COVID-19 and the Ministry of Health (MoH) guidelines.

In a WhatsApp interview with 43 librarians, six of the university librarians in the CUUL, indicated that they will be re-opening libraries when the final year students report in October 2020. It was reported that they planned to keep the libraries open during weekdays only, Monday to Friday, from 8:00am to 5:00pm, in contrast to the extended hours that were characteristic of academic libraries before the COVID-19 lockdown.

Six librarians reported that they will keep the libraries closed on weekends. Only two librarians indicated that they will be open on weekends (Saturday and Sunday) from 8:00am to 5:00pm. It should be noted that the variation in opening hours is mainly to adhere with curfew sanctions, and also due to staff layoffs, especially at the private universities.

In adherence to the COVID-19 SOPs, all libraries indicated that they will be registering all people entering the library buildings (students, visitors, and staff), and taking note of their names and phone numbers for contact tracing, in addition to the body temperature taken at the library entrance. Most libraries indicated that they had acquired temperature guns to take body temperatures, while one library reported that they had acquired an automatic temperature checking system. Additionally, libraries expect all people to put on masks and wash or sanitise their hands before they access library premises. To enforce this, hand washing/sanitising stations have been provided at the library entrances.

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Certainly, with the implementation of online learning in universities, it is expected that some students may seldom use the physical library, and hence the need for remote access to library resources. Four librarians indicated that their universities have running subscriptions to software for remote authentication, while two indicated that their subscriptions had expired and that they will be pursuing renewal of subscription contracts.

To provide for social distancing, six librarians indicated that they have reorganised the sitting arrangements in their respective libraries. They indicated that chairs had been removed to allow for the two-meter spacing prescribed in the COVID-19 SOPs. The implication for this is that the sitting capacity of libraries has been tremendously reduced, thus depriving some students of the opportunity for quiet reading. It should also be noted that some of these libraries are already too small.

To allow for physical distancing among library staff, especially in private universities, three libraries indicated that they will be working in shifts, and others remotely. The librarians from public universities did not indicate whether there are plans for remote or shift work schedules.

To address the concerns about possible virus transfer via books, DVD, or CDs, the librarians seemed non-committal on book isolation/quarantine after handling by students. One librarian indicated that in her library, gloves will be used by librarians while issuing out books. The North East Document Conservation Centre in the USA recommends that quarantine periods should be based on scientific studies that test the attenuation of the COVID-19 virus on collections of specific materials, e.g., paperbacks, plastics, etc. However, 72 hours is the quarantine period generally recommended for books. This requirement is likely to hit libraries in Uganda hard because of the chronic inadequacy of print collections, and a student body dependent on libraries for access to textbooks.

5. Implications of the COVID-19 Pandemic on Library Services in Uganda

The effects of COVID-19 on library services will continue to evolve, but the obvious ones for now concern library access policies, social distancing and collection sanitisation while observing the national Standard Operating Procedures.

Technologies are shaping libraries in new ways. Libraries adopted ICT in service delivery, particularly via providing access to online resources. The promotion of digital resources has been ongoing for several years but uptake has been low (Kinengyere et al., 2012). Now, with online education it will no longer be optional to access online resources, but rather the norm. This will require heavy investment in ICT infrastructure on the part of universities, in terms of subscriptions and corresponding access requirements, bandwidth, equipment, etc. The adoption of online learning in educational institutions demands that students access e-resources from wherever they are. Universities will need to provide for off-campus authentication systems to facilitate online access to not only library resources, but also other administrative services.

Budget cuts in libraries. It is anticipated that there will be an economic recession and therefore budget cuts. Libraries are usually candidates for budget cuts because of the consumptive nature of their services. And yet, this is the time to invest in libraries in terms of building adaptations for physical distancing, operational resources specifically, digital resources, and sanitation costs.

Re-skilling of library staff. Libraries have become used to offering traditional library services, whereas COVID-19 and attendant challenges call for remodelling library services to meet customers' needs, moreover in a very short time. New services will have to be implemented and this calls for re-training in customer care, and digital skills for the online user that is becoming the norm. Additionally, librarians shall need training in disaster preparedness, and on developing in-house plans and appropriate response strategies (Todaro, 2020).

Scaling up of hybrid library services. With the “onlinisation” of education, library services cannot afford to remain traditional. It is on record that libraries adopted ICTs in their operations years ago, but the uptake of these services has been so low and will therefore require a deliberate effort to match learning demand. There will be a need for digital information portals in libraries as well as the traditional help desks.

Library-lecturer collaboration is key to successful e-learning projects. This can take different forms, and produce various learning opportunities for students. Librarians can team up with the lecturer to co-teach, or create specific library guides as may be required. Or, better still, the librarian could organise workshops with a focus on specific challenges, as may be identified by the lecturer (Dawes, 2017). To curtail the spreading of rumours about the pandemic, librarians should promote services and products so that library users get accurate information. This will be achieved through information literacy, where emphasis will be put on building skills for research and critical thinking to abate the consequences of fake news (Batchelor, 2017). Libraries have to be innovative and creative to remain relevant to this new user. Many users are on social media for trending information, but it is high time that library services connected with users on these platforms like twitter, Facebook, and WhatsApp. In addition, libraries cannot continue with business as usual. The trend for online learning demands that students access e-resources from wherever they are. To navigate through the plethora of online resources available both for subscription and for free, librarians shall have to develop online tools to support library users.

Redesigning of Library Spaces. In adherence to the recommended social distancing of two meters, libraries will need flexible spaces for the safety of both library users and staff. The possibility of remote working and its implication on traditional library services is still evolving. There is a need for universities to develop charters for remote and shift working where possible to avoid work redundancies. This has been achieved in private universities, while public universities are still lagging behind.

While most universities have in the past hesitantly supported online learning, COVID-19 has fostered the need for online learning and therefore the use of online library resources. As a necessity for continued teaching and learning, several universities adopted e-learning without fear

of failure. Organisations leapt to embrace IT solutions like Zoom, Google products (Google Meet and Google Classroom), learning management systems, e.g., Model as an e-learning platform.

