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The Ravages of Famine in Somalia: Unpacking the Crisis and Charting a Path to Resilience

Researching a country like Somalia helps one realize how much we take for granted. While in more developed countries one may worry about fashion, entertainment and job satisfaction, the people of Somalia are in a daily struggle to survive. Widespread famine due to Somalia's civil war, droughts, locust and bird swarms, and flash flooding causes almost half of the Somali population to suffer from acute food insecurity. As of January 2023, 200,000 Somalis were classified as being in "Catastrophe", defined by the IPC website as a situation where starvation, death, destitution and extremely critical acute malnutrition levels are evident (IRC, 2023). This number will likely increase in 2023 as humanitarian funding decreases (WFP, 2023). Somalia needs substantive change to avoid a worsening catastrophe. By creating an infrastructure of aquifers and improving methods of collecting and preserving water during heavy rains and transitioning from farming crops that require larger amounts of water, like maize and wheat, to pulses, which require far less, Somalia may improve food security, stabilize deprivation that drives war and eliminate conditions that promote locust swarms. Initiatives to solve these problems will require funding, efficient distribution and novel economic relationships in a country without a functioning administration.

Somali families have historically lived a semi-nomadic lifestyle as agro-pastoralists or nomadic livestock herders (Evason, 2019). This lifestyle worked for smaller nomadic groups scattered in the impoverished northern land but is insufficient for the current population density. This is especially true in a country with significant water shortages and only two main rivers in the south. The delicate balance may be tipped given the headwaters of both rivers are at risk from global warming and are controlled by Ethiopia, a politically unstable country (Filacavano, n.d.). Most families lack electricity and plumbing so both water availability and distribution are problems (USAID, 2022). Hence, even small-scale droughts can become national disasters.

Women and girls, who must often travel long distances for water, are often subject to violence and sexual harassment while men and boys are often forced to fight for various military coalitions defend scarce resources from a young age (UN, 2021). Somalia is really a country of separate clans who are constantly vying with each other for scarce resources (Accord, 2016). Without a commercial agriculture industry, there are no safety nets in place for agriculture when local farming fails. Fallow land, resource intense crops and poor farming techniques amplify the effect of drought on soil quality contributing to locust swarms which worsen the conditions. This leaves most Somali families scrounging a day-to-day existence for the bare necessities while trying to avoid resource scarcity driven violence and civil war. There is no time to consider luxuries like reliable healthcare, leisure or education.

The seminal problem in Somalia is food insecurity amplified by climate change. Climate change has subjected Somalia to worsening droughts with seasonal heavy rainfall leading to flooding (Rashid & Brandvold, 2022). The water scarcity makes it very difficult to grow crops that require consistent hydration. Furthermore, the dry conditions and poor soil quality contribute to

flooding which further erodes soil and damages crops. This flooding also contributes to locust swarming behavior which further damages crops (Uyeno, 2020).

Conflict driven by a lack of resources has been a problem in Somalia for decades with various civil wars throughout its history and no coherent governmental structure. Conflict can also directly destroy crops, cause the theft of crops, or cause farmers to flee. The lack of agricultural production in Somalia causes them to import 90% of their agricultural resources (largely wheat, a resource intense crop) from foreign countries like Ukraine and Russia, which is not sustainable and exacerbates all the above problems and detracts from locally sustainable diets (IRC, 2022).

