Journal of Applied Research on Children: Informing Policy for Children at Risk

Volume 12
Issue 1 *Environmental Justice and Climate Change*

Article 10

2021

Risk and Resilience of Somali Children in the Context of Climate Change, Famine, and Conflict

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INTRODUCTION

The current and long-term risks posed by climate change for children are examined through the lens of famine, drought, and conflict in Somalia and its consequences for children, who are particularly vulnerable to the threats of climate-related adversities. Somalia was chosen as the focus for this article because it provides more than three decades of experience illustrating challenges posed by climate change and cascading repercussions of famine and conflict that have the potential to inform other regions of the world facing similar threats, such as Syria, Yemen, South Sudan, and the Tigray region of Ethiopia. Following a brief discussion of general threats posed by climate change to children, cumulative adversities faced by children in Somalia are described. These include poverty, malnutrition, exposure to violence or exploitation, displacement, and disruptions of key protective systems for healthy child development, including caregiving, family routines, education and healthcare systems, and other community and cultural functions. Subsequently, the potential for resilience in children is described through a discussion of key promotive and protective factors indicative of processes that foster positive adjustment and development among children in danger from exposure to severe and chronic childhood adversities. Specific examples are drawn from studies and observations of Somali children and families. The article concludes with recommendations for transnational policies to foster resilience and peacebuilding for children in the context of climate change.

CLIMATE CHANGE: AN EXISTENTIAL THREAT TO CHILDREN

As we move forward into the 21st Century, climate change presents the greatest existential risk to humanity, and its impending consequences demand a concerted international effort.[1] The United Nations Framework Convention on Climate Change (UNFCCC) defines this global threat in terms of "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".[2] Risks related to climate change may be highest for the young. UNICEF determined that there may be no greater threat facing the world's children now and for future generations than climate change.[3]

Children are disproportionately impacted by climate change due to their unique physiology, metabolism, and developmental needs.[4,5] In addition, specific groups of children are particularly vulnerable, including children on the move (refugee, immigrant, and internally displaced children); children exposed to the dangers of violence or political conflict; children already affected by malnutrition or chronic illnesses, poverty, social exclusion, oppression, or historical trauma; indigenous children; and those with developmental disabilities.[6,7] In addition, the

countries that are at greatest risk of climate change also tend to have higher proportions of children in the population.[8]

Broadly speaking, climate change increases the frequency and intensity of extreme weather conditions, resulting in disastrous storms, flooding, drought, heat, cold, fires, and other changes in ecological systems that not only impact the availability of water, food, and health services, but also spread disease and disrupt economies, education, and political stability, among many other effects. These conditions pose direct dangers to affected populations and particularly to children. Approximately 160 million children live in areas at risk of drought and 500 million live in flood zones; either climate event brings with it scarcity of food and potable water. Diarrhea is presently the second leading cause of mortality for children under 5 years age, and waterborne diseases such as dysentery will increase in coming decades with intensifying floods. By 2030, it is projected that climate change will result in 48,000 additional deaths in children under 15, and an additional 7.5 million children under 5 years will experience moderate to severe stunting.[9] The change in climate also impacts the range of vectors leading to an increase of diseases such as malaria, dengue, leptospirosis, and leishmaniasis. Finally, climate change negatively impacts children's development and overall psychological well-being through multiple processes, posing risks to emotion regulation, cognition, learning, behavior, language development, and academic performance.[10] Owing to their heightened exposure and vulnerability to the effects of climate change, children in the majority world (residing in low- and middle-income countries) are likely to suffer the most harm in psychological health, with an increase in emotional distress problems of anxiety, depression, and post-traumatic stress disorder (PTSD).[11]

CLIMATE CHANGE CHALLENGES IN SOMALIA

Topography of Somalia

Somalia is in the Horn of Africa, in the east of the continent, with a coastline extending 2720 kilometers along the Gulf of Aden and the Indian Ocean. Somalia is quite hilly and has a warm desert climate in the north and a semi-arid climate in the south. Approximately 60% of Somalia's population is comprised of nomadic pastoralists, who raise cattle, camels, goats, and sheep, and an additional 25% are farmers. The remaining 15% of the population resides in urban areas. As livestock and agriculture forms the backbone of most Somalis' livelihood, the country is highly vulnerable to the impacts of climate change.[12] In addition, Somalia is a low-lying coastal country whose economic and social system have been disrupted by war over the last 30 years.[13]