In a nutshell, the COVID-19 lockdowns may have taken libraries by surprise, but with a lot of creativity and innovation, libraries continued to serve users to a small extent. As technology continues to advance, libraries in Uganda have also built their digital capacity to meet the information needs of the user community. However, there is still a gap in the uptake of online library services like the use of online journals and books that is expected to close with the further push towards online education. The obligation is on the management of institutions to sustain online subscriptions and tools to ease access and retrieval.

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SECTION 2: INDUCTED FELLOW

This section presents profiles of distinguished scientists who were inducted into the Academy Fellowship on 23 October 2020 during the Annual Scientific Conference. Prof. Joseph Obua, the Chairperson of the Fellows and Membership Committee of the UNAS Council, presented the following rigorously selected candidates to the President.



DR. CISSY M. KITYO, PhD, MSc, MB. ChB,

is a Medical doctor and Public Health specialist with a PhD from the University of Amsterdam. She is the Executive Director of the Joint Clinical Research Centre. She has 28 years of experience in HIV clinical care and health research with 194 publications in peer-reviewed journals. She pioneered, with other Joint Clinical Research Centre (JCRC) doctors, prescribing ARTs in sub-Saharan Africa from 1992, and has been at the forefront of scaling-up HIV treatment and ART use in Uganda from 2003. As a member of the AIDS Task force and Chair of the Uganda AIDS Clinical Care Subcommittee, she was involved in planning and writing the first national strategic plan and ARV policy to increase access to HIV care and ARVs in Uganda. She has been PI/Co-PI or investigator for over 80 research projects in epidemiological trials of HIV treatment and associated infections, intervention studies for HIV prevention and HIV vaccines. Many of these pioneering research projects have informed policy and clinical practice in Uganda and other developing countries. She is the site PI for JCRC Clinical Research Site (CRS) of the US NIH AIDS Clinical Trials Group (ACTG), a network running for over 15 years now. She played a crucial role in the development of the JCRC state-of-the-art clinical and research laboratory equipped to perform a variety of tests including: molecular biology, HIV drug resistance (HIVDR), Tuberculosis, and pharmacokinetic studies, among others. She is the Director for the JCRC College of American Pathologists (CAP) certified laboratories with the biggest menu in the country. She serves as an executive member on various local and international scientific committees in HIV research, prevention and treatment and provides mentorship to both local and international scientists. **Dr. Cissy M. Kityo** was inducted as

a Fellow of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



PROF. JO IVEY BOUFFORD, MD,

is the former President of The New York Academy of Medicine. Dr. Boufford is Professor Emeritus of Public Service, Health Policy and Management at the Robert F. Wagner Graduate School of Public Service, and Clinical Professor of Pediatrics at New York University School of Medicine. She served as Dean of the Robert F. Wagner Graduate School of Public Service at New York University from June 1997 to November 2002. Prior to that, she served as Principal Deputy Assistant Secretary for Health in the U.S. Department of Health and Human Services (HHS) from November 1993 to January 1997, and as Acting Assistant Secretary from January 1997 to May 1997. While at HHS, she served as the U.S. representative on the Executive Board of the World Health Organization (WHO) from 1994–1997. From May 1991 to September 1993, Dr. Boufford served as Director of the King’s Fund College, London, England. She served as President of the New York City Health and Hospitals Corporation (HHC), the largest municipal system in the United States, from December 1985 until October 1989. In 2010, she was appointed by Governor Cuomo to serve on the New York State Public Health and Health Planning Council. She currently serves as Vice Chair of the Council, and as Chair of its Public Health Committee. She also serves on the board of the United Hospital Fund, NYC Health and Hospitals, the Regional Plan Association, and the Health Effects Institute. Dr. Boufford was awarded a Robert Wood Johnson Health Policy Fellowship at the Institute of Medicine in Washington, DC, for 1979-1980. She served as a member of the National Council on Graduate Medical Education 1998-2002, and the National Advisory Council for the Agency for Healthcare Research and Quality from 1997-2002. She was President of the National Association of Schools of Public Affairs and Administration in 2002-2003. Elected to membership in the Institute of Medicine (IOM), now the National Academy of Medicine, in 1992, she served as its Foreign Secretary from 2005 to 2015, and as a member of its Board on Global Health from 2003-2015. She received Honorary Doctorate of Science degrees from the State University of New York, Brooklyn, New York Medical College,

Pace University and Toledo University. She was elected a Fellow of the National Academy of Public Administration in 2005. She has been a Fellow of the New York Academy of Medicine since 1988, and a Trustee since 2004. Dr. Boufford attended Wellesley College for two years and received her BA (Psychology) magna cum laude from the University of Michigan, and her MD, with distinction, from the University of Michigan Medical School. She is Board Certified in pediatrics. Her area of expertise is Urban Health, Healthy Aging, Disease Prevention and Health Promotion and Health Disparities. **Prof. Jo Ivey Boufford** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



PROF. RICHARD J. DECKELBAUM, MD, CM, FRCP(C),

received his education at McGill University in Montreal, Canada. He now directs the Institute of Human Nutrition at Columbia University, where he holds professorships in nutrition, pediatrics, and epidemiology. In addition to his ongoing basic research in cell biology of lipids, cardiovascular diseases, and issues of human nutrition, he has been active in translating basic science findings to practical application in different populations. He served on the Food and Nutrition Board of the National Academies of Science, and is a Senior Fellow of the Synergos Institute. Deckelbaum has trained over 50 PhD and postdoctoral fellows who now hold prestigious positions in academia, industry, and international organizations, such as the World Health Organization (WHO), in North America, Europe, South America, and Asia. Dr. Deckelbaum's h-index rating is 70, an exceptional rating. As detailed in his CV, he has made major contributions to policy, guidelines, and implementation, by serving as chair on major task forces in the United States (e.g., U.S. Dietary Guidelines Committee), Europe (e.g., European Atherosclerosis Society), and internationally (e.g., WHO). Dr. Deckelbaum has directed novel "Eco-nutrition" task forces and activities integrating health, nutrition, ecology, and agriculture. He is the co-founder of a novel medical school at Ben-Gurion University in the Negev, an affiliation with the Columbia University Medical Center. Dr. Deckelbaum has written on "The Trilogy of Abraham: Using Health and Science as Win-Win Modalities to Brotherhood," emphasizing how science brings together Christianity, Islam, and Judaism. Dr. Deckelbaum is the facilitator

and co-founder of the African Nutritional Sciences Research Consortium (ANSRC), which brings together academic and research institutions from across the East African region with the goal of building a PhD training program in basic laboratory research in nutritional and agricultural sciences. **Prof. Richard Deckelbaum** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



