

CONVENED BY GEORGE P. SHULTZ

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# GOVERNANCE IN AN **EMERGING** NEW WORLD

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## AFRICA IN AN EMERGING WORLD

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George Moose, Andre Pienaar



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## A Letter from the Conveners

Sharp changes are afoot throughout the globe. Demographics are shifting, technology is advancing at unprecedented rates, and these changes are being felt everywhere.

How should we develop strategies to deal with this emerging new world? We can begin by understanding it.

First, there is the changing composition of the world population, which will have a profound impact on societies. Developed countries are experiencing falling fertility and increasing life expectancy. As working-age populations shrink and pensions and care costs for the elderly rise, it becomes harder for governments to afford other productive investments.

At the same time, high fertility rates in Africa and South Asia are causing both working-age and total populations to grow, but that growth outpaces economic performance. And alongside a changing climate, these parts of the world already face growing impacts from natural disasters, human and agricultural diseases, and other resource constraints.

Taken together, we are seeing a global movement of peoples, matching the transformative movement of goods and of capital in recent decades—and encouraging a populist turn in world politics.

Second is automation and artificial intelligence. In the last century, machines performed as instructed, and that “third industrial revolution” completely changed patterns of work, notably in manufacturing. But machines can now be designed to learn from experience, by trial and error. Technology will improve productivity, but workplace disruption will accelerate—felt not only by call center responders and truck drivers but also by accountants, by radiologists and lawyers, even by computer programmers.

All history displays this process of change. What is different today is the speed. In the early 20<sup>th</sup> century, American farm workers fell from half the population to less than five percent alongside the mechanization of agriculture. Our K-12 education systems helped to navigate this disruption by making sure the next generation could grow up capable of leaving the farm and becoming productive urban workers. With the speed of artificial intelligence, it's not just the children of displaced workers but the workers themselves who will need a fresh start.

Underlying the urgency of this task is the reality that there are now over 7 million “unfilled jobs” in America. Filling them and transitioning workers displaced by advancing technology to new jobs will test both education (particularly K-12, where the United States continues to fall behind) and flexibility of workers to pursue new occupations. Clearly, community colleges and similarly nimble institutions can help.

The third trend is fundamental change in the technological means of production, which allows goods to be produced near where they will be used and may unsettle the international order. More sophisticated use of robotics alongside human colleagues, plus additive manufacturing and unexpected changes in the distribution of energy supplies, have implications for our security and our economy as well as those of many other trade-oriented nations who may face a new and unexpected form of deglobalization.

This ability to produce customized goods in smaller quantities cheaply may, for example, lead to a gradual loss of cost-of-labor advantages. Today, 68 percent of Bangladeshi women work in sewing, and 4.5 million Vietnamese work in clothing production. Localized advanced manufacturing could block this traditional route to industrialization and economic development. Robots have been around for years, but robotics on a grand scale is just getting started: China today is the world's biggest buyer of robots but has only 68 per 10,000 workers; South Korea has 631.

These advances also diffuse military power. Ubiquitous sensors, inexpensive and autonomous drones, nanoexplosives, and cheaper access to space through microsatellites all empower smaller states and even individuals, closing the gap between incumbent powers like the United States and prospective challengers. The proliferation of low-cost, high-performance weaponry enabled by advances in navigation and additive manufacturing diminishes the once-paramount powers of conventional military assets like aircraft carriers and fighter jets. This is a new global challenge, and it threatens to undermine U.S. global military dominance, unless we can harness the new technologies to serve our own purposes. As we conduct ourselves throughout the world, we need to be cognizant that our words and deeds are not revealed to be backed by empty threats. At the same time, we face the challenge of proliferation of nuclear weapons.

Finally, the information and communications revolution is making governance everywhere more difficult. An analogue is the introduction of the printing press: as the price of that technology declined by 99 percent, the volume grew exponentially. But that process took ten times longer in the 15<sup>th</sup>, 16<sup>th</sup>, and 17<sup>th</sup> centuries than we see today. Information is everywhere—some accurate, some inaccurate, such that entire categories of news or intelligence appear less trustworthy. The “population” of Facebook now exceeds the population of the largest nation state. We have ceaseless and instantaneous communication to everybody, anybody, at any time. These tools can be used to enlighten, and they can also be used to distort, intimidate, divide, and oppress.

On the one hand, autocrats increasingly are empowered by this electronic revolution, enabled to manipulate technologies to solidify their rule in ways far beyond their fondest dreams in times past. Yet individuals can now reach others with similar concerns around the earth. People can easily discover what is going on, organize around it, and take collective action.

At present, many countries seek to govern over diversity by attempting to suppress it, which exacerbates the problem by reducing trust in institutions. Elsewhere we see governments unable to lead, trapped in short-term reactions to the vocal interests that most effectively capture democratic infrastructures. Both approaches are untenable. The problem of governing over diversity has taken on new dimensions.

The good news is that the United States is remarkably well-positioned to ride this wave of change if we are careful and deliberate about it. Meanwhile, other countries will face these common challenges in their own way, shaped by their own capabilities and vulnerabilities. Many of the world's strongest nations today—our allies and otherwise—will struggle more than we will. The more we can understand other countries' situations, the stronger our foundation for constructive international engagement.

This is why we have set off on this new project on Governance in an Emerging New World. Our friend Senator Sam Nunn has said that we've got to have a balance between optimism about what we can do with technology and realism about the dark side. So we aim to understand these changes and inform strategies that both address the challenges and take advantage of the opportunities afforded by these transformations.

To do so, we are convening a series of papers and meetings examining how these technological, demographic, and societal changes are affecting the United States (our democracy, our economy, and our national security) and countries and regions around the world, including Russia, China, Latin America, Africa, and Europe.

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As societies across the developed world grow older and some even shrink, Africa stands out as the overwhelming engine of global population and labor force growth, and the source of much of the world's youth in coming decades. But, across the continent, African states also face economic challenges, military conflict, and political instability. Moreover, they will feel the effects of a changing climate and environment. Against this backdrop—and keeping in mind the great diversity of the continent—how will African states and people alike realize the promise of advancing technologies and new means of production to advance their standard of living? And what does the spread of communications, via social media and mobile technology, mean for the future of governance in each region of the continent? Finally, can Africa transform itself—with its own innovators and foreign assistance—from the global engine of population growth to an engine of economic growth?

This volume begins with an assessment of Africa's place in the changing world of international trade and the prospects of technological development on the continent. Both inter- and intra-continental trade is weak, as Anthony Carroll, vice president at Manchester Trade, and Eric Obscherring, of C&M International, describe. But educational and infrastructure improvements, coupled with economic reforms, could open the continent further and lay the foundation for widespread adoption of new technological platforms and tools.

Ambassador Chet Crocker, the former assistant secretary of state for African affairs, follows with a careful consideration of the future of governance in Africa. He writes that developing economically and politically inclusive governance institutions, within such a complex national and regional political web, will be crucial to the long-term peace and prosperity of African states.

Complicating that effort will be climate change, which will affect Africa acutely. Georgetown University's Mark Giordano and Elizabeth Bassini review what we know so far about climate change in Africa; call for more research to understand the expected local impacts across the diverse ecosystems of the continent; and recommend ways to prepare for these looming changes.

Surveying the continent, George Mason University's Jack Goldstone describes Africa's demographic outlook as the most dynamic in the world. But to realize the full potential of that dynamism without losing its demographic dividend to global out-migration, African and foreign states alike should work together to bring down fertility rates and invest in the continent's youth.

Finally, Andre Pienaar and Zach Beecher, of C5 Capital, see in Africa's youth the potential for significant economic progress through greater access to mobile internet technology. Recognizing how authoritarian states and other actors have weaponized social media and other communications platforms around the world, they argue that good governance and a commitment to transparent institutions will be vital to realizing that potential.

The authors joined us at the Hoover Institution in January 2019 for a roundtable discussion of their papers and to carry the conversation to the broader Stanford University and Silicon Valley community. This examination of Africa in an emerging world concludes with summary observations of the discussion by former assistant secretary of state for African affairs George Moose, who moderated the roundtable. We wish to extend our thanks to our colleagues at the Hoover Institution who have worked to support this project, particularly to Shana Farley and Rachel Moltz for the creation of this booklet.



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# Africa Trade and Technology

By Anthony Carroll, Manchester Trade Ltd & Eric Obscherning, C&M International

## Introduction

It is perceived that economic nationalism has slowed the meteoric rise of global trade. Since the Uruguay Round created the World Trade Organization (WTO) in 1995, trade of goods and services has become a dominant feature in global economic growth. As a result, hundreds of millions of people in developing countries have graduated from subsistence living to middle-class status. The accession of China into the World Trade Organization in 2001 accelerated both the volume and character of global trade. By 2008, Global Value Chains (GVCs) have come to explain up to 70% of global trade volumes.<sup>1</sup> GVCs optimize comparative advantage across borders and have enabled innovation in trade logistics and services technologies, in addition to a general WTO commitment by member states to facilitate trade.

However, the renegotiation of liberal free trade agreements, such as Brexit and the reconsideration of NAFTA, and the concomitant shift of manufacturing jobs (on-shoring) back into developed economies have accelerated. In the latest WTO Report on G20 Trade Practices, \$481 billion in new import restrictive measures were imposed by G20 members in 2018.<sup>2</sup> This is the largest increase of such measures ever recorded by the WTO and six times larger than last year's. Also, according to the World Bank, the growth in GVC's has stalled.<sup>3</sup> The WTO appears unable to broker more ambitious global agreements among member states, and there is a perceptible decline in confidence in the organization's ability to evolve the rules-based global trading system.

The question of Africa's ability to adapt to these shifting trends in trade must be analyzed in light of its participation in the global economy and its ability to adopt the tools to become more competitive in a world of rapidly evolving technology and supply chains. It should be noted that this analysis will concentrate on sub-Saharan Africa (SSA) and will disaggregate data accordingly, whenever possible. Africa has enormous diversity amongst its 54 nations and even among its regions. This chapter will examine the political economy of Africa's trade and identify constraints and opportunities that will define its future, including the adoption of artificial intelligence.

## Africa and Global Trade

Pliny the Elder is known for two contributions to global learning. One is the discovery of hops as an essential

ingredient for brewing beer and the other for the phrase: "ex Africa semper aliquid novi" (always something new out of Africa).<sup>4</sup>

What is new about Africa has been the African rising story. While this optimistic narrative is a departure from the doom and gloom scenario of the past, there are storms on the horizon.

The first known evidence of trans-Africa trade dates from the 4<sup>th</sup> century BC, when the Axumite kingdom traded with the Ptolemaic dynasty of Egypt.<sup>5</sup> Later, caravan routes emerged linking trading centers across the Sahel. Yet, African trade has been restricted by its physical and human geography, namely vast deserts, few navigable rivers, and dispersed population.

After centuries of slave traders and Portuguese explorers, European countries began to take a colonizing interest in Africa and by the end of the 19<sup>th</sup> century every sub-Saharan country but Ethiopia had been colonized by a European power. In 1885, the European powers divided Africa into an illogical array of scattered colonies. This "Scramble for Africa" was fueled by aspirations of global hegemony and a thirst for natural resources to fuel the industrial revolution.<sup>6</sup> In some instances, these aspirations resulted in the establishment of settler communities. These colonial regimes built infrastructure to extract raw natural resources, which were then finished in the respective mother country, a "Colonial Value Chain"! Worse yet, colonists established state monopolies that ruled domestic markets and limited by law the emergence of a local business class. Local human capacity development was often limited to coopted elites recruited to administer (and police) these rapacious regimes.

The dawn of independence in Africa occurred from 1957 to 1975, when war-shattered European economies and global public opinion (including from the United States) coalesced to accelerate the exit of colonialism. Due to shortages in both human capacity and business acumen, the economic road to the Kwame Nkrumah's "Political Kingdom" soon became a dead end. Perhaps as a product of the ideological tendencies of the Cold War era manifested by the adoption of "scientific socialism," many of Africa's early leaders eschewed business friendly policies in favor of command economies. One iteration of these doomed practices was the establishment of import substitution regimes, which aimed to create indigenous



infant industries through high tariffs and impregnable non-tariff barriers against all imports, whether from neighboring countries or afar. These policies were an abject failure as the contribution of manufacturing to GDP at the beginning of the 21st century was the same as it was in 1970: 10%!<sup>7</sup> In the meantime, local consumers were gouged, productivity plunged, and the schemes became vehicles for the destructive rent-seeking and clientelism that define many Africa economies today.

The 1970s saw the promise of independence fade into dysfunction, predation, and manipulation by super powers fighting proxy wars across Africa. South Africa, the continent's most advanced economy, was roiled by Apartheid and the opposition to it, which spread beyond its borders and stifled trade.<sup>8</sup> Nigeria, Africa's most populous country, was riven by a succession of weak civil governments succeeded by oppressive military regimes, all marked by odious levels of corruption. Development assistance from multilateral and bilateral sources contributed to economic distortion<sup>9</sup> and suffocating levels of indebtedness. As a result, Africa's portion of global trade had fallen from 3.5% in 1971 to 1.5% in 1999 and consisted mostly of unprocessed goods.<sup>10</sup> Adding insult to injury, Africa was largely left out of the global trade negotiations under GATT and WTO and thus unable to shape its own economic future. When coupled with the devastation of the HIV/AIDS pandemic, by the 1990s, Africa was on the economic ropes. Famously, in May 2000, *The Economist* published a feature on Africa entitled "The Hopeless Continent."<sup>11</sup> African trade statistics notoriously fail to quantify the size of the informal economy and the volume of informal trade of goods and services both internal and externally. A recent IMF study revealed that in Benin, Nigeria, and Tanzania about 65% of the economy is informal.<sup>12</sup>

#### *Current Trade Situation*

Nearly twenty years since *The Economist* declared it doomed, sub-Saharan Africa remains the most under connected region in the world. While absolute trade has increased, the region represents about 2–3% of global trade volume and intra-Africa trade accounts for about 11% of total exports as seen by the below chart comparing Africa's leading Regional Economic Communities (RECs). These include the East Africa Community (EAC), Economic Community of West African States (ECOWAS), Southern Africa Development Community (SADC) and the Common Market for East and Southern Africa (COMESA). SSA represents Sub-Saharan Africa. This contrasts sharply with South America (22%) and Western Europe (70%).<sup>13</sup> [See Figure 1]

Sadly, what little trade that has occurred remains in raw commodities, mostly agricultural and mineral products. Although economic orthodoxy has long concluded that open markets beget economic growth, our evaluation of World Bank data has shown that there is a very weak

correlation between economic growth and merchandise trade. [See Figure 2]

The most compelling explanation of this is that most external trade from Africa is tied to raw commodities and offer few forward and backward linkages to the local economy. This is in contrast to intra-Africa trade which favors manufactured, fast moving, and consumer goods.<sup>17</sup> There are many reasons for the lack of intra-African trade including:

1. Weakness of physical and human infrastructure (more on this later)
2. Small size of individual African country markets
3. Residual tariffs and onerous non-tariff measures (NTM) on processed and semi-processed African products by both developed and emerging markets<sup>18</sup>
4. Export constraints and other pre-border barriers<sup>19</sup>
5. Absence of trade finance
6. Institutional constraints on enterprise growth and inability to achieve scale
7. Currency risk
8. Corruption and rent-seeking clientelism
9. Civil disruption

It is beyond the scope of this chapter to delve into each of the above factors, however a couple of items are worthy of note.

#### *Infrastructure*

As mentioned earlier, prior to independence, physical infrastructure was designed to satisfy the security concerns of competing European powers and related commercial interests seeking access to Africa's natural resource bounty. While multilateral and bilateral development assistance fueled a surge of investment in infrastructure in the early years of statehood, many of these investments suffered from poor design and lack of maintenance. In other regions, private investment in infrastructure provided higher yields. For Africa to enhance its trade competitiveness internally and externally, trade related to physical and human infrastructure must be enhanced. This is no mean task. In its most recent analysis, the Africa Development Bank has estimated that Africa needs approximately \$170 billion per year in infrastructure investment development, of which 20% is available from African sources.<sup>20</sup>

#### *Market Access*

Another obstacle is the resistance of foreign markets to open themselves to African value-added exports. These constraints can occur in the form of tariff biases. For example, cocoa is offered duty free access into the U.S. market, but chocolate is subject to duty. While

meat products could enjoy access to European markets, Sanitary and Phytosanitary (SPS) measures thwart these opportunities, often at the behest of protectionist interests. And despite all the rhetoric toward South-South cooperation, China provides duty free access to fewer African products than the United States, and it only does so for those countries that fall under the UN's least developed country definitions, thereby excluding the most export ready economies. Non-tariff measures equally restrict South-South trade and South-North trade.<sup>21</sup>

In order to partly remedy these deficiencies and respond to world opinion, G-8 countries have enacted several trade initiatives in the past twenty years, including the U.S. Africa Growth and Opportunity Act (AGOA) and the European Union's Economic Partnership Agreements (EPA). AGOA was passed in 2000 and expanded upon the Generalized System of Preferences (GSP) by allowing over 6,000 items from qualifying sub-Saharan African nations into the U.S. market on a zero-duty and nonreciprocal basis. AGOA was supported by over \$1 billion of trade-related development assistance, largely through USAID's Africa Trade Hubs. This market access requires minimal compliance with various standards such as labor and human rights and general business norms. In 2015, AGOA was extended until 2025, when it is assumed that a more reciprocal agreement is likely. In the past few months, the Trump administration has indicated its intent to negotiate bilateral Free Trade Agreements (FTAs) with willing African nations. As seen in Figure 3, AGOA has achieved modest direct and indirect results. While total two-way trade between Africa and the United States has trebled between 2000 and 2017, the vast majority of the trade has been in petroleum or mineral related products with the most amount of manufactured and agricultural goods limited to a few countries. [See Figure 3]

The EU's EPAs are neither as generous nor comprehensive as AGOA. These agreements are an extension of the Lomé agreement of the 1980s and are available to all qualifying African, Pacific, and Caribbean (APC) countries. While they have much more generous provisions than the Lomé agreement, they also require qualifying countries (which include all but the poorest APC countries) to open their markets to European exporters. As seen in Figure 4, the results have been inconclusive. [See Figure 4]

### Regional Trade

One of the barriers to intra-Africa trade has been the evolution of a system of regional trade agreements with often conflicting and always confusing results. In order to define its own economic future and accelerate intra-Africa Trade, in 2018, the leaders of 44 African countries signed an agreement to establish the African Continental Free Trade Agreement (CFTA). This agreement aims to establish the world's largest geographic free trade arrangement by 2019. When in force, the CFTA will remove trade obstacles such as tariffs, quotas, and

NTMs to accelerate the flow of goods and services amongst member states. Such integration is also aimed at increasing Africa's partnership in GVCs. So far, only 14 countries have ratified the agreement and Nigeria has voiced opposition to the agreement. While the achievement evidences a monumental shift in ambition, it remains to be seen whether this will be transformative as Africa's supply capacity has always limited the impact of market access agreements.

### Services

One area where supply constraints have been less daunting is the services sector. Services are less limited by physical barriers and have been greatly impacted by the growth of telecommunication and internet access across Africa. The impact has been dramatic, and there is evidence of a positive correlation to GDP growth. [See Figure 5]

According to a Brookings report, services exports grew six times faster than merchandise exports between 1998 and 2015.<sup>26</sup> According to the World Bank's most recent data, 53.2% of sub-Saharan African GDP is attributed to services.<sup>27</sup> And in Ethiopia and Ivory Coast, the services sector grew respectively by 8.59% and 9.15% in 2016.<sup>28</sup> Kenya, Rwanda, and South Africa have undertaken special measures to grow their services sectors and become knowledge based economies. Botswana has become the global center for diamond sales. However, services expansion is dependent upon access to media and the Internet, and some African countries have put constraints on access in order to suppress political dissent.

### Human Capacity

A key component crucial to fostering a prosperous economy is a country's ability to develop its human capital, or the benefits people can provide, given their knowledge, skills, and work ethic, to an economy. Unfortunately, many African countries are far behind their developed counterparts in this area, greatly hurting their economy in the present and likely in the future. This can be attributed to the collapse of post-secondary education institutions, lack of STEM (Science, Technology, Engineering, and Mathematics) related programs, and the limited possibilities for those who are educated. Although there is some hope on the horizon for these struggling countries, they still have a long way to go.

It is no secret that many African countries, predominantly in sub-Saharan Africa, fall short in their academic programs (see Figure 6). Research by the World Bank found that fewer than half the secondary school students in these developing countries could meet the benchmark minimum, set by the Programme for International Student Assessment (PISA), and only 26% of South African students reached it.<sup>29</sup> Not only do SSA countries struggle to meet requirements, but they also have difficulty getting young children into classrooms. It was estimated that about 30

million children in SSA (1 in 4) are not enrolled in school and that only 28% of youth are enrolled in secondary school.<sup>30</sup> Such dwindling numbers of children in school can in part be due to the wealth inequality throughout Africa. Many marginalized groups do not receive the same opportunities as the rich in the area and therefore do not have the means to send their children to school. In sub-Saharan Africa, 68% of children from poor families lack education, compared to only 13% from rich families.<sup>31</sup> This is generally due to the rich families' access to privatized schools, which are overall better than the public school system, which is chronically underfunded and lacks qualified teachers. Research found that in seven SSA countries, 3 in 10 fourth-grade teachers had not mastered the language curriculum they were teaching. It is highly unlikely that children can learn in an environment where their teachers are not even comfortable with the material. Such disparities can be detrimental considering they lead to fewer skilled workers for the continent as a whole. The societal implications could be significant further dividing economies into haves and have nots. These patterns inevitably continue through adulthood and result in workers who cannot provide as much value as their better-educated counterparts, thus leading to overall inefficiencies.

An additional problem for Africa's education system is that the students who are in school are not studying disciplines that are central to the development of the continent. Technological advancements are central to any country trying to increase its economic activity, which is why they need human capital to excel in this area and help the country prosper. However, most students who study at higher levels of education (secondary and post-secondary) specialize in the areas of humanities and social sciences, not STEM fields.<sup>32</sup> This lack of STEM education can be attributed to a variety of factors including inadequate funding for science and technology, small numbers of professionals in the field, and a lack of priority compared to other issues such as poverty and starvation.<sup>33</sup> The disadvantages presented are a huge contributing factor to the cycle of underdevelopment. Funds are consistently transferred to sectors other than STEM education and development because the returns on STEM investments are too long-term and there are more pressing priorities. This leaves STEM underfunded, despite its potential to drastically help the economy. Therefore, SSA countries are less likely to get the opportunity to develop further, even though this development can lead to huge benefits in the future if given the chance to grow. In order to improve the STEM areas in Africa, governments need to enforce policy changes and the expansion of educational systems. Through this, they can divide funds up to help those with short-term needs, as well as plan ahead for future prosperity. [See Figure 6]

Due to the economic downfalls for the majority of the continent, Africa is seeing a huge brain drain among

those with higher education; qualified professionals are leaving their home country to pursue better opportunities in other countries, typically in the United States or Europe. Those who do receive a good education in Africa are often incentivized to leave for higher paying jobs, a better quality of life, or more opportunities in other countries, thus leaving their home country worse off. The loss of potential workers leaves Africa increasingly reliant on bringing in workers from outside countries, which then hinders building up local skills in the community.<sup>35</sup> However, there has been progress as many Africans have begun creating and innovating products and presenting them at world conferences, such as HackForGood, an annual hack-a-thon partnered with Nigeria that helps teach students computer skills and challenges them to innovate computer products.<sup>36</sup> More events like this need to be in place so that students can feel challenged to keep improving and get a sense of gratification that their hard work is being recognized and encouraged. Improved public policy and increased business development would make African countries better able to provide the means for their citizens to study STEM fields and want to stay to continue their work.

Despite all that Africa has stacked against it, there is hope for its developing countries. Africa has the fastest growing middle class in the world, with the potential to grow its labor force immensely. It has a huge population of untapped potential that could be fixed with innovations and proper allocation of funding. Two changes Africa needs to make are improving school systems and pursuing technological advancements. Innovation is crucial for an economy to prosper, and the way to do that is through improved technology. Access to communications technology has the ability to dramatically improve the efficiency across all countries and give people the means to connect to one another. Similarly, growing the education systems will allow students to get a better education and grow up to contribute to the community. Young adults will be better prepared to enter the workforce and have the tools they need to push the economy into a place that can be beneficial for all. These adjustments will not be easy, but if governments and citizens can come together and develop better policies at all levels, change can happen.

### **Investment: Africa Rising**

A brief mention should be made of Africa's changing investment landscape. The Africa Rising scenario has become a popular mantra over the past decade and a departure from the Natural Resource Curse scenario that dominated African inward investment for decades. With a growing middle class, a growth in demand in Asia for commodities, and a suite of economic reforms, Africa has once again become a more attractive investment destination. While currency and limits on repatriation of earnings still exist, private equity funds are searching for the higher yields that Africa can offer. Private investment

and money remittances from the African diaspora now both exceed the amount of inward development assistance flows. China has made a contribution, first by its state-owned companies and now by 10,000 private companies operating in the continent.<sup>37</sup> However, much of the Chinese capital is in the form of medium- and long-term debt or is bartered in exchange for access to desired natural resources. Surprisingly, according to EY, the United States is still the leading investor into Africa outside of the African continent as measured by the quantity of investments. Within Africa, South Africa and Kenya has become leading investors as they bring not only capital but also access to world-class capital markets. The Johannesburg Stock Exchange is the world's fourth oldest capital market. Yet in many countries other than these, the institutional and regulatory environments remain challenged.<sup>38</sup>

Although low investment returns in the developed world have incentivized investors to look for opportunities in emerging markets, Africa has set up many obstacles to FDI. First, with the exception of Kenya and South Africa, Africa's capital markets are weak and offer few opportunities for investors to find attractive exits or raise complimentary capital. Second, Africans need more ambition with regards to the reform agenda, especially as there is compelling evidence that coherent, predictable, and transparent enabling environments are a precondition for investment. The World Bank's annual doing business survey provides ample evidence of an ongoing African reform agenda. While four of the world's top ten reforming economies are located in Africa,<sup>39</sup> six of the bottom ten countries in the ease of doing business rank are located in Africa.<sup>40</sup> While some African countries benchmark against other African countries, the reality is that, in a world of GVCs, each country in Africa competes with not only fellow Africa countries but also emerging markets everywhere.

### Automation & Artificial Intelligence (AI) in Africa

Enabled by artificial intelligence (AI), machines can learn from patterns in data and proactively improve themselves, bringing human-like cognition to industrial automation and disrupting modes of production and the delivery of services. Global investment in AI has rapidly increased to between \$20 billion USD and \$30 billion USD in 2016, with 90% allocated to research, development, and deployment, and 10% to acquisitions.<sup>41</sup> Much of this capital comes from companies like Google, Amazon, and Baidu. But there is also a growing contingent of private equity and venture capital investors, which spent between \$5 and \$8 billion in 2016.<sup>42</sup> While some recipients of these funds are building AI systems to filter emails and provide legal advice, others are applying automation and AI to improve agriculture and manufacturing.

The abundance of interest, capital, opportunities, and promises reminds one of mobile technology just 10 years

ago. Will automation and AI do to African nations over the next decade what mobile technology did to them in the last one, fueling a dramatic rise in connectivity and unlocking significant gains in economic development? Like mobile technology and communication capabilities, will automation and AI permit African nations to dramatically increase their research, development, and production capabilities? Will automation and AI give African nations even more power to leapfrog the need for old-fashioned infrastructure and outdated strategies of industrialization?

Some see application of automation and AI in Africa as "a chimera, not a reality"—a thing hoped or wished for but in fact illusory or impossible to achieve.<sup>43</sup> On the contrary, entrepreneurs, startups, and multinational stalwarts alike are already investing in identifying and putting together the policy, regulatory, and investment components needed to create an enabling environment for automation and AI to not only take root but to scale as well. This is especially true in Kenya, South Africa, Nigeria, Ghana, Botswana, and Ethiopia.<sup>44</sup>

African leaders, entrepreneurs, investors, and policymakers have the opportunity to leverage automation and AI to improve **agriculture** and **manufacturing** in particular. With greater productivity, efficiency, and safety, these high-growth sectors enabled by innovative technology and human capacity can advance sustainable development, maintain inclusive growth, and connect supply chains regionally and globally. PricewaterhouseCoopers estimated that AI technologies could increase global GDP by \$15.7 trillion, a full 14%, by 2030, of which \$1.2 trillion would be added for Africa.<sup>45</sup> But these outcomes are not possible without considerable challenge and significant investment.

Critical components necessary for automation and AI to take hold are missing across most of the continent except in a handful of countries—namely Kenya, South Africa, Nigeria, Ghana, Ethiopia, and Botswana. For one, the lack of quality first-generation internet and communications infrastructure leaves little to replace and a heavy burden for mobile networks to process the computationally dense work of AI at scale.

Internet connectivity still costs too much for most people; and many of those that can afford it still complain of poor service. Plus, further improvements to human capacity are also required to speed uptake and adoption of the new features afforded to users by automation and AI. Finally, many African countries remain incapable of requisite reforms in the areas of data collection and data privacy, infrastructure, education, and governance.

But there are also opportunities at large and tools available to solve problems and accelerate progress. Mobile technology should be seen as the foundation for automation and AI. A youth culture of strong interest in

business creation is a driving force of technology adoption and development, with many young entrepreneurs looking for global opportunities. Internet connectivity has nonetheless provided unprecedented access to information, partnership, and capital.

### Automation & Artificial Intelligence in Agriculture

The Global Opportunity Network's 2016 Report identified smart agriculture as the opportunity with the biggest potential for a positive impact on society—ahead of the digital labor market and closing the skills gap.<sup>46</sup> After all, with 2.3 billion more people in the world by 2050, we will need to produce 70 percent more food than we do today amidst climate change, resource scarcity, and growing inequality.<sup>47</sup>

Nowhere are these pressures felt more sensitively than in Africa. Agriculture employs 60 percent of Africa's workers and produces nearly a third of its GDP (see Figure 10).<sup>48</sup> [See Figure 7]

Until 2025, agriculture will create more jobs than the rest of the economy combined.<sup>50</sup> Buoyed by the increasing demands of population growth and the increasing supply pressures of climate change, agriculture will continue to be a critical pillar of Africa's economic growth and meaningful participation in the changing global trade landscape. As such, improving productivity and efficiency of agriculture and food processing is an important objective for countries in Africa, who can accomplish this goal with the help of automation and AI.

But the challenges are plenty. For one, there is more uncultivated arable land in sub-Saharan Africa than there is cultivated farmland in the United States, and that land needs to be utilized more effectively and efficiently.<sup>51</sup> Barriers to accessing financing for modernization persist, so it remains difficult and expensive to do so. Young working-age people are leaving rural homes for cities, attracted away from farming to what are perceived to be more 'innovative' industries. Climate change, disease, and drought also remain formidable and will almost certainly become more severe in the future. Nevertheless, automation and AI can help solve these, too.