Water scarcity is the main reason for Somalia's food insecurity. Rain comes in short but heavy deluges in Somalia. This usually leads to flooding with most of the water destructive and wasted rather than productive and useful. Implementation of a well-designed aquifer system capable of storing floodwater could help alleviate water scarcity (Simon, 2023). Greywater recycling from sources like cooking and bathing could contribute, though western style kitchens and bathrooms are largely absent from Somalia. Local and national infrastructure development is crucial, particularly in the construction of aquifers that can effectively control floodwater in Somalia (Simon, 2023). These improvements include flood canals that divert water away from farms and homes and the development and support for smaller more superficial aquifers for local water distribution. Allowing excess water to flow over defined floodplains and collect as ground water to replenish deeper national aquifers is also critical to maintain wells. The efficient collection of flood waters would also limit the swarming behavior of locusts which is promoted by sequestration of locust population by uncontrolled water. The Food and Agriculture Organization of the United Nations has recognized this issue in establishing the Somalia Water and Land Information Management (SWALIM) which is addressing this through management of water quality, irrigation, storage and flood management (FOA, n.d.). In addition to the FOA noted above, The United Nations Development Programme has a climate change adaptation project to help ensure water access and disaster reduction for Somalia's Pastoralists (FOA, n.d. || UNDP, 2023). Although these programs are making a difference, it may be necessary to divert more humanitarian aid from direct aid, and instead into long term investments like the aquifers and flood canals mentioned above.

In addition to locusts, the most numerous bird in the world, the red-billed quelea, has decimated crops throughout Africa. These grain-eating birds have no clear solution and were initially studied in 1971 with a full report at the Proceedings of the 9th Vertebrate Pest Conference in 1980 (Bruggers, 1980). Because of their smaller size, they tend to eat smaller seeds which may be another advantage for growing larger pulses like lentils as noted below.

A more distant and expensive option for fresh water is seawater desalinization which will likely become necessary if rainfall decreases further. Development of an affordable desalinization technique will be a critical goal for this century. Current technology relies on optimal membranes to separate salt and a one-atom-thick graphyne membrane has shown great potential to increase efficiency (Mehrdad & Moosavi, 2019). Given the pace of biotechnology the fantasy of a photosynthetic microbiologic system of organisms which ingest salt and precipitate in solution lowering salinity in successive solutions until fresh water is achieved might be imagined (Ahmed et al., 2022). An early model of this has already been achieved with halophytic algae

which have been proven to desalinate brackish water up to 30% in a single cycle. Furthermore, the biomass produces might also serve as a biofuel (Sahle-Demessie et al, 2019).

Even with the implementation of better water management methods, water will still be scarce in Somalia which recommends the production of crops better acclimated to drought than crops like rice and maize which are commonly grown in Somalia (IFAD, n.d.). Pulses such as peas, bambara beans and lentils are less water dependent, a useful trait given erratic rainfall of 300-400 mm/year (ACGT, 2016). The production of 0.5kg pulses only requires 160 liters of water. This compares to 750 liters for wheat and 7000 liters for beef (ACGT, 2016). Furthermore, pulses remain edible for several years when dried making them a smart option for households without refrigeration (ACGT, 2016). In addition, pulses are also good for animals and the environment too (ACGT, 2016). Pulses have nitrogen-fixing properties that can contribute to increased soil quality and lessen the need for expensive fertilizer (Bose, 2022). This is especially true in regions where governments have mistakenly tried to grow cereal crops like maize and sorghum which don't help the soil and are dependent on a steady water supply and fertilizers. A study in West Africa showed that animals fed cowpea hay along with rice feed meal, during dry season gain 95kg, compared to 62kg for animals that did not receive the cowpea hay (Amole et al., 2022). The manure was also of improved quality and farmers who used cowpea hay could benefit from an extra 50kg of meat a year and over 300kg of cereal grain from the improved soil quality (Amole et al., 2022).

Education will be critical to improve farming techniques, financial management, infrastructure engineering, and national identity in Somalia. This is not hopeless as Somalia won a UNESCO medal in 1975 for increasing its literacy rate from 5% to 75%. This was done with 100,000 student-teacher volunteers who travelled to remote areas where there were no schools (UNESCO, 1980). Yet, Somalia has suffered an ongoing civil war since that time and has undone much of its progress, with a current national literacy rate of 37.8% (Cline, 2019). For increased food security, it is essential Somalia implements education programs for their southern tier farmers. To keep any consistent crop yield in an arid and unpredictable Somalian climate, farmers need to be skilled in their craft and have access to new technologies. Introducing farmers to and convincing them to use new seeds, tools, and techniques would have a major effect on the efficiency of farming in Somalia.

