



**Statement before the House Foreign Affairs Subcommittee  
on Africa, Global Health, and Global Human Rights**

***“The Effects of Climate Change  
in Africa.”***

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## Impacts of climate change on food security in Africa: a survey

Chairwoman Bass, Ranking Member Smith, and distinguished members of the Subcommittee, thank you for the opportunity to testify. Two narratives dominate reports of climate impacts on food security in Africa: that climate-related weather events suppress farmers' yields, and that climate change contributes to violent conflict and humanitarian emergency in certain "hotspots." These narratives, while true, are incomplete. Instead, climate change affects food security for all Africans through a multitude of pathways, with important implications for U.S. foreign policy, development programming, and national security.

### Food insecurity in Africa: A baseline

Climate change is compounding food insecurity on a continent already severely afflicted by hunger and malnutrition. The Food and Agriculture Organization of the UN's (UN FAO) most basic estimate of food insecurity is "prevalence of undernourishment," describing the proportion of a population that lacks enough dietary energy for a healthy, active life. The prevalence of undernourishment is estimated to be 19.1 percent, or 250.3 million people, across Africa; populations in Asia and Latin America and the Caribbean are undernourished at less than half this rate (8.3 percent and 7.4 percent respectively).<sup>1</sup> While the *absolute number* of undernourished people is lower in Africa (250.3 million) than in Asia (381.1 million) today, the UN estimates that Africa will be home to the highest *prevalence and absolute number* (25.7 percent or 433.2 million) of undernourished people by 2030.

While useful, "prevalence of undernourishment" underestimates the extent of food insecurity in a population, as it describes access to dietary energy (calories) but not the nutritional value of food consumed. In their most recent report, UN agencies (the UN FAO, International Fund for Agricultural Development, UNICEF, the UN World Food Programme (WFP), and the World Health Organization) estimated that in 2019, 690 million people worldwide were undernourished, lacking enough dietary energy for a healthy, active life.<sup>2</sup> In the same report, these UN agencies also examined access to a healthy diet, one providing adequate calories and nutrients, intended to meet all nutrient intake requirements and to help prevent malnutrition in all its forms, including diet-related non-communicable diseases. They found that around the world, more than 3 billion people cannot afford the cheapest version of a healthy diet and that such diets are least affordable in Africa, where the average cost of a healthy diet exceeds average food expenditures.<sup>3</sup> The cheapest healthy diet is also more expensive than the international poverty line, meaning that, on average, Africa's poor do not have access to adequate nutrients.<sup>4</sup>

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<sup>1</sup> FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO.  
<https://doi.org/10.4060/ca9692en>

<sup>2</sup> FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020*.

<sup>3</sup> FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020*.

<sup>4</sup> FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020*.

These latest statistics from UN agencies represent food insecurity in Africa in 2019. Covid-19 has had severe impacts for food security and nutrition across the continent,<sup>5</sup> affecting near-term wellbeing and, for children affected by malnutrition, lifelong health and economic productivity.<sup>6</sup>

### **Impacts of climate change on agricultural yields in Africa**

A strong agriculture sector is necessary for food security in Africa. According to a recent study, climate change is responsible for reducing agricultural yields by 21 percent worldwide over the last 60 years.<sup>7</sup> In this period, the cumulative impact of climate change has been greatest in relatively warm regions such as Africa, responsible for a 33 percent yield decline. Like this study, most others focus on the important impact of nonliving systems (e.g., sea level rise, increased temperatures, greater frequency and severity of storms and droughts) but not living systems, including agricultural pests and plant diseases.