PROF. JAMES TUMWINE, MBChB, MMed, PhD,

holds an MBChB and MMed from Makerere University, MBChB (Mak); M.Med(Mak); FRSH(UK); PhD (UiB); and is a Professor of Paediatrics and Child Health in the Makerere University College of Health Sciences (MakCHS). He is a clinician, researcher and teacher of undergraduate, masters, PhD and post doc fellows. He has supervised over 20 PhDs and 50 Masters students to completion. He has experience in designing and carrying out clinical trials and cohort studies in Africa. He has had over 10 collaborative research initiatives with Universities in the USA, UK, Norway, Sweden, France and Africa. He has over 200 publications in peer-reviewed journals. He is Editor-in-Chief and founder of *African Health Sciences*, a PUBMED and Web of Science indexed journal. He is a consulting editor at PLOS MEDICINE and a member of the Council for Science Editors. He oversaw the establishment of Kabale University School of Medicine, chaired Kabale University Council for 8 years, and the Joint Medical Stores. For over 10 years, he coordinated research at Makerere College of Health Sciences where he also chaired the School of Medicine Research and Ethics Committee. He chairs Makerere Centre for Health and Population Studies (MUCHAP), and is a member of Fred Hutchison IRB in Washington State. **Prof. James K. Tumwine** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



PROF. ALISON MARY ELLIOTT, MBBS, MD, MA, BA,

is theme leader for Vaccines and Immunity and head of the Immuno modulation and Vaccines research programme at the MRC/Uganda Virus Research Institute (UVRI) and LSHTM Uganda Research Unit. She is also director of the Makerere University-UVRI Centre of Excellence for Infection and Immunity Research and Training, and Professor of Tropical Medicine at the London School of Hygiene and Tropical Medicine. She became interested in parasitology and research in Africa as an undergraduate, and this interest was encouraged further by an elective in The Gambia. After completing medical training, she joined the London School of Hygiene and Tropical Medicine and, during the late '80s and early '90s, undertook studies on the interaction between tuberculosis and HIV infection in Zambia. An infectious diseases fellowship in Denver, Colorado, followed, providing an opportunity to learn about management of drug resistant tuberculosis and about laboratory immunology. This enabled her to plan and conduct subsequent clinical-immuno-epidemiological studies. Since 1997, she has been based in Uganda at the Uganda Virus Research Institute. Current interests focus on the effects of chronic, immune modulating infections (such as helminth infections), on immune responses to vaccines, and on infectious and allergic disease incidence in children in Uganda; and on research capacity building in Africa. **Prof. Alison Mary Elliott** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



DR. MAGGIE B. KIGOZI

is a medical doctor by profession, a business consultant, and Chancellor at Nkumba University. She holds a Bachelor of Medicine and Bachelor of Surgery, and practiced as a physician in Zambia, Kenya and Uganda. In 1994, Dr. Maggie left the medical profession and joined Crown Bottlers Uganda Limited as the Marketing Director, where she has worked until her appointment at the Uganda Investment Authority (UIA) as its Executive Director from 1999-2011. Dr. Maggie is the first woman (and first person) ever to hold

this position. Dr. Maggie has continued to serve in various capacities as an Associate Professor, Makerere University; a Member of the Global Banking Alliance for Women (GBA) Advisory Board; a Director of the Board, Uganda Export Promotion Board and Crown Beverages Limited; Founder, Uganda Investment Authority Women Entrepreneurs Network; Focal Point Officer, Africa Asia Business Forum; Patron, Uganda Change Agents and Junior Chamber International; Patron, Ugandan Diaspora Network; Chief Scout, Uganda Scouts Association; Sportswoman; and she has represented Uganda in table tennis, lawn tennis, hockey and squash. She is now Board Member at Akina Mama wa Afrika. She is Uganda's Chief Scout and earned an African Elephant, the top prize for scouting in Africa. Dr. Kigozi sits on the Advisory Board of the apex private sector association, the Private Sector Foundation Uganda. She is a board member of UMA, where she chairs the Marketing Committee, which hosts the annual Uganda International Trade Fair. She is President of Business and Professional Women Uganda, and sits on a number of boards and works with many organisations that support leadership and entrepreneurship for women and youth. She is the chair of the Africa Scout Foundation, of the Global Fund Board Country Coordinating Mechanism (CCM) in Uganda, CBA Bank, Makerere University Business School, the Elder's Forum, and Trademark East Africa, among others. She travels regularly for scouting, and also works with Ugandans in the diaspora in regards to investment. She frequents the UK for board meetings of the Shell Foundation, and trains youth groups and university students. **Dr. Maggie B. Kigozi** was inducted as an Honorary Fellow of the Uganda National Academy of Sciences for her contributions to humanity.