According to IBM, problems related to weather cause 90 percent of all crop losses. Artificial intelligence tools can help farmers analyze data like humidity, soil pH, air pressure, precipitation, temperature, and weather in real-time and help determine plant strength, predict the best time for planting and irrigation, and increase food production in a time when the world really needs it.

Powered by AI, satellite image analysis can optimize use of uncultivated arable land, recommending locations and schedules for planting, irrigation, fertilization, and harvest. Powered by AI, financial transactions can be more secure, and lenders can more effectively assess risk with less information in order to widen access to

capital. Powered by AI, food processors and wholesalers can improve supply chain efficiency and increase profitability. Powered by AI, robots are also attracting significant agricultural interest, namely stationary robots, non-humanoid land robots, and fully automated aerial drones. Between 23 and 37 percent of the companies surveyed said they plan to make investment of this sort (depending on the industry).<sup>52</sup>

#### Who is Leading the Way?

Kitovu (Nigeria) – a web/mobile based decentralized fertilizer/seedling warehousing system based in Nigeria that matches the right inputs to different farm locations owned by smallholder farmers in distant pocket locations, using geo-location and soil data collected by the mobile app.

Syecom (Ghana) – specializes in the acquisition, processing, analysis and synthesis of imagery from remotely sensed satellites and multispectral image data from drones to monitor field crops/vegetative status and identify and mitigate potential diseases across fields in Sub-Saharan Africa on farms in Ghana.

Yellow Beast (South Africa) – develops, manufactures, and installs an easy-to-use, precision micro-irrigation device, called Nosets Simplified Irrigation, senses and interprets the most favorable, in situ conditions in the soil-crop system, using known information on the crop and soil properties, and automatically irrigates the crop.

### Automation & Artificial Intelligence in Manufacturing

Manufacturing represents almost a third of African countries' GDP (see Figure 10). Overseas Development Institute data show that between 2005 and 2014 manufacturing production within Africa more than doubled from \$73 billion to \$157 billion, growing 3.5% annually in real terms.<sup>53</sup> Uganda, Tanzania, and Zambia have achieved more than 5% annual growth in the recent past.<sup>54</sup> Manufacturing exports from sub-Saharan African markets almost tripled between 2005 and 2015 to more than \$140 billion.<sup>55</sup> Foreign Direct Investment (FDI) in African manufacturing is increasing and increasingly comes from other parts of Africa.<sup>56</sup> Manufacturing investments represent a quarter of all FDI in Mozambique and Tanzania and more than 40 percent in Rwanda.<sup>57</sup> Indeed, *The Economist* calls Africa "an awakening giant" in 2014; and Irene Yuan Sun, author and consultant, writing in *Harvard Business Review* in 2017 considered Africa "the world's next great manufacturing center."<sup>58,59</sup> [See Figure 8]

Improvements to manufacturing through automation and artificial intelligence (AI) can accelerate diversification of African economies, increase resilience to economic and climate shocks, and decrease dependence on natural resource exports. Automation and AI have the potential to expand manufacturing capabilities for aerospace, military, medical, dental, textiles, and automotive, all high-growth, high-value sub-sectors. Egypt, Tanzania, Morocco, South Africa, Tunisia, and Kenya are stand-out leaders in terms of pro-manufacturing policy, incentives for investment, and environments for experimentation and commercialization of automation and AI in manufacturing.

In fact, Morocco has been able not only to diversify its economy into manufacturing, but also to move higher up into the value chain.<sup>61,62</sup> In 2016 slightly more than 13% of Morocco's total exports were textile manufacturing products, while exports of higher value-added electrical machinery and mechanical appliances represented nearly 18% of exports. Morocco adopted policies to develop its automotive and aerospace sectors, which are now starting to bear fruit. The automotive industry represents nearly 14% of its exports, and the aerospace sector has grown by 216 times over the last 16 years to reach about \$443 million worth of exports, 2% of the total. This success was in large part the result of Morocco's Plan d'Accélération Industrielle, (PAI), which aimed to modernize, stimulate growth, and encourage competition in key export industries including aeronautics, auto-industry, agro-industry, offshoring, textiles, and pharmaceuticals.<sup>63</sup>

Tunisia is another example of a country steering its economy away from oil and into higher value-added manufactured products. Some of its major non-oil exports were textile products and electrical machinery and mechanical appliances, representing about 22% and 31% of its total exports respectively in 2016. Similar to Morocco, it is also moving into the automotive and aerospace sectors. In 2016, they represented about 3.5% and 1.7% of its exports respectively.

In East Africa, Kenya is also developing its textile manufacturing capabilities. Over the last 15 years, this sector has increased its size 59 times. In 2016, its textile exports reached about \$146 million, representing almost 10% of its total exports. Kenya is also expanding its automotive industry. Toyota and Volkswagen have invested in their own assembly plants in the country. In partnership with local companies, Hino Motors, Hyundai, and Tata Motors are also assembling their cars, trucks, and buses locally. Although this sector is still relatively small, locally assembled vehicles represent more than 50 percent of new vehicles sold, and Kenya's automotive exports have grown more than 20-fold since 2001. The Kenya Center of Excellence in the Africa Center of

Tech Studies and Kenyatta University helped incubate manufacturing in the country.

### **Automation & Artificial Intelligence in Other Growth Sectors**

#### *Safety*

Occupational safety is a significant issue in Africa as most employed individuals work in informal sectors and for MSMEs generally without any form of occupational hazard prevention or control procedures, legal protection, or health care coverage. Over 59,000 work-related fatalities and 4 million non-fatal accidents occur across the African continent each year according to the International Labor Organization (ILO). Promising applications of automation and AI to robotics can protect and safeguard employees by going into dangerous spaces in mines, where they perform tasks such as scouting, operating drills, and capturing detailed information. Multinational mining company Anglo American, which operates mines in multiple African countries, suggested in *Bloomberg* in 2017 that "robots will run mines within the next decade."<sup>64</sup>

#### *Healthcare*

Technologies powered by AI and automation can boost healthcare efficiency, freeing doctors to treat those who actually need in-person care and providing increased access for all. In addition, IBM Watson is partnering with Kenya Medical Supplies Agency and local businesses to monitor medical product supply chains. Services with intelligent chatbots interact with healthcare workers to submit supply chain data, which are analyzed by a trusted advisor to identify the causes of stockouts, preventative measures, and relevant resources to improve the availability of product by 50 percent. In 2016, the Rwandan government signed a deal with Zipline, a drone delivery service that delivers medicine and blood to otherwise difficult-to-reach areas and has put every Rwandan within 30 minutes of life-saving medical supplies.<sup>65,66</sup>

#### *Financial*

Finally, AI can help protect businesses' financial security. AI programs such as Ayasdi can take massive data sets, discover discrepancies, and predict when financial hiccups will arise. As companies increasingly focus on improving their risk profiles in our interconnected world, AI security programs will become increasingly common. HSBC is already using Ayasdi to transform its approach to financial crime risk and protect against money laundering, fraud, and other threats. Debeers has implemented a Blockchain system that will track a diamond from a mine to a ring thereby giving granted certainty of origin.<sup>67</sup>

### **Big Data**

Automation and artificial intelligence (AI) require large amounts of data from which to find patterns and make

predictions. While mobile phones and the growing popularity of social media and messaging applications across Africa have made data more readily available, there remain shortages and barriers. Even in countries where automation and AI hold promise, the quality, timeliness, and availability of data are often poor in quality or missing.<sup>68</sup>

In sub-Saharan Africa, Kenya leads in internet penetration, mobile density, and in trade in ICT services. Expanding internet access on the continent has led to a 25% increase in GDP, worth \$2.2 trillion, and 140 million jobs.<sup>69</sup> Even more fundamental than internet access, automation and AI no matter how innovative and disruptive still require basic ICT infrastructure, education, and improved cost and reliability of electricity.

### Developing, Not Automating, Human Capacity and Skill

More than just big data, automation and artificial intelligence (AI) rely on significant know-how among its human adopters. No one knows for certain if productivity gains from automation will create more jobs than it destroys, as has occurred during previous technological shifts. The labor effects of automation and AI are often painted as a zero sum, but the truth is more nuanced. The Future of Jobs Report in 2018 predicts the loss of 75 million jobs by 2022 and the creation of 133 million jobs over the same period, for a net increase of 58 million jobs.<sup>70</sup> In other words, innovative technology like automation and AI may create more jobs than it destroys.

Rather than displacing employees, machines can empower low-skilled workers and equip them to take on more-complex responsibilities.<sup>71</sup> This, in turn, can help meet an urgent need for countries lacking widespread access to education and skills training.<sup>72</sup> AI and web-based training programs, for example, could teach more complex skills to a low-skilled worker and respond by adjusting its settings as the worker expresses understanding and knowledge.<sup>73</sup> This type of technology is especially applicable in countries like South Africa, where unemployment remains high and employers cannot fill vacancies due to a dearth of skilled workers.

Similarly, a World Economic Forum report suggests new technologies have the capacity to both disrupt and create new ways of working, similar to previous periods of economic history such as the Industrial Revolution, when the advent of steam power and then electricity helped spur the creation of new jobs and the development of the middle class. But workers and the systems that educate and train them need to be ready. Significant investment should be maintained in developing human capacity from primary school to university. For instance, backed by Google and Facebook, the African Institute for Mathematical Sciences (AIMS) has created the first dedicated master's degree program for machine intelligence in Africa.

### Way Forward to Enabling Automation, Artificial Intelligence, and Their Benefits

Will automation and AI fuel economic development and research as mobile technologies did in the past decade? Will they allow African nations to leap ahead, skipping traditional industrialization steps? The answers to these questions remain elusive, and in many respects it remains too early to tell. But for any chance at positive outcomes—that is, for African countries to fully leverage the power of automation and AI to change sectors like agriculture and manufacturing into globally-connected productivity powerhouses—governments and private sector alike must fully understand the advantages and consequences of this technology and deliberately respond to integrating it into national strategy.<sup>74</sup>

Government leaders should focus on three (3) key activities:

- Increase financing of internet and communications technology (ICT) infrastructure development
- Integrate technology education into curricula of primary and secondary schools;
- Implement reforms to data collection and data privacy policies.

There is an urgent need to accelerate improvements to the agriculture and manufacturing sectors to increase their value alongside other efforts to diversify African economies, strengthen growth, and build resilience. Given the leapfrogging lessons of mobile technology on the continent over the last two decades, many African countries are positioned well to leverage automation and AI with agility and innovation. Automation and AI in agriculture and manufacturing would unlock tremendous value, connecting these markets to new regional and global marketplaces and allowing them to compete more efficiently and effectively. The challenge lies not in maneuvering these technologies as a vehicle but in ensuring that government, industry, and civil society contribute to creating an enabling environment.

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**See pages 19-22 for figures referenced in this article.**

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## Supporting Data

Figure 1. African intra-regional trade, as a percentage of trade with the world<sup>14</sup>

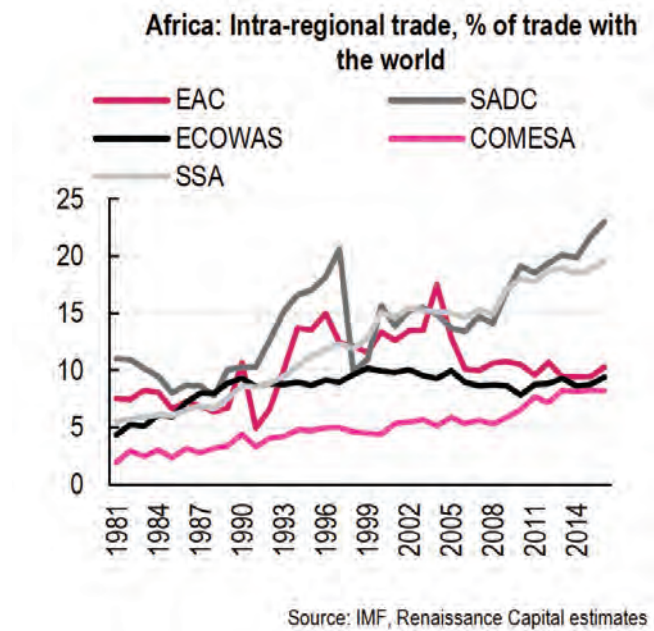


Figure 2. Correlation Between GDP Growth vs. Merchandise Trade<sup>15,16</sup>

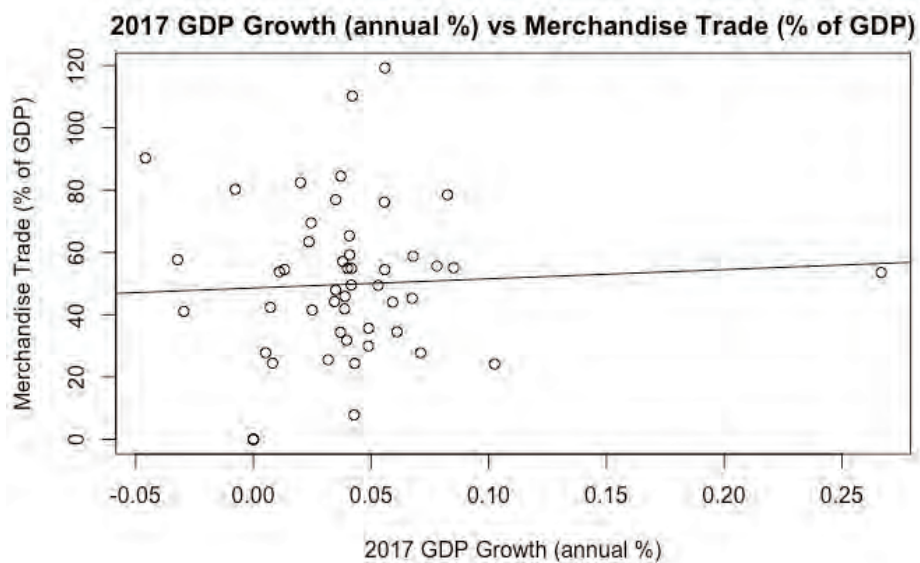


Figure 3. Aggregate two-way goods trade between AGOA countries and the United States<sup>22</sup>

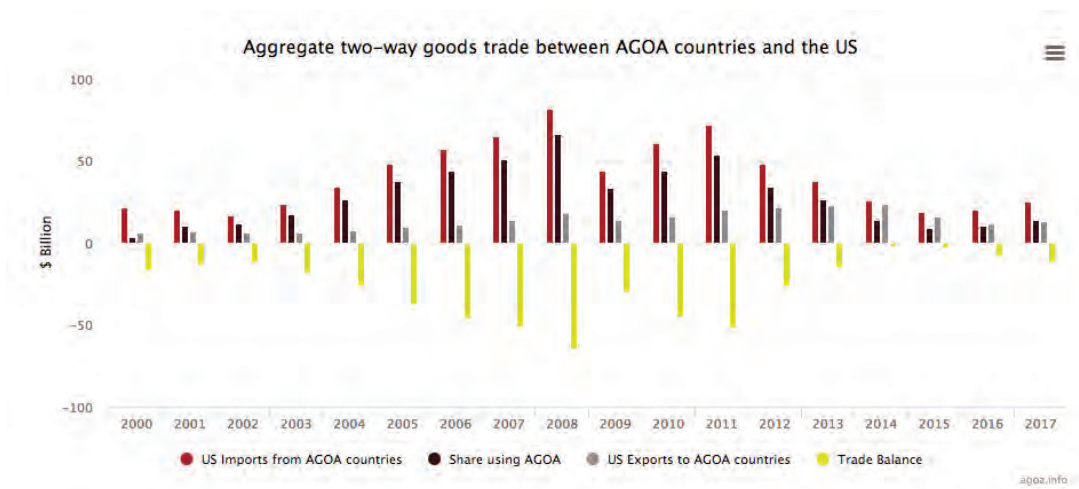


Figure 4. EU trade in goods with Africa, 2006–2016 (in € billions)<sup>23</sup>

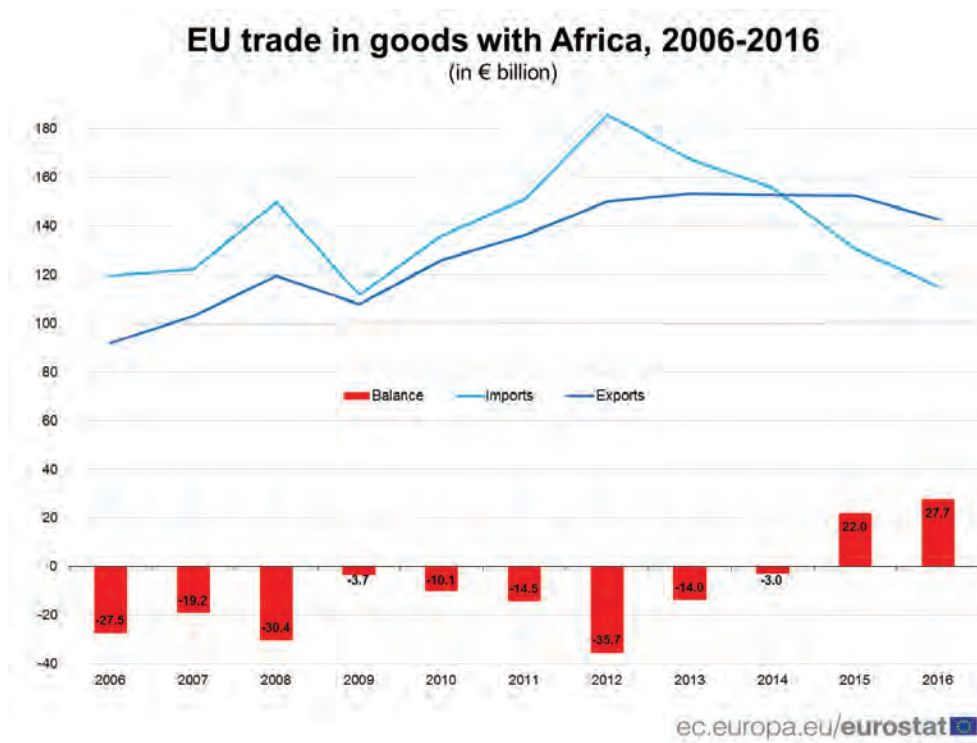


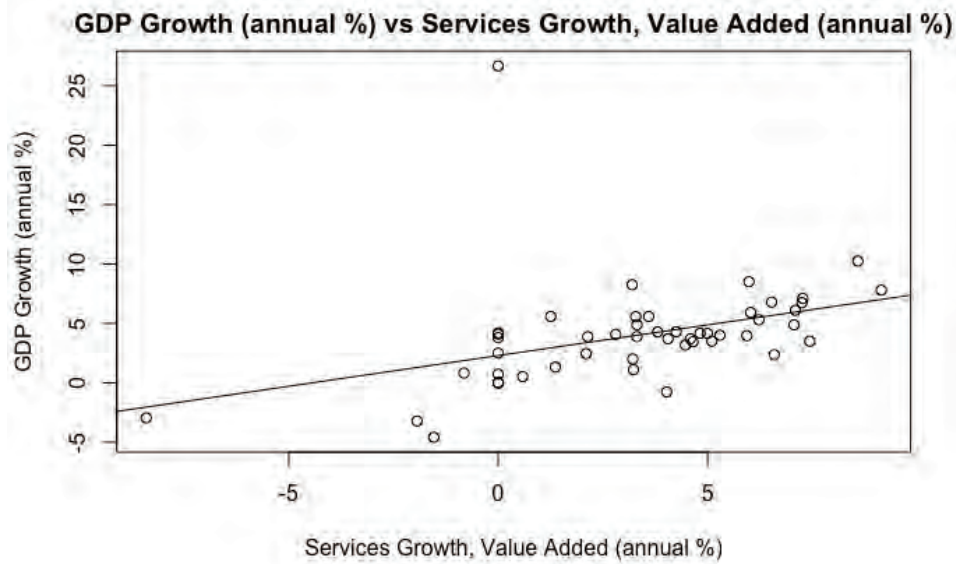
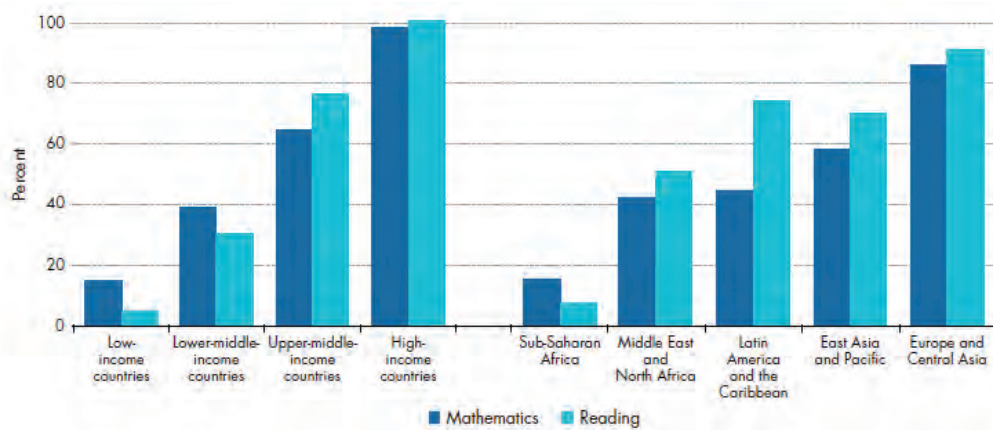
Figure 5. Correlation between GDP growth and services growth<sup>24,25</sup>Figure 6. Median percentage of students in late primary schools who score above a minimum proficiency level on a learning assessment, by income group and region<sup>34</sup>

Figure 7. Sectoral composition of GDP in Africa, 2000-2016<sup>49</sup>

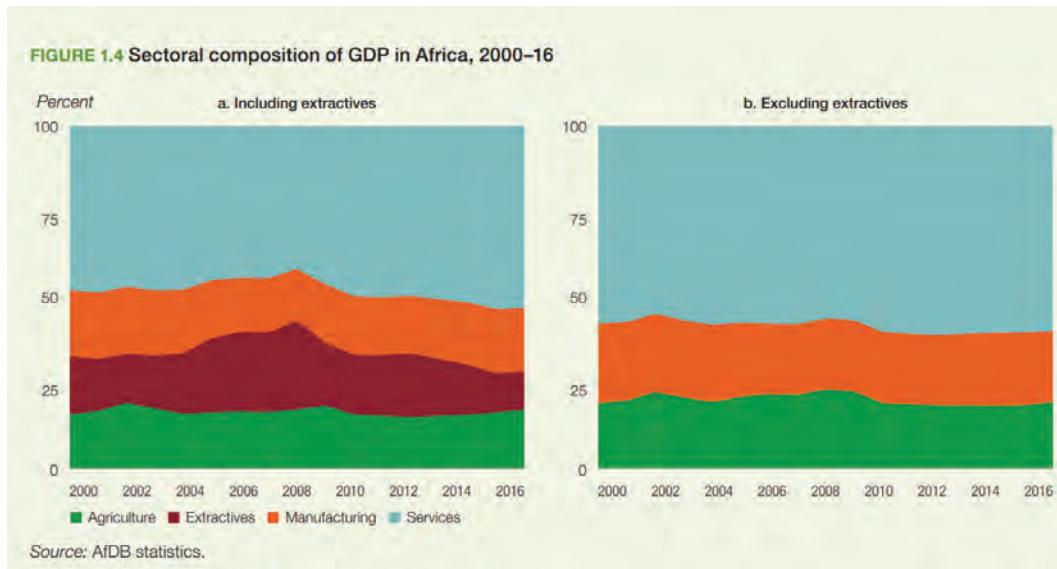
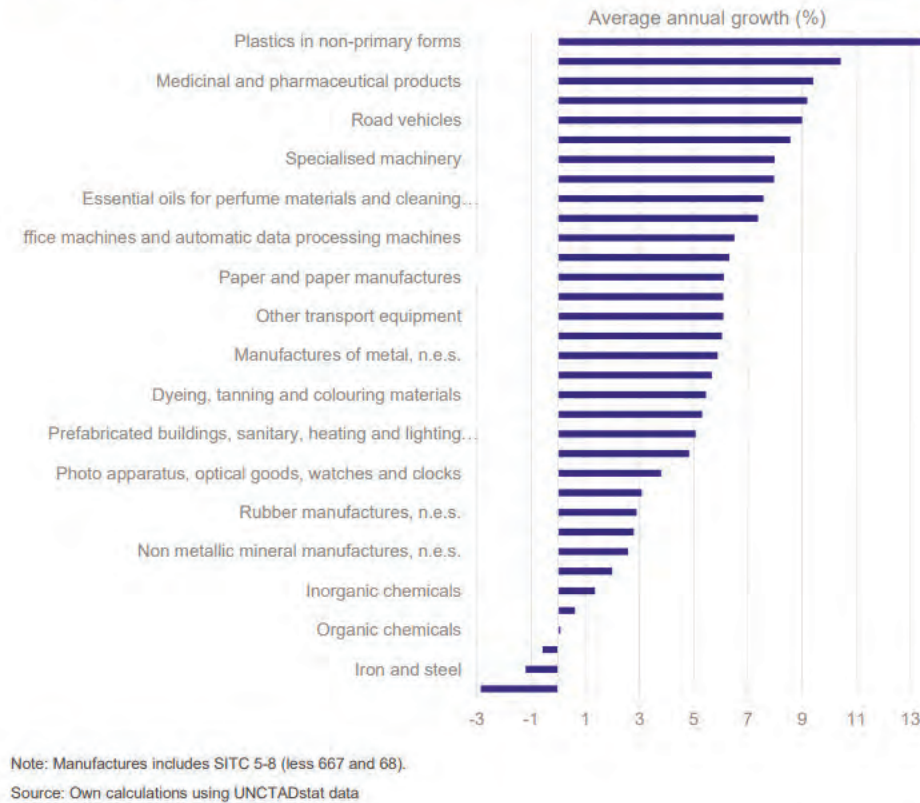


Figure 8. Average annual growth in value of African manufactures exports by sector, 2005-2016 (%)<sup>60</sup>

Figure 3: Average annual growth in value of African manufactures exports by sector, 2005-2016 (%)



# African Governance: Challenges and Their Implications

By Chester Crocker, Georgetown University

## Introduction

In Africa, as in every region, it is the quality and characteristics of governance that shape the level of peace and stability and the prospects for economic development. There is no more critical variable than governance, for it is governance that determines whether there are durable links between the state and the society it purports to govern. The nature of governance is central because it determines whether the exercise of authority is viewed as legitimate. Legitimate authority, in turn, is based on accepted laws and norms rather than the arbitrary, unconstrained power of the rulers. Governance also has an important regional dimension relating to the institutional structures and norms that guide a region's approach to challenges and that help shape its political culture.<sup>1</sup> This is especially relevant in looking at Africa's place in the emerging world since this large region consists of 54 states—close to 25% of the U.N.'s membership—and includes the largest number of landlocked states of any region, factors that dramatically affect the political environment in which leaders make choices. Consequently, national and regional governance factors interact continuously.

In this paper, I look first at the emergence of the African state system historically, including colonial legacies and the Cold War's impact on governance dynamics. This discussion leads to an analysis of African conflict trends to help identify the most conflict-burdened sub-regions and to highlight the intimate link between governance and conflict patterns. The third section looks at the critical role of political and economic inclusion in shaping peace and stability and points to some of the primary challenges leaders face in deciding how to manage inclusion: whom to include and how to 'pay' for it. The essay concludes with a sobering reflection on the challenge of achieving resilient governance.

## Impact of Historical Origins of African State System<sup>2</sup>

It should not be surprising that there is a weak social compact between state and society in many African states. Most of the region's states were defined geographically by European cartographers at the start of the colonial period. The modern African state system has been gradually Africanized, albeit on more or less the identical ter-

ritorial basis it began with at the time of decolonization in the second half of the 20<sup>th</sup> century. Less than 20% of Africa's states achieved statehood following rebellion or armed insurgency; in the others, independence flowed from peaceful transfers of authority from colonial officials to African political elites. The initial constitutions and legal systems were derived from the terminal colonial era.

Cold War geopolitics reinforced in some ways the state-society gap as the global rivalry tended to favor African incumbents and frequently assured they would receive significant assistance from external powers seeking to build diplomatic ties with the new states. This situation supported an external orientation in African politics in which Cold War reference points and former colonial relationships assured that African governments often developed only a limited sense of connection to their own societies. The African state system has gradually developed a stronger indigenous quality only in the last twenty-five years or so. Africa's states are the world's newest, and it can hardly be surprising that Africans define themselves in terms of multiple identities including regional, tribal, clan-based, and religious ones—in addition to being citizens of a relatively new state.

For these and other reasons, the state-society gap lies at the heart of the problems faced by many states. Governments that rely on foreign counterparts and foreign investment in natural resources for a major portion of their budgets—rather than on domestic taxation—are likely to have weaker connections to citizens and domestic social groups. This adds to the challenge of building national identities; this 'identity vacuum' increases the risk that political elites and social groups will capture the state for narrower, self-interested purposes that weaken, rather than strengthen, social cohesion.