Somalia has two rainy seasons, the Gu' and the Deyr, which have shaped the lives of farmers and pastoralists for centuries. The Gu' season starts as early as the second half of March, intensifying through May and continuing through August (except in the northeastern coast, which receives the least precipitation during this rainy season). The 2019 Gu' was the driest in 30 years and the

second consecutive below-average rainy season in a country still feeling the impact of a prolonged 2016-2017 drought. Deyr, the second rainy season, is shorter in duration with less precipitation and runs through October and November. Somalia has only two perennial rivers, the Juba and Shabelle, which originate in Somalia's northern neighbor, Ethiopia. The Juba and Shabelle, which are essential for agricultural production, have a reduced waterflow as they run downstream. This is due to several factors including the lack of contributing tributaries within Somalia, spillage into flood plains, diversions for irrigation, and loss due to evaporation and ground absorption.[14]

Droughts, Floods, and Famine

Somalia is prone to periods of extended drought, erratic rainfall, and disruption of monsoon seasons.[15] Recently, Somalia has experienced a decrease in annual rainfall, resulting in recurrent droughts that, according to the UN's emergency aid coordination office, have increased in frequency and intensity over the past three decades.[16] Concomitantly, the country has experienced a decrease in food production, most noticeably across central and southern Somalia. In addition, during this period, environmental degradation, deforestation, desertification, and increasing soil dryness have diminished the land's resilience to extreme weather hazards.[17] The Lower Juba area lost approximately 50% of its forest cover between 1993 and 2014.[18] Added to this danger, there has been a continuous increase in mean annual temperatures since 1991, and scientists anticipate an increase of up to 4.3 degrees Celsius by the end of the century.[19] Even at current temperatures, the flora in Somalia is strained to such an extent that it is often unable to cool and rehabilitate the soil. Moreover, in the long term, droughts and desertification are likely to be punctuated by a growing number of devastating storms. In some years, regions of the country seem to alternate between a dearth of water and an excess, which are interrelated phenomena: Soil dried by years of drought cannot absorb water efficiently, and so heavy rains easily become flash floods.[20]

In the past, drought has led directly to food availability decline (FAD). The 1992-1993 famine resulted in 220,000 deaths and struck Somalia's most agriculturally productive area in the valley between the two rivers.[21] Famine occurred again in 2010-2012 with nearly 260,000 deaths. Half of these deaths were children under age 5, as reported by the UN Famine Early Warning Systems Network (FewsNet).[22]

A severe drought occurred again in 2016-2017, but this time, famine was averted. The UN, Oxfam, and other nongovernmental organizations (NGOs) sounded a preemptive alarm, warning of impending famine. In early 2017, the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Somalia Humanitarian Country Team released a famine prevention plan for humanitarian organizations to follow.[23] In addition, the Somali government created a Drought Operations Coordination Center (DOCC) in Mogadishu, thus successfully adverting the potential famine.

However, leading thinkers in the global community concerned about famine, such as the 1998 Nobel Laureate in Economics, Amartya Sen, have increasingly acknowledged that famine is not purely an issue of drought and food availability.[24] Rather, famine results from a complex set of variables such as variations in the price of goods and services, hyperinflation, rationing, and supply-chain disruption; it is a dynamic social crisis that unfolds over time through the interactions of many systems.[25] Just as conflict causes widespread disruption of the social and environmental systems that ensure healthy food access, so too can FAD incite or exacerbate violent conflicts between groups. This is particularly relevant in Somalia.

Climate change in Somalia has increasingly become a national security issue, which has added to political unrest by putting pressure on underequipped governance and judicial systems. The amount of available cultivable land is decreasing due to environmental change, land degradation, and conflict. The resulting displacement and marginalization contribute to grievances and violence between farmers, herders, and clans over land access. As a result, insurgent groups may be more likely to succeed in recruitment efforts.

Armed Conflict in Somalia

Somalia has experienced armed conflict and violence since the late 1980s, resulting in the collapse of a functioning government.[26] In 1990-1992, civil war erupted, and the collapse of customary law resulted in a failed state. Conflict persisted due to disputes over territorial claims between clans and a fragile government. In 2007, the Islamist extremist group Harakat al-Shabaab al-Mujahideen (al-Shabaab) became a significant contestant of government control. Conflict continues between al-Shabaab and the Somalia Transitional Federal Government (TFG). Internationally, Somalia's security landscape continues to experience increasing foreign military involvement, with an onslaught of international actors currently operating in Somalia, including groups from Turkey, the United Arab Emirates, the United Kingdom, and the United States.[27] A number of international organizations participate in ongoing peacekeeping efforts, including the European Union (EU), the African Union (AU), and the UN. The AU Mission in Somalia (AMISOM) has the largest multilateral peace operation in the country.[28]