DR. EDWARD KANYESIGYE

holds a Bachelor of Medicine, Bachelor of Surgery (MBChB), a Postgraduate Diploma in Public Health (DPH), and a Masters of Public Health (MPH) from the University of Adelaide, South Australia (1992). He was appointed Fellow of the African Institute of Public Health Professionals (FAIPH) in 2019. He served in the Uganda public service as a Medical Officer (1979-81), District Medical Officer (1982-1986), and Assistant Commissioner Health Services (1988-2002). From 1986 to 2002, Edward worked at MOH Headquarters

heading (at different times) the divisions of Training, Health Education, Clinical Services, Nutrition, and Human Resource Development. He had a three-year stint in between, and served as Behavior Scientist in the Medical Research Council (MRC)UK Program on AIDS in Uganda on an IEC intervention trial in stopping HIV transmission among people living in Masaka District, southern Uganda. He worked as the Training and Primary Health Care Manager, African Medical and Research Foundation (AMREF), Uganda Country Office, from June 2002 to December 2003. Between 2004 and 2007, he was a pioneer at the International Health Sciences University, Namuwongo, Kampala, teaching public health. From 2009 until today he has been at the Uganda Christian University (UCU). He headed the health Sciences Department, which was upgraded to a faculty in 2014, and a School of Medicine in 2018. He has served as external examiner (Public Health) at several Ugandan universities, chaired several conferences and boards of health services organizations, and is founder and President of the Uganda Public Health Specialists Association (UPHSA). He is a Rotarian and member of the Uganda Medical Association (UMA). **Dr Edward Kanyesigye** was inducted as an Honorary Fellow of the Uganda National Academy of Sciences.



DR. ROBERT FUNGO, PhD, MSc, BSc,

holds a PhD in Applied Human Nutrition from Makerere University, Uganda. He is a Researcher and an Academician in the field of nutrition and food science and technology. His professional interests include understanding the influence of biodiversity and food systems on the nutrition and food security of women and children in low- and middle-income African countries (LMIACs). He has published over 20 peer-reviewed articles in reputable journals, and is serving as a reviewer for a number of journals. He has mainly conducted research affecting the rural poor across Africa, and has published widely on topics related to how the locally available foods in East, Central and West Africa contribute to food and nutrition security among children and women. Robert has worked as a nutritionist with several international agencies including UNFAO, CIFOR and Biodiversity International, in East, West, and Central Africa. He has also served as a consultant with regional agencies, including CIAT, RUFORUM and IGAD in East Africa, and the USAID

FANTA III Project. Robert is the current President of the Federation of African Nutrition Societies (FANUS), an advocacy platform advocating for food and nutrition security to be recognized by African governments as a development goal. For the last 10 years, he has organized several international nutrition conferences across Africa, with the latest being the FANUS Nutrition Conference that attracted over 400 participants and several development partners. Robert's professional interests include understanding the influence of biodiversity and food systems on the nutrition and food security of women and children in low and middle-income African countries (LMIACs). **Dr. Robert Fungo** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Agricultural Sciences.



**PROF. JAMIDU HIZZAM YAHAYA
KATIMA, BSc, MSc, PhD,**

is a chemical engineer by training, and until recently a full Professor of Chemical Engineering at the University of Dar es Salaam, Tanzania. Currently, he is a Vice Chancellor of the Kampala International University in Tanzania. He holds a PhD from Leeds University (1990), an MPhil from Loughborough University (1986), and a BSc. (Eng. Hons.) from the University of Dar es Salaam (1982). His research, training and consultancy interests have focused on climate change, renewable energy, environmental management, impact assessment, wastewater treatment using constructed wetlands, monitoring and evaluation, and life cycle assessment. He is a registered expert with the Scientific and Technical Advisory Panel of the Global Environmental Facility, a Registered UNFCCC Expert—Clean Development Mechanism Methodologies. He has served as a Bureau Member of the Intergovernmental Panel on Climate Change—Task Force Bureau for the Greenhouse Gas (GHG) Inventories, and he has served as a Member of the Editorial Board of the Emission Factors of the IPCC. He has championed research in the use of wetland systems for treatment of wastewater—novel designs of wetlands have been developed, among them integrated wastewater treatment system with mitigation of GHG emissions through energy generation. Over 20 CW units have been constructed in Tanzania, Uganda, Kenya, Seychelles and Ethiopia. He has served as Principal Investigator in 5 megaprojects. He has successfully

supervised 20 PhDs and published about 30 papers in peer reviewed journals. He has championed development of modified fuel oil for use in low-speed engines, developed a rocket stove that uses jatropa cake, and developed a non-incineration technology for health care waste treatment. He has undertaken more than 100 consultancies for local and international organizations and companies. **Prof. Jamidu Hizzam Yahiya Katima** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Agricultural Sciences.



PROF. MICHAEL T. CLEGG, BS, MSc, PhD,

has a research specialty in population genetics and molecular evolution. In the 1970s, Prof. Clegg employed empirical experiments, computer simulations and mathematical analyses to establish that correlations among genetic loci decay rapidly to zero under moderate selection. These findings were of fundamental importance because they validated the key assumption of classical population genetic theory that the mathematical study of single genetic loci in isolation from the rest of the genome could accurately describe evolutionary dynamics. During the 1980s through the 1990s, Clegg pioneered the use of chloroplast DNA as a tool for phylogenetic inference by employing early DNA sequencing methods to the study of chloroplast encoded genes. These data were then used to reconstruct plant evolution at deep phylogenetic levels. Beginning in the late 90s, Clegg turned to the study of DNA sequence variation in plant genomes by analyzing the evolution of gene duplication, the evolution of plant transposable elements, and the distribution of single nucleotide polymorphisms (SNPs) in plant genes. In the 2000s, he used SNP-based approaches to reconstruct the early stages of plant domestication focusing on barley and avocado, thereby revealing that multiple domestication events were common in early agriculture. In international science, Prof. Clegg served as Foreign Secretary of the US National Academy of Sciences (2002-2014), as Vice President (external) of ICSU (2014-2018) and as a co-chair of the Inter-American Network of Academies of Science (2010-2016). He served on the ASADI Board (2003-2015), and as advisor to the Uganda National Council for Science and Technology. **Prof. Michael T. Clegg** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Agricultural Sciences.