## Conflict Trends and the Governance Link

African conflict trends point to a complex picture, made more so by the differing methodologies used by different research groups. It seems clear that Africa's conflict burden declined steadily after the mid-1990s through the mid-2000s owing to successful peace processes outstripping the outbreak of new conflicts; but the burden has been spiking up again since then. One influential re-

search group, SIPRI in Sweden, counted a total of 9 active armed conflicts in 2017 (in all of Africa) plus another 7 post-conflict and potential conflict situations.<sup>3</sup>

More revealing is the granular comparison of conflict types over time. Thus, another report by PRIO and the University of Uppsala (two Norwegian and Swedish centers) breaks conflict down into state-based (where at least one party is a government), non-state-based (neither party is an official state actor), and one-sided conflicts (an armed faction against unarmed civilians). This study points to a marked increase in state-based conflicts, owing in significant part to the inter-mixture of Islamic State factions into pre-existing conflicts. This study notes that in 2007 Africa saw 12 conflicts in 10 countries. Ten years later, in 2017, the number of conflicts was 18, taking place in 13 different countries. Using a second conflict lens, the number of non-state conflicts has increased dramatically in recent years, peaking in 2017 with 50 non-state conflicts, compared to 24 in 2011. These events point to extreme state fragility and a loss of sovereign control over violence in the 11 affected countries, led by Nigeria, South Sudan, and the Central African Republic (CAR). One-sided violence against unarmed civilians has also spiked up since 2011.<sup>4</sup>

These numbers require three major points of clarification. First, many of the conflicts enumerated take place within a limited number of conflict-affected countries and in clearly-defined geographic zones (the Sahel and Nigeria; Central Africa; and the Horn.) Second, the levels of direct 'battle deaths' from these events is relatively low when compared with far higher levels in the wars of the Middle East. Some of these conflicts are, in reality, low-tech, sporadic skirmishes and armed attacks. Third, Africa's conflict burden reflects different forms and sources of violence that sometimes become linked to each other: political movements may gain financing and coercive support from criminal networks and traffickers, while religious militants with connections to terrorist groups are often adept at making common cause with local grievance activists. Large states and those with complex ethnic and geographic features—e.g., the DRC, Nigeria, Uganda, the Sudans, Ethiopia—may be especially prone to such multi-sourced violence. Indeed, it should be added that a high percentage of today's conflicts are recurrences of previous ones, often in slightly modified form with parties that may organize under more than one flag. One scholar specializing on the Horn of Africa likens the situation a 'political marketplace' in which politics and violence are simply options along the spectrum pursued by powerful actors.<sup>5</sup>

This brief overview of conflict in Africa signals the severity of the security challenges to African governance, especially in those sub-regions that feature persistent and recurrent outbreaks of violence. Recent developments add further complications to the region: (a) the collapse

of Libya after 2011, spreading large quantities of arms and trained fighters across the broader Sahel region; (b) the gradual toll of desertification placing severe pressure on traditional herder/farmer relationships in places like Sudan and Nigeria; and, (c) the proliferation of local IS or Al Qaeda franchises in remote, under-governed spaces. Not surprisingly, incumbent leaders facing these challenges look to short-term military remedies and extend a welcome to military partners—with France, the United States, and the United Nations the leading candidates.

The link between conflict and governance is a two-way street. Security challenges can impose tough choices on governments that may act in ways that compound the problem, opening the door to heightened risks of corruption and the slippery slope of working with criminal entities. On the other hand, weak or destructive governance is sometimes the source of conflicts in the first place. This can happen in several ways. In the thankfully rare cases where national governance breaks down completely—South Sudan, Somalia, CAR—its absence is an invitation to every ethnic or geographic community to fend for itself—a classic security dilemma.

A second conflict pattern can develop along the lines of ethnic cleavages which can be readily politicized and then militarized into outright ethnic violence. The challenge facing Africa's leaders—perhaps above all others—is how to govern under conditions of ethnic diversity. Admittedly, the problem is by no means uniquely African, but it is very commonly experienced in Africa.

When conflicts evolve along ethnic lines, they are readily labelled 'ethnic conflict' as if 'caused' by ancient hatreds; in reality, it is more often caused by bad governance and by political entrepreneurs. Poor leadership can result in acts of commission or omission that alienate or disenfranchise geographically distinct communities.

A third pattern flows from the authoritarian reflex where 'big men' operate arbitrary political machines, often behind a thin democratic veneer. Typically, such leaders scheme to rig elections or to change constitutional term limits—actions seen in recent years in such countries as Rwanda and Uganda. Despite the adoption of constitutional term limits in many African countries during the 1990s, such restrictions have been reversed or defied in at least 15 countries since 2000, according to a recent report.<sup>6</sup>

The conflict-governance link takes various forms, and it points to the centrality of the variable of leadership. In 'new' countries such as most of those in Africa,<sup>7</sup> where the rule of law is in competition with the rule of men, leaders play a strikingly critical role, for good or ill. Wise leadership respects ethnic diversity and works toward inclusive policies. This theme, which is further developed below, is especially critical bearing in mind that Africa is



the world's most ethnically complex region, home to 20 of the world's most diverse countries in terms of ethnic composition.<sup>8</sup>

### Governance Trends and Scenarios

African governance trends were transformed by the geopolitical changes that came with the end of the Cold War. Almost at a stroke, the relationships between African governments and the major powers and major sources of concessional finance were upended, while political liberalization in the former Soviet bloc helped to trigger global political shock waves. Space opened up for African citizens and civil society movements, while incumbent regimes were no longer able to rely on assured support from erstwhile external partners. These partners, for their part, sometimes disengaged from close political ties and often brought new governance conditions into their assistance programs. Freedom House calculated that 17 out of 50 countries it covered were 'free' or 'partly free' in 1988, compared to 31 out of 54 countries in these categories by 2015. Of the latter, 10 achieved the top rating of 'free,' a conclusion close to ratings by the Economist Intelligence Unit (EIU).<sup>9</sup> A more bullish reading drawn again from multiple sources is that over 60% of people in sub-Saharan Africa live in 'free' or 'partly free' countries, a situation that enabled a Brookings Institution study to conclude that "the region [is] moving in fits and starts towards greater democratic consolidation."<sup>10</sup> Countries absent from the apparent democratic wave missed its beginnings in the early and mid-1990s, became caught up in protracted or recurrent civil conflicts, or degenerated as a result of electoral violence or 'big men' patrimonialism.

Against this broad picture, what is striking is the more recent downward trend in democratic governance in Africa and the relative position of African governance when viewed on a global basis. Freedom House's ratings see a pattern of decline since 2005 and note that 10 out of 25 countries (worldwide) with declining ratings are in Africa. The same source concluded that 7 out of the 12 worst scores for political rights and civil liberties are African.<sup>11</sup> As noted, the reasons vary: patrimonialism gone wrong (the 'big man' problem), extreme state fragility and endemic conflict risks, the perverse mobilization of ethnicity by weak or threatened leaders.

The long-term, global pushback by the leading authoritarian powers against liberal governance norms has consequences in Africa and other regions as governments directly act to 'close the space' for civil society to operate. These dynamics often lead to increased state fragility or the 're-authoritarianization' of once more participatory governance systems.<sup>12</sup> The trend is sometimes, ironically, promoted by western firms and governments more interested in commercial access and 'getting along' with existing governments than with durable political and economic development. African states, along with

Asian, Middle Eastern, and even European governments, have all been affected. The campaign by some (but not all) African states to pull out of the International Criminal Court is but one illustration of the trend. The swing against western norms was captured in an interview with Uganda's repeatedly re-elected president Yoweri Museveni who remarked "How can you have structural adjustment without electricity? ... The Chinese understand the basics. ... You can't impose middle class values on a pre-industrial society."<sup>13</sup>

This outline leads us to examine more closely the sources of legitimacy in African governance systems. One can identify five bases of regime legitimacy in the African context today. The first type is rights-based legitimacy deriving from rule of law, periodic elections, and alternation of political power, the kind generally supported by western and some African governments such as Ghana and Senegal. In direct contrast is the second model: statist, performance-based legitimacy, measured typically in terms of economic growth and domestic stability as well as government-provided services—the legitimacy claimed by leaders in Uganda and Rwanda, among others. Leaders may not be the only ones who support this definition of legitimacy.

A third, less often recognized base of legitimacy can be called 'conventional African diplomatic legitimacy' wherein a government—however imperfectly established—is no more imperfect than the standard established by its regional neighbors. Regional governance comes into play here, and certain precedents may get set and then ratified by regional or sub-regional organizations. For example, the election day itself goes more or less peacefully, the vote tabulation process is opaque or obscure, and the entire process is shaped by a pre-election playing field skewed decisively in favor of the incumbents. Sometimes, another precedent flows from these—namely, pressure from outside the country but with some support internally as well for creating a transitional government of national unity. Such post-electoral pacts reflect the conclusion that stability is more important than democracy.

Still another form of legitimacy in Africa sometimes derives from traditional political systems based on some form of kingship. Long-standing kingdoms such as those in Morocco and Swaziland are recognized national states. More frequently, this form of rule operates at the sub-state level as in the case of the emir of Kano or the Sultan of Sokoto in Nigeria or the former royal establishments of the Baganda (Uganda) or the Ashanti (Ghana). Ousted royals such as Haile Selassie (Ethiopia) and King Idriss (Libya) may be replaced by self-anointed secular rulers who behave as if they were kings until they, in turn, get overthrown. But established and recognized forms of inherited rule cannot be lightly dismissed as 'un-modern,' especially when linked to the identity of an ethnic or trib-

al group, and could be construed as a building block of legitimacy.

It may be useful to recall that historical kingships or dynasties were the common form of rule in Europe, India, China until modern times, and still is the predominant form of rule on the Arabian Peninsula. Legitimacy based on successful predation and state capture was well known to the Plantagenets and Tudors as well as the Hapsburgs, Medicis, and Romanovs, to say nothing of the Mughal descendants of Genghis Khan.<sup>14</sup> In this fifth model of imagined legitimacy, some African leaders operate essentially on patrimonial principles that Vladimir Putin can easily recognize (the Dos Santos era in Angola, the DRC under Mobutu and Kabila, the Eyadema, Bongo, Biya, and Obiang regimes in Togo, Gabon, Cameroon, and Equatorial Guinea, respectively).<sup>15</sup> Such regimes may seek to perpetuate themselves by positioning wives or sons to inherit power. Rule that is based on predation and political monopoly is unlikely to enjoy genuine popular legitimacy, but it can linger for decades unless there are effective countervailing institutions and power centers.

Against this backdrop, where is African governance headed? The key lies in identifying the variables that will shape its context. These include macro variables such as educational access (especially for women), climate change impact and mitigation, development and income growth rates, demographic trends, internet access, urbanization rates, and conflict events. Beyond such macro factors, several less obvious variables seem important to the political and economic governance future of the region. One of these is the potential influence exerted by the region's leading states, measured in terms of size, population, economic weight, and overall political clout and leadership prestige. If a critical mass of the leaders—e.g., South Africa, Nigeria, Kenya, Ethiopia, Cote d'Ivoire, Algeria, Egypt—are heading in a positive direction, they will pull some others along in their wake; of course, the reverse is also true.

One snapshot by the influential Mo Ibrahim index of African Governance noted in 2015 that 'overall governance progress in Africa is stalling,' and decided not to award a leadership award that year. (No award was made in 50% of the years since the program was launched in 2007; former Liberian president Ellen John Sirleaf won the award in 2017. Interestingly, small and mid-size state leaders have won the award so far.) The point here is that peer pressure, examples, and precedents are especially important in a region of 54 states, many of them dependent on satisfactory relations with their neighbors. Due to the influence of previous South African and Nigerian leaders, the African Union established the African Peer Review Mechanism (APRM) to review and report on a range of governance criteria. By 2016, 35 AU members had 'joined' it, but less than half actually subjected themselves to being assessed. African states are by no means homogeneous

in terms of governance standards: as the Mo Ibrahim index based on 14 governance categories reported in 2015, some 70 points on a scale of 100 separated the best and worst performers.<sup>16</sup>

Stated another way, if the abolition of term limits, neo-patrimonialism, and official kleptocracy become a regionally accepted norm, this will make it harder for the better governed states to resist the authoritarian trend. If more leaders practice inclusive politics or find themselves chastened by the power of civil society to do so, this could point the way to better political outcomes in the region. While this seems obvious, it is less clear what vectors and drivers will have the most weight in shaping that outcome.

### **Other Critical Governance Drivers**

One of these will be the role and weight of various powerful external actors. African political elites are more determined than ever to shape their own destiny, and they are doing so. But the context in which their choices are made is directly influenced by global political trends and the room for maneuver that these give to individual governments and their leaders. The rise of non-Western centers of power and the return of global polarization among major powers reduce the presence and weight of western influence. This provides wide opportunity for governments to experiment, to chart a course independent of Western preferences, but it can also encourage them to move toward authoritarian, state capitalist policies when that is the necessary or the expedient thing to do. Africa's geopolitical environment is shaped by Africans to a considerable degree. But it also reflects the impact of Arab, Russian, Chinese, Indian, European and U.S. vectors of influence which project their differences into African societies. If African political elite opinion converges with that of major external voices in favoring stabilization over liberal peacebuilding agendas, the implications for governance are fairly clear.<sup>17</sup>

Another driver of governance trends will be the access enjoyed by youthful and rapidly urbanizing populations to the technologies that are changing the global communications space. Relatively unfettered access to the internet via smart phones and laptops brings information—and hence potential power—to individuals and groups about all kinds of things: e.g., market prices, the views of relatives in the diaspora, conditions in the country next door, and the self-enrichment of corrupt officials. Issues of corruption and transparency are likely to become driving themes in African politics. The balance of power between official and non-official actors will likely shift, as networked activists assert their ability to organize and take to the streets on behalf of diverse causes. Overturning regimes in Africa's often fragile states could become easier to do, without necessarily leading to better governance. The same technology vectors can also empower criminal, trafficking, and terrorist networks, all of which

pose threats to state sovereignty. In sum, the digitization of African politics raises real challenges for political leaders and has the potential to increase their determination to digitize their own tools of political control.

### The Sources of Resilient Governance

This brief essay began by identifying the state-society gap as the central challenge for African governance. In these relatively new nations, the critical task for leadership is to build a social contract that is sufficiently inclusive to permit the management of diversity. To illustrate, when there are 2.2 billion Africans, 50% of whom live in cities, how will those cities (and surrounding countryside) be governed? What policies and laws will determine relations between farmers and urban dwellers, between farmers and herders, between diverse identity groups living in close proximity or encroaching on each other's farm land, and between public officials, criminal networks and ordinary citizens? The optimistic reply—and it is a powerful one—is that Africans will gradually build inclusive political and economic institutions.<sup>18</sup> This, however, requires wise leadership.

Political leaders everywhere face competing demands in this regard. On the one hand, they recognize the need for strong, responsive state institutions; weak, fragile states do not lead to good governance. Yet political stability cannot be based on state power alone, except in the short run. Political and economic inclusion is the companion requirement for effective and legitimate governance. The question then becomes, how to be inclusive?<sup>19</sup> A number of African states have decentralized their political decision-making systems and moved to share or delegate authority from the center to provincial or local levels. The jury is still out on the merits of this practice. The cases of Nigeria, Kenya, and South Sudan suggest that each case must be assessed on its own merits. At times, devolution has had major fiscal and governance consequences, including serving as a vehicle for co-optation and corruption. Large countries such as the DRC, Ethiopia, and Mozambique are likely to experience pressures against centralized, authoritarian, or one-party governance (whether accompanied by real elections or not).

Another basic question is, whom to include? Non-official institutions and civil society may have very different ideas from the national government on this issue, leading to debates about legitimacy. Yet, governments are expected to govern and make decisions after consulting relevant stakeholders. Ideally, African nations will benefit when civil society respects the state's role (as well as the other way around); rather than one-sided advocacy, both sides should strive to create a space for debate in order to legitimize tolerance of multiple views in society.

The imperative for inclusion raises many questions: should the priority be to achieve inclusion of diverse elites, of

ethnic and confessional constituencies, of a sample of grass roots opinion leaders? Should inclusion be an on-going process or a single event? For example, is it more effective to negotiate a power-sharing pact among key parties and social groups (as in Kenya) or is there possible merit in a periodic 'national dialogue' to address issues that risk triggering conflict? Building an inclusive political system also raises the question of what levels of the society to include and how to assure that local communities as well as groups operating at the national level can get their voices heard.

In some societies, traditional, tribal authorities may offer informed and genuinely accepted governance, provided that they are not merely government appointees pursuing decentralized self-enrichment. Legal norms are an integral part of the discussion about inclusivity since they affect every aspect of economic and personal life; this poses a critical question over whether individual rights or group rights take precedence in the normative hierarchy. There is also the question of inclusion of specific demographic cohorts: women, youth, and migrants from rural to urban areas (including migrant women) all face issues of exclusion that can have an impact on conflict and governance. Misguided policies at the national level combined with cultural constraints facing these social groups may increase exclusion and create seeds of future trouble.

In light of this discussion of types of inclusion, the implications for dealing with state fragility and building greater resilience can now be spelled out. Some regimes seem resilient because of their apparent staying power but actually have a narrow base of (typically ethnic or regional) support. The regime in this case captures the state, co-opts the security organs, and dissolves civil society. When a seemingly brittle regime reaches the end of its life, it becomes clear that the state-society gap is really a regime-society gap; the state withers and its institutions become hollow shells that serve mainly to extract rents.

The problems that face African governments are universal. But African societies are exposed to especially severe pressures, and governments must operate in an environment of high social demands and limited resources and capacity with which to meet them. These circumstances can generate an authoritarian reflex and the temptation to circle the wagons against all sources of potential opposition. The result is *transitory resilience of the regime*, but shaky political stability, declining cohesion, and eventual conflict or violent change.

The most promising pattern is *adaptive resilience* in which leaders facing such pressures create safety valves or outlets for managing social unrest. Some African leaders such as Ghana's Jerry Rawlings, Zambia's Kenneth Kaunda, or Mozambique's Joaquim Chissano accept and respect term limits and stand down. A more recent example of

adaptive resilience is being demonstrated by Ethiopia's Abiy Ahmed. His dramatic tenure since April of 2018 appears to be shaking up the state's creaky authoritarian services and creating the space for important adaptations such as ending a long-standing state of emergency, freeing political prisoners, reaching out to a wide range of foreign partners, and extending the olive branch to Eritrea with whom Ethiopia had fought a costly war. The quality and durability of such leader-defined adaptive resilience cannot be assured and can be reversed unless the associated norms become institutionalized.

A long-term route to political and economic success has been comprehensively documented by Daron Acemoglu and James Robinson in their global study of why nations fail or succeed. In this view, nations fail because of 'extractive economic and political institutions' that do not provide incentives for growth and stability. They succeed when there are political conditions that permit a broad coalition to impose 'pluralist political institutions' and 'limits and restraints' on ruling elites.<sup>20</sup> Thus, resilience of both state and society may hinge in the end on the rule of law replacing the rule of men. This we might call *transformative resilience*.<sup>21</sup>

The development of inclusive institutions may involve struggles that enable political and societal actors to check the domination of entrenched rulers and to broaden rule-based participation in governance. For Acemoglu and Robinson, such turning points occur in specific, unique historical circumstances that arise in a society's development.

### An Interim Conclusion

It is too soon to tell whether such institutions can evolve in modern Africa as a result of gradual tinkering with reformist agendas, as the legacy of wise leaders; or whether they will only happen as a result of fundamental tests of strength between social and political groups. We know a good deal about what Africans want and demand from their governments from public opinion surveys by Afrobarometer. There is strong demand for jobs, better economic management, reduced inequality and corruption and such outcome deliverables as health, education and infrastructure.<sup>22</sup> Those outcomes require effective governance institutions. We do not yet know whether such institutions will consistently emerge, starting with relatively well-governed states, such as Ghana or Senegal, as a result of repeated, successful alternations of power; or whether they will only occur when Africa's political systems burst apart and are reconfigured. If inclusion is the central ingredient, it will be necessary to explore in greater depth the resources leaders have available to 'pay' for including various social groups and demographic cohorts. Even old-fashioned tyrants learn that inclusion or co-option are expensive. Enlightened leaders face a more complex version of the same challenge: how to find

and mobilize the resources for broad-based inclusiveness? This point links the reader to the other Africa chapters that have been prepared for this project.

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<sup>1</sup> Chester A. Crocker, Fen Osler Hampson and Pamela Aall (eds.) *Rewiring Regional Security*. USIP press. 2011

<sup>2</sup> This discussion includes material drawn from Chester A. Crocker and Pamela Aall, "Can State and Society be Woven Together?" (Chapter 21). *The Fabric of Peace in Africa: Looking Beyond the State*. Centre for International Governance Innovation. 2017

<sup>3</sup> *SIPRI Yearbook 2018*. Stockholm International Peace Research Institute. Stockholm. 2018

<sup>4</sup> Ingrid Vik Bakken and Siri Aas Rustad, *Conflict Trends in Africa 1989-2017*, June 2018. Peace Research Institute Oslo (PRIO)

<sup>5</sup> Alex de Waal. *The Real Politics of the Horn of Africa: Money, War, and the Business of Power*. Polity Press. Cambridge MA, 2015

<sup>6</sup> John Stremlau, *Africa's Democracies: Promises, Progress and Prospects*. Electoral Institute for Sustainable Democracy in Africa. Johannesburg, South Africa. 2016. p. 23

<sup>7</sup> A few of today's African countries have longer independent identity than the majority of liberated European colonies: Morocco, Egypt, Ethiopia, Swaziland, and in some respects Botswana.

<sup>8</sup> Stremlau, op. cit. p. 6

<sup>9</sup> Data drawn from Jakkie Cilliers, "The Future of Democracy in Africa". Institute for Security Studies (Pretoria) and Frederick S. Pardee Center for International Studies (Denver). October 2016.

<sup>10</sup> <https://www.brookings.edu/blog/africa-in-focus/2017/01/10/foresight-africa-viewpoint-democracy-in-africa-in-2017/>

<sup>11</sup> <https://freedomhouse.org/report/freedom-world/freedom-world-2018>

<sup>12</sup> See the excellent policy brief by Thomas Carothers at <https://www.usip.org/sites/default/files/Fragility-Report-Policy-Brief-Closing-Space-and-Fragility.pdf>

<sup>13</sup> Quoted in James Kynge, 'Uganda Turns East: Chinese Money will Build Infrastructure says Museveni', *Financial Times*, 21 October 2014

<sup>14</sup> Mohammed Ayoob, "State Making, State Breaking, and State Failure". Chester A. Crocker, Fen Osler Hampson and Pamela Aall (eds.) *Leasing the Dogs of War*. USIP press. 2007

<sup>15</sup> A compelling study of the Angola case is: Ricardo Soares de Oliveira, *Magnificent and Beggar Land: Angola since the civil war*. London: Hurst. 2015.

<sup>16</sup> Stremlau, op.cit p. 28-29.

<sup>17</sup> Ricardo Soares de Oliveira and Harry Verhoeven "Taming Intervention: Sovereignty, Statehood and Political Order in Africa" *Survival* 60.2 (April-May 2018)

<sup>18</sup> Acemoglu, Daron and James A. Robinson (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Random House (Crown).

<sup>19</sup> This discussion draws from the work cited in footnote 2 supra (Chester A. Crocker and Pamela Adl, "Can State and Society be Woven Together?" (Chapter 21). *The Fabric of Peace in Africa: Looking Beyond the State*. Centre for International Governance Innovation. 2017)

<sup>20</sup> Acemoglu, Daron and James A. Robinson (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Random House (Crown).

<sup>21</sup> The typology of resilience draws from Martin-Breen, Patrick and J. Marty Anderies. 2011. "Resilience: A Literature Review." The Bellagio Initiative Background Paper. The Institute for Development Studies, The Resource Alliance and the Rockefeller Foundation. <http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/3692/Bellagio-Rockefeller%20bp.pdf?sequence=1>.

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# Climate Change and Africa's Future

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Africa is often described as the continent most at risk to the negative effects of climate change, both because of the expected change itself and because of the perceived lack of capacity of Africans and their governments to adapt. This paper provides an overview of what is known and unknown about Africa's climate future and examines how possible changes may challenge four critical and inter-related areas: agriculture, health, migration, and conflict.

A primary conclusion is that our understanding of climate change in Africa is disturbingly poor as a result of gaping holes in historic data availability, the complicated nature of climate processes affecting tropical regions in general and Africa in particular and the severe underrepresentation of climate research and researchers on Africa. There is nonetheless broad consensus that temperatures will rise faster than global averages, with the Intergovernmental Panel on Climate Change (IPCC) base scenario projecting an increase of about 4 degrees Celsius by the end of the century, though there is little agreement on how that change will impact precipitation. As an example, models using differing but plausible assumptions about the interrelations between Africa's climate and the melting of the Greenland ice sheet on one hand and trends in sea surface temperature on the other can produce scenarios in which rainfall in the Sahel increases 200–300 percent from current levels or falls to desert conditions. What does seem certain is that variability in timing and quantity of rainfall will increase with significant social consequences.

Africa's agricultural sector, including livestock, is particularly vulnerable to rainfall change because of the limited ability to control water, poor agricultural research infrastructure, and already low productivity which limits options for adaptation. This vulnerability constitutes a more general threat to African states because of the continued high dependence on the sector for livelihoods and food security. Vulnerability will be compounded by growing food demand from an increasing and increasingly wealthy population.

While a changing climate will have some direct health consequences, induced changes in the extent and location within Africa of disease vectors such as mosquitos and the increased threat of zoonotic disease transmission will have a greater impact on health. Africa is also likely to face new disease challenges caused by the impacts

of climate change outside the continent. For example, the thawing of northern hemisphere permafrost will free long trapped viruses that will use avian migration to move across continents. Specific predictions are impossible, but the majority of infectious diseases that have emerged in the last 100 years have had a zoonotic origin. Health systems in and outside of Africa will face new challenges.

Rising temperatures will also influence the habitability of some areas. However, the largest climate related migration pressures will likely result from diminishing agricultural opportunities, adding to the inexorable move of people from rural to urban areas already underway and, to a lesser extent, to movement across national boundaries. Migration related to climate shock has already been associated with conflict in Africa, for example in the Sahel, and Darfur has been cited as the world's first climate conflict. While climate (or weather) has played a role in conflict and no doubt will continue to do so in the future, there is limited direct evidence of climate or climate change as a primary cause of conflict. Nonetheless, local, national and international institutions designed to peacefully manage land, water, and other resources under earlier climate regimes will struggle under changing conditions.

Four caveats should be considered before using these conclusions to inform action. First, it is foolhardy to use the singular to discuss a continent with the immense geography and vast diversity of populations and systems as Africa. Some of Africa's 50+ states will become drier, others wetter. Effects in Burundi and Burkina Faso where agriculture accounts for more than 80% of employment will be much different than in Angola, South Africa, and Mauritius where it accounts for less than 10%. Second, while the effects of climate change will be significant, they are only one driver of change amongst many including population, technologic transformation, and governmental evolution. Outcomes will depend not on climate change alone but on the human systems on which change occurs. Third, perhaps the one thing that all African governments can agree on is the culpability of the others for the climate predicaments Africa will face. A shared interest in climate solutions can perhaps ironically provide an avenue for new forms of cooperation between African states. The intercontinental dimensions of disease may also encourage new forms of cooperation between African states and the rest of the world. Finally,

the history of post-Colonial Africa has been a history of adaptation to difficult conditions. Africans will continue to adapt to a generally harsher and more variable climate environment. But the path to adaptation can be made much easier if it is well paved. The paper ends with brief reflections on how this might be done.

### Evidence of Change in Africa's Climate

Our understanding of climate change is arguably weaker for Africa than any other major region. Existing historical knowledge comes from spatially disparate sources including documentary reconstruction in Southern Africa, proxy records of African alpine glacial recession, temperature proxies from lakes Tanganyika and Malawi, borehole records from southern Africa, and a limited instrumental record.<sup>12</sup> These sources together suggest a warming trend from the late 19th century, a period of cooling in the mid-20th century, and nearly continuous increases in temperatures from the 1970s to the present with an acceleration over the past quarter century. [SEE FIGURE 1] The most recent report of the IPCC concluded that the average temperature increase for all of Africa over the last 50-100 years has been about 0.5 degrees C.<sup>3</sup>

In providing its overall results, the IPCC also presented spatially disaggregated temperature change calculations for the period 1901–2012 for those regions with a sufficient instrumental record. As shown in the upper left quadrant of Figure 2, the area for which data was insufficient to calculate change is as striking as the actual change. The blank area on the map is slightly more than 2/3 the size of the entire United States.

Precipitation data was even more limited, and no calculations were possible for more than half the continent, even when the period of interest was reduced to 1951-2010. [SEE FIGURE 2, LOWER LEFT] More data have since been made available,<sup>4</sup> but even the expanded collection has 100-year records from only 300–400 stations. This is approximately equivalent to having only one station for a country the size of Denmark. Since stations with longer records tend to be spatially clustered based on colonial interests, data gaps are functionally even more pronounced than averages suggest.

There has been a major reduction since the early 1980s in the number of stations from which data is available [SEE FIGURE 3] due to a decline in the number of functioning stations (e.g. in the D.R. Congo) and increasing costs and difficulty in accessing data that does exist. Because of data gaps, scientists studying African climate have developed multiple sources with the result that many models are based on differing base data, complicating comparison and the development of shared understanding of processes.<sup>5</sup>

Based on the longest possible time series (typically mid-19<sup>th</sup> century), consistent, though often statistically insignificant,

declines in precipitation over the vast majority of the continent are evident, with exceptions primarily in central and eastern Africa.<sup>6</sup> Trends based on the IPCC's shorter time frames (half century) are more spatially varied, with decreases in perception along the Sahel belt and in the western equatorial region and increases in the north and south and the eastern equatorial region, though most trends were again not statistically significant. [SEE FIGURE 2, LOWER LEFT] The differences between the two time series highlight the temporally and spatially complicated relationship between temperature and precipitation. They also highlight the challenge of isolating the direct impact of climate change on African precipitation from other multi-decadal processes, which themselves are changing with a changing climate, as discussed further below.

Finally, as important as changes in averages are changes in extremes. Africa has experienced hotter and longer heat waves of greater spatial extent in the 21st century than in the last 2 decades of the 20th century.<sup>7</sup> Longer periods without rain and more intense precipitation when rainfall does occur have also been observed.<sup>8,9,10</sup> The seasonal timing of rainfall has also shifted, changing cropping seasons and generally shortening the growing season.

### Expected Future Impacts of Global Climate Change on Africa's Climate

The exemplar of global climate change is rising atmospheric temperatures. The warming atmosphere in turn accelerates the hydrologic cycle by increasing its water holding capacity (7% increase per degree C increase) and by increasing potential evapotranspiration (2% increase per degree C increase). While average global rainfall increases with rising temperatures, the drivers behind its distribution and variation continue, implying even greater precipitation near the equator, further reductions towards the subtropical highs at approximately 30 degrees north and south latitude, and greater intra- and inter-year variability overall. [SEE APPENDIX for an explanation of global climate systems and Africa]

Models of these mechanisms drive the IPCC's projections of Africa's climate future. The IPCC's base scenario (RCP8.5) shows average temperatures in Africa rising faster than global averages, increasing 2.0 degrees Celsius above the mid-20<sup>th</sup> century baseline by 2050 and 4 degrees above by the end of the 21<sup>st</sup> century. The greatest increase is in the desert north and south and lowest near the equator.

Under the same IPCC scenario, warmer temperatures are projected to intensify existing precipitation patterns, with increases in rainfall in equatorial regions of up to 30% and decreases of 10–20% in Africa's far north and

south. [SEE FIGURE 4, BOTTOM RIGHT] There is also a general agreement that extreme events (higher high temperatures, longer periods between rainfall, more intense rainfall) and variability will increase, but little certainty on the extent or geographic variation.