According to the UN FAO, agricultural pests, diseases, and infestations were responsible for nine percent of crop and livestock production loss between 2008-2018, greater than the impact of extreme temperatures and wildfires.<sup>8</sup> In Africa, pests, diseases, and infestations were the second highest cause of crop and livestock production loss between 2008-2018.<sup>9</sup> Warming and changing patterns of temperature can expand pests' habitats, affecting pest population sizes, metabolism, and maturation rates, resulting in more pests that are hungrier and mature and reproduce faster—with greater destructive impacts.<sup>10</sup> Two pests that have caused considerable damage in Africa, and whose destructiveness is linked to climate change, are the fall armyworm and the desert locust. Fall armyworm can cause widespread damage to crops, particularly maize. A May 2020 study estimated that due to climate change, the population of fall armyworm could increase between 12 and 44 percent, “leading to food shortages and malnutrition in poor areas that rely on... crops for daily subsistence, particularly in Africa.”<sup>11</sup> Two tropical cyclones in the Arabian Peninsula created favorable conditions for desert locust swarms in 2018; swarms went undetected until they had already become a plague in 2019.<sup>12</sup> According to the UN FAO, this outbreak of desert locusts is

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<sup>5</sup> FAO. 2020. Understanding the Impact of the COVID-19 Pandemic on Food Security in Africa. FAO. Rome. <https://doi.org/10.4060/cb0720en>

<sup>6</sup> Headey, D., Heidkamp, R., Osendarp, S., Ruel, M., et al. 2020. *Impacts of COVID-19 on Childhood Malnutrition and Nutrition-Related Mortality*. The Lancet.

[https://doi.org/10.1016/S0140-6736\(20\)31647-0](https://doi.org/10.1016/S0140-6736(20)31647-0)

<sup>7</sup> Ortiz-Bobea, A., Ault, T.R., Carrillo, C.M. et al. 2021. *Anthropogenic climate change has slowed global agricultural productivity growth*. Nature Climate Change.

<https://doi.org/10.1038/s41558-021-01000-1>

<sup>8</sup> FAO. 2021. *The impact of disasters and crises on agriculture and food security: 2021*. Rome.

<https://doi.org/10.4060/cb3673en>

<sup>9</sup> FAO. 2021. *The impact of disasters and crises on agriculture and food security: 2021*.

<sup>10</sup> Schoonover, R. 2021. *Plant Diseases and Pests Are Oft-Ignored Climate-Linked National Security Risks*. Center for Strategic and International Studies.

<https://www.csis.org/analysis/plant-diseases-and-pests-are-oft-ignored-climate-linked-national-security-risks>

<sup>11</sup> Zacarias, D.A. 2020. *Global bioclimatic suitability for the fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), and potential co-occurrence with major host crops under climate change scenarios*. Climatic Change.

<https://doi.org/10.1007/s10584-020-02722-5>

<sup>12</sup> Meynard, C.N., Lecoq, M., Chapuis, M.-P. and Piou, C.. 2020. *On the relative role of climate change and management in the current desert locust outbreak in East Africa*. Glob Change Biol, 26: 3753-3755.

<https://doi.org/10.1111/gcb.15137>

the worst to strike Ethiopia and Somalia in 25 years and the worst that Kenya and Uganda have experienced in 70 years.<sup>13</sup>

Climate change also poses serious threats to livestock production in Africa. Increased temperatures, changing patterns of rainfall, greater frequency of extreme weather events, increased heat stress, and reduced water availability are expected to adversely affect livestock production and productivity around the world.<sup>14</sup> The UN FAO admits that these impacts will be difficult to quantify, but anecdotal evidence abounds, including in the Sahel, where violence between farmers and herders has escalated since 2018.<sup>15</sup> There, competition over water and changes in climate push herders south in search of water and grazing land. In western and central Nigeria, over 1,700 violent deaths were attributed to these conflicts in 2018.<sup>16</sup> In 2019 and 2020, disputes among herders and farmers resulted in several hundred deaths. By some estimates, Nigeria is losing 2,000 square kilometers of crop and grazing land every year due to desertification, further fueling competition for scarce natural resources.<sup>17</sup>