**PROF. ELI KATUNGUKA RWAKISHAYA,
BVM, MVM, PhD,**

is a Professor of veterinary medicine with wide experience in research management. He holds a PhD (Glasgow), Certificate in Leadership (SRA, USA), certificate in Grantsmanship (SRA, USA), M.V.M. (UCD, Dublin), and B.V.M. (Makerere). Currently he is the Vice Chancellor, Kyambogo University, having served as the First Deputy Vice Chancellor (Academic Affairs) and Acting Vice Chancellor for the period February 2014 to May 2017. Before then, he was Director of Research and Graduate Training (2005-2013) at Makerere University. As Director of Research and Graduate Training, he attracted large sums of money to support research at Makerere University. Notable development partners were the Swedish International Development Agency (SIDA), Carnegie Corporation of New York, the European Union, Welcome Trust, and more. Before, he was Dean, Faculty of Veterinary Medicine, Makerere University (1996-2004) and Head of Department of Veterinary Medicine and Deputy Dean of the Faculty (1992-1996). He is also the President of Eastern African Research and Innovations Management Association, and Founding Member of the Uganda Research and Innovation Management Association (URIMA), and Executive Director of the Africa Foundation for Research and Innovations in Capacity Development (AFRICaD). He has published eight books, six book chapters, 65 peer-reviewed papers, over 70 conference proceedings, and has participated in more than 140 conferences and workshops where he has presented papers or participated as a key organiser. He is a member of many national and international organisations, notably the World Animal Health Aquatic Animal Health Standards Commission, the Society for Research Administration International, the Uganda National Examinations Board, and the Inter-University Council for East Africa. He obtained his Doctorate in Veterinary Medicine/Parasitology from the University of Glasgow. He got his Bachelor's degree in Veterinary Medicine from Makerere University, and Master's Degree in Veterinary Medicine from University College, Dublin. **Prof. Eli Katunguka Rwakishaya** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Veterinary Sciences.



**DR. WINIFRED M. TARINYEBA
KIRYABWIRE, LLB, LLM, SJM, SJD, Dip.
Legal Practice**

is an advocate by profession, and an Associate Professor of Law in the Department of Commercial Law at Makerere University, where she teaches Corporate Finance Law, Corporate Governance, Law of Banking and Law of Business Associations. She holds a Doctor of Science of Law degree (JSD'09), and Master of Science of Law degree (JSM'06) from Stanford University, USA as well as a Master of Laws degree (LL.M'01) from Cambridge University, UK, a postgraduate diploma in Legal Practice (PGDLP'00) from the Law Development Centre, and a Bachelor of Laws degree (L.L.B'99) from Makerere University. Dr. Tarinyeba Kiryabwire's research interests are in the areas of Law, Finance and Governance. She has published books on company law and micro credit, and co-authored publications on corporate governance and legal ethics. She is a Visiting Professor at Strathmore Law School, and has been a visiting senior academic at the Center for Commercial Law at Harris Manchester College, University of Oxford, a Visiting Professor at Strathmore University, and a Research Fellow at Cambridge University. She is a member of several professional bodies, including the International Insolvency Institute where she is a member of the academic committee, INSOL International, Institute of Directors (UK), and the Uganda Law Society. Dr. Tarinyeba Kiryabwire also serves on the boards of various organizations, including the International Ethics Standards Board for Accounts (IESBA), and Dfcu Bank. **Dr. Winifred Tarinyeba Kiryabwire** was inducted as a Fellow of Uganda National Academy of Sciences in the category of Law.



DR. ESTHER KATUURA, BSc, MSc, PGD, PhD, MBA,

is a Lecturer of Plant Sciences, Microbiology and Biotechnology (PBM), College of Natural Medicine (CoNAS), Makerere University. She holds a BSc in Botany and Zoology, a Masters in Plant Taxonomy and Biosystematics, a Postgraduate Diploma in Education, a PhD in Phytomedicine, and a Masters in Business Administration. Her research interests and experience of over 20 years is based on scaling up indigenous knowledge in medicinal plants for contemporary treatment of diseases and economic gain. She worked at the Natural Chemotherapeutics Research Institute for ten years as a Principal Research Officer. Her PhD thesis was on “Documentation, Efficacy, Phytochemistry and Safety of Plants used in the Treatment of Malaria.” She has published peer-reviewed papers and articles in a number of international journals. Her work focuses on finding ways to harness scientifically-evidenced plants, particularly of health, to solve the socio-economic and health challenges in our communities, country and wider world. **Dr. Esther Katuura** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Agricultural Sciences.



PROF. HENRY MWANAKI ALINAITWE, BSc, MSc, PhD,

is the Principal of the College of Engineering, Design, Art and Technology, and a Professor at Makerere University. He has previously served as Deputy Principal of the same college, Dean of the School of the Built Environment, and Deputy Dean (Undergraduate Affairs) of the then-Faculty of Technology. He has served Makerere University for more than 25 years. Henry is a registered and practicing civil engineer. He is a Fellow of the Uganda Institution of Professional Engineers. He is a Fellow of the Institution of Civil Engineers (United Kingdom). Henry studied at Makerere University for his undergraduate degree, the University of Sydney for a Master’s degree in Civil Engineering, University of Loughborough for a Master’s degree in Construction Management, and Lund University

in Sweden for a Licentiate degree and a PhD in Engineering. Henry was a state scholar from Senior One to the attainment of his Bachelor's degree. Henry has supervised a number of graduate students to completion. His main academic interests are materials, structures and construction project management. He has published work in international peer-reviewed journals, books and conference proceedings. Henry has been involved in the inception, design, construction, and maintenance of several civil engineering infrastructure projects. He is currently the Chairman of the Board of Directors of Technology Consults Limited, a leading engineering consulting firm. He is a member of the Global Engineering Dean's Council, Vice President (East Africa) of African Engineering Educators Association and Vice President (East Africa) of African Engineering Deans' Council. **Prof. Henry Mwanaki Alinaitwe** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Physical Sciences.