All precipitation scenarios are in fact highly uncertain, and reasonable but differing assumptions and models of global processes can result in projections for Africa with substantial differences in both sign and magnitude. For example, DeFrance et al. (2017)<sup>11</sup> demonstrate how the melting of the Greenland ice sheet could rapidly and drastically reduce precipitation from the west African monsoon, substantially reducing arable land. They estimate that tens to hundreds of millions of people would be forced to migrate from rural to urban areas in response. In contrast, Schewe & Levermann (2017)<sup>12</sup> show how Sahelian rainfall could abruptly increase 40–300% once sea surface temperature increases beyond a relatively low threshold.

### Implications for Africa

Temperatures in Africa have risen, rainfall patterns changed, and warming will continue with large, but largely uncertain impacts, on rainfall. We now turn to how these changes may impact agriculture and health and in turn influence migration and conflict.

#### *Agriculture, Agricultural Livelihoods, and Food Security*

A large share of African agriculture already occurs at the thermal and rainfall limits of current crops, and so small increases in temperature and/or decreases in water availability will have disproportionately large consequences on arable area and yield. The IPCC base scenario projects negative consequences for the overwhelming majority of the continent's agriculture, with the north and south particularly hard hit. The highlands of east and north-east Africa are expected to benefit because of higher rainfall and carbon fertilization. While the IPCC provides little analysis of the critically important livestock sector, other projections suggest substantial, though uneven, negative effects due to direct physiological stress on animals from higher temperatures, reductions in forage availability and quality, and other factors.<sup>13</sup> The potential harm to herders is obvious, but poor farmers often derive large shares of their incomes from livestock and will also be disproportionately affected. There are also implications for conflict between farmers and herders as has been publicized, for example, in the Sahel, that are described below.

Impacts on agriculture and, to a lesser extent livestock, could be substantially mitigated through water control (irrigation and the storage infrastructure behind it), allowing farmers to adapt to changes in absolute levels of rainfall, increased variability in its timing, and shifts in its arrival. Africa, however, has by far the lowest level of

water control of any world region. As a comparison, the United States has the ability to store 6,000 cubic meters of water per person. Africa's storage capacity is 120 cubic meters per person, the lowest of any major world region. Of this limited storage, the majority is in Zimbabwe and South Africa in the south and the Maghreb and Egypt in the north, leaving most of the continent at the mercy of the skies. While limited water control is partly a failure of finance and political will, a major reason is geographic. Few of Africa's river systems are well suited to irrigation development. In addition, Africa is not blessed with aquifers that could fuel the groundwater irrigation revolutions that have driven agricultural growth over the last half-century in South Asia, China, the United States, Australia and elsewhere.

Research and extension related to seed development and farming practices could also provide a means for agrarian adaptation. Africa lags the world though in agricultural research, partly a legacy of colonial and Green Revolution era neglect but exacerbated and continued by the choices of most African governments. Public and private investment in agricultural research now makes up less than 4% of global totals even though Africa accounts for 17% of the world population.<sup>14</sup> Recognizing the problem of low investment, African states and international partners began in 2006 to use the Comprehensive Africa Agriculture Development Programme (CAADP) under the African Union to set and monitor national targets for agricultural research and extension. While useful in drawing attention to the issue of research investment, most states still fail to meet their own funding goals, and nearly half of all African states spend less now on agricultural research than they did in 1980 after adjusting for the rising costs of research.<sup>15</sup>

An already difficult climate, limited water control, and under-investment in research have all contributed to Africa's low agricultural productivity. Average grain yields have only recently risen above one ton per hectare, a commonly referenced threshold of minimal productivity. There are notable positive exceptions to the low averages, including the countries of the Maghreb, Egypt, and South Africa. With over 80% of land holdings less than one hectare<sup>16</sup> and with limited off farm employment in most rural areas, low productivity translates into poverty and therefore limited ability to invest in adaptation, withstand variability, and generate surplus for urban consumers. Incentives to invest in productivity enhancement are further reduced by poor infrastructure that reduces market access.

The climate challenges to agriculture in Africa are all the more significant given that the sector still accounts for more than 50% of employment and that rural populations are expected to continue rising for at least another decade. However, while the challenges are many, there are reasons to doubt the most apocalyptic scenarios



of Africa's agricultural and food security future. African farmers have faced significant challenges from all fronts throughout the independence period. Rather than falling into Malthusian collapse, the agricultural sector has grown, just keeping up with already rapid population growth and highlighting the ability of African farmers, if not always their governments and the donor community, to adapt to challenging and changing conditions even with limited resources. Nonetheless, most analyses of the physical impacts of climate change on African agriculture assume no adaptation by farmers. Farmers choose crops to match current conditions and as conditions change, crops, seeds, and farming systems will change with them, partly mitigating negative effects. This process may be helped by rapidly declining costs in some areas of biotechnology that will make it increasingly possible to produce seeds that meet the changing needs of highly varied African farmers in ways the previous Green Revolution did not. However, taking advantage of this opportunity will require changes in the way international agricultural research is conceived and the nature of public-private partnerships in research.

#### *Health and Health Systems*

Many northern Africa cities are already located where peak temperatures are near the limits of human capacity. Expected increases in temperature, particularly higher peak temperature as well as longer heat waves, will increase mortality if countervailing measures are not taken (e.g. India has dramatically reduced heat wave fatalities through simple measures including public and medical sector awareness, changes in school and office hours, and opening of parks). The effect may be locally significant for some large conurbations in the north, but modest in the overall context of African mortality. Locally significant health impacts can similarly be expected from other climate related changes including increased rainfall variability (i.e. drought and flood) and greater likelihood of dust storms.

More significant health impacts are likely to occur as a result of shifts in the geographic distribution of vector-borne and zoonotic disease.<sup>17</sup> As examples, shifts are predicted in the areas most suitable for year-round malaria transmission from coastal West Africa to the region between the Democratic Republic of Congo and Uganda,<sup>18</sup> and there is already evidence that malarial zones in east Africa have extended above 1000 meters as temperature and rainfall have increased. Disease burden may of course decline in other areas as they become less suitable for existing disease vectors.

Shifts in disease distribution will also cause new health pressures. In the short term, health systems may not be prepared for diagnosis and treatment. Over the longer term, populations without previous exposure will continue to be challenged by limited natural immunity and new

disease interaction. HIV-infected individuals, for example, are much more susceptible to Malaria infection than the overall population.<sup>19</sup>

Climate change will also drive changes in the geography of vertebrate wildlife due to habitat modification and movement of human populations (see below) searching for new agricultural and pasture opportunities. Separately and together these movements will bring new interactions between wildlife, livestock, and humans. While the health impacts are hard to predict in their specifics, over 60% of human pathogens are zoonotic or transmissible from animals,<sup>20</sup> and most emerging infectious diseases of current concern (e.g. HIV/AIDS, SARS, H1N1, MERS) are zoonotic. New interactions will bring new infectious disease.

New pathogens will also result from climate change impacts outside the African continent. In 2016-17, the avian influenza virus H5N8 spread from poultry farms in China to Russia and West Africa via wild bird migration as shown in Figure 4.<sup>21,22</sup> The impact of this latest wave of bird flu was primarily on the poultry sector rather than humans, and there is no reason to attribute the event to climate change. However, we know that bacteria and viruses are deposited by migrating avian populations in the extremes of northern temperate regions and lie dormant in snow and ice for years, decades, or centuries. Higher temperatures are melting permafrost and freeing long-dormant bacteria and viruses for which humans have no recent immunity. Pathogens will use avian migration to move across large distances<sup>23,24</sup> and create new risks for avian to human crossover. Again, while specific predictions are problematic, the global impact has the potential to be catastrophic as we learned just a century ago during the Spanish Flu pandemic.

As explained by Morens and Fauci, two leaders in our understanding of global infectious disease, human health outcomes are a function of the microbial agent itself, the condition of the human host as well as the human environment.<sup>25</sup> The negative impacts of climate change on health outcomes will be amplified to the extent that the food and water security challenges discussed above are not addressed and reduced to the extent that health systems are prepared for future change. Unfortunately, national health systems in many African state are ill-prepared even for current health challenges.<sup>26</sup> The 2014-16 Ebola outbreak showed that the capability of international health systems to deal with global disease challenges was much lower than hoped.

#### *Migration*

Increasing peak temperatures and heat waves will reduce the habitability of some cities, causing outright migration to other urban centers as discussed above, though likely slowing the ongoing rate of in-migration as

well. Because Africa's physical geography tends not to encourage large coastal populations, sea level rise is not likely to be as significant a force in migration as expected in some other regions, though local exceptions may exist including in Egypt and Ghana.

More significant climate related population shifts can be expected from rural to urban areas. We know already that significant rural-to-urban migration in Africa can occur in response to low rainfall, for example as occurred during the Sahelian drought of the 1970s when farmers moved southwards to urban centers.<sup>27,28,29,30</sup> The potential for future movement is substantial, since more than half of Africa's population is still engaged directly in agriculture and more than 2/3 still resides in rural areas.

However, the propensity to migrate from rural to urban areas is a function of multiple variables including but not limited to socio-economic status, group affiliation, and urban opportunity. In some cases, only the financially well off may be able to use migration as an adaptive response to worsening environmental conditions, because migration is costly. In other cases, women and men with high social capital may pool their household resources to create financial buffers significant enough to mitigate the impact of environmental changes that might otherwise have pushed them to migration.<sup>31</sup>

While often presented as a problem to be avoided, urbanization can be a force for improved livelihoods, since labor productivity and wage opportunities in urban manufacturing and service sectors are generally higher than in agriculture. Rural out migration can in turn motivate productivity increases of remaining agricultural labor. This is the story of Europe, much of Asia and the United States, where farming now accounts for just 2% of employment. But for the opportunity of urbanization to be fulfilled, it must be driven at least as much by the pull of opportunity in cities as the push from worsening rural conditions. This means that national economic policy and performance and its impact on cities is critical to rural climate adaption.

There has been substantial discussion of the potential impact of climate change on international migration, both within Africa and from Africa to other regions, particularly Europe. There are clear examples when climate crises drove populations across African borders (e.g. the Sahel crises from the 1970s through the 1980s), and we can expect an increase in the number of climate events that could contribute to rapid migration in the future. However, the specific impact of climate events or climate change on movement across African borders, like its impact on rural to urban migration, has been and will continue to be a function of many variables including the nature of colonial borders, current politics, and the overall state of national economies.

At the intra-continental level, one recent publication suggested that rising temperatures will substantially increase the pressure for migration to Europe, with asylum applications increasing between 100,000 and 600,000 per year by the end of the century.<sup>32</sup> However, the primary drivers of cross-continent migration remain economic opportunity and political instability, not climate.<sup>33,34</sup> Climate change may well increase pressures for movement, but participation in extra-continental migration is not an option for those most vulnerable to expected climate impacts, the rural poor, since the process is both arduous and costly.

Finally, it is important to keep in mind the potential magnitude of climate change impacts on migration given existing trends and politics in source and receiving regions. Urbanization in Africa, while lagging many other regions, is underway. Data is poor, but conservative estimates placed the rural to urban migration rate at a little over 1%/year from 1990 to 2000.<sup>35</sup> It has likely increased since. Climate change induced urbanization will add to rather than define the trend. According to the U.N., migration out of Africa from all sources is expected to play a minimal role in Africa's overall demographic trends.<sup>36</sup> Even if rates increased substantially above the U.N.'s projections due to climate change, the impact on Africa's overall population would still be small. However, the political implications for receiving countries in Europe could still be substantial.

#### *Intra- and Interstate Conflict and Cooperation*

As described, there is a general consensus that climate change will negatively impact the majority of African agriculture, put increased strain on health systems, and contribute to migration pressures within and across states. A key question is whether the increased competition for resources and new patterns of interaction caused by these changes will lead to increased levels of conflict. The running discourse is that they will.

In April 2007, the U.N. Security Council held its first-ever debate on climate change as a global security issue. The Darfur wars of the early 21st century, which followed a series of severe droughts, have since frequently been described as the world's first climate conflict and substantial discussion has now focused on the role of climate change in increasing conflict in Africa. However, more nuanced analysis suggests that direct linkages between climate/climate change and conflict are much weaker than commonly assumed. In the Darfur example, the Khartoum government dismantled a native administration system in the 1970s that had traditionally been used to manage grazing rights, access to watering points, cattle transit, crop rotations, and, critically, migrant integration. When drying and drought later occurred, migrants ignored the earlier customary law in making new land claims. Rebel groups formed in Darfur to retaliate.

These were themselves countered by northern Arab militias armed by the government to support broader political objectives.<sup>37</sup> The Darfur story is different in detail but not concept from that provided a quarter century earlier for northern Nigeria during the Sahel drought of the early 1970s.<sup>38</sup> In both cases the proximate cause of conflict may have been drought but the ultimate causes were a combination of other factors including the decline or destruction of long developed institutions capable of adapting to change, including climate change.

There are many reasons the role of climate in African conflict in particular may be overemphasized (e.g. discussions of drought in California and Australia are not usually framed in language of widespread violent conflict or civil war). First, post-Cold War analysis of the African environment has been securitized.<sup>39</sup> In other words, there is an active search for a connection between climate change and African conflict as there had been in the 1970s and 80s between (poor) African land stewardship and desertification. Second, African case studies have tended to focus on a limited set of accessible regions that have experienced both climate change/variability and conflict, creating conditions for overstating positive linkages while failing to explain peaceful outcomes.<sup>40</sup> Finally, many large-N analyses of Africa explore correlations between climate and conflict but do not present theory through which causation could be tested.<sup>41</sup> Unfortunately this means that more informed understanding of climate and conflict can be missed. For example, countering the conventional causation assumptions, one recent study found that conflict increased when increased rainfall expanded food abundance, since armed groups can only operate where food is available to procure.<sup>42</sup>

Most of the focus on climate and conflict in Africa has been on the changes in the African climate. As a major food importer (particularly North Africa), Africa is also vulnerable to food price shocks caused by climate impacts in the world's major agricultural exporters. Abrupt food price rises are consistently associated with urban upheaval and sometimes violent conflict as most governments know and as the Arab spring, which started in Africa, attests.

Any change creates new pressures that can lead to conflict. But assuming that climate change will directly lead to conflict in Africa is as misguided as ignoring the strains that will be placed on already challenged social and economic systems. In the end the real questions are related to institutional and political capacity to deal with change, and on that front we have at least some hope. As put by Witmer, "If political rights continue to improve at the same rate as observed over the last three decades, there is reason for optimism that overall levels of violence will hold steady or even decline in Africa, in spite of projected population increases and rising temperatures."<sup>43</sup>

On that positive note, we must also remember that even the negative impacts of climate change can sometimes be turned into new opportunities for cooperation. Northern states must cooperate with African governments if they want to protect their own citizens from the potentially devastating effects of emerging infectious disease. And the one item perhaps all African leaders can agree on is that the climate change costs Africa must now bear are the result of choices made outside of Africa. This consensus may provide a pathway for African states to cooperate in demanding solutions.

### **Some Thoughts on Paving the Adaptation Path**

There can be no single best approach or sets of approaches to climate change adaptation for a continent as large and diverse as Africa. However, there are a number of considerations that can help frame particular strategies and tactics. We outline here some of them.

*Greater understanding of African climate and climate change* – Science to understand climate in Africa is woefully lacking compared to much of the rest of the world. Simply put, substantially more investment is needed to improve our understanding African climate and its relationship to global climate processes.

*More research by Africans for Africa* – The impact of science investment will be greater if it is driven to a much greater extent by African researchers responsible to their own constituencies and governments than is currently the case. For example, African farmers are rightly more interested in knowledge on current rainfall variability that can inform planting decisions than multi-decadal trends in average temperature that may be more of interest to the international community.

*More investment in agricultural research and new approaches to water investment* – With or without additional Africa-centric climate research, the worldwide biotechnology revolution now unfolding holds tremendous promise for agricultural adaptation in Africa's heterogeneous landscapes. Capitalizing on the opportunity will require a new prioritization of agricultural research in general and new approaches to national, international, and private research partnerships. For much of the continent, adaptation will be further facilitated by investments emphasizing improved on-farm soil and water management rather than expansion of large-scale irrigation.

*Broadened approaches to food security* – Better adapted seeds and agricultural practices are important to food security in Africa under climate change but so too is investment in supporting storage and transportation infrastructure as well as market access within and between African states. In many cases though, food security will only be assured if both physical and economic access to

international agricultural markets is assured. This requires international regimes that support predictable and reliable trade flows as well as economic environments that support national income growth.

*Urbanization and migration as adaptation strategies* – Urbanization can be a source for income growth and a positive adaptive response to climate change. But only if it is driven at least as much by the pull of opportunity as the push from worsening rural conditions. National economic policy and its relation to urban growth is thus critical to rural adaptation options. Climate change is unlikely to drive migration out of the continent at rates significant to African populations. However, the political implications of these “small” numbers will still be high, giving Europe and the rest of the international community incentive to ensure an international system fair to African trade and investment.

*Health systems preparedness* – Strong health systems arguably provide the single best pathway for livelihood improvement with or without climate change. The global threat of climate change-related emerging infectious disease draws international attention, but it cannot be addressed without strengthening underlying national health systems.

*Conflict and cooperation* – Climate change will increase stress on resources as well as existing formal and informal institutions to manage them at local, national, and international levels. But climate change will also bring new impetus for cooperation. As important as it is to focus on conflict mitigation, we should not miss the opportunity to use the threats from climate change as a chance to foster new cooperation.

## Appendix: African Climate within the Global Climate System

Solar energy is globally highest in equatorial regions where the sun's rays are most direct and pass through the narrowest band of atmosphere. It is redistributed north and south towards the poles, in part, by a series of atmospheric circulation cells. The resulting patterns of air temperature and pressure produce distinct patterns of precipitation, with high rainfall near the equator where evaporation is strongest gradually decreasing poleward until approaching zero at around 30 degrees north and south latitude in areas known as the Sub-Tropical Highs. (Different processes drive precipitation at still higher latitudes). This precipitation pattern translates into vegetation patterns typified by rainforests near the equator tapering north and south to deserts.

The African continent is almost centered on the equator, and its latitudinal extension so expansive that it reaches

into and beyond the northern and southern Sub-Tropical Highs. As a result, Africa's climate exemplifies global patterns and results in an equatorial rainforest belt in central Africa tapering into two of the world's greatest deserts, the Sahara in the north and the Kalahari in the south. Notable regional exceptions include the highlands of Ethiopia and North Africa where orographic (i.e. related to mountains) rainfall dominates and eastern Madagascar where ocean circulation processes drive coastal rainfall.

While this describes Africa's longer-term (century or more) climate, African and other tropical climates are strongly influenced by large-scale teleconnections, particularly as related to sea surface temperature, which operate at multi-decadal time scales. For example, changes in the Atlantic El Niño–Southern Oscillation (ENSO) are now understood to be the primary cause of the Sahelian droughts of the 1970s and 80s as well as the recent trend towards normal rainfall patterns.<sup>44,45</sup> Similarly, declines in East African rainfall over the past few decades are now associated with changes in Indian Ocean circulation,<sup>46,47</sup> and the general downward trend in African precipitation beginning in the 1980s now appears associated with changes in the western Pacific.<sup>48,49,50,51,52</sup>

These equatorial processes contrast with mid-latitude climates (e.g. North America and Europe) controlled more by synoptic (local) factors and internal variability. As is discussed in the main text, this difference has important implications for our understanding of climate change in Africa, including its causes and impacts, and appropriate policy response.

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**See pages 39-40 for figures referenced in this article.**

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## Supporting Data

Figure 1. African annual mean temperature anomalies<sup>53</sup>

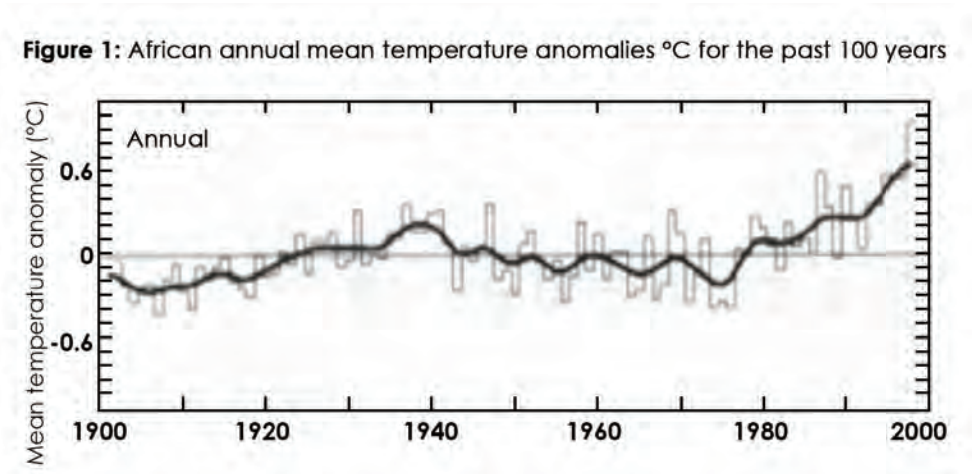


Figure 2. Observed and projected changes in annual average temperature and precipitation<sup>54</sup>

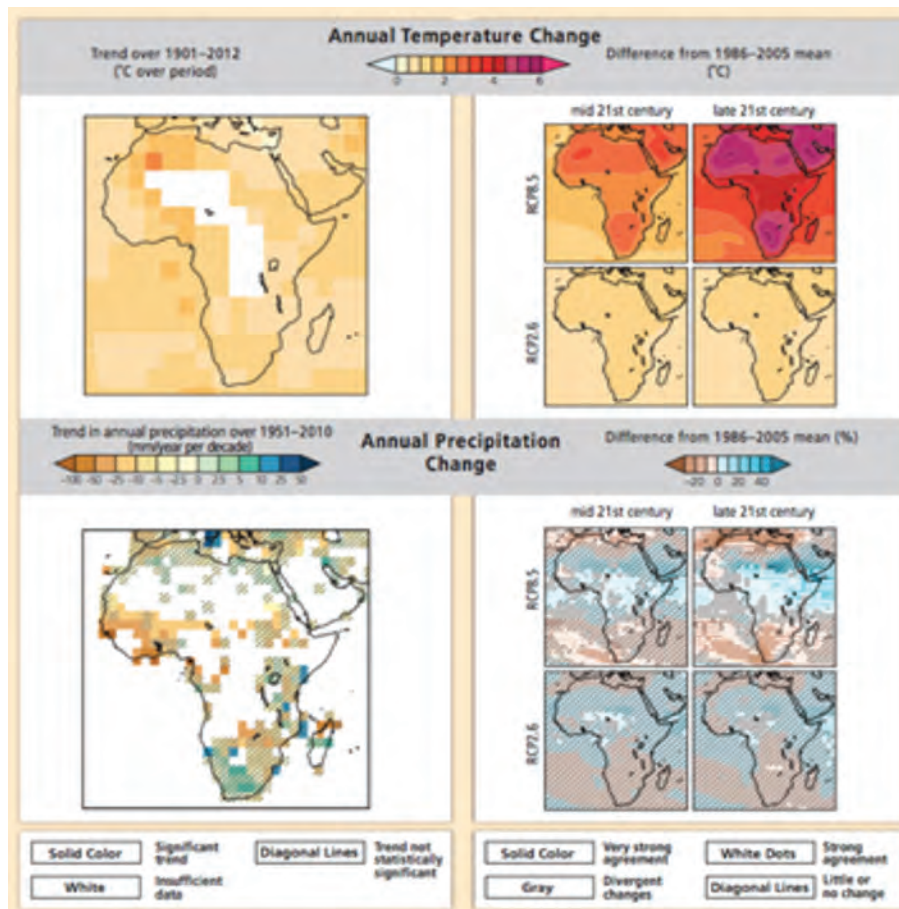
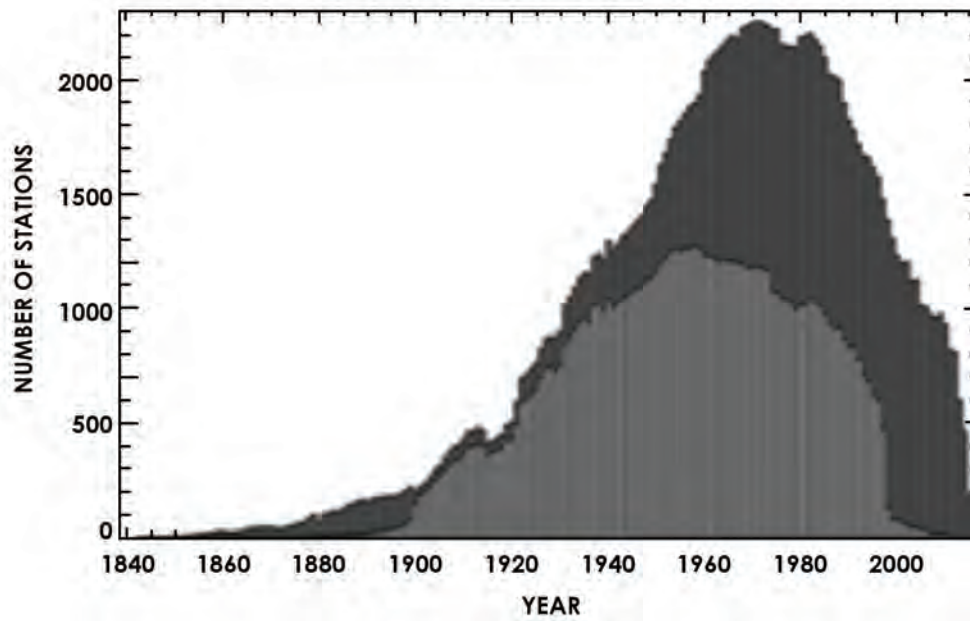
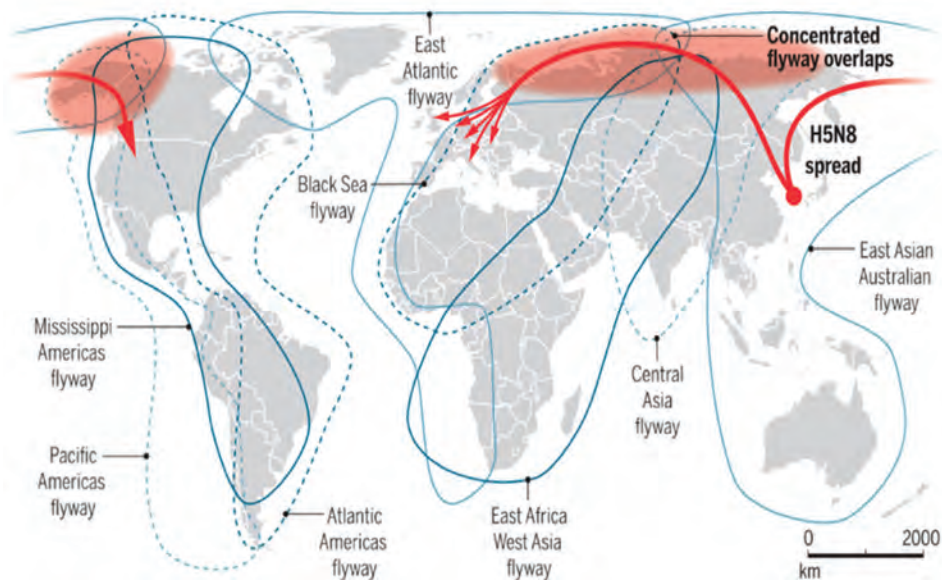


Figure 3. Number of African weather stations with precipitation data available in each year<sup>55</sup>



Note: The dark area shows stations included in the updated data set; lighter shading shows stations in the prior data set.

Figure 4. Spread of Bird Flu Virus H5N8, 2016-17<sup>56</sup>





# Africa 2050: Demographic Truth and Consequences

By Jack A. Goldstone, George Mason University

No general statement about African demography is true. The variation in the continent is too great.

Africa today includes giant countries with populations near or exceeding 100 million (Egypt, Ethiopia, Nigeria) and tiny countries with populations under 1 million (Comoros, Djibouti, Cabo Verde, Reunion, Mayotte, Sao Tome and Principe, Seychelles). It includes countries where fertility is rising (Algeria, Egypt, Tunisia, Seychelles), countries where fertility is high but stable, falling by less than 1% per year (Mozambique, the Democratic Republic of the Congo, Nigeria, and ten others), and countries where fertility is high but falling very rapidly, 2.5% per year or more (Ethiopia, Rwanda, Kenya, Malawi, and Sierra Leone). It also includes countries where fertility rates are exceptionally high, exceeding six children per woman (Niger, Somalia, Chad, DRC, Mali) and countries where fertility has fallen to replacement levels (2.1) or below (Tunisia, Mauritius). Annual population growth rates for African countries range from under 0.5% per year (Mauritius, Central African Republic, Libya) to eight times that rate, or about 4% per year (Niger, Equatorial Guinea). Some African countries are highly urbanized, with urban populations around 60% of their total (South Africa, Angola, Botswana), while others are barely urbanized at all, with urban populations less than 20% (Burundi, Ethiopia, Malawi, Niger, Rwanda, Uganda). And while Africa has most of the world's highly ethnically diverse countries, some African countries are quite low in ethnic diversity (Burundi, Algeria, Tunisia, Egypt).<sup>1</sup>

In short, Africa is enormously varied. About the only firm statement one can make is that Africa will be the most demographically dynamic continent in the world in this century. It will also be the source of virtually all labor force growth in the world, and by far the youngest region, in the 21<sup>st</sup> century. This paper will lay out the main aspects of Africa's population dynamics in the coming decades, focusing on trends in mortality, fertility, population growth, labor force growth, and urbanization. I will discuss the reasons for Africa's "demographic exceptionalism" and the main consequences of these trends for Africa's and the world's economy, politics, and security.

## Mortality: Good News

Most of Africa has made remarkable progress in reducing mortality, especially in recent years, as improvements in

nutrition, sanitation, and measures to combat malaria and other tropical diseases have led to substantial increases in lifespans. For Africa as a whole, life expectancy in the 1950s was less than 40 years, not much different from Europe in the 1700s. But by the 1980s, life expectancy surpassed 50 years, and by 2010–2015, had reached 60 years—a 50% increase. However, there is substantial regional variation; life expectancy in northern Africa is 71 years, led by Algeria, Tunisia, and Morocco at 75 years, while in western Africa, life expectancy is just under 55 years, with Sierra Leone, Nigeria, and Cote d'Ivoire barely above 50.<sup>2</sup>

These gains in life expectancy are mainly due to dramatic declines in infant mortality. For Africa as a whole (and sub-Saharan Africa as well), infant mortality has fallen by 29% in just the last decade, from 2000–2005 to 2010–2015. Champions include Ethiopia (decline of 41%), Rwanda (51%), Congo (43%), and Botswana (46%). But all regions enjoyed declines of about 26–28%. Only a few countries suffering from high infant mortality had smaller declines: Burundi, Somalia, Central African Republic, Chad, Benin, and Mauritania.