There clearly is a strong bidirectional relationship between environmental damage and armed conflict.[29] In 2011, al-Shabaab took control of arable land in many communities and charged them for the right to farm each hectare, diverting the flow of river water away from farmers who did not support them financially.[30] Similarly, in cities like Mogadishu, the areas that have been most affected by conflict also have the most tenuous water access.[31] Adding to the complexity of this situation, the federal government has a strained relationship with Somalia's six autonomous states, which all resent Mogadishu's efforts to centralize control. International humanitarian responses have been no more effective. The coming decades may subject Somalia to greater social instability. In a global sample of 92 major flooding incidents between 2015 and 2018, 24% were followed by

political unrest and/or conflict, resulting in an increased risk in “ethnically fractionalized” countries.[32,33] Unfortunately, although the causes of political conflict arise in the adult sphere, they disproportionately harm children.

CLIMATE CHANGE AND CHILDHOOD ADVERSITY

Childhood adversity is defined by exposure to one or more stressful events or conditions during childhood that can threaten the adjustment or development of a person in the short-term and/or over the life course.[34] Adverse childhood experiences can disrupt or impair an individual’s adaptive function or development at multiple levels, including neurobiological function and brain development, physical and mental health, psychological well-being, and multiple domains of cognitive, emotional, and social behavior.[35] Climate change can significantly increase the likelihood of exposure to an array of adverse conditions known to affect health, well-being, and development, including poverty, violence, war, natural disasters, vector-born disease, and displacement, while also disturbing crucial supports for healthy human development, including access to sensitive caregiving, nutrients, clean air and water, or medical care.[36]

Poverty

The UN rates poverty in resource-poor countries, with an extreme poverty threshold defined as less than $1.25 per day. However, childhood poverty can also be viewed from a multidimensional perspective. It is defined by the lack of two of the five essential aspects of well-being as defined in the UN Convention on the Rights of the Child (CRC), which include education, health, nutrition, water, housing, and sanitation. Monetary and multidimensional child poverty are correlated but not conceptually interchangeable. For example, in Milliano and Plavgo’s 2018 analysis of 44 sub-Saharan countries, 48.2% of children met criteria for monetary poverty, but 64.6% were experiencing multidimensional poverty.[37] That said, it is not difficult to imagine how a single flood, or a yearlong drought could lead to monetary poverty and simultaneously deprive a child of one or more aspects of well-being. The WHO names extreme poverty as the world’s biggest killer given that it is associated with adverse health effects from malnutrition to lack of sanitation to vector-borne disease. As temperatures rise, so does transmission of a number of vector-borne diseases.[38]

Climate change increases the risk for multidimensional poverty. Following natural disasters, families may end school enrollment for their children to save money while other children seek employment to support their families. There is evidence of a “pipeline” between environmental degradation and unskilled child labor contributing to injuries and long-term health impacts related to exposure to dust, heat, and heavy metals.[39] Children’s involvement in labor contributes to a cycle of school absence and unenrollment, both a cause and an effect of educational cessation.[40] Adding to the economic pressures on families, the cost of feeding a child will increase in the coming decades as the prices of staples like

corn, wheat, and rice increase, owing to decreased availability of these crops along with infrastructure instabilities brought about by extreme weather.[41]

The ability to swiftly rebound from environmental shocks and gradual climate insults may be limited to the wealthy. In places hard-hit by climate change, poorer households lose relatively two or three times more assets than wealthier ones, and the effects on children are particularly potent and immediate. For example, following environmental disasters, children in asset-poor families receive less nutritious meals, less schooling, and less medical attention.[42]

With economic opportunities severely disintegrated and the likelihood of a swift recovery diminished, many Somalis make the difficult choice to leave the region that ties them to family, local culture, and livelihood, and move elsewhere.

Hunger and Malnutrition

A long-term climate forecast for Somalia conducted in 2018 projected intensifying weather extremes in the coming decades, with overall rainfall decreasing through 2030 and then increasing in the 40 years that follow.[43] Both of these weather projections have the opportunity to disturb the country's food production system, since the local agricultural practices depend on predictable timing and quantity of rainfall.[44] Irrigation systems have proven vulnerable to political and social conflicts, with recent Ethiopian dam-building projects in the west of Somalia contributing to the drying up of downstream water supply.[45] Droughts have become more common such that more and more of the arid landscape has undergone desertification.[46] Furthermore, the Indian Ocean continues to be the fastest warming tropical ocean, with ever more frequent and more intense cyclones causing coastal and riparian flooding in addition to infestations of crop-destroying pests such as locusts.[47,48] With production of essential food staples like cereals in decline, some children may suffer from an overall caloric deficit and develop acute malnutrition, which may cause damage to organ systems and impede development in language and learning.[49]