In Africa, climate change is also affecting forestry-based agricultural yields, including cashews, cocoa, and coffee. According to the World Resources Institute, by 2050, climate change will reduce by half the areas of the world suitable for coffee production.<sup>18</sup> Ethiopia may experience significant volatility in coffee yields by 2030, according to McKinsey. There, the chance of a significant decrease in production is estimated to increase by over 30 percent by 2030.<sup>19</sup> Kenya, Tanzania, and Uganda—which with Ethiopia produce 80 percent of Africa’s coffee exports—are likewise vulnerable to climate impacts.<sup>20</sup>

Finally, climate change is affecting Africa’s fisheries. According to the World Bank, climate change leads to rising sea temperatures, making fish stocks migrate toward colder waters away from the equator, influencing the abundance, migratory patterns, and mortality rates of wild fish. Globally, climate change could reduce fish stocks by 7.7 percent.<sup>21</sup> The drop could be far greater

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<sup>13</sup> FAO. 2021. The impact of disasters and crises on agriculture and food security: 2021. Rome.  
<https://doi.org/10.4060/cb3673en>

<sup>14</sup> FAO. 2021. The impact of disasters and crises on agriculture and food security: 2021.

<sup>15</sup> Gleick, P., Iceland, C. and Trivedi, A. 2020. *Ending Conflicts Over Water: Solutions to Water and Security Challenges*. World Resources Institute.  
<https://doi.org/10.46830/wrirpt.19.00081>

<sup>16</sup> Gleick, P., Iceland, C. and Trivedi, A. 2020. *Ending Conflicts Over Water: Solutions to Water and Security Challenges*.

<sup>17</sup> Gleick, P., Iceland, C. and Trivedi, A. 2020. *Ending Conflicts Over Water: Solutions to Water and Security Challenges*.

<sup>18</sup> Bunn, C., Läderach, P., Ovalle Rivera, O. et al. 2015. *A bitter cup: climate change profile of global production of Arabica and Robusta coffee*. *Climatic Change* 129, 89–101.  
<https://doi.org/10.1007/s10584-014-1306-x>

<sup>19</sup> Woetzel, J., Pinner, D., Samandari, H., Engel. et al. 2020. *How will African Farmers adjust to changing patterns of Precipitation?*. McKinsey.  
<https://www.mckinsey.com/business-functions/sustainability/our-insights/how-will-african-farmers-adjust-to-changing-patterns-of-precipitation>

<sup>20</sup> Fröhlich, S. 2020. *How Climate Change Threatens African Coffee Farmers*. DW.

<https://www.dw.com/en/how-climate-change-threatens-african-coffee-farmers/a-55648060>

<sup>21</sup> Lovei, M. 2017. *Climate Impacts on African Fisheries: The Imperative to Understand and Act*. World Bank.  
<https://blogs.worldbank.org/nasikiliza/climate-impacts-on-african-fisheries-the-imperative-to-understand-and->

for some parts of West Africa: up to 53 percent in Nigeria, 56 percent in Cote d'Ivoire, and 60 percent in Ghana.<sup>22</sup> In East Africa, ocean warming has reduced fish stocks and destroyed parts of coral reef where certain species live. Climate change can also lead to ocean acidification through increased concentration of carbon dioxide in surface waters, endangering some fish species.<sup>23</sup>

Strong agricultural sectors—farming, herding, forestry, and fishing—are important to increase the amount of food available to Africans and to sustain the livelihoods of those who derive their incomes from agriculture and food systems. Continent-wide, African countries rely on imports to meet approximately 85 percent of their food needs, making African countries vulnerable to food-price shocks—from economic, political, or climate-related phenomena—as in the global food-price crisis of 2007-2008.<sup>24</sup> As African countries' food imports rise, their food exports are rising at the same time,<sup>25</sup> so reduced agricultural yields result in foregone profits for producers. Reduced yields, lost incomes, and threatened livelihoods can also result in competition for scarce resources, violent conflict, displacement, and migration.