Africa's population today is thus far healthier and longer-lived than it was in the preceding century. The UN projects that by 2050–55, average lifespans in Africa (and sub-Saharan Africa) will reach 70 years, a dramatic convergence with other world regions.<sup>3</sup>

## Fertility: A Conundrum

Based on the experience of other developing regions, these improvements in Africa's mortality, especially infant mortality, would be expected to lead to similarly impressive reductions in fertility. In Asia and Latin America, fertility was similar to that in Africa in the 1950s, with about six children born per woman during her lifetime. Then with improvements in mortality and other indices of economic development, fertility steadily declined. By the late 1970s, total fertility had fallen to four, and then by the early 2000s to well below three. As of 2010–2015, fertility in Asia and Latin America is about at replacement levels, at 2.2 and 2.1 respectively. Yet in Africa, a wholly different pattern developed.

From the 1950s, fertility in Africa actually rose slightly, reaching nearly seven children per woman by the early

1970s. Fertility then sharply diverged in different regions. In northern and southern Africa, fertility began a steady decline. In northern Africa, fertility fell from seven children per woman in the 1960s to five by the late 1980s, and then to three by 2005–2010. In southern Africa, where fertility was six children per woman in the 1960s, the level fell to four in the late 1980s and down to 2.71 in 2005–2010. These regions thus followed the pattern of other developing regions, with about a one-decade delay.

By contrast, in eastern Africa in the late 1980s, fertility was still above seven children per woman. It then began a slow decline but still remains at nearly five in 2010–2015. In middle Africa, which had fertility of about six children per woman in the 1950s, fertility continued to rise all the way up through the late 1980s, reaching 6.76 in 1985–1990. Fertility then began to decline but very slowly, remaining at about six children per woman even twenty-five years later in 2010–2015. Western Africa was similar to middle Africa, with fertility rising and remaining close to seven children per woman up to the late 1980s, then falling slowly, but a bit further than in middle Africa, reaching 5.5 by 2010–2015. Western, middle, and eastern Africa have thus shown a dramatically different fertility path than other parts of Africa and other regions of the developing world. These are the only large regions of the world where, even after decades of falling mortality, fertility remains at or above five children per woman.<sup>4</sup>

Because these tropical regions dominate Africa in terms of population, overall fertility for sub-Saharan Africa remains at 5.1 children per woman in 2010–2015, and at 4.72 for Africa as a whole. Outside of Africa, except for a few small Pacific Island nations, and for the tribal Islamic countries of Yemen, Palestine, Afghanistan and Iraq, there are no other nations, much less regions, with a fertility of even 4.0. By contrast, thirty-two nations in Africa have fertility of 4.5 or higher, including giant countries like Nigeria (5.74) and Ethiopia (4.63), and extremely high fertility countries like Niger (7.4), Somalia (6.6), the Democratic Republic of the Congo (6.4), Chad (6.3) and Burundi (6.0).

As demographers Jean-Pierre Guengant and John F. May have observed, “This pattern of persisting high levels of fertility in the majority of African countries differs markedly from what has been observed in other developing countries since 1960.”<sup>5</sup> Yet as population expert John Casterline recently observed, “there is nothing approaching consensus on the sources of this difference.”<sup>6</sup>

#### *Why High African Fertility Persists*

John Bongaarts, summing up the experience of most developing regions, notes that “As societies modernize, economic and social changes such as industrialization, urbanization, new occupational structure, and increased education lead first to lower mortality and subsequently

to a decline in fertility.”<sup>7</sup> The puzzle as to why these changes have not produced lower fertility in Africa, as they have done elsewhere, has given rise to two main answers: First, it is true that Africa has not yet experienced the same increases in education, income, and other indices of modernization that have been seen in Asia and Latin America. As Bongaarts notes, real income per capita in sub-Saharan Africa grew hardly at all from the 1970s to the 2010s, while real income in other developing regions rose sharply in these decades.<sup>8</sup> Goujon, Lutz, and Samir have pointed out that many sub-Saharan countries had a “stall” in their progress in education that may have produced a “stall” in progress in reducing fertility.<sup>9</sup> Thus it could be posited that Africa is simply behind in certain attainments and will eventually catch up to other regions.

Yet this is unsatisfactory for two reasons. First, northern and southern Africa did in fact follow the pattern of other regions, as would be expected; it is only eastern, middle, and western Africa that have not done so. Second, even for the latter regions, the rate and amount of their fertility decline is not comparable to what happened in other developing regions at similar levels of income and development. According to Bongaarts and Casterline, “... the median pace of change in sub-Saharan Africa (0.03 per year) is less than one-third the pace in the other regions [Asia and Latin America] (0.12 and 0.13, respectively).”<sup>10</sup> Indeed, the behavior of fertility in sub-Saharan Africa is wholly at odds with the idea that economic progress determines the pace of fertility decline; as Bongaarts has shown, fertility rose when the region's GDP/capita was relatively high in the 1970s, then began the onset of fertility decline in the early 1990s, when GDP/capita had fallen considerably, and then encountered a widespread stall in fertility decline in the 2000s, when GDP/capita had been rising more rapidly.<sup>11</sup>

Forecasting of Africa's demographic trajectory based on expectations that it would follow the pattern of other regions has thus been badly misleading. Figure 1 shows the difference between the decline in fertility from 1990–1995 to 2010–2015 projected by the United Nations Population Division in 1995 (shown in orange) and the actual decline in fertility as revealed by on-the-ground Demographic and Health Surveys two decades later (shown in grey).<sup>12</sup> As can readily be seen, the UN fertility projections, based on analyzing the pattern of fertility decline in other developing regions, anticipated fertility reductions of .5 to 1 child per woman more than was actually observed.

As the slow fertility decline in Africa continues to confound expectations, the adjustments to population projections can be dramatic. Table 1 shows how the UN's projections for Africa's total population in various regions for 2050, as made in 2010, differ from their projections made in the 2017 revision, published in 2018. The differences—due to an expected decline in fertility that simply did not occur—are striking. By 2018, the new “medium variant” projection

for the population of sub-Saharan Africa in 2050 is higher by 337 million people (15.4%) than the projection made just eight years before. For some regions, the new projections are almost thirty to forty percent higher than those of 2010. Indeed, the new 2018 “medium variant” forecasts are closer to the 2010 “high variant” forecasts, and sometimes exceed them. The new “high variants” have been similarly adjusted upwards. If, as has occurred to date, the “high variant” projections become the new “medium” projections, the forecast population for Africa in 2050 would be almost 2.8 billion, or 600 million more than the 2010 medium forecast of 2.2 billion. (See Figure 1)

Table 1. UN Population Projections For 2050 (Millions), 2010 vs. 2018

	MEDIUM VARIANT PROJECTIONS			HIGH VARIANT PROJECTIONS		
	<b>2010</b>	<b>2018</b>	<b>Increase</b>	<b>2010</b>	<b>2018</b>	<b>Increase</b>
AFRICA	<b>2191</b>	<b>2528</b>	<b>15.4%</b>	<b>2470</b>	<b>2786</b>	<b>12.8%</b>
Eastern Africa	780	888	13.8%	879	982	11.7%
Middle Africa	278	384	38.1%	314	420	33.8%
Northern Africa	322	360	11.8%	368	399	8.4%
Southern Africa	67	86	28.4%	79	97	22.8%
Western Africa	744	810	8.9%	830	887	7.0%

Because of the failure of Africa's fertility to track the pattern of other regions, an alternative hypothesis has been advanced, arguing that Africa has an exceptionally pro-natalist culture that maintains high fertility even in the face of economic modernization. John and Pat Caldwell, who have led this line of argument, point to the exceptionally high desired family size that appears in African surveys.<sup>13</sup> It has also been noted that in Africa, due to traditional taboos on post-partum intercourse and long breast-feeding periods, birth spacing was historically relatively high. This means that there is both less room to lower fertility by increasing birth spacing, and more room to increase fertility by reducing birth spacing if these traditional practices are relaxed.<sup>14</sup>

While this explanation would account for the low rate of fertility decline observed in Africa, and even the rise in fertility observed from the 1950s to the 1970s, it too has difficulties. In fact, we do observe a gradient in fertility within sub-Saharan Africa linked to modernization indices. Women in cities, and women having higher education

and higher incomes generally have lower fertility than women in rural areas and with lower education and lower incomes.<sup>15</sup> Modernization factors thus have an effect on fertility in Africa, just not quite in the same fashion as in other developing regions.

A more likely answer would be an interactive combination of modernization levels and cultural factors, such that certain regions of Africa—western, middle, and eastern Africa—have distinctive cultural patterns that affect the impact that economic development has on fertility. That is, as Bongaarts has argued, “the response of fertility to development could be fundamentally different in Africa than elsewhere in the developing world.”<sup>16</sup>

We test this hypothesis with a path analysis of how modernizing factors affect fertility in Africa vs. other developing regions.

#### *Africa Is Different*

John Bongaarts has found that while fertility in African countries generally declines in line with changes in income, education, mortality, and urbanization, in a multiple regression including all of these factors only education was consistently significant in driving fertility, contraceptive use and desired family size. In addition, he found an “Africa effect” such that for any level of development indicators, fertility was about one child per woman higher than in other developing countries. He thus concluded that both the level of economic development (especially education) and a distinctive pro-natal culture in sub-Saharan Africa contribute to Africa's unique fertility dynamics. The finding that education was the most consistently significant factor supports the suggestion by Goujon, Lutz, and Samir that Africa's “fertility stall” reflects a lack of progress in educational attainments.<sup>17</sup>

In Figure 2, I show a path model for the determinants of fertility in developing countries *excluding* sub-Saharan Africa. This is based on data available from Demographic and Health Surveys (DHS) for 31 countries at various time intervals from 1991 through 2013, making up 88 observations.<sup>18</sup> The model follows the distinction made by Guegant and May between *intermediate* determinants of fertility, which are mainly socioeconomic conditions that influence fertility indirectly, and *proximate* determinants of fertility, which are mainly biological and behavioral and influence fertility directly.<sup>19</sup> The intermediate determinants exert their influence on fertility through their effect on the proximate determinants. In the model, the intermediate determinants are income (real GDP/capita), urbanization (percent urban), infant mortality, women's employment (both for young women age 15–24 and all women), and women's education. The proximate determinants are desired family size and birth interval, which together shape total fertility.<sup>20</sup>

In the path model, positive effects are shown by red arrows, negative effects by blue ones, with the strength of the effect shown by the thickness of the arrow. Non-significant effects are shown as dotted arrows. In this model, fertility is affected most strongly by desired family size, though the effect of birth interval is also highly significant. The effects are almost all as one would expect from the development. (See Figure 2)

If we run the same path analysis on African countries, we would perhaps expect, following Bongaarts, that these relationships would still obtain but be weaker, or that, following Goujon, Lutz and Samir, that education would have a larger impact. The model using data from DHS surveys in 35 countries in sub-Saharan Africa, with 95 observations from 1991 through 2013, is shown in Figure 3. In fact, there are some surprising and marked differences. literature. Rising incomes lead to lower infant mortality, and have a direct effect on increasing birth intervals, thus reducing fertility. Rising income also leads to greater urbanization, which is associated with higher levels of women's education and women's employment (both for young women and all ages), and also has a direct effect on increasing birth intervals. Lower infant mortality leads to a reduction in desired family size, which greatly reduces fertility. In addition, lower infant mortality, women's employment, and women's education all also contribute to rising birth intervals; indeed these factors seem to impact fertility entirely through greater spacing of births rather than changes in desired family size. Still, the overall pattern is familiar—as incomes rise, urbanization and women's education and employment rise as well, and all of these factors produce a decline in desired family size and increases in birth spacing, producing lower fertility. (See Figure 3)

Regarding similarities, in Africa rising income does lead to higher urbanization and to lower infant mortality, although the latter effect is much weaker in Africa. Lower infant mortality, in turn, has a somewhat stronger effect on reducing desired family size in Africa than in other developing countries but a much weaker effect on birth intervals. Higher urbanization is associated with higher women's education and employment, in much the same magnitude of effect in Africa as in other developing regions.

However, there are huge differences in the results of women's education and women's employment. Outside of Africa, many factors contribute to larger birth intervals and hence to reduced fertility—lower infant mortality, higher income, women's education, young women's employment, total women's employment, and urbanization all have direct effects. The largest of those effects are through women's employment, both for young women and total women. But in sub-Saharan Africa, the most powerful factor driving changes in the birth interval is women's education. Women's

employment—whether for young women or for all women—has no significant impact at all! Moreover, in sub-Saharan Africa, but not other developing regions, women's education also has a significant direct impact on desired family size. Also unusual is that in sub-Saharan Africa, unlike other developing regions, gains in income and urbanization have no direct effect on birth intervals at all; rather they act only indirectly through increasing women's education.

In sum, Africa is different. In other developing regions, a cluster of modernizing changes work in tandem, reinforcing changes that stretch out birth intervals and thus reduce fertility. Most important is getting women into the workplace. Women's education, however, has only a minor impact on birth intervals and none on desired family size. In sub-Saharan Africa, by contrast, women's education is absolutely central, as it is the most important driver of changes in birth intervals and a strong direct factor in reducing desired family size. By contrast, women's employment has no significant effect at all on fertility, not through family size nor through birth intervals.

How is this possible? In most developing countries, as women move into paid work outside the home—including young women with modest education—fertility is reduced as they have to choose between spending more time working and earning income and staying home to take care of their children. Women's employment thus has a strong impact on fertility. However, in Africa, extended family child-care systems have developed that allow women to avoid this trade-off. The basic commitment enabling this pattern is the cultural expectation that aunts, uncles, siblings, grandparents, cousins, and even co-wives (where polygyny occurs) will take care of children while their mothers work. As Korotayev et al. note:

As long as extended families provide working women (not only agricultural workers, but ones in urban areas having paid employment as well) with relatives who are willing to come and assist with household tasks and child care, paid female employment may not only make a far smaller contribution to fertility decline in tropical Africa than that observed in other regions, but it may also actually delay fertility reduction in Africa by slowing the trend toward the nuclear family system.<sup>21</sup>

Korotayev et al. argue that the “right” to extended family childcare is rooted in longstanding cultural patterns distinct to tropical Africa. They note that this region (corresponding to eastern, middle, and western Africa) was characterized by hoe-based agriculture, in which women were the primary daily field workers, as opposed to the plow-based agriculture that prevailed in north Africa, Europe, and Asia. In the latter regions, men were the primary field workers, while women worked at textile

and other domestic tasks that were undertaken inside the home and combined with child care. Tropical Africa thus commonly has extended families with widespread polygyny and large desired family size, all of which facilitate women working outside the home. When women shift to paid work outside the home this pattern simply continues and allows women to enter paid labor without worrying about child care.<sup>22</sup> These cultural patterns buffer the effect of women's employment on childbearing. Women's employment thus should have no impact on birth spacing or fertility in tropical Africa, which is exactly what we find in the path model.

The factor that is central to fertility decline in Africa, more than any other, thus appears to be women's education. It is only through their effects on this factor that other development changes seem to matter, as shown by both the path analysis in Figure 3 and Bongaart's multiple regression showing that when total fertility, contraceptive prevalence, and desired family size are regressed on education, income, life expectancy and urbanization, only education is consistently significant. To understand future fertility in Africa, we thus need to take a closer look at its progress in education.

### **Africa's Secondary Education Deficit**

It is widely known that there are problems in the quality of education in developing nations. Teachers do not show up for classes, educational materials go missing, and effective testing, feedback, and cumulative growth in skills are often lacking.<sup>23</sup> These problems are not unique to tropical Africa; they are found in many developing nations, especially in south Asia, where fertility has nonetheless declined. Yet in other nations, educational progress is far less important for fertility decline than in sub-Saharan Africa. As we have just seen, in most developing countries women's education has a far smaller impact on fertility than women's employment; only in sub-Saharan Africa is it the other way around.

This would suggest an opportunity for rapid fertility reduction in Africa by investing in women's education. Yet Africa has, despite substantial increases in education in recent decades, apparently invested in the wrong kind of education for fertility reduction. That is, Africa has invested mainly in primary education, leaving a great deficit in secondary education. Moreover, such secondary education as is provided goes mainly to boys, with girls having a significant gap. Moreover, while provision of secondary education is weak across the board, with sixty percent of youth aged 15 to 17 in sub-Saharan Africa not in school in 2017, girls' exclusion from higher secondary education is even worse, and particularly at lower income levels. For middle and low income females in sub-Saharan Africa, according to an assessment of DHS survey data in 2008, participation of female teens in secondary school was less than ten percent.<sup>24</sup>

For women, it appears that secondary education is the critical arena for reducing fertility. Women who leave school after primary education, which ends at age 12, are readily available for very early marriage and have no distinctive skills that allow them to be more productive or stand up to their husbands. Women who complete high school, by contrast, are unlikely to marry before age 18 and emerge with greater confidence and skills that allow them to shape their own fertility and make a greater economic contribution to their families.<sup>25</sup>

Moreover, as Véronique Hertrich has argued, women in Africa face particular difficulties in asserting their choices about their reproductive behavior. Women in Africa often are married while young to much older men or have to compete with co-wives in polygamous marriages. In either case, they are ill-placed to make demands about shaping family size. In addition, the extended family child-support system also carries with it pressure from the extended family to have a larger family size, since, in conditions of great uncertainty and rare opportunities, a larger family has valuable risk-spreading benefits for the entire extended family. The benefits of larger families, as well as the costs, are thus spread over a large extended family grouping, rather than the spousal couple.<sup>26</sup> Completing secondary education makes it possible for young women to have the skills and confidence to assert themselves against these pressures and gain the ability to limit their childbearing if they choose to do so.

Demographer Joel Cohen has forcefully made the case for the effects of secondary education in high fertility societies. He writes:

Although there are other factors at work, in many developing countries, women who complete secondary school average at least one child fewer per lifetime than women who complete primary school only. In Niger in 1998, for example, women who completed secondary education had 31% fewer children (on average, 4.6 per lifetime) than those who completed only primary education (6.7). In Yemen in 1997, women who completed primary school had 4.6 children on average whereas women who completed secondary school had 3.1 children on average. In some sub-Saharan African societies, lifetime fertility is reduced only among girls who have had 10 or more years of schooling.<sup>27</sup>

However, despite its importance, the data on secondary school enrollments in tropical Africa tells a disappointing story. Overall, net secondary attendance for females in sub-Saharan Africa is only 34%; that is one-half the level in the Middle East and North Africa and one-quarter less than in South Asia.<sup>28</sup> Table 2 provides a sample of primary

and secondary enrollment rates for females in major countries of tropical Africa.<sup>29</sup>

As is clear, while considerable progress has been made in female primary education, there is a substantial gap when it comes to female's secondary education. Even in countries where female primary attendance is over 80%, such as Tanzania, Burundi, Uganda, and Rwanda, female secondary attendance falls to 25% or less. Across all these countries, female enrollment ratios never reach even 50%.

To be sure, female education is not a necessary and sufficient condition for fertility decline. Kenya and Rwanda both have similar levels of fertility, 4.1 and 4.2 respectively, even though Kenya has almost twice the level of female secondary attendance. In Rwanda, a vigorous state-led campaign to promote contraception and legal limits on teenage marriage have had roughly the same effect as Kenya's greater progress on female education. Yet on average, female education is the single most important factor in reducing fertility in tropical Africa. And tropical Africa severely lags other developing regions in providing women with secondary education.

In sum, the reason that tropical Africa continues to have extraordinarily high fertility is rooted in both this region's distinctive extended family culture and its deep deficiency in secondary education. Unless the latter is addressed, we can expect that even continued growth in primary education, urbanization, and income per head will have only minor effects on reducing fertility. Given the rapid decline in mortality that Africa has enjoyed, and the still high fertility that it maintains, the future will be one of extremely rapid population growth.

Table 2. Africa's Secondary Education Gap

	FEMALE NET ATTENDANCE RATIO	
	Primary Education	Secondary Education
Niger	46	13
Burkina Faso	50	17
Nigeria	66	49
Ethiopia	67	18
Sudan	67	45
Central African Rep.	68	15
Angola	76	17
Tanzania	83	25

Burundi	84	14
Dem. Rep. Congo	85	41
Kenya	87	44
Uganda	87	21
Malawi	95	34
Rwanda	96	23

### Growth Projections for Africa: 2050 and Beyond<sup>30</sup>

The combination of falling mortality and relatively stable and high fertility makes Africa unique among all world regions. Outside of Africa, the steady decline of fertility means that population growth will likely end in this century. The UN medium variant projection for developed countries shows their population peaking in 2054, and for less developed countries excluding the least developed countries (most of which are in sub-Saharan Africa), peak population is projected to be in 2077.

For Africa, however, with a total population of 1.2 billion in 2015, the medium projection is for population to reach 2.5 billion by 2050 and continue growing to 4.5 billion by 2100. Although fertility has fallen since its peak in the 1970s, the even greater decline in mortality since the 1980s means that population growth in Africa accelerated in the decades from 1980 to 2015. In the 1950s, before the onset of the demographic transition, Africa's population was growing at 2.2% per year. But by the 1980s, this had increased by almost a third, to 2.8% per year. After the 1990s, growth rates declined very slightly to 2.7% for sub-Saharan Africa and a bit more, to under 2% per year, in northern Africa, where fertility declined more rapidly. But because of the growing demographic weight of sub-Saharan Africa, the growth rate for Africa as a whole remained at 2.6 % per year up through 2015 and is projected (again, the medium variant projection) to decline only slowly to 2.5% per year by 2020 and 2.4% by 2025 as fertility falls. While this decline is welcome, it must be remembered that even at an annual growth rate of 2.3%, total population doubles every 30 years.

Africa's population would thus increase from 16% of the world's population today to 26% by 1950, and 40% by 2100. This "medium variant" projection still presumes that fertility in sub-Saharan Africa will fall from an average of 5.1 today to 3.0 in 2050–55 and 2.2 in 2095–2100. If in fact fertility remains as high as 3.5 children per woman in 2050 and 2.65 in 2100, which is the UN "high variant" scenario, then Africa's total population would soar to 2.8 billion by 2050 and 6.2 billion by 2100. In the following sections, we

shall use the UN medium variant projections for future growth, but recall that this is a conservative, rather than "worse case," scenario.

You may note that I have given population totals here for "Africa" and not just sub-Saharan Africa. This is because, although northern and southern Africa are distinct and have progressed further than other regions in their demographic transition to low fertility, they are still well above replacement fertility rates and hence experiencing significant growth. Moreover, over the last five years several countries in northern Africa—Tunisia, Algeria, and Egypt—have seen an unexpected increase in fertility of 8–12%. If this proves to be a sustained trend, rather than just a blip, it would contribute further to overall African growth.

Table 3 shows the countries in Africa where fertility is falling most rapidly (more than 10% in the last five years) and where it is stalled or rising. As can be seen, there is wide variation. However, fertility remains high in most cases, even in countries where fertility decline has been rapid. Moreover, as the left column shows, fertility decline is slow or absent in many countries where fertility is quite high, from 4.0 to above 6 or even 7 children per woman. Only very few countries have fertility declining at double-digit rates over this period. Thus, for Africa as a whole, fertility decline in the last five years was just 3.6%. Unless that decline significantly accelerates, Africa as a whole would not reach replacement fertility of 2.1 children per woman for 110 years, well into the next century.

The UN medium variant projection generally assumes that countries with higher fertility will shift to a more rapid decline in coming years. Thus, this variant assumes that Nigeria, whose fertility declined by 3% in the five years 2005–10 to 2010–15, will in the future experience a fertility decline of 6.6% every five years to 2050. That is certainly closer to the median for Africa as a whole. But given the wide variation among African countries, it is not clear why they should converge to a median rate of fertility decline.

Indeed, for Nigeria, whose population is divided between a higher-fertility and faster growing Muslim population in the north and a lower fertility and hence slower growing Christian population in the south, it may well be that fertility decline slows as the Muslim population becomes an ever-larger portion of Nigeria's total population.

Table 3. Fertility rates in African countries with the highest and lowest rates of fertility change, 2005–2010 to 2010–2015, excluding small island states

LOWEST RATES OF FERTILITY DECLINE			HIGHEST RATES OF FERTILITY DECLINE		
	Fertility in 2010–2015	% decline since 2005–10		Fertility in 2010–2015	% decline since 2005–10
<b>Zimbabwe</b>	4.00	0.0%	<b>Malawi</b>	4.88	17.4%
<b>Namibia</b>	3.60	0.0%	<b>Rwanda</b>	4.20	15.5%
<b>Botswana</b>	2.88	0.9%	<b>Djibouti</b>	3.10	14.5%
<b>Libya</b>	2.40	1.3%	<b>Ethiopia</b>	4.63	13.6%
<b>Niger</b>	7.40	2.0%	<b>Swaziland</b>	3.30	13.6%
<b>Senegal</b>	5.00	2.0%	<b>Kenya</b>	4.10	13.4%
<b>Gambia</b>	5.62	2.5%	<b>Madagascar</b>	4.40	9.8%
<b>Congo</b>	4.86	2.9%	<b>Eritrea</b>	4.40	9.1%
<b>South Africa</b>	2.55	2.9%	(All others decline is less than 9%)		
<b>Nigeria</b>	5.74	3.0%			
<b>Lesotho</b>	3.26	3.5%			
<b>Dem R Congo</b>	6.40	3.6%			
<b>Egypt</b>	2.93	-11.8% (increasing)			
<b>Tunisia</b>	2.25	-10.1%			
<b>Algeria</b>	2.96	-8.0%			
<b>W Sahara</b>	2.60	-1.9%			

Africa's unique high fertility regime will produce high rates of population growth in coming decades. Table 4 shows how the UN medium variant projections play out for the next two generations, to 2050 and 2100, for both Africa's largest countries and for its fastest growing countries (there is some overlap between these two groups).

Nigeria, by these projections, will be more populous than the United States by 2050 and by 2100 have more people than all of Europe. By 2050, Ethiopia, Egypt, the Democratic Republic of the Congo, and Tanzania will each have larger populations than Russia.

It might be tempting to dismiss these numbers as simply fantastical. Could Niger go from 20 million to nearly 70 million by mid-century, or Angola to 76 million? Could Tanzania go to 300 million by 2100, or the DRC to nearly 400? But this is change projected over only two

generations, or about 85 years. And it should be recalled that Africa is, historically, a vast and underpopulated continent. The population density of Angola and Somalia today is only 24 people per square kilometer; Tanzania is at 65, the Democratic Republic of the Congo is at 37. Even giant Nigeria has but 215 people per square kilometer. For comparison, India has 450 people per square kilometer, Haiti has 400, and Bangladesh has 1,278. So there is plenty of physical space for people; the question, which we return to below, is whether the economy will provide jobs and sustenance for such populations.

Table 4. UN population projections for Africa's largest and fastest growing countries in millions

	2015	2050	2100
<b>AFRICA</b>	1194	2528	4468
<b>SUB-SAHARAN AFRICA</b>	969	2168	4002
<b>LARGEST COUNTRIES</b>			
<i>Nigeria</i>	181	411	794
<i>Ethiopia</i>	100	191	250
<i>Egypt</i>	94	153	199
<i>Dem R Congo</i>	76	197	379
<i>South Africa</i>	55	73	76
<i>Tanzania</i>	54	138	304
<i>Kenya</i>	47	95	142
<i>Uganda</i>	40	106	214
<i>Algeria</i>	40	57	63
<i>Sudan</i>	39	80	139
<b>FASTEST GROWING COUNTRIES (Not Already Shown Above)</b>			
<i>Niger</i>	20	68	192
<i>Angola</i>	28	76	173
<i>Somalia</i>	14	36	79
<i>Zambia</i>	16	41	94
<i>Burundi</i>	10	26	54
<i>Mali</i>	17	44	83
<i>Mozambique</i>	28	68	135
<i>Burkina Faso</i>	18	43	82
<i>Malawi</i>	18	42	76

To be sure, vigorous programs of state-led family planning, coupled with increased education, could bend these curves. If all of Africa were to accelerate its fertility decline to the rates achieved by Kenya, Rwanda and Ethiopia, of 13–15% per year, then Africa's total population would only reach 3.1 billion instead of 4.5 billion by 2100.<sup>31</sup> Yet the change to mid-century would be modest; the UN "low fertility" variant projection still forecasts an African

population of 2.3 billion by 2050 (instead of 2.5 billion in the "medium variant"). This is because of "demographic momentum."

That is, virtually all of the women who will be having children from now until 2030 have already been born, so that number cannot change. Given increasing health and lifespans, more of them than ever before can have children for longer periods, and more and more of those children will themselves survive to have children. This means that even considerable declines in fertility in the next few decades will not have a major effect on population growth until after 2050. For comparison, the country that had the most rapid decline in fertility in recent years has been Iran, where fertility fell from 6.5 children per woman to 2.0 in just twenty years, from 1980–85 to 2000–05. Nonetheless, Iran's population increased from 38.7 million in 1980, when its rapid demographic transition began, to 80 million in 2010, when the transition was completed; such is the power of demographic momentum to keep population growing even when fertility is declining. Thus, it is almost impossible to expect Africa's population to do any less than double by 2050, and that would be an optimistic projection. Rapid progress in reducing fertility could only have a major impact in the second half of this century.

### Consequences of Rapid Population Growth: Economic, Political, and International

Social science has made great progress in understanding the implications of rapid population growth. We have learned that a significant number of social changes, including urbanization, political instability, education, and democratization are all linked to changes in population structure.<sup>32</sup> We will look at how Africa's rapid population growth will likely affect its labor force, its cities, its politics, and the international arena.

#### *Labor Force Growth and the Economy*

Other parts of the world also have growing populations, but that is mainly because their adult populations are healthier and living longer. Africa is unique not only in the speed of its population growth, but in the fact that this growth is driven by high fertility and falling infant mortality. This means that the additions to Africa's total population are overwhelmingly young people.