Other mechanisms of Somali food production that historically comprised the backbone of the country's economy are simultaneously becoming unstable in the face of the changing climate. Despite a long coastline and historically sound fishing economy, the Somali Basin of the Indian Ocean shows changes in currents and oceanic surface temperatures that increase the region's risk of marine food insecurity.[50] Additionally, while 60% of Somalia has historically engaged in raising livestock, availability of water and feed (not to mention, flooding) threaten this livelihood as well. Children with diminished access to fish, milk, and meat face the threat of the severe protein deficiency syndrome known as kwashiorkor, which may leave them with long-term health effects and cognitive disabilities.[51,52] Although hunger affects people of all ages, the growing bodies of children may suffer especially adverse and prolonged effects even from short periods of deprivation. Additionally, severe weather events may exacerbate the effects of malnutrition; following flooding in 2018, 22 feeding and shelter centers for children in affected areas were shut down.

Although revenue from farming comprises 75% of Somalia's gross domestic product (GDP) and 93% of its income from exports, Somalia imports more food than it exports, a fact that has little chance of reversing if climate trends continue. In a given nation's economy, the agricultural and aquacultural sectors are most severely affected by climate change. The 2017 droughts alone cost the farming sector over $130 million. This is to say, as adverse climate events become more common, the Somali economy will decline. In addition to the direct risks to children associated with food insecurity, childhood exposure to poverty will become more common, along with poverty's consequences.

Childhood Illness

The under-5 mortality rate (U-5MR), or the probability of dying between birth and the fifth birthday, is a key indicator expressed as the number of deaths per 1000 live births. Worldwide the under-5 mortality rate declined from an estimated 90 deaths per 1000 live births in 1990 to 46 deaths per 1000 live births in 2013.[53] In contrast, Somalia has experienced one of the highest infant mortality rates in the world, with an estimated under-5 child mortality rate of 180 per 1000. During the 2011 famine, an estimated 4.6% of Somalia's total population and 10% of the children less than 5 years of age died in southern and central Somalia.[54] The Lower Shabelle, Mogadishu, and the Bay area were hardest hit with the child death rates reaching 18%, 17%, and 13% respectively.

In less than 40 years, Somalia has lost 30% of its forest cover, which has weakened the stability of riverbanks and increased the impact of flooding.[55] In 2018, tropical cyclone Sagar caused floods that displaced over 230,000 people and in 2019 potent seasonal rains displaced over 400,000 persons. However, rising water also carries indirect health risks. Standing water has contributed to malaria outbreaks, and damage to water treatment systems has resulted in outbreaks of water-borne illnesses, including cholera (a major cause of mortality in children under 5), with most cases in Somalia in recent years occurring in flood-stricken regions. [56]

Social Upheaval

Human societies have taken their current form during an epoch of remarkable environmental stability, following the last ice age until now. Climate features many communities once took for granted, like availability of clean potable water and predictable growing seasons, may reveal, as they change, just how much our social patterns and structures have depended on them. In many pastoralist Somali communities, women are usually responsible for finding and fetching household water. Droughts like those experienced in Somalia in recent years threaten to complicate this task, especially for mothers who must go in search of clean water sources farther and farther from the home while minding small children. In this and other ways, climate change has the potential to change the way that women allocate their labor, potentially resulting in less time for childcare and the disruption of other unforeseen household and family routines.

Both inside and outside the home, children rely on safe and stimulating environments to reach developmental milestones, from positive adult relationships to religious communities to effective classrooms. Climate shocks have revealed how tenuous some of these spaces can be. Following the 2019 floods in the Shebelle River valley, a number of schools were converted into emergency shelters for displaced people, resulting in an indefinite cessation of classes for students. Another set of devastating floods in 2020 displaced over 650,000 people from their homes.[57] Clearly, a natural disaster poses risks to children's safety, but it also has indirect effects on the integrity of the social systems around them that support their health and growth.

In recent years, estimates of internally displaced Somali people reached up to 1.5 million. The loss of income opportunities, drought, and conflict over dwindling resources are expected to increase this number in coming years. Displacement in such conditions is viewed as a "risk caravan" that amplifies risks to well-being through the accumulation of more adverse experiences and their cascading effects.[58] For example, displacement in all forms puts a child at a high risk of separation from parents. Loss of connection to a caregiver is a developmental crisis for children in the midst of adversity, at a time when the physical protections and emotional security offered by attachment bonds are most needed. Given how essential a stable family is for a child in the aftermath of a challenge like a natural disaster or migration, it is not surprising that PTSD rates are higher in children who have undergone displacement than in those exposed to similar traumas without the loss of the stable social world.[59] For decades, research on the mental health of children during wars and natural disasters underscored the profound distress that children often experience if they are separated from caregivers and family. These findings led to global recognition among emergency responders that avoiding separation and reuniting separated children with families was vital to the health of the children.[60]