Mutually beneficial commercial investment could lead to the implementation of educational programs for farmers leading to acceptance of new and better seeds, like pulses mentioned above, better farming techniques, like dry farming, and other technologies, like soil moisture detectors. For example, through research and technology development supported by UK aid, which invests in the African Agricultural industry, innovations such as disease-resistant livestock breeds, improved seeds, and modern farming practices can emerge. Investment in small agricultural enterprises, supply chain enhancements, and job creation can lead to the adoption of these advancements by Somali farmers, improving agricultural productivity and livelihoods. Additionally, research and innovations targeting climate resilience and food security, funded by the UK, can equip Somali farmers to cope with climate change, ultimately ensuring a stable food supply, reducing poverty, and enhancing the well-being of the population (GOV.UK, 2018). The UK likely gains several advantages from its investments in agriculture and development projects in African countries. First, it opens up economic opportunities for UK companies providing

technology, expertise, or equipment to these projects through business contracts and exports, thereby boosting the UK economy. Second, supporting African countries in developing their agricultural sectors potentially creates new markets for UK agricultural products, technologies, and services, contributing to increased trade. Third, the UK commitment to research and innovation in agriculture not only benefits African agriculture but also enhances the UK's reputation as a global leader in this field, offering global market potential.

A program like The African Development Bank (AfDB) Group Agriculture Fast Track Fund could play a pivotal role in how commercial investment can lead to the implementation of new seeds, tools, and techniques for farmers in Somalia. This multi-donor trust fund is dedicated to expediting agricultural investment across Africa by streamlining project preparation activities. It addresses the critical challenge of the dearth of well-prepared and bankable agricultural projects, often a stumbling block in attracting private sector investment. By providing financial and technical support for project preparation, the fund makes agriculture projects more attractive to investors. It particularly focuses on infrastructure ventures like irrigation systems and storage facilities, vital for enhancing agricultural productivity. Additionally, the fund promotes public-private partnerships and supports initiatives benefiting smallholder farmers, thus fostering inclusive and sustainable agricultural development. This collaborative approach facilitates the implementation of cutting-edge seeds, tools, and techniques, contributing to enhanced food security in Somalia and beyond, while simultaneously yielding economic benefits for the investing companies involved in these transformative agricultural ventures (African Development Bank Group, 2013).

Even with drought resistant crops and better water collection methods, the majority of farming activities are restricted to the southern region, where proximity to the country's two main rivers facilitates water soil levels necessary for crop cultivation. In the northern regions, traditional agro-pastoralists face a dire situation as extreme water shortages have made it almost impossible to sustain livestock. Due to Somalia's deep rooted clan divisions and lack of a centralized authority, infrastructure necessary to facilitate dispersion of southern Somali crops to the starving northern region is currently non-existent (US Department of State, 2023). Connecting the arid northern part of Somalia to the more fertile south through the construction or improvement of roads and railways would help alleviate the famine conditions in the northern regions. Moreover, this expansion of infrastructure would not only address immediate food security concerns but also foster long-term economic development across the entirety of Somalia. Somalia's lack of infrastructure has been recognized by groups like the African Development Bank Group and various funds have been put into place to support Somali infrastructure growth (African Development Bank Group, n.d.). If solutions in this paper can be implemented driving Somalia to agricultural self-sufficiency then distribution to the impoverished masses will become the major weakness which could drive infrastructure development.

Somalia's plight underscores the profound disparities in our world. The country's relentless struggle with food insecurity, driven by climate change, demands urgent attention and a multifaceted approach. By investing in water management, more efficient crops, education, commercial partnerships, and infrastructure development, Somalia can begin to break the cycle of deprivation and instability. These measures are not just about addressing immediate

challenges but also fostering long-term sustainability and prosperity, offering hope to a population trapped in a daily battle for survival.

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