PROF. JOY CONSTANCE KWESIGA, BA, MSc, PhD

holds a B.A. (University of East Africa), a first-class postgraduate diploma in Public Administration (Institute of Public Administration-IPA), a Master's degree in Higher and Further Education (London), and a PhD in Higher Education (London). She has widely researched into the Ugandan society, and has published on education, gender studies, and the African Women's Movement. She is a member of the Executive Committees of the

Inter-University Council for East Africa (IUCEA), the Uganda National Council for Higher Education (NCHE), and the Uganda Vice-Chancellors' Forum (UVCF). Joy Kwesiga has won many awards in recognition of her work, focusing on equity in education, promotion of girls' education, and women's empowerment. She is an experienced academician, University Administrator and Social Development Analyst, and a renowned gender and women's advocate. She has had the enviable privilege of combining academic work with women's rights activist work. She has been a Professor of Gender Studies and the Vice-Chancellor of Kabale University since November 2005 to today. She oversaw the transformation of Kabale University from a private community university to a public university. She served as the founding Head of the Department of Women and

Gender Studies at Makerere University, and Dean of the Faculty of Social Sciences at Makerere University. Prof. Kwesiga was the founding Head of the Gender Mainstreaming Programme at Makerere University, and later became the First Deputy Academic Registrar in the Gender Mainstreaming Division of the Academic Registrar's Department at Makerere University. Joy Kwesiga was a founding member of Action for Development (ACFODE), a national women's rights organization that redirected the Women's Movement in Uganda during the 1980s and 1990s. She co-founded a national women's rights body (Action for Development), and actively promoted gender equity in education through organisations such as the Forum for African Women Educationalists (FAWE), the Uganda Association of University Women, and African Women in Research and Development (AWORD). She is also a founding member of KOMAZA (2006), a Civil Society Organisation with headquarters in Kabale, with the goal of empowering communities, especially girls and women, and other disadvantaged members of society. She is a member of the Board of FAWE (Africa) and also a member of the *Women's Situation Room* and the Eminent Women of Uganda, which worked towards peaceful elections during the 2016 general elections in Uganda. This group continues to work to achieve that goal. Joy Kwesiga has served on many education and research bodies, including the International Institute of Tropical Agriculture, OSSREA, the African Academy of Sciences, the International Women's Forum, the Uganda Journal, Teaching in Higher Education (UK), and the Uganda Journal of Management and Policy Studies. **Prof. Joy Constance Kwesiga** was inducted as a Fellow of Uganda National Academy of Sciences in the category of Social Sciences.



PROF. MURINDWA RUTANGA, BA, MA, PhD,

holds a PhD in Political Science from Jadavpur University, Kolkata, India, MA and BA degrees in Political Science from Makerere University, and a Post-Graduate Diploma in the Research Training Programme from the Centre for Studies in Social Sciences, Calcutta (CSSSC). Prof. Rutanga is a Constitutional Expert for the East African Confederation, and former Head of

Political Science and Public Administration, Makerere University. He was awarded the Uganda Independence 50th Anniversary Gold Medal, the

UPDF Recognition Award, and a Certificate for Dedicated and Patriotic Contributions towards Ideological Work in the UPDF. Prof. Rutanga is a member of CODESRIA and OSSREA, a Founding Member and Senior Research Fellow of CBR; and a Member of the International Editorial Advisory Board, Journal of Development Issues. Prof. Murindwa Rutanga teaches and researches at Makerere University and the Centre for Basic Research, Politics, Religion, and Power in the Great Lakes Region. Some of Prof. Murindwa Rutanga's works include; *Nyabingi Movement: People's Anti-colonial Struggles in Kigezi 1910-1930*; *Conditions of Labour on Commercial Dairy farms in Kabale District*; *Reflections on the Agrarian Crisis and Contestations Within the Agrarian Domain*; *The Rise, Use, and Abuse of Language*; *Agrarian Struggles In The Judicial Domain—The Case of Kigezi*; *Agrarian Struggles Through Litigation Within The Legal Domain*; *Contradictory Outcomes From Solutions For The Agrarian Crisis In The Great Lakes Region*; *From Twariireto Tweriire Politics*; *Have You Killed Your Tutsi Today*; *Independence And Its Negations In The Great Lakes Region*; *People's Anti-Colonial Struggles In Kigezi Under The Nyabingi Movement*; *Private Capital, Donors And Elections In Uganda*; *Reflections On Issues Of Post-Coloniality And International Relations In Africa*; *The Current Status Of The Agrarian Crisis in Kigezi, South West*; *The Effects of The 1990-1994 RPF-Rwanda War on Agrarian Crisis*; *Traditional-Cultural Institutions In Uganda's Democratic Transition*; *A Historical Analysis of the Labour Question in Kabale District*; *Struggles for Rights in the Great Lakes Region*; and *Politics, Religion and Power in the Great Lakes Region*. **Prof. Murindwa Rutanga** was inducted as a Fellow of Uganda National Academy of Sciences in the category of Social Sciences.