PROMOTING RESILIENCE FOR SOMALI CHILDREN

Resilience can be defined as the capacity of a dynamic system to adapt successfully to challenges that threaten system function, survival, or development.[61] Many kinds of systems can show resilience, including individuals, families, communities, economies, and ecosystems. Many processes engaging multiple levels of interaction among multiple systems are involved in the resilience of individual children who adapt successfully to adversity. Resilience involves processes in the body and mind of a child, interactions with family and other social supports, and interactions with ecological and sociocultural systems in which the lives of children are embedded. Moreover, the resilience of individual children depends on resilience of other systems, particularly the resilience of their families and communities. These systems, and the capacity they provide for children to adapt successfully to challenges, can be disrupted by disasters related to climate change, just as they have been by war, earthquakes, and pandemics.[62]

When resilience scholars identify the factors associated with children doing well in the context of adversity, they often distinguish between promotive effects, which are positive for adaptive functioning regardless of risk conditions (analogous to a statistical main effect), and protective effects, which are more important when risk or adversity levels are elevated (interaction effects).[63] Vaccines and airbags are classic examples of pure protective factors in that they matter only in the context of a specific adversity. In contrast, effective parents and teachers have promotive as well as protective effects. Generally, good parents and teachers promote healthy functioning and development in children through skilled parenting or teaching; however, under high adversity conditions, their roles may become more important. When children are threatened by adversity, adults mobilize more resources or take special actions to protect endangered or vulnerable children. However, it is also the case that efforts by adults to sustain “normal” function in the family or classroom in the midst of adversity in itself reflects resilience of the parent or teacher who is managing to function well under adverse conditions. Efforts by a parent or teacher to provide normal child routines and opportunities amid a pandemic or refugee camp may have particularly salutary effects on children in these difficult conditions.

The effects of factors and processes associated with adjustment to adversity also may vary depending on the situation, cultural influences, and developmental timing. In some situations, for example, it may be advantageous or dangerous to be female (or male) due to the likelihood of exposures to specific risks or cultural expectations and beliefs that influence risk exposures and recovery.[64] Older children with more advanced cognitive capabilities may be more vulnerable to some threats because they understand more about future implications of a disaster and have more friendships with peers that could be threatened or lost. At the same time, older youth are more capable of surviving on their own and figuring out how to get help than very young children. Very young children, who depend on the effective functioning of caregiving systems, are highly vulnerable to the loss or degradation of effective care, whether it results from death or illness of a parent, food insecurity, exposure to violence, or alterations in the work loads of parents required to provide clean water and food for their children.

Protective factors and the processes they represent operate throughout all levels of a child's life. This ranging from individual characteristics to family, social networks, and the society that the child lives.[65] Resilience theory now embraces a multisystemic approach embedded in a socioecological framework.[66] This framework suggests that effective investments in the systems that support positive child development at the community level can foster competence and resilience for multiple children at once.[67]

From the perspective of positive deviance (“bright-spots”) research, the solutions to a problem reveal themselves more quickly when we begin by attending to examples of resilience — where we find outcomes *better* than the conditions of risk would lead us to expect. Understanding positive deviations from a risk gradient in a given context also can help identify local practices that mitigate risk and promote well-being in children, guiding efforts to boost

resilience and promote healthy development in risky contexts. Moreover, interventions based on contextualized observations of resilience often have high community buy-in because they are more likely to be affordable, endemic, and culturally harmonious.[68] The following section considers child resilience in light of climate change to illustrate what communities and researchers worldwide could potentially learn from the example of healthy children and healthy systems in Somalia.

Individual and Interpersonal Resilience

Natural disasters and conflict often contribute to adverse socioemotional outcomes in children. However, not all people suffer equally after calamity and loss, and there are a number of influences associated with better functioning and adjustment in the literature on conflict, war, famine, and climate change. Some individual attributes--such as problem-solving skills, self-efficacy, and self-regulation skills--are associated with positive adaptation to adversity in many cultures.[69] A positive outlook and empathy or caring are also widely reported resilience factors.[70]