Africa will therefore have, by the second half of the century if not earlier, a surfeit of a commodity that is becoming increasingly rare in the rest of the world— young workers. Indeed, as shown in Figure 4, labor force growth (increase in the population age 15–59) in sub-Saharan Africa is far faster and greater in numbers than in any other region of the world, including China and India. After 2040, labor force age groups will be shrinking everywhere in the world, except in sub-Saharan Africa. By 2070, after thirty years in which *all growth in the labor force*



*in the world* will be in sub-Saharan Africa, that region will have a working-age population of 1.8 billion, more than the United States, India, and China combined. If we focus on new entrants to the labor force, youth aged 15–24, by just 2040 sub-Saharan Africa will have well over twice the youth population of China, half again more than India, and almost three times the youth of the United States and Europe combined.<sup>33</sup>

Fundamental to the future of labor productivity in both Africa and the world will be the productivity of this massive increase in workers. As we have seen, secondary school enrollments in sub-Saharan Africa are poor. Although the numbers in Table 2 are for female enrollments, those for men are not much better. The high school completion rate among the male population up to age 21 is under 15% in Burundi, Niger, Madagascar, Burkino Faso, Mozambique, the Central African Republic, Gabon, Zimbabwe, Mali, Ethiopia, South Sudan, and Senegal. It is under 25% in, among others, Rwanda, Congo, Uganda, Liberia, and Sierra Leone. In South Africa and Kenya, who are among Africa's leaders, it is 44%. (See Figure 4)

With an average across sub-Saharan Africa of a 31% high school completion rate for males, and 24% for females, the vast majority of African youth are unlikely to have the skills to compete with workers in south Asia or north Africa, nor to work with machinery. They are thus likely to be left to agriculture and the informal labor market, and low-productivity and low-income work—unless this changes.<sup>34</sup>

A fast-growing population and labor force could be a boon to the economy. Indeed, the countries of East Asia benefitted from a “demographic dividend” during their period of rapid population growth.<sup>35</sup> But this only occurred after three conditions were met: (1) Fertility continued to decline so that the dependency ratio—the number of children to be supported by working adults—fell. With more of the population of working age, rather than being children, output per person rose sharply, savings increased for investment, and more could be invested in education and training for each child. (2) Investments were made to increase enrollments in secondary/vocational and tertiary education, reaching 100% for secondary/vocational enrollments. And (3) as populations moved from the countryside to the cities, they found work in factories and service firms, expanding the formal economy.

The “demographic window” for favorable development opens approximately when the population under age 15 falls below 30% of the total population, and the proportion of people 65 and older is still under 15%. Unfortunately, most tropical sub-Saharan African countries are far from this point, and with high fertility and falling infant mortality, they are not closing in on it. Almost all tropical African countries, including “good” performers like Kenya and Rwanda, are at 40 to 50% of their population aged 0–14.

Ideally, African countries would invest in secondary education—this would increase the skill level of workers and accelerate the decline in fertility. This would kick off a virtuous circle in which, as fertility fell, more money could be invested per student and worker, raising productivity further and leading to sustained and rapid economic growth. The alternative, if this is delayed, is a vicious cycle in which fertility continues to decline slowly or stall, spurring continued growth of the young population, making it harder to provide secondary education for all youth, and leaving less to invest in workers.

Africa has plenty of scope to increase its agricultural productivity and release workers for manufacturing and service jobs. Most of Africa's farmland is not irrigated, and adoption of machinery, fertilizers, and improved species of plants and animals has just begun. Tropical parasites and diseases, which reduce human and animal productivity, are being conquered. A sorghum and cassava “revolution,” along the lines of the “green revolution” that transformed Asia, is potentially within reach.

The great difficulty is whether there will be jobs for those who move to the cities. To some degree, construction and service jobs grow in parallel with urbanization as expanding cities create their own demand. But if cities are overwhelmed with migrants, the construction of transport, housing, electricity, and sanitation lags behind, creating vast slums of substandard housing, rutted roads, and squatters. Happily, China is providing a good deal of investment in urban infrastructure in Africa, putting to use their knowledge of how to cope with fast growing megacities. Japan and other countries are investing as well. But it remains to be seen if this can keep up with the forecast urban growth.

For Africa as a whole, the urban population is projected to increase from 41% to 59% of total population between now and 2050.<sup>36</sup> That means an increase in the urban population from 491 million in 2015 to 1.49 billion in 2050. Almost all population growth in the coming decades is thus expected to end up in cities. For example, in Nigeria, the urban population is expected to grow from 87 million to 287 million. But where will 200 million additional city-dwellers go? Will twenty million people be added to the population of each of Nigeria's 10 largest cities in the next 35 years? Or will many dozens of new cities of 1 million or more arise from small towns? The Democratic Republic of the Congo is projected to have 100 million new urban residents by 2050, Egypt 85 million, Ethiopia and Tanzania 75 million. For comparison, China increased its urban population by 583 million in the thirty-five years from 1980 to 2015; that is only 58% of the increase in urban population that Africa is expected to add in the next thirty-five years.

In short, over the next few decades, Africa will add approximately one billion new workers to its labor force.

Most of them will be young and eager for work, but unless things change radically, they will be poorly educated and poorly prepared for work. Almost all of them will be converging on cities, looking for a better life than they had in the countryside.

Some economists have worried that if robots and automation take over work in the developing world, there will not be the kind of low-wage manufacturing work for exports available for Africans that helped Asia move forward.<sup>37</sup> Yet there are plenty of needs within Africa for African workers to address if the transport networks for intra-African trade were developed. Exports of agricultural goods are possible if Africa's vast lands are more profitably used for high-value farming and animal husbandry; Kenya and Ethiopia are already among the world leaders in cut flowers, as well as high-value specialty tea and coffee. As we will discuss further below, Africa could also export workers to rich but aging countries who will need younger workers for landscaping, construction, and health and elderly care. Or they could trade on their climate to offer solar energy and follow Asia in developing resorts and retirement communities with lavish personal services for developed world retirees.

Sadly, these are likely to be only marginal developments. Absent truly unselfish and creative leadership, global investment, and drives to enlist labor in vast projects, Africa will be awash in under-employed youth converging on sprawling cities across the entire landscape.

#### *Politics, Fragility, and Instability*

Africa's politics are famous for instability. Whether it is the hundreds of military coups that have taken place in African countries since independence, or the civil wars and genocides that swept across central, west Africa and Algeria in the 1990s and the multiple rebellions that have occurred in western Africa since 2000, the continent has been a byword for political instability. By 2010, there was some hope that Africa was turning a corner, and that states such as Tanzania, Botswana, Mozambique, Rwanda, South Africa, Ethiopia, Ghana, Uganda and Zambia were leading the continent toward more stable and democratic government.<sup>38</sup> The uprisings in 2010–2011 in Tunisia, Libya, and Egypt were greeted with much hope as heralding an end to dictators and the spread of democracy. But by 2018, it had become clear that many of these states have joined the global trend toward the reassertion of strongman, autocratic rule. Only Ghana, Botswana, and perhaps Tunisia are maintaining their path to stable democracy. In Tanzania, President “Magufuli is fast transforming Tanzania from a flawed democracy into one of Africa's more brutal dictatorships.”<sup>39</sup> In Zambia, “the slide toward dictatorship was abrupt. Two and a half years ago, Zambia was one of Africa's most stable democracies, a place so functional that it rarely made international headlines. Now it is ‘all, except in

designation, a dictatorship,’ according to the country's influential Conference of Catholic Bishops.”<sup>40</sup> In Uganda, President Yoweri Museveni has held onto power for 32 years, changing the constitution as needed to remain in office indefinitely.<sup>41</sup>

Unfortunately, all these tragic trends could be forecast from the state of African demography. Numerous scholars have demonstrated that states with large youth bulges and sustained population growth suffer from a variety of political pressures.<sup>42</sup> Whether it is the difficulties of providing jobs, affordable food, adequate housing, controlling inflation, or policing sprawling cities, governments are hard pressed to be responsive to the needs of rapidly growing populations, often falling into debt through the costs of subsidies and bloated government payrolls. Fights over resources among military or ethnic or regional factions are rendered more likely and more severe by the ready availability of young men to join factional struggles, as the young are both more drawn to ideological extremists and are more available for protest and rebellion, being less tied to jobs and responsibilities. Conflict, or the threat of conflict, promotes the seizure of power by autocratic leaders.

Demographers and political scientists have demonstrated that not only are relatively young societies more prone to political violence, rebellions, and civil wars, they are far more likely to backslide to dictatorship after venturing in the direction of democracy.<sup>43</sup> As Leahy et al. have written, it is now clear that the impact of demographic conditions on a state's “security, democracy, and development is significant and quantifiable.”<sup>44</sup> They note that:

The finding that countries with very young populations are more vulnerable to conflict holds true despite the maturation of age structures globally at the end of the twentieth century. This suggests that the vulnerability of countries with a very young population was not merely a result of the large numbers of institutionally weak states in the early stages of industrialization. Although age structures in most countries in East Asia, the Caribbean and Latin America matured significantly over this three-decade period and many countries in these regions moved into more advanced age structures, the likelihood that countries with very young age structures would experience civil conflict actually increased in each decade from the 1970s to the 1990s.<sup>45</sup>

In fact, in these decades, countries in which 60% or more of the population was under 30 had more than four times a higher risk of experiencing outbreaks of violent civil conflict. That age structure still characterizes almost all of sub-Saharan Africa today.

Richard Cincotta has found that the chance of a country being a stable democracy exceeds 50% only once it has progressed in its demographic transition to the point where its median age is 29.5; the chances of being a stable democracy rise to 80% when median age reaches 35.<sup>46</sup> With a few exceptions in northern and southern Africa, virtually all African countries have a median age below 25, and for many it is below 20. Indeed, the median age for Africa as a whole is just 19.4 years. Most African countries are thus decades away from reaching the age structures favorable to sustaining democratic rule.<sup>47</sup>

Aside from the small island states of Mauritius, Reunion, and the Seychelles (median age 35), as of 2015 no countries in Africa except for Tunisia (31) had reached a median age of 30. Several states in northern Africa—Algeria, Egypt, Libya, Morocco—along with South Africa, Botswana, Cabo Verde, and Djibouti, with median age around 23–25, are on track to reach the 50% threshold in the next decade. But for all other African states, with median age of 22 or less, the probability of achieving stable democracy is 10–20%. This does not mean that none of these states will become democratic; but it does mean that for the next two decades, it is most likely that some 80–90% of African states will remain, or revert back to, autocracies, with recurrent waves of violent conflict.<sup>48</sup>

If there is a region to look at as a likely model for Africa's future, one need look no further than the Middle East and North Africa. Even if sub-Saharan Africa's economies prosper, that is not likely to resolve the problems of political disorder. The countries of the Middle East and North Africa, after rapid population growth and then progress in their demographic transition, enjoyed decades of economic growth and rapid educational expansion prior to the outburst of revolutions in 2010–2011. Yet they also exhibited a huge increase in youth population and urbanization, severely unequal distribution of the benefits of growth, high degrees of corruption and political exclusion, and struggled to keep up with prior commitments to subsidize food prices, fuel, and government employment. Syria also was affected by climate change, as a severe drought disrupted rural areas and spurred urban migration.

Many of the countries of tropical Africa are likely to follow this path in regard to both economic growth and educational progress, combined with not enough jobs, strained governments, corruption, autocracy, and extreme climate events. That was a formula that led to revolutions and civil wars in the Middle East and North Africa and will likely do the same in tropical Africa in the coming decades.

#### *Africa and the International System*

Until very recently, Africa was simply too small, in terms of its population and its economy, to matter much to the

world. In 1950, the total population of sub-Saharan Africa was 180 million people. That was only twice the population of Japan, and only about one-third the population of Europe. Africa was a largely empty continent, useful mainly as a source of raw materials and notable primarily as an arena for imperialist competition among European powers. In the 1960s, imperialism was thrown off and most African countries gained their independence, but Africa's role as mainly a source of raw materials remained. As late as 1980, sub-Saharan Africa had just 372 million people, and Africa as a whole had 480 million; at this time Asia had 2.6 billion people. Europe still had almost twice the population of sub-Saharan Africa.

This has now changed with remarkable speed. As of 2015, sub-Saharan Africa's population, at 970 million, is now one-third larger than that of Europe. By 2040, twenty-five years from now, sub-Saharan Africa is projected (again, by the UN medium variant) to have 1.8 billion people, making it more than twice as populous as all of Europe (including Russia). In the sixty years from 1980 to 2040, tropical Africa will have gone from having half the population of Europe to having twice its population.<sup>49</sup>

Nonetheless, Africa's economy remains quite small, due to the deep poverty of its population. As of 2018, according to the IMF, the total gross domestic product of all of Africa in current U.S. dollars is \$2.3 trillion—just 50% more than the GDP of Australia and New Zealand. That is about one-tenth the GDP of East Asia or of Europe and under three percent of total global output. In short, the total economic output of Africa is not much more than a rounding error in the global economy.<sup>50</sup>

That is not likely to change anytime soon. If the global economy grows at 3% per year, and Africa's economy were to grow consistently at 5% per year, it would take 70 years for Africa to be generating even 10% of global economic output; even though by that time Africa would likely have over one-third of the world's population. While Africa will have a vast number of potential consumers, their actual purchasing power will be modest. Africa will likely remain, overall, an economic pygmy among giants.

Of course, inequality means there will still be a substantial middle class. With a population of 2.5 billion by 2050, the richest ten percent would comprise 250 million people with a middle class to upper class income, concentrated in some 20–30 metropolitan areas scattered across the continent. This will mean a substantially increased demand, perhaps four or five-fold, for air travel, tourism, and consumer goods compared to today's level. Yet this market will still be of little interest to global multi-nationals. Much like China, Africa will likely disappoint as a consumer market, due to low per-capita incomes, distinctive local tastes, a large informal market, and high rates of savings to cope with an uncertain environment.<sup>51</sup>

The impact of Africa on the international system will thus depend mainly on the impact of its vast population growth. This will matter mainly in terms of regional instability, extremism, climate change and disease, and international migration.

We have already noted that Africa is likely to remain a continent of politically fragile states, mainly autocracies with chronic violence. As the world's largest pool of youth aged 15–24, it is also likely to be an incubator and recruiting ground for all kinds of extremist ideologies. It will be a major concern for developed regions to contain the spread of violence and extremism from Africa, just as in recent decades it has been a concern to contain the spread of these tendencies from North Africa and the Middle East. At present there are already violent extremist movements active in Nigeria (Boko Haram), Somalia (al-Shabab), Uganda (Lord's Resistance Army), Mali (Al Qaeda in the Islamic Magreb), and elsewhere. This problem is likely to grow worse as Africa's youth population grows in the context of inequality and corrupt autocratic regimes.

Africa is also potentially a source of international risks in regard to climate change and disease. The latter risks were brought home with the outbreak of Ebola in the United States in 2014. In the coming decades, the number of travelers from sub-Saharan Africa to other continents, driven by increased population and higher incomes in Africa, is likely to increase by three or four times.

In regard to climate change, much of the world's fate depends on what happens in Africa. At present, due to its poverty and mainly rural population, Africa is a trivial generator of greenhouse gases. In 2016, Africa as a whole emitted 1.33 million metric tons of carbon dioxide, less than Russia by itself. 80% of that comes from just six fossil fuel dependent industrializing countries: South Africa, Algeria, Nigeria, Libya, Egypt and Morocco. Africa's CO<sub>2</sub> output per person is thus a mere 1.1 tons per year. That compares with 1.8 tons per year in India.<sup>52</sup>

But Africa's CO<sub>2</sub> output per person has been growing fast, much faster than its population. That is to be expected, as increases in income and urbanization will lead to higher per capita fuel and electric consumption. From 1950 to 2016, Africa's CO<sub>2</sub> emissions increased by a factor of 14.<sup>53</sup> Today, Africa has 1.2 billion people and is projected to have 3 billion by 2060. If CO<sub>2</sub> emissions per capita by that date were merely to rise to the level of India today, Africa's total CO<sub>2</sub> output would quadruple to 5.45 million mt of CO<sub>2</sub> per year—the same total as the United States today. Put another way, if by 2060 Africa achieves the same emissions level per person as India today, then even if China, the United States, India, Russia, Japan, and Germany were ALL to cut their CO<sub>2</sub> emissions by 20%, that would not offset the increases to CO<sub>2</sub> output from Africa.

It is thus vital that Africa be put on a course of solar, wind, geothermal, hydro, and nuclear power for its fuel needs. Otherwise, even a modest increase in Africa's per capita emissions will make it impossible for more developed countries to make meaningful reductions in the world's carbon loading. Fortunately, Africa has plentiful wind, hydro, uranium, and solar resources. Unfortunately, with the backing of foreign capital, mainly from China, over 100 coal-powered electric plants are in various stages of planning or development in Africa.<sup>54</sup>

Next to climate change, the largest impact that Africa is likely to have on the international system is through a growing contribution to international migration. This will have two components: labor migration and refugee movements.

To date, sub-Saharan Africa has been a modest contributor to global labor migration. North Africa has had a much higher rate of migration outside of Africa, with many north Africans working in the Gulf oil countries and, more recently, refugees from the Libyan civil war seeking asylum in Europe. Still, the number of sub-Saharan Africans seeking to move to the United States and Europe has been steadily rising. From 2010 to 2017, Europe received nearly one million asylum applications from sub-Saharan Africans who reached its shores, more than half of them in the three years 2015–2017; the United States received fewer, about 400,000 from 2010 to 2016. But many of these claims were rejected; the net increase in sub-Saharan Africans living in Europe in these years was only 420,000. In the United States, which took more students and skilled workers, the increase was 325,000 in the same period. Altogether, there are an estimated 4.15 million sub-Saharan Africans living in Europe in 2017 and 1.55 million in the United States<sup>55</sup>

Of these international migrants, about half of those living in the United States are from four countries: Nigeria, Ethiopia, Ghana, and Kenya. In Europe, there is a greater mix, with half of sub-Saharan migrants coming from Nigeria, South Africa, Somalia, Senegal, Ghana, Angola, Kenya, the DRC, and Cameroon. What are the prospects for a major increase in migration from these and other countries?

The push factors are obvious: the number of young Africans aged 15–24 is growing rapidly; their numbers will double from 230 million in 2015 to 461 million by 2050 (94% of that increase coming from sub-Saharan Africa). Many will be un- or under-employed at home. More and more of them will learn about life in Europe and the United States from friends, relatives, and media and have the resources to consider moving. While most will simply move to larger cities in their own country or to other countries in Africa or the Middle East, most who are surveyed say that their first choice of destinations is Europe or the United States. But even if the number of migrants from

sub-Saharan Africa to the United States and Europe were to double, or even triple, in the next three decades, the annual numbers would be less than 600,000 per year to Europe (out of a projected population of Western Europe in 2050 of 457 million, or 0.13 percent), and less than half that to the United States (or about 0.08 percent). If done in an orderly way, this volume of migration is not a threat.

One may worry that a bigger risk is a repeat of what happened in 2015 with the surge of immigrants to Europe driven by Syria's civil war, when one million migrants entered Europe in the span of a few months, briefly pushing migrant flows up to five times higher than in previous years, creating a shock to Europe's political system. Syria's war created roughly five million international refugees out of a prewar population of 21 million. If, say in 2025 a combination of climate disaster and civil war in the Democratic Republic of Congo (estimated population then of 104 million) or Ethiopia (126 million) or South Africa (62 million) broke out, might it also send millions of refugees streaming toward Europe? That is possible; if assistance cannot be given in place, or if refugees are not welcomed in neighboring countries, those desperate for survival might undertake the costs and risks of trying to get to Europe. The Syrian surge turned out not to have been a great economic burden for Europe but had immense political consequences. The sudden flow of foreigners to Europe's borders raised fears of loss of identity and control among Europeans and promoted authoritarian governance.<sup>56</sup> If roughly every decade a major crisis were to send 500,000 to one million African refugees to Europe's borders, that could have the effect of periodically exacerbating identity crises and political extremism, reinforcing populist regimes, and doing sustained damage to European democracy.

A different and more pragmatic approach to migration would be to view the vast numbers of young workers in Africa as an untapped resource. For most resources, whether it be minerals or fossil fuels, if they are rare in Europe but cheap and plentiful elsewhere, international investment flows in to refine and upgrade the resource and export it to Europe. Why shouldn't African labor be viewed similarly?

Europe and America are already facing severe shortages of low-wage labor for service, construction, and eldercare jobs—work that is not easily or cheaply done by robots. There are also shortages of skilled workers for jobs such as nursing and pharmacy and healthcare, shortages that will grow as the populations of Europe and America age.

Europe and America also are facing huge future costs of funding their national and local pension and health care systems with a shrinking labor force. In the United States, for example, the recent fall in fertility to record low levels has resulted in the U.S. Census reducing its population

forecast for 2050 from 439 million (forecast in 2008) to 390 million (latest forecast in 2017).<sup>57</sup> That means in 2050, the United States will have almost 50 million fewer people—most of them prime working age—than was expected just ten years ago to pay into social security and Medicare to support seniors; and that is with recent immigration rates of one million per year being sustained to 2050. Without immigration, due to low fertility, the U.S. labor force would already be in decline. The United States will need an additional one million immigrants per year for the next 35 years just to get back to the 2050 population that was expected a decade ago!

Many potential African migrants to the United States and Europe are Christians who speak French or English, mitigating anxieties about how they would “fit” into American or European society. It would therefore make sense for the United States and Europe to plan on attracting more migrants from Africa to meet the needs of their aging and shrinking native populations. This could be combined with training and pre-screening overseas to create orderly migration inflows. Increased training and migration of Africans to developed Western countries could also, as happened with India and China, create a virtuous circle of return migration over time to increase managerial and entrepreneurial skills in Africa, improving prospects for African countries' development.

### **Policy Recommendations: Meeting the Challenges of Africa's Demographic Growth**

Ideally, Africa's population growth, and the entry of African populations into the global economy as workers and consumers, would recapitulate the success stories of Eastern Asia. Even Bangladesh, once written off as a basket case, and whose own population doubled in the 30 years from 1975 to 2005, has emerged as a success, being one of the world's fastest growing economies and raising its per capita income by 64% in the decade from 2007 to 2017.<sup>58</sup> But Bangladesh's performance depended on reducing its fertility from 6.9 children per woman in 1970–75 to 2.5 in 2005–10, and making investments in its human capital and infrastructure that allowed it to become a major textile manufacturer and exporter and create its own financial, steel, pharmaceuticals, and food processing industries.

To emulate that success, African countries and their Western supporters and partners need to adopt a two-pronged approach. From now until 2050, the major goals must be coping with the consequences of unavoidably rapid population growth and yet still working to lower fertility as quickly as possible so that after 2050 Africa can achieve sustained high growth in income per head. During the 30 years from 1975 to 2005 when its population doubled, Bangladesh had only modest growth in per capita income and struggled with coups and unstable

government. Yet it managed to reduce its fertility and improve its education and economic infrastructure so that it was poised for rapid growth in the following decade.

For Africa to achieve similar fertility reductions in the next 30 years will be difficult. As Hertrich has explained, changing Africa's high fertility will require changing the conditions that both lead to higher desired family sizes and weaken women's ability to assert their preferences if they desire fewer children.<sup>59</sup> That means empowering women through later marriage and greater education. Indeed, probably the single most important investment for international donors that can be made in Africa's future—both for the earning capacity of its population and stemming the flood of population growth after 2050—is to target universal secondary education for both sexes.

If by 2050 Africa can turn the corner on fertility and reduce its population growth, and make the investments in its human capital and infrastructure needed to lay the foundation for future growth, then in the second half of this century Africa could be the main motor of global economic growth, much as China has been for the last thirty years and India could be for the next thirty. Yet if Africa fails to do so, the ever-larger swelling of its population will mean that its economic lags and political instability will only increase and become an even greater burden for the international system later in the century.

The pressures on Africa's labor markets, urban centers, and political stability from the population growth that will inevitably occur by mid-century will be immense. African countries and developing nations would be wise to plan now to meet these pressures by developing a variety of stand-by quick response institutions. This would include provision of humanitarian aid for larger populations likely to be affected by extreme climate events and provision of peace-keeping and refugee settlement and support for populations likely to be affected by rebellions and civil wars. It would also include provision of social media campaigns, information sharing, and well-trained police/gendarme forces to combat the spread of extremist ideologies and extremist actors.

While it would be too much to expect most sub-Saharan African countries to achieve stable democracy before their fertility is brought down and the age structure of their societies matures, critical steps can be taken by the international community to discourage corruption, improve administrative and legislative capacity, and raise expectations regarding government behavior. Africa would likely make greater progress under regimes, whether autocratic or democratic, that respect the rule of law, develop strong private sectors, and invest in education and infrastructure than under regimes, whether autocratic or democratic, that are highly

unstable, corrupt, ineffective, and invest mainly in show-projects and elite consumption.

There is also great potential for Western countries to help themselves, as well as Africa, by treating the surge of young people in Africa as an opportunity rather than a threat. By helping to train African workers in their countries and facilitating a greater but more orderly flow of migrants, Western countries can help meet their own shortages of labor, take better care of providing for their aging populations in terms of both fiscal health and physical care, and create cadres of African workers who will be capable of contributing to the world economy.

Indeed, among the literally billions of Africans who will be born in the 21<sup>st</sup> century, there are no doubt future Mozarts, Einsteins, Salks, and Picassos, as well as brilliant performers, writers, and thinkers of all kinds. To deprive the world of that talent by lack of education and opportunity would be a tragedy for all of mankind.

In the coming decades, Africa will have by far the fastest growing population anywhere in the world and will soon be the only fast-growing source of one of the most precious resources on the planet—young people. This will create risks and anxieties, tempting the developed world to try to wall itself off from Africa. Yet that would be a tragic mistake. Helping Africa to develop those youth as productive contributors to their own and the global economy, and managing Africa's future energy transition to minimize its impact on climate, will be *the* vital tasks for global security and prosperity in the coming century.

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<sup>1</sup> Data on demographic variables from the UN Population Division, World Population Prospects 2017 revision on-line <https://population.un.org/wpp/Download/Standard/Population/> and the UN Population Division, World Urbanization Prospects, 2018 Revision, on-line <https://population.un.org/wup/>. Data on ethnic diversity from Alberto Alesina, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat and Romain Wacziarg, "Fractionalization," Harvard Institute of Economic Research Discussion Paper Number 1959, Cambridge, MA: Harvard University, June 2002.

<sup>2</sup> The UN Population Division divides Africa into five regions: northern, western, middle, eastern and southern. When data is given for these regions, it is drawn from the UN World Population Prospects 2017 revision, which gives population-weighted totals for each region.

<sup>3</sup> All mortality data in this section is from the UN World Population Prospects 2017 revision <https://population.un.org/wpp/Download/Standard/Population/>. The estimate of life expectancy in 2050-55 is from their "medium variant" projection.

<sup>4</sup> Fertility data in this and subsequent paragraphs is from the UN World Population Prospects 2017 revision <https://population.un.org/wpp/Download/Standard/Population/>.

<sup>5</sup> Jean-Pierre Guengant and John F. May, "African Demography,"

*Global Journal of Emerging Market Economies*, vol. 5 no. 3 (2013), p. 225.

<sup>6</sup> John B. Casterline, "Prospects for Fertility Decline in Africa." *Population and Development Review*, vol. 43, Supplement 1 (2017), p. 4.

<sup>7</sup> John Bongaarts, "Africa's Unique Fertility Transition." *Population and Development Review*, vol. 43, Supplement 1 (2017), p. 40.

<sup>8</sup> Idem, p. 44.

<sup>9</sup> Anne Goujon, Wolfgang Lutz and K.C. Samir, "Education stalls and subsequent stalls in African fertility: A descriptive overview," *Demographic Research* vol. 33, no. 47(2015), pp. 1281-1296.

<sup>10</sup> John Bongaarts and John B. Casterline, "Fertility transition: Is sub-Saharan Africa different?," *Population and Development Review*, vol. 38, Supplement 1 (2012): p. 155. See also David Shapiro and Andrew Hinde, "On the pace of fertility decline in sub-Saharan Africa," *Demographic Research*, vol. 37, no. 40 (2017), pp. 1327-1338; David Shapiro and Tesfayi Gebreselassie, "Fertility transition in sub-Saharan Africa: Falling and stalling," *African Population Studies*, vol. 23, no. 1 (2008), pp. 3–23; and Alex Ezeh, Blessing Mberu, and Jacques Emina, "Stall in fertility decline in Eastern African countries: Regional analysis of patterns, determinants and implications," *Philosophical Transactions Royal Society B*, no. 364 (2009), pp. 2991–3007.

<sup>11</sup> Bongaarts, "Africa's Unique Fertility Transition," p. 44.

<sup>12</sup> This graph was prepared by Julia Zinkina at the Russian Academy of National Economy and Public Administration based on the UN World Population Prospects 1995 revision and a survey of recent DHS reports.

<sup>13</sup> John C. Caldwell Pat Caldwell, "The cultural context of high fertility in sub-Saharan Africa," *Population and Development Review*, vol. 13, no. 3 (1987), pp. 409–437.

<sup>14</sup> Ron Lesthaeghe, "On the social control of human reproduction," *Population and Development Review*, vol. 6, no. 4 (1980), pp. 527-548; Kofi D. Benefo, "The determinants of the duration of postpartum sexual abstinence in West Africa: A multilevel analysis," *Demography*, vol. 32, no. 2 (1995), pp. 139-157.

<sup>15</sup> John Bongaarts, "The causes of education differences in fertility in sub-Saharan Africa." Working Paper No. 20, (2010), The Population Council, New York; Guengant and May, "African Demography," pp. 227–228.

<sup>16</sup> Bongaarts, "Africa's Unique Fertility Transition," p. 40.

<sup>17</sup> Ibid., p. 54; Goujon, Lutz and Samir, "Education stalls."

<sup>18</sup> The path models in Figures 2 and 3 were prepared by Julia Zinkina and Sergey Shulgin at the Russian Academy of National Economy and Public Administration.

<sup>19</sup> Guegant and May, "African Demography," p. 227.

<sup>20</sup> A number of researchers have found that the main factors affecting levels and changes in African countries' fertility are desired family size and birth spacing. See John C. Caldwell and Pat Caldwell, "Africa: the new family planning frontier," *Studies in Family Planning*, vol. 33, no. 1 (2002), pp. 76–86; John C. Caldwell, I.O. Orubuloye and Pat Caldwell, "Fertility decline in Africa: A new type of transition?," *Population and Development Review*, vol. 18, no. 2 (1992), pp. 211–242; John B. Casterline and

Samuel Agyei-Mensah, "Fertility desires and the course of fertility decline in sub-Saharan Africa," *Population and Development Review* vol. 43, Supplement 1 (2017), 84-111; John B. Casterline and Colin Odden, "Trends in inter-birth intervals in developing countries, 1965–2014," *Population and Development Review*, vol. 42, no. 2 (2016), pp. 173–194; and Tom A. Moultrie, Takudzwa S. Sayi, and Ian M. Timæus, "Birth intervals, postponement, and fertility decline: A new type of transition?," *Population Studies*, vol. 66, no. 3 (2012), pp. 241–258.

<sup>21</sup> Andrey Korotayev, Julia Zinkina, Jack Goldstone and Sergey Shulgin, "Explaining current fertility dynamics in tropical Africa from an Anthropological perspective: A cross-cultural investigation," *Cross Cultural Research*, vol. 50, no. 3, p. 259.

<sup>22</sup> Korotayev et al., "Explaining current fertility dynamics," pp. 258–262. See also Helen Ware, "Women's work and fertility in Africa," in S. Kupinsky (Ed.), *The Fertility of Working Women*, New York, NY: Praeger, 1977, pp. 1-34.