PROF. PETER ATEKYEREZA BA, MSc, PGD,

is a trained Sociologist holding a PhD from Johannes Kepler University in Linz, Austria (2001); a MSc and a Post Graduate Diploma from the University of Zimbabwe, Harare (1995 and 1993, respectively), and BA from Makerere University (1991). He served Makerere from the level of Teaching Assistant to Professorial position, and led the review of the curricula in Sociology. He served as external examiner of Sociology in over five universities. He has done social science research and also participated in multidisciplinary research projects thereby cross-pollinating sociological principles and values. He published and contributed to knowledge in areas of structural forms and functions of the African family; family reproductive health and HIV/AIDS; urban agriculture and livelihoods; and livelihoods and vulnerability. He has supervised undergraduate, Masters and PhD students. He has attended and presented at national and international conferences. Currently, he is President of the Uganda Sociological and Anthropological Association, National Coordinator for the Regional Network on HIV/AIDS, Livelihoods and Food Security (RENEWAL) in Uganda facilitated by the International Food Policy Research Institute (IFPRI). He is a member of the Subcommittee on Social Protection at the Ministry of Gender, Labour and Social Development, and chair of many governing boards for school and community associations. **Prof. Peter Atekyereza** was inducted as a Fellow of the Uganda National Academy of Sciences in the category of Social Sciences

ANNEX: 1 SPEAKER BIOGRAPHIES



PROFESSOR MANDIVAMBA (MANDI) RUKUNI, FUNAS,

is a scholar, philosopher, and author. He is an experienced strategist in a variety of sectors including agriculture, business, finance, government, and education. A Zimbabwean national, Mandi is currently Director of BEAT Leadership and Doctoral Academy. His career started 40 years ago at the University of Zimbabwe, where he eventually served as Professor and Dean of Agriculture. He subsequently worked with the W.K. Kellogg Foundation for 11 years as Director for Africa Programs. He has served as advisor to several organizations, including the World Bank, EU, UN, and the African Union. Professor Rukuni also served on several Zimbabwean and international boards in sectors of higher education, international agricultural research, banking, hospitality, food manufacturing, and so on. He has received several national and international honours and awards and has published 15 books and more than 100 articles.



DR. RHODA WANYENZE, MBCHB, MPH, PHD,

is a Professor and Dean of Makerere University School of Public Health (MakSPH). Prof. Wanyenze has vast experience in public health research, capacity building and program management, especially in infectious diseases and sexual and reproductive health. Prior to joining MakSPH, Prof. Wanyenze was the Program Manager for the Makerere University Joint AIDS Program and a clinician. Her work has been funded by the NIH, CDC, and Global Fund, among others. She has developed and sustained several research and service collaborations. Prof. Wanyenze is active in public health policy, leadership, and has served on various boards and technical committees of the Uganda MoH and other agencies. She is currently a member of the COVID-19 Scientific Advisory Committee to the Ministry of Health. She is also leading an evaluation of the COVID-19 response across four countries in Africa.



PROFESSOR SEGGANE MUSISI, FUNAS

is a Senior Consultant Psychiatrist at Mulago Hospital, and Professor and Head of the Makerere Psychiatry Department. He has trained psychiatrists, psychologists, Psychiatric Clinical Officers and PhDs in psychiatry, psychology, social work, counseling and anthropology. Prof. Musisi obtained his MBChB degree in 1977 from Makerere University and specialist Psychiatry Degree, FRCP(C), from the University of Toronto in 1984, with super-specialization in Psychosomatics and Liaison Psychiatric Intensive Care. He returned to Uganda in 1999 and founded the African Psycare Research Organization, an NGO to research, teach and consult on mental health problems in Africa. He has over 100 publications, two edited books, book chapters, editorials, and has convened conferences. He sits on various boards, is Editor-In-Chief of two scientific journals, and has won grants and awards, including one of the World's Top 30 Fulbright New Century Scholars in 2001. He integrated Ugandan Psychiatry from isolation and stigma into general hospital medical care.



ELIZ NASSALI STATE, PhD,

is a University Librarian at Kyambogo with 25 years' experience in academic libraries. Prior to heading the library at Kyambogo University, Liz worked at Makerere University Library in different capacities. She provided leadership to the Library Automation Project at Makerere University for several years. She was heavily involved in conducting information literacy training for staff and graduate students in Uganda, has trained librarians in Sudan with the University of Bergen Library, Norway (NUCOOP Project), and in Nigeria and Ghana with the Mortenson Centre for International Library Programs, USA. She is a Standing Committee Member of the Academic and Research Libraries Section of the International Federation of Library Associations and Institutions (IFLA) since 2011, and a member of the American Library Association. She has authored several articles and book chapters in Library and Information Science. She is an avid reader, and is currently reading: *The Room Where It Happened* by John Bolton,

and *A Plague of Corruption: Restoring Faith in the Promise of Science* by Kent Heckenlivey, Judy Mikovits and Robert J. F. Kennedy. Liz holds a doctorate in Library and Information Sciences from Makerere University.



PATRICK KABOYO

is a teacher and social worker by profession, with fifteen years teaching experience. He is a leader in the education sector, for which he has immensely contributed in terms of policy engagement. He's the Founding Director of the Coalition of Uganda Private School Teachers' Association, the first private school teachers' association registered in 2004. Currently, Patrick serves as the National Secretary of the Federation of Non-State Education Institutions (FENEI), an umbrella body for all directors of private education institutions in Uganda. He is the Chairman, Eastern Africa Region Local Government Audit Committee of the Government of Uganda, in charge of overseeing 29 Local Governments in the Eastern Region.

MOSES KABANDA

works for the Ministry of Finance, Planning and Economic Development as an Assistant Commissioner in the Macroeconomic Policy Department. His work involves analysing, proposing, and implementing policy solutions to economic development challenges in Uganda in the key field of macro-fiscal management. Moses has a Msc. in Economics from the University of Birmingham in the U.K.

ANNEX 2: CONFERENCE AGENDA

The overall objective of the Annual Scientific Conference (ASC) is to provide a neutral platform for the exchange of ideas, knowledge, and experiences on topical issues that foster national development. Presenters at the ASC share theoretical models and practical approaches that enable national resilience and recovery within the context of pandemics, emergencies, crises. At this ASC, presenters share insights about how the professional pursuits cultivate opportunities for leadership, a sense of shared purpose, and consensus across sectors and disciplines in light of the current COVID-19 pandemic and other crises.