### **Toward a holistic view of food security in Africa**

However, focusing exclusively on agricultural production results in a myopic view of food security that concerns only food producers. The percent of Africans who derive their livelihoods from agriculture is falling across sub-Saharan Africa: 53 percent of workers are employed in agriculture today, down from 63 percent 30 years ago.<sup>26</sup> In this same time, the proportion of Africa's population living in urban areas has increased from 28 percent to 40 percent across the continent; the majority of some countries' populations already live in cities, like Nigeria (51 percent urban), Ghana (56 percent urban), and South Africa (67 percent urban).<sup>27</sup> The UN predicts that the world's rural population will peak this year and then begin to decline; through 2050, all the world's population growth is predicted to occur in cities, including in Africa, where climate change is affecting food security for urban residents as well as rural producers.<sup>28</sup>

A November 2020 study of climate variability in sub-Saharan Africa found that increases in exposure to high temperatures is associated with an increase in the prevalence of wasting, or low weight for height. This same study found that high temperatures have indistinguishable impacts

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<sup>22</sup> Lovei, M. 2017. *Climate Impacts on African Fisheries: The Imperative to Understand and Act*. World Bank.

<sup>23</sup> National Oceanic Atmospheric Administration. 2020. *Ocean Acidification*. NOAA.

<https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification>

<sup>24</sup> Fox, L. and Jayne T.S. 2020. *Unpacking the Misconceptions About Africa's Food Imports*. Brookings.

<https://www.brookings.edu/blog/africa-in-focus/2020/12/14/unpacking-the-misconceptions-about-africas-food-imports/>

<sup>25</sup> Fox, L. and Jayne T.S. 2020. *Unpacking the Misconceptions About Africa's Food Imports*. Brookings.

<sup>26</sup> The World Bank. 2021. *Employment in Agriculture (% of Total Employment)-Sub Saharan Africa..* The World Bank.

<https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=ZG>

<sup>27</sup> The World Bank. 2021. *Urban Population (% of Total Population)t-Sub Saharan Africa*. The World Bank.

<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=ZG>

<sup>28</sup> UN Department of Economic and Social Affairs. 2019. *World Urbanization Prospects: The 2018 Revision*. UN. <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>

on wasting across rural and urban areas.<sup>29</sup> In a related publication by CSIS, authors concluded that “the salient question is not so much whether rural or urban residents are more or less vulnerable, but instead how—and why—the sources of vulnerability differ for these populations.”<sup>30</sup> These sources of vulnerability to climate-related-food insecurity include increased incidence of rainfall, which create conditions for diseases that contribute to malnutrition; higher food prices, reducing access to nutritious food; and increased rates of migration, with impacts for those left behind.<sup>31</sup> A 2020 report from UNICEF noted that “urban areas around the world will be affected by rising sea levels, increased precipitation, inland floods, more frequent and stronger cyclones and storms, and periods of more extreme heat and cold. Due to the concentration of children in urban areas, and their level of vulnerability, children will bear the heaviest impacts.”<sup>32</sup> This same report highlighted climate change as a direct cause of malnutrition among children. Covid-19 has only heightened the importance of addressing food insecurity in urban areas: according to a 2020 study by the International Food Policy Research Institute, due to the effects of coronavirus, poverty will increase by 15 percent in rural areas but 44 percent in urban areas in sub-Saharan Africa.<sup>33</sup>

### **Climate change, food insecurity, migration, and conflict**

Food insecurity, particularly as it relates to climate change, is part of a complex system of disruptors also involving migration and/or violent conflict. Migration can be a cause or an effect of food insecurity. In its 2019-2023 Strategic Vision, the International Organization for Migration states, “climate change will have a strong influence over future dynamics and become part of the intricate set of factors fueling internal movement, including displacement, and the transfer of populations from rural to urban settings.”<sup>34</sup> Often those leaving rural areas were previously employed in agriculture: a pastoralist no longer able to rear livestock because of droughts, or a fisher who leaves a village because ocean acidification has erased fish stocks. Migration can be a climate adaptation strategy leading to better outcomes. It can also be a “push” factor for displacement across Africa: 2.7 million people are displaced in the Lake Chad Basin today;<sup>35</sup> prior

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<sup>29</sup> Thiede, B.C. and Strube, J. 2020. *Climate Variability and Child Nutrition: Findings from sub-Saharan Africa*. Global Environmental Change.