<sup>23</sup> Lant Pritchett, *The Rebirth of Education: Schooling Ain't Learning*, Washington D.C.: Center for Global Development, 2013.

<sup>24</sup> Adriaan M. Vespoor with the SEIA Team, *At the Crossroads: Choices for Secondary Education in Sub-Saharan Africa*, Washington, DC: The World Bank, 2008, Figure 2.2, p. 49.

<sup>25</sup> Shireen J. Jejeebhoy, *Women's Education, Autonomy, and Reproductive Behaviour: Experience from Developing Countries*, Oxford: Clarendon Press, 1995.

<sup>26</sup> Véronique Hertrich, "Trends in age at marriage at the onset of fertility transition in sub-Saharan Africa," *Population and Development Review*, vol. 43, Supplement 1, (2017), pp. 112-137. See also Jennifer Johnson-Hanks, "Natural intentions: Fertility decline in the African Demographic and Health Surveys," *American Journal of Sociology*, vol. 112, no. 4 (2007), pp. 1008–1043, and Cheikh Mbacke, "The persistence of high fertility in sub-Saharan Africa: A Comment," *Population and Development Review*, vol. 43, Supplement 1, (2017), pp. 330-337.

<sup>27</sup> Joel Cohen, "Make secondary education universal," *Nature*, vol. 456, no. 4, (2008), p. 572.

<sup>28</sup> UNICEF GLOBAL DATABASES <https://data.unicef.org/topic/education/secondary-education/>, consulted Nov. 29, 2018.

<sup>29</sup> Idem.

<sup>30</sup> All population, fertility, and density estimates and projections in this section from UN World Population Prospects, 2017 revision.

<sup>31</sup> Patrick Gerland, Ann Biddlecom and Vladimira Kantorova, "Patterns of Fertility Decline and the Impact of Alternative Scenarios of Future Fertility Change in sub-Saharan Africa," *Population and Development Review*, vol. 43, Supplement 1 (2017), pp. 21-38.

<sup>32</sup> Tim Dyson, *Population and Development: The Demographic Transition*, London: Zed Books, 2013; Elizabeth Leahy, with Robert Engelman, Carolyn Gibb Vogel, Sarah Haddock and Tod Preston, *The Shape of Things to Come: Why Age Structure Matters to a Safer, More Equitable World*. Washington, D.C.: Population Action International, 2012.

<sup>33</sup> UN World Population Prospects, 2017 revision.

<sup>34</sup> Data in this paragraph from UNICEF GLOBAL DATABASES <https://data.unicef.org/topic/education/secondary->

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<sup>35</sup> Jeffrey Williamson, "Demographic Change, Economic Growth, and Inequality," in N. Birdsall, A. Kelley and S. Sinding (eds). *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*, Oxford: Oxford University Press, 2001; Population Action International (PAI), "How Shifts to Smaller Family Sizes Contributed to the Asian Miracle." Washington, DC: PAI, 2006.

<sup>36</sup> All data on urbanization from UN World Urbanization Prospects 2018 <https://population.un.org/wup/>

<sup>37</sup> Dani Rodrik, "An African Growth Miracle?," *Journal of African Economies* (2016), pp. 1-18.

<sup>38</sup> Steven Radelet, *Emerging Africa: How 17 Countries Are Leading the Way*, Washington, DC: Center for Global Development, 2010.

<sup>39</sup> *The Economist*, "Tanzania's rogue president," March 15<sup>th</sup>, 2018, <https://www.economist.com/middle-east-and-africa/2018/03/15/tanzanias-rogue-president>

<sup>40</sup> Ernest Chanda, "How to Gut a Democracy in Two Years," *Foreign Policy*, August 3, 2017, <https://foreignpolicy.com/2017/08/03/how-to-gut-a-democracy-in-two-years-zambia-state-of-emergency-lungu/>

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# Supporting Data

Figure 1. UN Projections of Fertility Decline from 1990–1995 to 2010–2015 vs. DHS Reported Fertility Decline

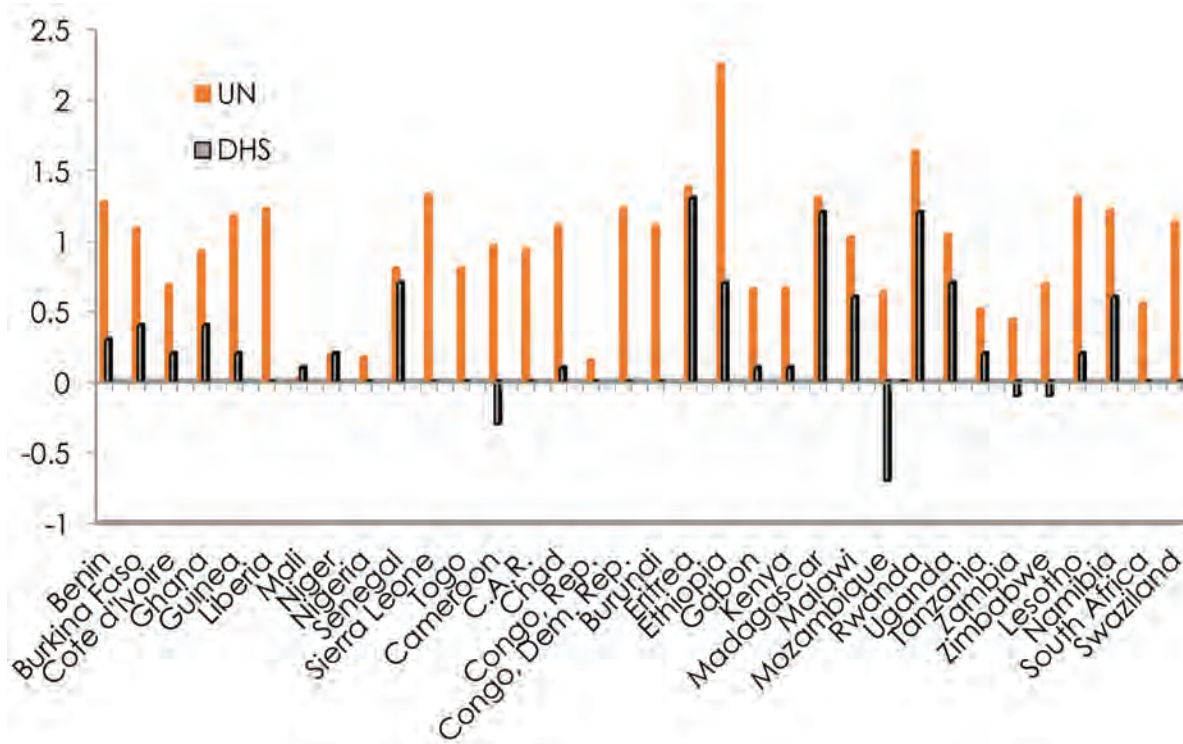


Figure 2. Path Model for Fertility in Non-African Developing Countries

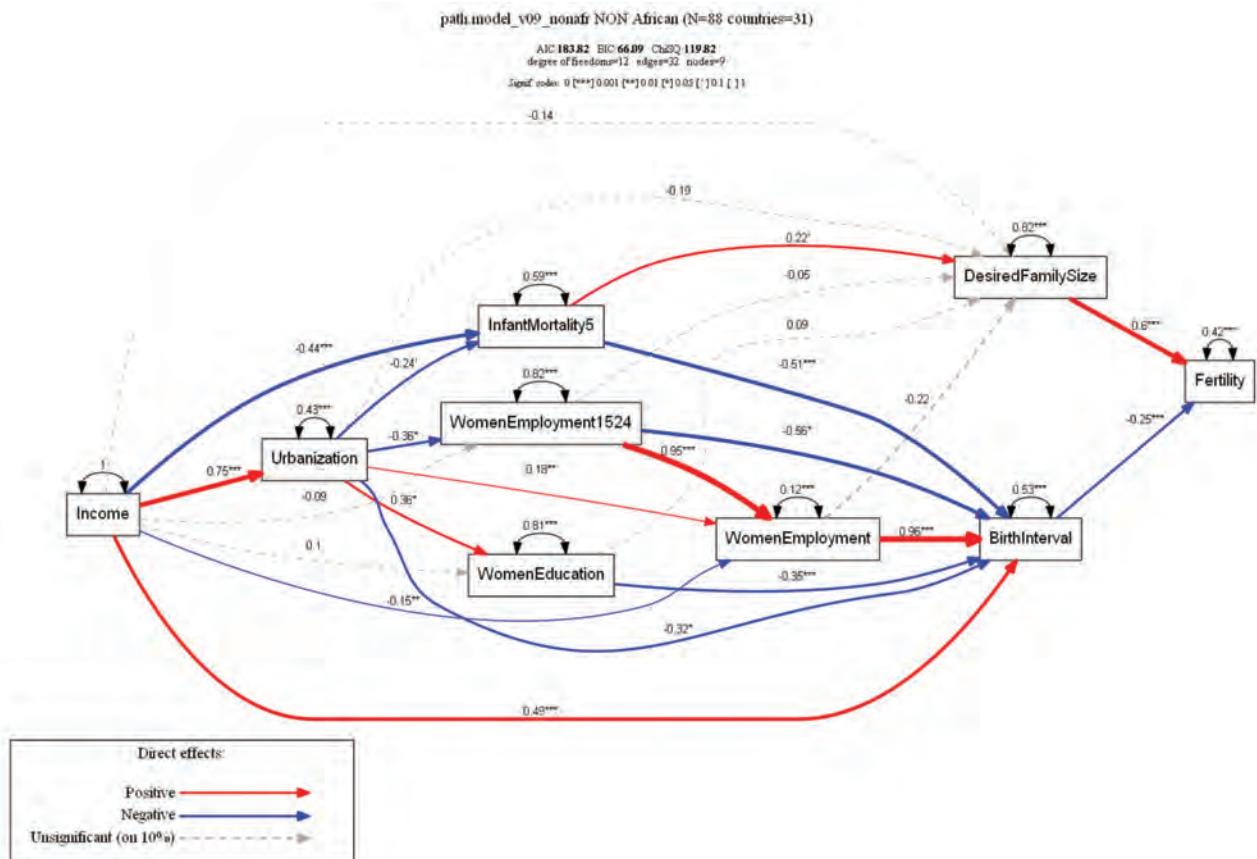


Figure 3. Path Model for Fertility in Sub-Saharan African Countries

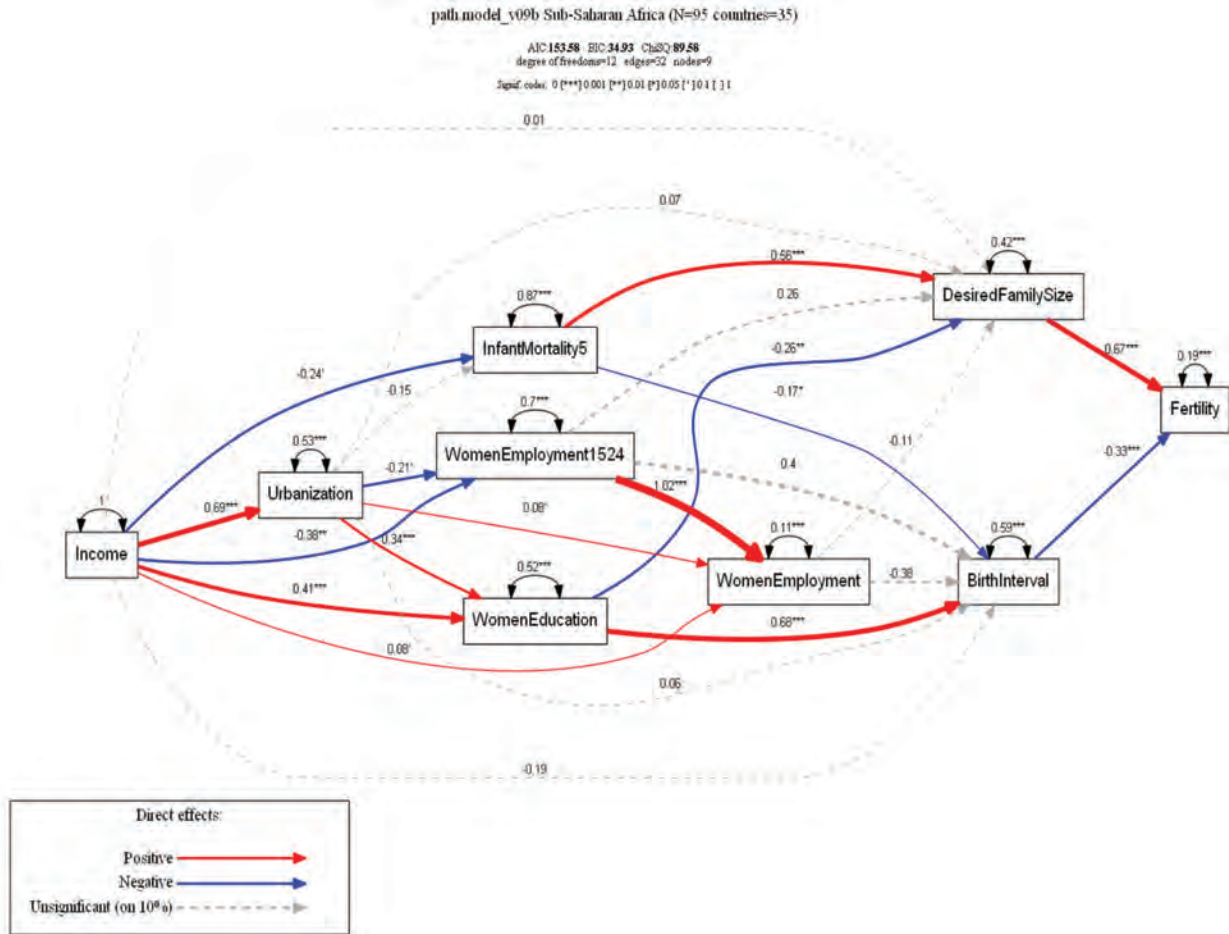
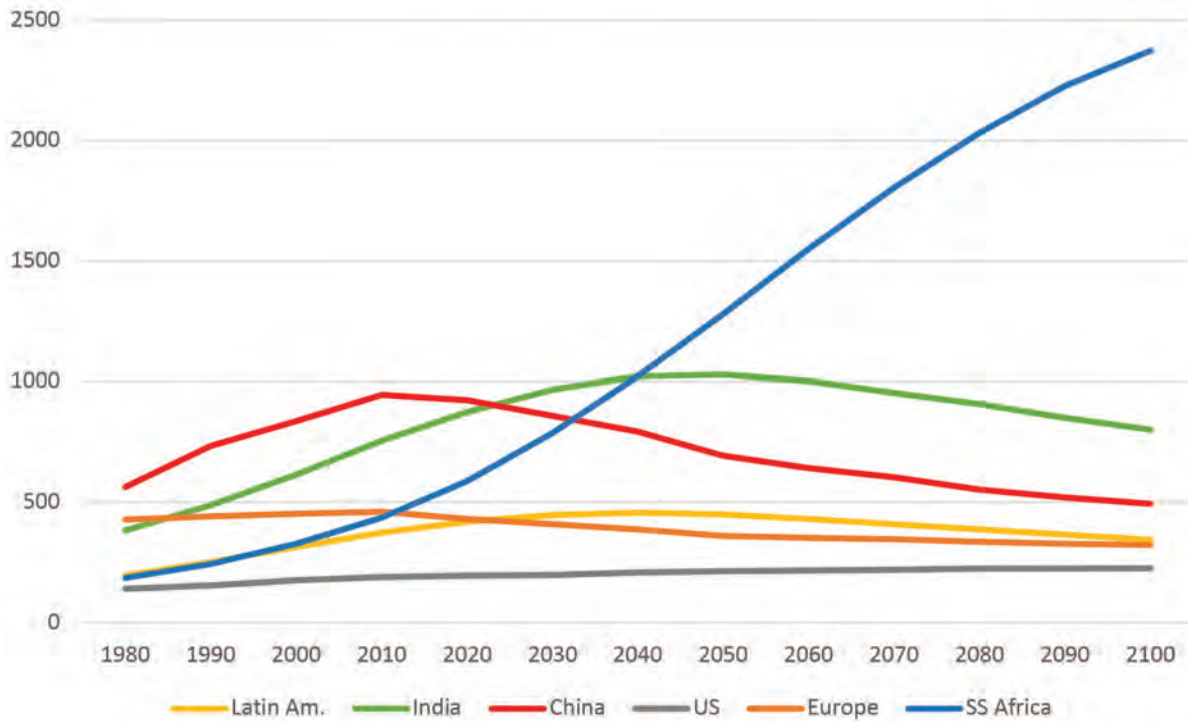


Figure 4. Growth of Labor Force (Population age 15-59) in millions, 1980-2100



# Unlocking the Potential of MobileTech in Africa: Tracking the Trends and Guiding Effective Strategy on Maximising the Benefit of Mobile Tech

By **Andre Pienaar**, C5 Capital & **Zach Beecher**, Cloud Leadership Centre

Africa is home to a burgeoning digital domain. Africans across the continent are taking notice of what mobile internet technology offers them. In fact, the vast majority of Africans believe that increased internet access offers paths to improved education, economies, and personal relationships.<sup>1</sup> Though there is scepticism about the role of mobile internet technology in politics, there is a generally positive interpretation of where it could lead. Africans are not timidly wading into the technological fray but rather enthusiastically diving in.

Technology is making our world smaller, day by day. The gulf in access to this digital marketplace between the haves and have-nots of the world is shrinking as more users than ever before are signing onto the World Wide Web. The gaps of yesteryear are being quickly replaced with a global economy capable of being powered by a device in the palm of our hands. Mobile devices can be agents for increased accountability, vehicles to greater education, and offer access to services never before enjoyed by some of the world's most vulnerable citizens. Whether increasing awareness about voter registration or education on HIV/AIDS in communities without ready access to professional medical advice, technology is delivering actionable and quantifiable improvements to people's lives. These disruptions to the day-to-day way of life for millions offers the potential to improve democratization and the ability for people to participate in their civil society, not only as citizens but as entrepreneurs. Understanding the trends will help us better understand both the possibilities and pitfalls of increased mobile technology access.

New connections are being forged across the continent, with new opportunities for networks to grow. Facebook, Twitter, Instagram, WhatsApp, amongst so many others, are redefining the landscape of how we communicate and work with one another. With 2.23 billion active monthly users, Facebook services more than a quarter of the population with its full range of options. This saturation

across a global context is making our world smaller, more rapidly connectable, and easier to be engaged. Now, activists from Latin America and Africa can connect over questions of peace and security with the click of a mouse and a friend request. As the expansion of these networks grows, the scalability of this impact is growing ever faster.

Yet, it is necessary to understand that, as with all technologies, there is an inherent duplicity to their application. Technology is foremost a tool, the end to which that tool is applied comes down to the user. Human beings are those who ascribe their meaning and significance. Resultingly, technology is not an objective good but one that must be found and applied with the right intentions for the end of enabling good. Consider the role of social media in simultaneously bringing disparate and widely dispersed populations into touch with another for the first time. Yet, while some would use social media as a means to connect across the world to many of different backgrounds, there are those who pull ever more deeply into a cocooned existence. They increase the chasm between those unlike them and pull ever closer to those who are like them, thereby enabling the rapid rise of extremist elements across political and religious ideologies. Moreover, the manipulation of these elements enabled elections to be influenced and the fires of discontent to be fanned to fray at the fabric of civil society in both the developing and developed world. Thus, we must pay particular attention to the ends that technology is applied to as a means.

Mobile internet technology thus carries the potential to empower and enable, all while meaningfully expanding the economy. Studies have found that a "developing country with an average of 10 more mobile phones per 100 population has 0.59 percent higher GDP growth than an otherwise identical country."<sup>2</sup> Mobile technology decentralizes the engine of progress into the hands of the participants that it enables to enter the marketplace. In 2010, the number of mobile phone subscribers was 350

million.<sup>3</sup> However, as neighbours step forth across the chasm of the digital divide that persisted for years, many African countries are now leaping forth to catch up.

Yet, use across the continent is uneven. South Africa is the only country in the region where at least half of the population is online with 59%, higher than the global average, online.<sup>4</sup> Yet, in a recent study conducted of the 17 leading countries in sub-Saharan Africa, home to more than 300 million people, there was incontrovertible evidence of the integral role that mobile technological adoption and use is improving the lives across the continent. These countries have seen growth rates per capita averaging at 3.2% a year, which equates to overall GDP growth outpacing 5%.<sup>5</sup> To the everyday citizen of this country, this means a 50% increase in average incomes in the last 13 years.<sup>6</sup> Integral to this is the adoption of new mobile phone technologies and the creation of new industries and occupations.

As a result, communication is being put in the hands of the many who never had it before, but the proliferation of mobile internet technology in those phones is leading to an explosion in access to the internet and the information as well as opportunity contained therein. In December 2017, African mobile internet penetration rested around 35.2% well below the world average of 54.4%.<sup>7</sup> Africans across the continent are insatiably pursuing to close this digital divide. From 2017 to 2018, there was a 20% increase in internet penetration.<sup>8</sup> With each step forward, more economic opportunities are emerging for Africans to participate not only in their local economy but to bring the local into a global context. Moreover, the informal market is burgeoning as people begin to place themselves within the equation to derive benefit. Whether selling minutes and "airtime" or using their ingenuity to learn how to fix mobiles, Africans across the continent are adapting to their marketplace and building in their own local sustainability for a global connected market.

Central to the emergence of these informal markets, as well as more sustainable internal transfers of money within local economies that thereby benefit the national economy, is the provision of services of which many Africans were never able to have before. Millions across Africa are considered the "un-bankable," people whose earnings are so low or present such a risk to banks that it is impossible for them to open up accounts and begin to work and establish lines of credit to build their wealth. Yet, it also presents security challenges as money is always physically in the market rather than in controlled spaces within the banking network. Money and opportunity could then "bleed" from the system as it was stolen or not retained long enough for an individual to establish purchasing power and a mechanism by which to safeguard their money. The British Department for International Development and private developers

partnered in an attempt to offer a solution for this with the launch of M-PESA in Kenya.<sup>9</sup>

First launched in 2013, M-PESA aimed to develop a system of credits and mobile money transfer grounded in an SMS based system to move from user to user. Now, at least 70% of the population in Kenya uses M-PESA.<sup>10</sup> The transfer of money between customers and businesses or family members is now secure, convenient, and cost-effective. Moreover, there are more than 110,000 vendors across the country who use M-PESA based exchange as a means of payment, including all major vital services and vendors and everyday life and participation in the local market, such as shopkeepers, banks, and gas stations.<sup>11</sup> This grew from an original pool size of 23,000 in 2010.<sup>12</sup> Resultingly, the 70% of the population that now uses mobile money in Kenya on the M-PESA platform are more "fully integrated" into the marketplace.<sup>13</sup> With lower barriers for participation, it is then easier for these new participants in the marketplace to innovate and begin to build their own businesses while simultaneously building a more sustainable local market.

The results are telling. In the first five years that M-PESA operated in Kenya, it lifted 194,000 households or 2% of the Kenyan population out of extreme poverty.<sup>14</sup> As such, the Kenyan government is adjusting and opening up its financial regulations to better enable and diversify access to this mobile money market. Banks can now compete directly with M-PESA and the launch of M-Shwari gives proper accounts to users to participate in the M-PESA system.<sup>15</sup> In 2014, M-PESA expanded its market of payable agents to include telecommunications companies and other banks, further embedding M-PESA and its users within the formal market structures of the Kenyan economy. Mobile internet technology is undoubtedly changing lives while simultaneously rewriting the rules for how to bridge the impoverished into a sustainable formal market structure.

Now, more than ever, we stand at the precipice of unlocking incredible potential across Africa. Foreign governments are taking notice and so, too, are foreign investors. Growth is occurring exponentially. Across the continent, African start-ups generally raised 50% more venture capital in 2017 than in 2016.<sup>16</sup> Tech output is becoming a mainstay in the economies of significant players on the continent: 11% of the Kenyan and 10% of the Nigerian economic outputs are directly related to their technology sectors.<sup>17</sup> Resultingly, the Departments for International Trade and International Development are building out partnerships and accelerators in coordination with the private sector to vault these new and exciting contributions to the African and global marketplace quickly and sustainably.

Critically, there is an ambitious generation of young Africans ready to take this mantle and begin to bend the arc of their story towards increased prosperity. Across all of Africa, there are 1.2 billion people, and of those 60% fall under the age of 24.<sup>18</sup> This is only going to continue to grow with estimates placing the population of Africa in 2050 to be 2.4 billion. There is an incredible opportunity to train and empower the next generation of innovators through mobile internet technology and a widening social consciousness through social media.

Mobile internet technology is literally putting the power in the hands of Africans across the continent. Now, in order to scale this effect across the continent to further lower the barrier to access, we need to think about the role of the cloud. With improved access to cloud-based data management, effective systems like M-PESA and other technical applications capable of driving positive impacts can be rapidly scaled across communities and countries and ultimately the continent.

Cloud is taking the computing power we have come to know first on our personal computers and on-premises servers and industrializing its capacity with computing infrastructure on a global scale, for everyone's benefit. Amazon pioneered this by investing billions of dollars to build multiple industrial-sized computing centres around the world and networking them cost-effectively with high-speed fibre optic cables. This means that we need less capital and less infrastructure to grow organizations. We can displace capital with technology to build, scale, and innovate globally on an unprecedented scale. The power of cloud computing to scale innovation, to reduce the cost of computing, and to increase its accessibility to everyone is one of the drivers of growth in the global economy.

The significance of cloud-based computing cannot be overstated. Cloud data storage enabled an aggregation of more data in the last few years than in the preceding 2000 years. This in turn enables us to learn from patterns in data in an unprecedented way. This enables us to bring the transformative power of different forms of artificial intelligence (AI) to bear on real world problems. Today, it is vital that we harness the full transformative power of cloud computing to offer the unprecedented opportunities for innovation and entrepreneurship in a young and eager economic setting such as Africa.

To continue to grow this in Africa, venture capital must begin to invest in African companies. Venture capital will play a vital role in enabling sustainable and enduring growth in mobile technology within Africa. Patterns across the continent now border on predatory consumption of companies with good ideas. Instead, there must be a move to grow and enable the growth of African

companies within an African context managed and powered by the intellect and efforts of Africans from across the continent. Venture capital will provide the bridge to opportunity so desperately needed to jumpstart domestic entrepreneurship, but it will require scaled investment. Governments can play a major role in helping grow this sector. Consider the United Kingdom's new national security innovation fund, which brings together corporate venture capital, university endowments, and government funds to enable faster and greater investment in projects vital to the security of the state. Using the same design, the United States government can help grow effective and scalable investment efforts alongside the private sector and domestic African governments to ignite further innovation in Africa.

Another important step that mobile internet technology and social media can play across Africa is the building of more peaceful communities. A new emerging field within the start-up and tech space is Peacetech. Simply defined, Peacetech is the purposeful application of the innovation that cloud computing enables for good and not for evil. Example programs include cloud-enabled innovation, through which we can rapidly scale technology to immediately have strategic impact. Used for good, this can sustain national and international security gains while building a strong peace and securing the future for young Africans.

Yet, we must also confront the dark side of technology, for as much as mobile technology is bringing people together, one need only read the headlines in any country to see how it is also playing a role in tearing people apart. As individuals silo themselves into more distinct communities and build the walls around them higher for those not within their group, the boundaries between certain social groups are becoming hardened and sharper. With the ability to rapidly communicate and mass supporters as quickly as one sends a tweet, the ability to organise is vastly easier than ever before. These mass organisations of people can be both empowering in their solidarity when peaceful and out of control in their violence when heated.

In Africa, a continent long suffering from a myriad of conflicts and struggles, where the crime of genocide is a recent memory in some communities, there is an even greater need to consider the impacts of technology when abused for malevolent purposes. One need only remember the use of the radio in the Rwandan genocide to give orders and enable the killing of innocents; the rapidity and scale of communication that mobile technology offers must be confronted and managed responsibly by businesses and governments alike. If groups silo and harden against other social groups, societies are at risk of isolating and marginalising minority social groups ever further from the benefits of society. Doing so

increases the chance of violence by the majority group but will heighten the calls to radicalisation amongst the outgroups. Thus, while social media offers a period of transitional change that carries the power to unite, it simultaneously risks the polarization of the "other." To counter this risk, the United States government must work with domestic African governments and civil societies to actively counter efforts to divide rather than unite. There is far too much at stake to be mere observers.

There are already leaders in this space like the PeaceTech Labs in Washington, DC, who are confronting this aggressive use of technology for violent means. They are designing and enabling methods to responsibly use technology to amplify messages of unity and cohesion over division and discord. For example, the Kenyan Election and Violence Prevention Program (KVEP), a public-private partnership between the PeaceTech Labs, Mercy Corps, and the United States Department of State, aimed to use technology as a means to prepare a broad swath of Kenyan society in four target counties to "ensure that youth and communities were able to remain resilient to political manipulation and ensure a peaceful election."<sup>19</sup> The program democratized the ability of people to report and respond in real time to events of "election-related tension, rumours, hate speech, and brewing violence." Furthermore, to provide additional context and intelligence-led prevention, PeaceTech Lab analysts monitored social media pages and popular websites for heightened or aggressive terminology related to previous heated dialogue that contributed to the outbreak of violence in particular areas. By coupling intelligence-based analytical prevention with democratized report and response mechanisms, PeaceTech Labs was able to keep citizens informed and alert authorities in the event of simmering violence.

Social media and mobile technology do not only play a role in organising mass demonstrations or violent demonstrations, but they are also radicalising youth and pulling them deeply into the abyss of extremism. Whether it is Al-Shabab in Kenya or the Islamic State across the Middle East and beyond, terrorist and extremist organisations are using social media and mobile technology to reach new recruits. Preying on disaffected youth or those with dashed expectations, these organisations are targeting and communicating directly with their new recruits. Using flashy social media posts with highly produced videos, these organisations are using marketing efforts more akin to a young exciting start-up than the terrorist organisations of yester-year. They aim to be both hip and extreme in playing their struggles as the main effort of the day, one where the youth belong to play a part in making history. Countering these messaging campaigns has remained a constant difficulty for governments and civil society alike. The United States Department of

State struggled to establish effective communication campaigns against the Islamic State. The Combined Joint Task Force for Operation Inherent Resolve, the military coalition working with the Iraqi government to purge the Islamic State from the region, launched a multi-national team to work to stem the tide of spreading hate speech and radicalisation online. Meanwhile, PeaceTech Labs is using data analytics to evaluate and understand hate speech when used over mobile technology to better understand the role language plays in radicalisation. By identifying and then blocking these lines of communication, organizations can counter the tide of radicalisation among youth and identify areas to prioritise for engagement with counter-radicalisation narratives. Managing and regulating the internet's forum of ideas is vital to shaping whether or not mobile technology will bring people closer together or wedge them further apart.