DAY 1: Thursday, October 22, 2020

MODERATOR: Philippa Musoke, Chairperson, UNAS Publications and Conferences Committee

- 08:30-09:00 *Welcome and Opening Remarks*
Peter N. Mugenyi, President, Uganda National Academy of Sciences
- 09:00-09:30 *Broader Considerations and Pressure Points (National, Continental, and Global Perspectives)*
Mandivamba Rukuni, FUNAS, Director, Barefoot Education for Africa
- 09:30- 10:00 *Health Systems Perspective*
Rhoda Wanyenze, Professor and Dean, School of Public Health, College of Health Sciences, Makerere University
- 10:00- 10:30 *Psycho-Social Perspective*
Seggane Musisi, Professor and Senior Researcher, Department of Psychiatry, School of Medicine, Mulago Hospital, Makerere University
- 10:30-11:00 Health Break
- 11:00-12:00 *Discussion*
- 12:00 End of Day 1**

DAY 2: Friday, October 23, 2020

MODERATOR: Philippa Musoke, Chairperson, UNAS Publications and Conferences Committee

- 08:00 -08:30 *Welcome and Opening Remarks*
Peter N. Mugenyi, President, Uganda National Academy of Sciences
- 08: 30- 09:00 *Education Systems Perspective*
Patrick Kaboyo, Education and Social Sector Consultant and National Secretary, Federation of Non-State Education Institutions
- 09:00- 09:30 *Economic and Domestic Financing Perspective*
Moses Kabanda, Senior Economist, Macroeconomic Policy, Ministry of Finance, Planning, and Economic Development
- 09:30- 10:00 *Information Science Perspective*
Eliz Nassali State, University Librarian, Kyambogo University
- 10:00-11:00 *Discussion*

Induction of New Fellows of the Academy

During this part of the ASC, UNAS inducts eminent scientists into the Fellowship of the Academy. These scientists are nominated, shortlisted, and vetted through a rigorous process by the Fellows and Membership Committee and another *ad hoc* committee that makes recommendations to Council about nominees' suitability to become Fellows of the Academy. The nominees are from Uganda and other countries.

MODERATOR: Joseph Obua, Chairperson, UNAS Fellows and Membership Committee

11:00-13:00 *Induction Process*

The activities below apply to each Inductee. (10 minutes each)

- Introduction by the nominator
- Oath taking by the Inductee
- Acceptance Remarks by the Inducted Fellow

No	INDUCTEE	NOMINATOR	SECONDER
CATEGORY- HEALTH AND MEDICAL SCIENCES			
1	Dr. Cissy M. Kityo Health and Medical Sciences	Prof. Grace Ndeezi, FUNAS	Prof. Harriet Mayanja-Kizza, FUNAS
2	Prof. Jo Ivey Boufford Health and Medical Sciences	Prof. Francis G. Omaswa, FUNAS	Dr. Sally K. Stansfield, FUNAS
3	Prof. Richard Deckelbaum Health and Medical Sciences	Prof. James M. Ntambi, FUNAS	Prof. John T. Kakitahi, FUNAS
4	Prof. James K. Tumwine Health and Medical Sciences	Prof. Grace Ndeezi, FUNAS	Dr. Angelina Kakooza-Mwesige, FUNAS
5	Prof. Alison Mary Elliott Health and Medical Sciences	Prof. Livingstone S. Luboobi, FUNAS	Prof. Nelson K. Sewankambo, FUNAS

CATEGORY- HONORARY FELLOWSHIP			
6	Dr. Maggie B. Kigozi Honorary Fellowship	Prof. Paul Edward T. Mugambi, FUNAS	Prof. Elly N. Sabiiti, FUNAS, FTWAS, FAAS
7	Dr. Edward Kanyesigye Honorary Fellowship	Prof. Elly N. Sabiiti, FUNAS, FTWAS, FAAS	Prof. Peter N. Mugenyi, FUNAS, FRCPI, FRCP Edin, FTWAS, FAAS
CATEGORY- AGRICULTURAL SCIENCES			
8	Dr. Robert Fungo Agricultural Sciences	Dr. Donald R. Kugonza, FUNAS	Prof. John H. Muyonga, FUNAS
9	Prof. Jamidu Hizzam Yahaya Katima Agricultural Sciences	Prof. Noble Banadda, FUNAS	Prof. John H. Muyonga, FUNAS
10	Prof. Michael Clegg Agricultural Sciences	Prof. Edward K. Kirumira, FUNAS	Dr. Sally K. Stansfield, FUNAS
CATEGORY- VETERINARY SCIENCES			
11	Prof. Eli Katunguka Rwakishaya Veterinary Sciences.	Prof. Denis K. Byarugaba, FUNAS	Prof. Francis Ejobi, FUNAS

CATEGORY- LAW			
12	Dr. Winifred Tarinyeba Kiryabwire Law	Prof. David Justin Bakibinga, FUNAS, FAAS, FTWAS	Prof. Emmanuel Byarugaba Kasimbazi, FUNAS, FAAS, FTWAS
CATEGORY- BIOLOGICAL SCIENCES			
13	Dr. Godwin Anywar Upoki Biological Sciences	Prof. Esezah K. Kakudidi, FUNAS	Prof. Hannington Oryem-Origa, FUNAS
14	Dr. Esther Katuura Biological Sciences	Prof. Maud Kamatenesi-Mugisha, FUNAS	Prof. Paul Edward T. Mugambi, FUNAS
CATEGORY- PHYSICAL SCIENCES			
15	Prof. Henry Mwanaki Alinaitwe Physical Sciences	Prof. John H. Muyonga, FUNAS	Dr. Abel M.S. Katahoire, FUNAS
CATEGORY- SOCIAL SCIENCES			
16	Prof. Joy Constance Kwesiga Social Sciences	Prof. Edward K. Kirumira, FUNAS	Prof. Kamatenesi-Mugisha, FUNAS
17	Prof. Murindwa Rutanga Social Sciences	Prof. Peter K. Baguma, FUNAS	Prof. John R.S. Tabuti, FUNAS
18	Prof. Peter Atekyereza Social Sciences	Prof. Peter K. Baguma, FUNAS	Prof. John R.S. Tabuti, FUNAS

13:00 **Closure of the Conference**



Sciences For Prosperity

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