<https://doi.org/10.1016/j.gloenvcha.2020.102192>

<sup>30</sup> Man, C. and Thiede, B. 2021. *Beyond Yields: Mapping the Many Impacts of Climate on Food Security*. Center for Strategic and International Studies.

<https://www.csis.org/analysis/beyond-yields-mapping-many-impacts-climate-food-security>

<sup>31</sup> Man, C. and Thiede, B. 2021. *Beyond Yields: Mapping the Many Impacts of Climate on Food Security*.

<sup>32</sup> Godfrey, S. and Tunhuma, F.A. 2020. *The Climate Crisis: Climate Change Impacts, Trends and Vulnerabilities of Children in Sub Sahara Africa*. United Nations Children’s Fund Eastern and Southern Africa Regional Office, Nairobi.

[https://reliefweb.int/sites/reliefweb.int/files/resources/73800\\_theclimatecrisisreportesawcarsep20.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/73800_theclimatecrisisreportesawcarsep20.pdf)

<sup>33</sup> Laborde Debucquet, D., Martin, W., and Vos, R. 2020. *Impacts of Covid-19 on Global Poverty, Food Security, and Diets*. IFPRI.

<https://doi.org/10.2499/p15738coll2.134229>

<sup>34</sup> IOM. 2019. *IMO Strategic Vision: 2019-2023: Setting a Course for IOM*. International Organization for Migration.

<https://governingbodies.iom.int/system/files/en/council/110/C-110-INF-1%20-%20IOM%20Strategic%20Vision.pdf>

<sup>35</sup> OCHA. 2020. *Lake Chad Basin: Humanitarian Snapshot*. United Nations Office for the Coordination of Humanitarian Affairs.

[https://reliefweb.int/sites/reliefweb.int/files/resources/20201123\\_LCB\\_humanitarian%20snapshot\\_en%20covid.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/20201123_LCB_humanitarian%20snapshot_en%20covid.pdf)

to the onset of recent conflict, 425,000 were displaced in Ethiopia because of drought;<sup>36</sup> across the Sahel, millions have fled toward the coastal communities and cities amid drought and widespread crop failures.<sup>37</sup> While migrants may find greater incomes, which could improve food security, migration can also change income and labor allocations for those left at home, possibly diminishing their food security.<sup>38</sup>

Violent conflict can also be a cause or an effect of food insecurity, often in the context of climate change. According to the WFP, armed conflict, deteriorating security, widespread poverty, and climate change are contributing to today's humanitarian emergency in Africa's Sahel. Climate change can diminish agricultural livelihoods across the Sahel, creating competition for scarce resources, leading to disputes between farmers and pastoralists in some places. Elsewhere, armed groups appropriate means of agricultural production to bolster their resource base; they extend their influence by offering food in exchange for loyalty.<sup>39</sup> According to this month's WFP Situation Report for the Sahel, 6.5 million people face severe food insecurity in Burkina Faso, Mali, and Niger.<sup>40</sup> The Annual Threat Assessment of the U.S. Intelligence Community, released earlier this month, states, "The degradation and depletion of soil, water, and biodiversity resources almost certainly will threaten infrastructure, health, water, food, and security, especially in many developing countries that lack the capacity to adapt quickly to change, and increase the potential for conflict over competition for scarce natural resources."<sup>41</sup>

## U.S. government response

In conclusion, climate change poses a real threat to food security in Africa, but the impact of climate change on food security is more complicated than often portrayed. This presents challenges and opportunities for U.S. policymaking,<sup>42</sup> particularly in 2021.