Governments are also weaponizing the use of mobile technology. The Russians are sowing discontent and working to manipulate elections through hacking and social media campaigns. The Chinese People's Liberation Army uses cyber capabilities on social media as a means to disrupt its adversaries and internally to suppress dissent while establishing further social control. Social media and mobile technology are new tools in the ever-evolving pursuit of strategic advantage.

Therefore, the failure of Western governments, especially the United States, to get involved in funding virtuous applications of social media and mobile technology to democratise dialogue and enable entrepreneurship in Africa risks allowing the vital African market to fall into the hands of strategic adversaries. Often, there are comparisons of the innovation economy in the United States and the United Kingdom with that of China, but it is important to grasp that the Chinese model is a radically different proposition to the Western model. The application of cyber and AI for internal controls means that China and its close allies are building technology-based authoritarianism. This is in sharp contrast to our open systems and the underlying altruism of our innovation economy that enables our freedom of choice, even if the luxury of having so many choices and so much convenience can at times be overwhelming to us.

However, the impact of social media and mobile technology also requires meaningful commitment to the virtues at the heart of Western liberal democracy. Central to this is the role of good governance, the essential building block of a strong and lasting peace and the promise of economic growth. The potential success of technology must offer a tantalising incentive to compel leaders to offer the good governance required to allow and enable the continuing flourishing of a sector in which millions of Africans are placing their hopes for the

future. For venture capital investors in Europe, the Middle East, and Africa, corruption and innovation are opposing forces. Where one is present, the other is invariably absent. Innovation thrives on good governance. Corruption corrodes and kills innovation and opportunity thereby wasting the talent of generations. Standing at the edge of a transformative era in technology and the economy of Africa to better determine its own destiny, African governments and their Western partners must demand transparency and a strong commitment to the values of the liberal international order to enable their citizens to flourish in the digital domain.

Moreover, the diffusion of mobile technology capable of rapid saturation opens new doors for the possibilities of education across Africa. The power of educating the next generation on myriad topics, from mathematics to voting to public health, can now be placed in the palm of every citizen's hand. Access is now scalable so long as investment and effort follows to make it relevant and central to how governments are integrating mobile technology as a means of communication and education. With the introduction of technologies such as Iridium's Cloud Connect, global coverage is possible, it must be invested in as an enabler. By focusing on this, the United States and other Western governments can better accelerate the digital scaling of the participation of African youth in the global digital domain.

Mobile internet technology and social media offer the hope of a better future. Acting as vehicles to improve access to traditional marketplaces, bridges into a global economy, and access to national and global conversations, these technologies offer Africans the chance to better determine their own economic future and progress. Though technology may only be a tool, it offers the means to lift people from poverty, increase discussion in civil society, and bring communities closer together, both formally and informally, thereby creating a clear path to a more sustainably prosperous future across the continent. Ultimately, there is much reason to hope. As digital usage continues to grow across the continent, we place our hope in the reality that those under 25 in Africa, the largest growing population in Africa, believe in a future where innovation and success in the marketplace are what move nations to prosperity. It is now our time to facilitate and empower this ascension to the world stage in the digital domain that promises further prosperity and democracy for millions.

*Affairs*, Vol. 209, No. 437: p. 662.

<sup>3</sup> Collender and Etzo, 659.

<sup>4</sup> John, Courtney and Laura Silver. (October 2018). "Internet Connectivity Seen as Having Positive Impact on Life in Sub-Saharan Africa." Pew Research Center. Washington, D.C.

<sup>5</sup> Radelet, Steven. (September 2010). "Emerging Africa: How 17 Countries Are Leading the Way." *CGD Brief*. Center for Global Development. Washington, D.C. p. 1.

<sup>6</sup> *Ibid.*, 1.

<sup>7</sup> "Internet Penetration in Africa." (31 December 2017). *Internet World Stats: Usage and Population Statistics*. Miniwatts Marketing Group. Online. Accessed on 23 October 2018.

<sup>8</sup> Mumbere, Daniel. (8 February 2018). "Digital in 2018: Africa's internet users increase by 20%." *Global Sentinel News*. Online. Accessed 23 October 2018.

<sup>9</sup> M stands for mobile, while "pesa" is the Swahili word for money.

<sup>10</sup> Jack, William, Adam Ray, and Tavneet Suri. "Transaction Networks: Evidence from Mobile Money in Kenya." *American Economic Review* 103, no. 3: p. 356.

<sup>11</sup> *Ibid.*, 356.

<sup>12</sup> Jack, William and Tavneet Suri. (2016). "The long-run poverty and gender impacts of mobile money." *Science*. Vol. 354, Issue 6317, p. 1292.

<sup>13</sup> Jack, Ray, and Suri, 361.

<sup>14</sup> Jack and Suri, 1288.

<sup>15</sup> *Ibid.*, 1288.

<sup>16</sup> Department of International Development. Government of the United Kingdom. (29 August 2018). "Ambitious new Innovation Partnerships with African Countries." Press Release. Online. Accessed on 23 October 2018.

<sup>17</sup> *Ibid.*

<sup>18</sup> "Youth Empowerment." (2017). Office of the Special Advisors on Africa. United Nations. Online. Accessed on 23 October 2018.

<sup>19</sup> "What is the PeaceTech Accelerator?" (2018). *PeaceTech Accelerator*. Online. Accessed 23 October 2018.

<sup>1</sup> Lawler, Dave. (11 October 2018). "Poll: Africans think increased internet access is good for society." *Axios*. Online. Accessed 26 October 2018.

<sup>2</sup> Collender, Guy and Sebastiana Etzo. (October 2010). "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" *African*

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# Observations from the Roundtable

By **George Moose**, United States Institute of Peace

The papers and discussion brought into stark relief Africa's current reality and the dramatic transformations that are being driven by the megatrends of demography, climate, and technology. The roundtable also highlighted the enormous challenges these transformations will present. Together they paint a picture of Dickensian contradictions, with both bad news and good news, and reasons for both hope and deep concern.

The most disturbing news is the extent to which these megatrends, which will be powerful disrupters globally, are destined to have greater disruptive impacts across the African continent. Population and climate arguably pose the most concrete threats to economic sustainability and social and political stability. But, notwithstanding its positive potential, the disruptive potential of technology is no less real and grave.

These are not the only megatrends out there. Two that are certain to compound and amplify the impacts are:

- The spread of extremism, religious and ideological, and its violent expression, which is driven and exploited by both local and external actors, and
- The rise of populism, nationalism, and authoritarianism, which further complicates the challenge of developing rational and concerted responses.

All these trends, both separately and together, will create enormous governance challenges at all levels—national and sub-national, regional, and global—implicating both governmental and non-governmental institutions and structures.

These trends threaten to overwhelm the capacities of governments and other institutions to manage the impacts of the transformations they are driving. In so doing, they could make the most fragile continent in the world even more fragile.

*Fragile states suffer from deficits of institutional capacity and political legitimacy that increase the risk of instability and violent conflict and sap the state of its resilience to disruptive shocks. In fragile states, governments lack legitimacy in the eyes of their citizens, and institutions struggle or fail to provide basic public goods—security, justice, served—and to manage political conflicts peacefully. Almost every country in Africa falls outside the “stable” range of the Fund for Peace Fragile States Index, occupying a spot somewhere between “warning” and “alert”.*

– *State Fragility and the Challenge of U.S. Leadership*, U.S. Institute of Peace

The good news is that these possible outcomes are not fore-ordained or pre-determined. The papers and presentations highlight opportunities and potential benefits emerging from these trends. As with the megatrends that preceded them—industrialization, for example—they have the potential to produce enormous opportunities, advances, and benefits. The papers also highlight policies and strategies that could mitigate the most destructive effects of these trends, increase resilience and adaptive capacities of governments and societies, and maximize the prospects for improved economic, social, and political outcomes.

As Chet Crocker makes clear in his contribution, the most critical factor in determining whether these trends will yield positive or negative outcomes is the character and quality of governance—the ability of political institutions to make wise decisions and sound choices. Avoiding disaster and reaping the potential benefits will require thoughtful, focused, and concerted actions, at all levels of governance. Thoughtful and focused because there is a need to ensure that energies, resources, and investments achieve maximum impact. Concerted because the magnitude of the challenges far and away exceeds the capacities of individual actors; they will require responses that go beyond whole-of-government to embrace whole-of-community, both governmental and non-governmental.

George Shultz has rightly described the challenge we face as one of governing over diversity. But it could also be described as governing in adversity!



## Climate and Demographics

The demographic and climatic trends described in the papers and further elaborated during the roundtable pose the greatest threats to the economic sustainability of Africa's 54 countries, as well as to their political and social stability. Their dramatic impacts are compounded and amplified by the ways in which these forces interact with one another. Moreover, the basic trendlines driven by these forces are largely set. The people who will cause the next surge in population growth have already been born; and the climatic forces that will drive climate change over the next 50 years have largely been set by the patterns of the past 50 years. In the near-to-mid-term, change will only be possible at the margins, which does not mean that it cannot be meaningful.

As Jack Goldstone's paper underscores, Africa's demographics are exceptional. Whereas improvements in mortality and economic development have caused fertility rates in Asia and Latin America to drop to about replacement levels (2.1–2.2 births per woman), Africa has the only large regions of the world with fertility rates above 5.

The projected consequences are stunning. Whereas population growth outside Africa is projected to end in this century, Africa's population is projected to grow from 1.2 billion in 2015, to 2.5 billion by 2050 and 4.5 billion by 2100: from 16% of the world's population today to 26% by 2050 and 40% by 2100. The dramatic nature of this change is illustrated by Nigeria, whose population is projected to grow from 181 million in 2015 to 411 million in 2050 (more than the United States) and 794 million by 2100 (more than Europe).

This projected population growth is driven by high fertility, which is itself a product of economic, cultural, and educational factors. Tropical Africa has a long tradition, for example, of strong extended family structures and high fertility. But the crucial factor for our purposes is the lack of secondary education for girls. When young women are educated, they can exert more control over their own family size. It is the critical factor to reducing fertility.

Population and climate impact one another in numerous ways. Mark Giordano's paper stresses that, while there is much uncertainty and great diversity, the outlook is for temperatures to rise faster in Africa than global averages. As a result, the continent will likely experience longer, hotter heatwaves, longer periods without rain, and more intense precipitation when it does fall, with negative consequences for arable land and agricultural yield. One consequence is that climate-related migration pressure will likely increase the movement of people from farms to cities due to diminished agricultural opportunities. Migration out of Africa will likely have a small impact on Africa's population, but the implications for receiving countries (namely in Europe) could be substantial, and politically explosive.

There will also be significant health impacts due to changes in the extent and location of disease vectors such as mosquitos and the increased threat of diseases that spread from animals to humans. These impacts will in turn have consequences for both life expectancy and the quality of the labor force, not to mention healthcare costs.

Satisfying the energy needs of this growing population will cause carbon dioxide emissions and air pollution to rise, which can be moderated if Africa turns to its plentiful wind, solar, hydro, and uranium resources. The continent's natural gas can also play a transitional role, especially where it can displace coal and oil or indoor biomass burning.

## Climate and Conflict

In his paper on climate, Mark Giordano demonstrated scholarly prudence and caution about asserting a causal connection between climate change and conflict. However, even without drawing a direct connection—and from the perspective of one who has lived on and visited the continent over the past forty years—we can already see examples of a nexus between climate and conflict. It is especially evident in the Sahel, where the steady decline in arable land was a major contributor to the conflict that erupted in 1989 between farmers and pastoralists in the Senegal River basin, which escalated into a larger conflict between Senegal and Mauritania. It also exacerbated the inter-clan conflict that led to the civil war and ensuing famine in Somalia in the early 1990s.

For another example, over the past half century, Lake Chad has shrunk by over 90%, while the population living around the lake has nearly doubled, from 17 million to almost 30 million. The resulting scarcity and unequal distribution of natural resources have fueled instability and violent conflict throughout the Lake Chad Basin, which includes Northern Nigeria. Meanwhile, BBC World has documented the increasingly volatile swings between droughts and floods in Northern Mali which are inflicting lasting damage on crops and livestock, exacerbating tensions between farmers and herders from different ethnic groups.

## Demography and Economics

Africa's population growth threatens to outpace the capacity of governments to manage and mitigate the social and political impacts, as well as some projections of the continent's potential economic growth. A growing gap between population growth and economic growth could also be accompanied by growing income inequality, with wealth increasingly concentrated in the hands of small economic and political elites. As has been observed elsewhere through this project, automation of manufacturing can increase the returns to invested capital over labor, which could cause the small economic and political elite of Africa to get even richer. As this happens, it will be important to find other ways for these technologies to make the poor richer, too.

Africa will have an excess of young workers, who will be in short supply in the rest of the world. After 2040, working age populations will shrink everywhere in the world except sub-Saharan Africa. If education does not improve (high school completion rates are 31% for men and 24% for women), most African youth will not be able to compete with workers in South Asia or North Africa.

Despite this dramatic population growth, Africa will remain the world's least densely populated continent. The crisis that looms is one that arises from the disconnect between the combined impacts of population growth and climate change on the one hand and the lagging productive capacity to educate, feed, house, and care for the continent's rapidly increasing population on the other.

## Technology and Economics

With a growing middle class, Africa is becoming an attractive investment destination, particularly for the United States and China. Private investment and remittances both exceed development assistance.

As Andre Pienaar describes in his paper, Africans are embracing mobile technology as an enabler for greater education, access to services, and improvements in people's lives. African mobile internet penetration (35%) is below the world average (54%) but growing rapidly. The technology sector accounts for an increasing portion of the growth in African economic output (Nigeria, Kenya). These activities have facilitated the growth of informal markets of citizens serving the needs of citizens, and mobile money transfer systems have facilitated payments for goods and services, creating new livelihoods. Supported by the growth of telecommunication and internet access across Africa, services make up 53% of GDP, with services exports growing six times faster than merchandise exports.

Opportunities exist to use technology to improve agriculture and manufacturing. Agriculture employs 60% of African workers and produces nearly one-third of its GDP. Improving productivity of food production and processing will be necessary to support growing populations while coping with the effects of climate change, disease, and drought. Manufacturing represents another third of African GDP. As Tony Carroll notes, the focused application of artificial intelligence (AI) has the potential to improve productivity and overall production in both sectors.

Internet connectivity provides young entrepreneurs access to information, partnerships, and capital, but many countries struggle with poor communications and internet infrastructure. Prospects for the technology sector are also adversely affected by education shortfalls, especially at the secondary school level, and by the fact that educated professionals leave Africa for higher paying jobs and better quality of life elsewhere.

Prospects are further dimmed by serious institutional and governance deficits. Capital markets are weak. Government reform is needed to establish predictable and transparent investment environments, which are also critical to the development of the technology sector. Historically, we have seen, in Africa and elsewhere, concerted resistance from established institutions—e.g., state telecoms monopolies—to policy and legal reforms that would undermine their positions, market control, and revenues. That resistance to change is almost always aided and abetted by governments and political elites that also benefit from existing monopolistic regimes and which may also feel particularly threatened by these new technologies and their potential political uses. The papers point to notable exceptions where the technology sector has shown impressive growth. Kenya, despite its other serious political and governance issues, appears to be one example. It would be helpful to have a better understanding of why that is so. Meanwhile, in Sierra Leone the literal collapse of the state created space for the expansion of cell phone technology.

Sub-Saharan Africa remains the most under-connected region of the world. What little trade there is with the rest of the world remains in raw commodities, mostly agricultural and mineral products. Intra-Africa trade remains small; favors manufactured and consumer goods; and is limited by weak physical and human infrastructure, small individual country markets, tariffs and other barriers, absence of trade finance, currency risk, corruption, rent-seeking, and civil disruption. Technology alone cannot solve these problems.

## Technology and Governance

Access to the internet by Africa's youthful and urbanizing population provides information and power to individuals and groups, which can be used to make governments and markets more transparent and accountable and institutions more responsive to citizens' needs. But it has also made it easier for networked activists (and criminal, trafficking, and terrorist networks) to overturn fragile African states. This in turn can increase the determination of leaders to seek tools of political control.

Mobile internet technology is being used to support peace, for example by amplifying messages of unity and cohesion over division and discord, enabling peaceful and transparent elections, and countering the use of social media for recruiting by terrorist groups. But it is also being used by indigenous actors to sow discontent, manipulate public opinion, stoke racial and ethnic tensions, and discredit and delegitimize political leaders and governing institutions.

Increasingly, technology and social media are also being employed by external actors. China is making major investments in technology, intentionally aligning state interventions with those of the Chinese private sector, including giants Huawei and Alibaba. With those investments comes influence, and questions about how that influence will be used and to what ends. Chinese companies affiliated with the Communist Party of China are building and managing the transition from analog to digital broadcasting in much of Africa. Meanwhile, there is evidence that Russia is using the same tactics it has deployed elsewhere to manipulate elections and public opinion. Andre Pienaar is not alone in his concern that Africa is becoming the arena for a global contest between digital democracies and digital autocracies.

## Governance and Everything

To quote Chet Crocker, "In Africa, as in every region, it is the quality and characteristics of governance that shape the level of peace and stability and the prospects for economic development. There is no more critical variable than governance, for it is governance that determines whether there are durable links between the state and the society it purports to govern."

In the relatively new African nations, the challenge for leadership is to build a social contract sufficiently inclusive to allow effective governance over diversity. In addressing this challenge, Africa starts out with a significant deficit in the form of weak social compacts between states and societies, which is not surprising given the continent's colonial and Cold War history. Governments that have come to rely on foreign counterparts and foreign investment in natural resources, rather than domestic taxation, have weaker connections to their citizens.

Building more inclusive governance systems and political processes becomes infinitely more difficult when the landscape of who needs to be included is changing or expanding rapidly and dramatically. The youth bulge has revolutionary potential, with implications for political and social stability and the potential for conflict. The differential impacts of these changes on different regions, sub-regions, and groups only add to the difficulty of managing them.

These changes and the other challenges presented in these papers place extraordinary burdens on Africa's leaders. It is worth recognizing that human agency – the leadership of men and women in official and non-official roles – will be at least as decisive as the abstract variables and vectors described in these studies. Wise leadership is central to the building of inclusive governance. Africa's external partners bear a parallel responsibility to support wise leaders and to nurture the institutional legacies they help create.

### *Global and Regional Influences*

African governments and institutions will not be able to overcome these challenges and deficits on their own. They will need outside help.

External actors, however, seem increasingly incapable of (or opposed to) exercising leadership and mobilizing global capacities in this area. Traditional sources of leadership—the United States and Europe—are preoccupied with their own internal governance crises and challenges. At the same time, global trends favoring populism, nationalism, and authoritarianism are undermining respect for and promotion of democratic values and good governance. In consequence, global institutions (namely the United Nations) are further weakened and marginalized in their ability to act and exert influence.

Meanwhile, the rise and growing engagement of non-Western international actors (e.g., China, Russia, Turkey, Iran, and Saudi Arabia) are exacerbating governance challenges. Behaviors of some major external actors, such as China, may contribute to short-term improvements but over the longer term will constrain growth possibilities and exacerbate economic and social dislocations.

The global context is further shaped by a larger security dynamic: the concern over global terrorism. Cold War considerations led governments to prioritize security considerations over issues of good governance and to overlook—or worse—the flaws of those African political leaders deemed to be important in the confrontation between East and West. An eerily similar dynamic is at work with respect to the “Global War on Terrorism,” with Western governments inclined to downplay the extent to which support for the activities of African security forces, and the governments that nominally control them, exacerbates governance issues. There is also the question of whether Western assistance, however well-intended, serves to support rather than reform flawed governance systems.

The global pushback against liberal governance norms has consequences in Africa, as governments act to close the space for civil society to operate. Non-western centers of power and great power polarization reduce western influence and provide opportunities for African states to pursue courses independent of western preferences and to move toward authoritarian, state capitalist policies.

It is too soon to tell whether states can evolve toward inclusive agendas or face fundamental tests of strength between social and political groups. Success could depend on developing the economic and financial resources required for including various social groups and demographic cohorts.

If a critical mass of leading states (such as South Africa, Nigeria, Kenya, Ethiopia, Cote d'Ivoire, Algeria, and Egypt) head in a positive direction, they will pull some others along. If more leaders practice inclusive politics, the outcomes could be better. The reverse is also true. If the abolition of term limits, patrimonialism, and kleptocracy become regional norms, it will be harder for better governed states to resist the authoritarian trend.

One positive force that must not be ignored or underestimated, and which may ultimately determine the future, is the growing popular demand for better governance and accountability, a trend affirmed by the continent-wide polling of AfroBarometer. The question is how best to enable and empower civil society to demand and measure governmental accountability.

Finally, as one insightful roundtable participant pointed out, it is unrealistic to expect a revolution in governance in the near term. For the foreseeable future, good governance will remain the rare exception rather than the norm. Therefore, it is important to consider what can be achieved in an imperfect governance environment. Bangladesh offers one example. Kenya may be another.

### **“What is To Be Done?”**

One cannot read the papers in this volume and not come away with a powerful sense of the need for urgent action. There are equally compelling reasons for policymakers in the United States and elsewhere to act: humanitarian concern for the fate of present and future African generations, but also prudent regard for their own national interests.

But, facing such an array of challenges, we must focus our limited energies and resources and prioritize those actions and interventions that seem to be most likely to achieve the maximum impact/effect. With that in mind, the following list is intended to be suggestive rather than definitive.

#### *Education*

If there is one cross-cutting theme that rises to the top of the list of priorities, it is the importance of education, with a pronounced emphasis on secondary education, especially for girls. The single most important driver of high fertility rates, especially in sub-Saharan Africa, is minimal secondary education for girls. Expanding access to that education, combined with the employment possibilities that flow from it, is essential to lowering fertility rates and beginning to bend the curve of Africa's explosive population growth. It is equally essential to preparing Africa's rapidly growing youth population for productive work and employment, which in turn is a critical underpinning for a stable and civically engaged middle class. The development and expansion of a more educated populace is in and of itself a driver of economic growth, creating both a demand for and an ability to supply new products and services.

Alongside education, increased mobile connectivity and broadband access can help lower fertility rates and empower women. Educated women, primarily urbanites, ultimately will have to lead public education campaigns to reduce fertility and modify family structures. Their efforts will be made much easier if young women with fewer educational opportunities gain access to mobile technology and, with it, greater knowledge and exposure.

In this context, health and health education are critical adjuncts to education, both in changing attitudes and behaviors that affect fertility and in supporting healthier populations. Retaining and attracting the continent's most talented and highly educated youth may prove to be even more difficult and daunting than educating them in the first place.

### *Agriculture*

There is also a strong consensus on the need to improve the productivity and sustainability of the agricultural sector, given the proportion of the population involved (60%), as well as the need to increase food production to feed the continent's rapidly growing population. Results of these efforts will depend on closely related interventions, including investments in both physical infrastructure (e.g., roads, transportation, and storage facilities) and institutional infrastructure (e.g., extension services, marketing support).

Issues of land tenure and land reform, which are both legal and cultural, pose a daunting challenge to this effort. No less daunting is the question of how to promote the expansion of industrial agriculture while at the same time protecting and preserving the position and contributions of traditional small farmers. Models do exist for developing complementary relationships between traditional and modern agriculture, but success will depend upon policies based on an understanding of those complementarities.

### *Technology and Economy*

Technology, to include AI applications, could be the critical enabler for expanding educational opportunities and assisting in the adaptation of the agricultural sector. But its potential contribution is much greater, extending to both the industrial sector and commerce in general. The question for both government policymakers and private sector entrepreneurs is how to harness technology in ways that maximize Africa's growth potential. The answer to that question depends on success in tackling some significant structural and legal problems:

- Breaking down existing governance structures (e.g., state monopolies) that impede growth and the effective and efficient use of resources.
- Policy and investment components to create an enabling environment for technological innovations, including investments in automation and artificial intelligence.
- Addressing the problem of weak and inconsistent laws and law enforcement, as well as reforming data collection and data privacy policies.
- Undertaking or incentivizing targeted investments in infrastructure to facilitate business and commerce, such as wireless and internet infrastructure.
- Integrating and expanding STEM education into primary and secondary schools, as well as on-line platforms.

Two other challenges stand out. The first is reducing barriers to intra-African trade which severely constrain possibilities for economic growth. The second is finding ways to channel remittances and external investments, which together far exceed Official Development Assistance, to productive economic activity. In some areas, the informal economy is the primary source of employment and opportunity. Yet today, external investments, such as the high-profile Chinese initiatives, are directed largely into the formal economy, such as real estate projects, which yield few secondary benefits for broad-based economic growth. Remittances from the diaspora, on the other hand, flow primarily to families and into the informal economy. They are one of the largest sources of foreign resources inflows into Africa and a source of great opportunity for the continent.

### *Climate*

Important steps can and should be taken to prepare for climate change, including: more research on a continent for which there is paltry data on climate trends; more investment in agricultural research to develop such things as adapted seeds and farming techniques (think Israel) and improved soil and water management; the strengthening of health systems; protection of Africa's forests; and assisting African governments in developing plans and strategies to mitigate and adapt to changes in climate.

There is an urgent need to radically expand and scale the development of clean energy to reduce carbon dioxide emissions. While not mentioned explicitly in the discussion, there is also a need for strategies to protect and preserve Africa's forests and carbon sinks. These efforts have both local and global benefits.

### *Governance*

The logical place to begin is with support for good actors, governments attempting to move in the right direction (Ghana, Ethiopia, Senegal, Benin) and those political leaders who have demonstrated a commitment to change (Ethiopia, Angola).

Also important is strengthening support for responsible and legitimate civil society actors and using both leverage and incentives to enlarge the space for democratic engagement. That includes arming civil society actors with the technological tools to promote transparency and accountability, both political and economic, as well as enabling the use of mobile internet technology and social media platforms to counter drivers of conflict and promote peace (see the work done by PeaceTech). Better protection of property rights complements these efforts, encouraging entrepreneurship, decreasing hostility to outside influence, and promoting inclusiveness and trust within communities.

Implicit in the roundtable assessments and discussions was a recognition of the need for much greater focus on strengthening the capacities of urban governments and institutions, since it is in Africa's rapidly growing urban centers that the greatest governance challenges will arise: meeting the needs for basic services (education, housing, employment, health) and creating structures that allow for the management of the inevitable competition, tension and conflict that arise in urban settings.

Better regional and intra-Africa institutions will also be crucial, especially in addressing climate change. Weak regional governance and interstate cooperation has hindered past efforts on water and other resource management, The Okavango Delta is one example, the Mono River project that was designed to serve Ghana, Togo and Benin in West Africa is another. At the global level, it has become increasingly clear that the United States and others will need to develop ways to counter Chinese and Russian exploitation of internet technologies and social media platforms and the havoc they can cause in the realm of governance. At the same time, the United States and other external actors should examine carefully the consequences, intended or inadvertent, of their own policies and interventions.

The issue of Africa's growing debt burden is brought into sharp focus by China's irresponsible and exploitative lending practices, which have not only saddled African governments with unsustainable debt burdens but also made them hostage to China's political wishes and whims. There is an irony in the fact that China is one of the greatest beneficiaries of responsible international lending through the World Bank and other global lending institutions. This underscores the fact that the debt issue is a matter of global governance, one in which international lending institutions, backed by concerned governments, need to intervene to constrain exploitative lending practices.

Efforts to improve African governance must be undertaken with full recognition that success will be halting and slow. Therefore, a major challenge will be finding ways to improve economic and other outcomes in the absence of good governance.

Where national governments prove unresponsive, experience in other parts of the world suggests that important gains can be made by working to strengthen governance at the state, municipal and local levels. In addition, more can be done with mobile technologies to strengthen civil society organizations and their ability to hold governmental authorities accountable, and to expand the space for both political and economic participation. The same technologies and social media platforms can create opportunities to channel remittances and other financial resources into productive, job-creating investments, which can further enlarge the space for non-governmental action. As mentioned above, the experience of Bangladesh suggests that progress of this sort is possible, and Kenya may represent another example.

## Conclusion

As grim as the projections and prospects may be, we cannot and must not allow them to become an excuse for resignation and inaction. There is nothing inevitable about these possible outcomes.

However, if good outcomes are to prevail over bad ones, affirmative action and effective management will be required, i.e., good governance. Thoughtful, focused, and concerted interventions can make a difference.

The encouraging news is that we have examples from history of the international community's ability to respond to major challenges and threats. There is, of course, the oft-cited example of the Marshall Plan, which is regularly invoked as the model for responding to contemporary crises. But a more recent and relevant example is the international community's response to the HIV/AIDS pandemic, which had Africa at its center.

The awareness of the crisis came in the late 1980s, when epidemiologists were able to document the evolution of the epidemic and its potentially catastrophic implications, not only for health but also for economic growth and social and political stability. Throughout the 90s, the U.S. government, among others, struggled to mobilize an appropriate response, hampered by political and cultural controversies taking place within its own borders. It was not until 2001 that a response emerged, the PEPFAR (President's Emergency Plan For AIDS Relief) authored by the George W. Bush

Administration. It was followed shortly by the creation of the Global Fund for AIDS, Malaria and Tuberculosis, which also benefited from strong political and financial support from the Bush Administration. Some twenty years later, sparked by these two global initiatives, the international community has mobilized more than \$80 billion to combat the spread of AIDS, much of that directed to Africa. In consequence, HIV/AIDS transmissions have been dramatically reduced and health outcomes greatly improved.

The response to the HIV/AIDS crisis can perhaps serve as both a model and an inspiration for the actions needed today to address the challenges posed by the potentially disastrous megatrends of population, climate, and technology.

There is still time to answer these questions. But the clock is ticking.

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## About

New and rapid societal and technological changes are complicating governance around the globe and challenging traditional thinking. Demographic changes and migration are having a profound effect as some populations age and shrink while other countries expand. The information and communications revolution is making governance much more difficult and heightening the impact of diversity. Emerging technologies, especially artificial intelligence and automation, are bringing about a new industrial revolution, disrupting workforces and increasing military capabilities of both states and non-state actors. And new means of production such as additive manufacturing and automation are changing how, where, and what we produce. These changes are coming quickly, faster than governments have historically been able to respond.

Led by Hoover Distinguished Fellow George P. Shultz, his Project on Governance in an Emerging New World aims to understand these changes and inform strategies that both address the challenges and take advantage of the opportunities afforded by these dramatic shifts.

The project features a series of papers and events addressing how these changes are affecting democratic processes, the economy, and national security of the United States, and how they are affecting countries and regions, including Russia, China, Europe, Africa, and Latin America. A set of essays by the participants accompanies each event and provides thoughtful analysis of the challenges and opportunities.



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