Nonetheless, one would not expect all factors to pose a universal benefit to all Somalis in all situations. For example, although being male appears to be broadly protective against PTSD symptoms in adults, gender appears to play a complex role in resilience for Somali children, with maleness serving variously as a risk or a protective factor.[71] Some accounts indicate that families invest more in females than in males, believing that girls are more likely than boys to be responsible with skills and resources and more prone to remain loyal to the family in the long term.[72] Similar reasons may lead families to favor older siblings in resource allocation. In addition, females may be somewhat more likely to be "chosen" by a family for a migration opportunity, owing to the belief that they are at greater risk of sexual assault if they remain in Somalia, and if a daughter experiences an additional social vulnerability like mental illness, she may be more vigorously protected than a son would be. Following immigration, women and girls may be more likely to secure refugee status in some countries and therefore have more opportunity for upward mobility there. However, in the case of children exposed to parental separation, some reports suggest that boys coming from more traditional Somali communities may have an advantage. Many young males were trained early in life to leave the home for periods of time to engage in community-essential roles like livestock care. Some unaccompanied migrant boys may benefit from this training that accompanies work roles valued by the community. Of critical importance, though, is that males and females alike benefit from the presence of others who share their cultural values and background.

Positive identity and a sense of belonging are two widely reported resilience factors in youth.[73] Another salient resilience indicator is a strong sense of meaning in life, which is often inextricably linked to identity. For many children worldwide, cultural, and spiritual beliefs and practices offer a language and liturgy of suffering, acceptance, redemption, identity, and hope.[74]

Promoting Resilience in Family Systems

Children depend on the resilience of parents and families. Thus, it is not surprising that family functioning and the network of relationships and caring adults surrounding a child play a crucial role in child resilience. Landmark longitudinal studies also have shown that the presence of a supportive relationship with at least one caring adult outside of a troubled home was associated with better social and emotional outcomes in even the most disadvantaged children.[75]

The concept of family resilience and also parenting resilience offers the opportunity to identify and promote key processes that enable families to overcome adversity and crises.[76,77] A sense of coherence, collaboration, competence, and confidence are vital in coping with difficult family experiences.[78] The smallest "unit" of a child's family is the dyadic relationship of a caregiver and child, and from the earliest days of resilience research, scholars have noted that a positive attachment relationship with just one caregiver is the most fundamental resilience factor.[79] However, having a secure relationship with *two* caregiving adults may provide additional protection against childhood PTSD following conflict exposure.[80] Moreover, the effectiveness and health of these caregivers is important. Evidence across cultures indicates that maternal mental health is associated with mental and physical well-being in children.[81]

The moderating influence of the family on the mental health of war-affected children may take two forms, depending on the quality of parenting provided: parents or family members can provide a "protective shield" during hardship, or parents can accentuate the impact of the stress of war when they manage stress poorly. The quality of the home environment can help moderate the impact of violence on children's' behavior. Evidence indicates that better home environments and family functioning are associated with decreases in the intensity of child problems.[82] Thus, a child's adjustment to the stressors of conflict, war, and famine is shaped not only by their own individual qualities, but also by the functioning of the family system.

Needless to say, the positive impacts of parental mental health are strongest when parents are able to be present with their children. One of the pernicious features of climate-related disasters is the particular risk they pose of separating children from their parents, whether this occurs due to floods, a challenging migration process, parental death, or income-driven parental migration, leaving children behind. In Somali youth, significant PTSD risk emerges from the interaction between traumatic experience and multiple separations.[83] It is essential for governments and NGOs to make every possible effort to keep children and parents together during and after disasters, reuniting separated families as soon as feasible, and also to support parental health throughout the recovery process.

In Somalia, the kin-based network is an important source of resilience beyond the immediate family, both for those in the home country and abroad. Somali society is organized in units referred to as "clans" or "sub-clans," although these English words are poor translations of the concept. Group members, sharing a common male ancestor between four and eight generations, are

committed to support one another, no matter where in the world members find themselves. Membership often comes with obligations, such that extended family can constrain the decisions of an individual. However, it is also the unit of belonging, of accountability, and of provision. Kin networks provide care for children who are orphaned because their membership extends beyond a parent's lifespan. When those in one region suffer the loss of arable land, this network provides access to other land, providing a vital buffer likely to become important in new ways as climate events intensify.

During and after migration, a connection to family lineage in the new country can facilitate children's integration into the host society. The benefits extend both ways: As members earn income in their new country, they send remittances to family abroad, called *hawala* or *xawilaad*. Importantly, sending these remittances appears to function as a resilience factor for the senders as well as the receivers. This practice may contribute to the senders' sense of efficacy and agency.[84] These networks, however, are not without their risks, because they may be strained by lack of institutional support and fragility of individual members' support systems. Extensive obligations also could pose an economic burden to immigrants.

Material stability (often measured by socioeconomic status) is a family-level predictor of resilience. Somali children whose families are able to earn a living and maintain housing stability through climate crises often reap resilience benefits. Thus, poverty reduction strategies, particularly those that address climate-driven economic change, can serve the function of child welfare interventions.[85] Similarly, loss of resources poses a mental health risk to Somali refugee populations, and interventions that address material and social resources may be an important intervention for refugee children.