The U.S. government approach to development food security is informed by the U.S. Global Food Security Strategy (GFSS).<sup>43</sup> Drafted in 2016, this strategy recognizes the role of climate change in suppressing agricultural productivity and promotes "climate-smart" agriculture to help producers increase output while adapting to climate change and reducing greenhouse gas emissions, where

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<sup>36</sup> Ferrandez, P.C. 2019. *No Matter of Choice: Displacement in a Changing Climate*. International Displacement Monitoring Centre.

<https://www.internal-displacement.org/sites/default/files/publications/documents/201912-ethiopia-slow-onset.pdf>

<sup>37</sup> Lustgarten, A. 2020. *The Great Climate Migration*. The New York Times Magazine.

<https://www.nytimes.com/interactive/2020/07/23/magazine/climate-migration.html>

<sup>38</sup> Man, C. and Thiede, B. 2021. *Beyond Yields: Mapping the Many Impacts of Climate on Food Security*.

<sup>39</sup> Taub, B. 2017. *Lake Chad: The World's Most Complex Humanitarian Disaster*. The New Yorker.

<https://www.newyorker.com/magazine/2017/12/04/lake-chad-the-worlds-most-complex-humanitarian-disaster>

<sup>40</sup> WFP. 2021. *Emergency Dashboard – Central Sahel*. United Nations World Food Programme.

<https://www.wfp.org/publications/emergency-dashboard-central-sahel>

<sup>41</sup> Office of the Director of National Intelligence. 2021. *Annual Threat Assessment of the U.S. Intelligence Community*. DNI.

<https://www.dni.gov/files/ODNI/documents/assessments/ATA-2021-Unclassified-Report.pdf>

<sup>42</sup> Man, C. and Thiede, B. 2021. *Beyond Yields: Mapping the Many Impacts of Climate on Food Security*.

<sup>43</sup> USAID. 2016. *U.S. Government Global Food Security Strategy: FY: 2017-2021*. USAID.

<https://www.usaid.gov/sites/default/files/documents/1867/USG-Global-Food-Security-Strategy-2016.pdf>

possible. Country-level plans for GFSS target countries reflect this approach.<sup>44</sup> The GFSS does not, however, acknowledge other mechanisms through which climate change can impact food security in Africa, including via climate-driven health impacts, increased migration, and high food prices, all of which affect food security for urban and rural populations across the continent. A recent study of food insecurity across 65 countries concluded that household income consistently explains more discrepancy in food security than any other factor, including agricultural production.<sup>45</sup> An approach to improving food security that focuses mainly on increasing agricultural productivity—even via climate-smart agriculture—will have limited impact on household-level food security. Fortunately, 2021 presents opportunities to improve the U.S. government’s approach to food security in Africa. U.S. departments and agencies are presently revising the GFSS, which expires this year; the resulting strategy may take a more holistic approach to reducing food insecurity as it relates to climate change.

The newly formed USAID Bureau for Humanitarian Assistance coordinates U.S. funding and programming in response to humanitarian emergencies worldwide, including in Africa. The bureau presently integrates climate change adaptation and mitigation efforts into existing programming. It could make this explicit—including by using the best tools available to anticipate and respond to climate-linked emergencies—in an overarching strategy for humanitarian response. Finally, with the Bureau for Resilience and Food Security, the Bureau for Humanitarian Assistance could also take a more ambitious approach to climate change generally, in line with the Biden administration’s ambition and directives to federal agencies.<sup>46</sup>

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<sup>44</sup> Feed the Future. 2021. *About*. Feed the Future.  
<https://www.feedthefuture.gov/about/>

<sup>45</sup> Allee, A., Lynd, L.R., and Vaze, V. 2021. *Cross-National Analysis of Food Security Drivers: Comparing Results Based on the Food Insecurity Experience Scale and Global Food Security Index*. Food Security.  
<https://doi.org/10.1007/s12571-021-01156-w>

<sup>46</sup> White House. 2021. *Executive Order on Tackling the Climate Crisis at Home and Abroad*. The White House.  
<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>