Somali families may be highly resilient systems because they often enjoy spending time together, have effective crisis management skills, are committed to one another, are affectionate and appreciative of one another, engage in positive communication, and share healthy spirituality. Just as family resilience can be protective for individual child resilience, community resources and protective systems can augment family resilience.

Community Restoration and Renewal

A resilient community is socially connected and has accessible systems that can withstand disaster and foster community recovery.[86] The community can take collective action after an adverse event because it has developed resources that reduce the impact of major disturbances and help protect people's health. Resilient communities promote physical, behavioral, and social health for daily as well as extreme challenges. Community health resilience (CHR) is the community's ability to use its assets to strengthen its physical, behavioral, and social health and to withstand, adapt to, and recover from adversity.[87]

One of the fascinating characteristics of systemic resilience is its apparent tendency to grow and cascade to other systems: When a community is resilient,

individuals within it grow in resilience, and when many individuals engage in mechanisms of resilience, the community's resilience grows.[88] It is not surprising to learn that observers report the best predictor of functioning in Somalis after adversity is the strength of a person's family and community networks.

Schools play a central role in the resilience of children, families, and communities in post-disaster and post-conflict recovery. Effective schools have been identified as a key protective factor for children since the early days of resilience research. Schools, like families, have the dual role of protecting children from threats in the present and nurturing future resilience. In the aftermath of disasters, schools are a powerful symbol of recovery and return to normal routines, not just for children and families but for the entire community. Attendance at an effective school is a correlate of child resilience to such an extent that post-disaster and post-conflict aid sometimes includes "rapid educational response" arms.[89]

In 2019, a single flood affected close to 100 schools in Somalia. Though the waters recede from classrooms, the books are not replaceable. Children who withdraw from school during floods may not re-enroll. Clearly, protecting school buildings directly from floods--building them on higher ground and ensuring that they are sandbagged--is a community priority. Following floods, although camps for internally displaced persons meet the acute needs of food, shelter, clean water, and toilets, they often lack facilities and personnel for educating children.[90] Given the cost that lost education levies upon a child's future human and social capital and the contribution of schools to child resilience in the wake of upheavals, restoring school functioning as quickly as possible is becoming a high priority for communities and humanitarian relief groups.[91]

Disasters can interfere with a child's education in more ways than simply damaging a building. When homes are submerged, schools often become shelters, preventing classes from meeting. Lost income following a flood may lead parents to suspend children's education, and these children temporarily or permanently may enter the labor force in elementary or middle school. Over and above protecting a school from floods, an entire *community* must be protected from floods. This means caring for Somalia's rivers through de-silting and reforestation and restoring riverbank control structures like off-streams, canals, and retention pools that reduce the impact of floods on educational spaces.[92]

Health of the land is related to flood resilience, so those wishing to mitigate flood damage must take steps to reduce the frequency, duration, and intensity of the droughts that dry out the soil. This likely begins with investing in the long-term drought resilience of soil using methods like crop diversification and rotation. Such practices improve the levels of organic matter in soil, allowing it to absorb more water during heavy rainfall and reducing erosion.[93,94] Stakeholders must also work to ensure that a meteorological drought does not automatically become an agricultural drought by developing infrastructure to transport and store water for irrigation and livestock. These programs are especially likely to be effective in Somalia if they are participatory, capacity-

building, mixed-sector (ie, public and private), and considerate of social equity issues affecting resource allocation.[95]

Soil and Forest Reclamation to Assure Quality Childhood Nutrition

Tactics for improving soil health not only offer children protection by buffering against floods, but they also target another critical facet of development: access to sufficient and diverse nutrients. Rotating and interplanting legumes and cover crops with grains replenishes organic matter and minerals in the soil and makes more efficient use of these soil nutrients, which boosts agricultural productivity and thereby child nutrition. In fact, in 11 sub-Saharan countries, village-wide crop diversity was significantly associated with children's height-for-age scores.[96]

Caloric intake is one critical facet of nutrition, but another is diversity of diet. Even with sufficient daily energy input from food, a lack of vitamins and minerals, as well as macronutrients like fats and proteins, can lead to chronic disease and, in children, cognitive and physical stunting.[97] Micronutrient deficiency is over twice as common globally than caloric deficiency, often earning it the name "the hidden hunger."[98]

As with flood prevention, a surprising solution to micronutrient deficiency may lie in the return of forests to cleared areas. In many countries, forest cover loss is associated with poorer child diets due to reduced micronutrient intake. Conversely, tree cover is associated with better child nutrition and a wider range of food types, controlling for overall aridity of a region. Places that enjoy forest cover have a route to continuing traditional and wild-harvest dietary practices, which bring with them a number of benefits: lower rates of both communicable and noncommunicable diseases, including heart disease and anemia, better maternal health, and more nutritional resilience to natural disaster, war, crop failure, and poverty.

Another form of dietary resilience comes from an effective food transportation infrastructure. An analysis of children's nutrition by geographical location in 21 African countries showed that the distance a child lives from a road is related to her dietary diversity. As climate challenges continue and grow, some areas will become harder and harder to farm, restricting the access a child has to nutrients not readily available in her own region. However, a child who lives closer to a road will be protected from some of these effects. Transportation infrastructure is a worthwhile investment for many reasons, and one is the diversification of children's nutrient access.

GLOBAL TRANSNATIONAL POLICY RECOMMENDATIONS

The global community often attempts to respond to natural disasters with humanitarian aid. However, in areas where long-term effects of climate change and conflict interact, including Somalia, effective responses are especially challenging. The immeasurable impact on the rights of children to grow, survive, and thrive demands a concerted international effort to reverse the impending

catastrophic consequences of climate change. The following are four policy recommendations that may improve transnational responses to the complexity of famine, conflict, and climate change.

Creation of Sustainable Funding for Humanitarian Action

As climate-related disasters grow in frequency and intensity in the Horn of Africa, the need for multisectoral and proactive response mechanisms becomes more urgent. Specifically, transnational organizations must create a long-term funding structure to replace the episodic humanitarian fundraising launched after each climate crisis. Transdisciplinary response teams can engage in planning as well as simple response. For example, in response to the 2017 drought in Somalia, the EU, UN, and World Bank conducted a needs assessment resulting in the Recovery and Resilience Framework (RRF). This plan has become the official resource mobilization framework for the UN in Somalia and also offers a blueprint for future humanitarian crises.[99]

Child-Sensitive Climate Change Policies

Per UN agreement, each country must implement a Nationally Determined Contribution (NDC) plan to mitigate the effects of climate change. Currently only 20% mention children and youth specifically. National climate policy must be child-sensitive, holistic, and multisectoral to offer the greatest protections to child rights and child thriving, prioritizing support for high-risk groups including children with disabilities and those from ethnic minority clans who may experience additional vulnerabilities.[100]

Encourage Youth Engagement and Leadership

Children are disproportionately victimized by the effects of climate change, and young people worldwide are fighting back. Greta Thunberg, the young activist from Sweden, has sparked a global movement of school-age students demanding government actions against climate change.[101] Many youth globally are equipping the adult world with new visions of climate health. Youth Climate Leaders (YCL) is an international network of students, researchers, entrepreneurs, young professionals, government leaders, and community representatives who engage in advocacy and unite local environmental movements with global ones. Youth advocacy has the multifaceted benefit of motivating governments to address climate change while also providing opportunities for youth to build leadership skills and experience agency, meaning, and purpose, individually and collectively, thereby contributing to resilience at multiple levels.

Promoting Peace

In many places, intensifying climate crises are likely to lead to more armed conflict as resources become more scarce and militant groups use this opportunity to claim power. Children's exposure to armed conflict corresponds directly to a number of adverse social and health outcomes that will grow in importance as climate crises worsen. In places that successfully end and prevent armed conflict, children will be more protected in the face of climate events. UNICEF's Learning for Peace program offers insights for mitigating conflict, strengthening social cohesion, and safeguarding children's developmental and cultural needs and rights.[102] Learning for Peace goes beyond traditional peace-teaching approaches to include education policies, curriculum development, teacher recruitment, equitable education resource distribution, and institutional and staff capacity development.

There is growing attention to integrating multisystem concepts of resilience with the goal of peacemaking in humanitarian nongovernmental agencies.[103] Building resilience and structural opportunities into multiple human systems of child rearing, education, health, and social policy may provide fundamental building blocks for peace, addressing structural inequalities and nurturing a healthier and more prosperous society. Scholars as well as humanitarians have noted the alignment of goals for nurturing health and resilience of children at multiple system levels with those of societies struggling to find a path away from conflict toward peace.[104] Peacebuilding efforts increasingly recognize that investments and goals for healthy development, education, and economic security need to be combined with social justice, and intergroup contact. It is essential to dismantle structural violence and systemic racism and build empathy, conflict resolution skills, and equitable opportunities for an economically secure and healthy future. Key protective factors, including hope, a sense of belonging and purpose, and close relationships, can be directed toward war or peace. Peacebuilding may be fostered by nurturing resilience capacity at the level of individuals, families, communities, and societies in a context of equitable opportunities and social justice.

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