Climate Change and Violence in the Horn of Africa

Begna Dugassa[*]

The Oromo Studies Association
*Corresponding author: begna.dugassa@gmail.com

Abstract **Background:** Climate change is exacerbating social problems and creating new challenges. It limits self-sufficient societies from feeding their families and intensifies competition for limited resources. Like infectious diseases, violence is predictable, preventable, and contagious. We can apply public health methods to predict and prevent violence. **Methods:** Applying Abraham Maslow's theory of hierarchy of needs and motivation, primary and secondary data are collected and analyzed if climate change causes deficits in physiological needs (i.e., food, water, shelter, clothing, comfort, sleep, and procreation), safety and security needs, and social needs/belonging and contribute to violent motives. **Objectives:** The primary objective of this paper is to explore if climate change aggravates the deficits in physiological needs (i.e., food, water, shelter, clothing, comfort, sleep, and procreation), safety and security needs, as well as social/belonging needs and instigate the motives to violence. The secondary objective is to provide a public health thinking framework, foster people's capacity to think and act at the "upstream level," and advance violence prevention. **Findings:** In the Horn of Africa (HA), climate change widens deficits in physiological and security needs. Those deficits enlarge necessities for social needs and intensify competition for resources. The violence resulting from climate change is contagious, predictable, preventable, and has an incubation period. **Conclusions:** Climate change is one of the root causes of violence in the HA. Thinking "upstream level" and envisioning prevention strategies can reduce and prevent violence.

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1. Introduction

Knowledge is inextricably socially constructed [1,2]. The road to profoundly understanding the relationships between climate change and violence can be a personal journey because personal narratives are vital starting points to comprehend and call for action. Paving the policy directions in addressing this critical issue, fostering thinking at the "upstream level," and reorienting the decision-making process are the professional duties of public health leadership [3,4]. When public health is understood as a cross-disciplinary area, it is denoted that it encompasses science and art that focus on understanding and preventing the biological and social causes of disease and the promotion of health [5]. Applying public health principles, i.e. thinking "upstream level" and making efforts to understand the relationships between climate change and violence, is an effort to connect the dots, put the puzzles in their places, make sense of the big picture, and envision workable solutions.

Throughout human history, all societies have strived to understand and address their unique health problems. Those protracted efforts enhanced their knowledge and problem-solving skills. Most initial efforts focused on understanding and controlling biological agents, i.e. contagious infectious diseases. Those efforts led to controlling and improving the physical environment, i.e., sanitation, clean water, food, adequate housing, and vaccination. The second significant effort is controlling chemical and physical pollutants and improving workplace conditions. The third vital effort that encompasses the prior is advancing social and environmental justice, which includes social hygiene, i.e., social determinants of health, i.e. guaranteeing food security/nutrition [6,7]. The contemporary social movement further widens our scope and challenges us to think and act, considering "planetary health" [8]. However, although violence is a longstanding social problem and easily preventable, until recently, it was not recognized as a public health issue. Violence was understood simply as a crime and left to the police and court to deal with it. Recent evidence suggests that violence is a contagious, predictable, preventable problem with an incubation period and getting the attention of public health [9,10,11]. By applying the public health parable "upstream thinking," we can effectively understand the root causes, predict, mediate, and prevent violence. What is not yet clear is the impacts of climate change and violence in the HA.

In the HA, drought, famine, and collective violence are longstanding problems [12,13,14]. Climate change is bringing unprecedented challenges, exacerbating century-old problems, and creating new ones. Currently, the global and local average temperature is on the rise. Due to climate change, weather patterns are becoming

unpredictable, deserts are expanding, and flooding and forest fires are becoming more common. Zoonotic diseases are widely spreading. Malaria-free zones are becoming prone zones. Flooding intensifies soil erosion and washes off the top fertile soil. The rise in weather temperature and high humidity gave some microorganisms a competitive advantage. As a result, climate change impacts food production and storage and further aggravates food insecurity and water scarcity [15,16].

Many researchers have reported that climate change is causing increased weather temperatures, severe storms, flooding, droughts, and other weather extremes and threatening people with increased property loss, structural breakdown, and hindrance to public services and sustainable ecosystems. As explained in the "the rich are getting richer, and the poor are getting poorer" aphorism, in the Horn of Africa, the highland regions that usually get adequate rain expected to get more, and the lowland regions that are usually dry would get less (Beyene 9 cited in 15,). Those extreme events are causing human migration, harming harmony between communities, and creating family and community conflicts. Climate change is the greatest threat to the Horn of Africa. However, the people of the HA are responsible for an insignificant share of greenhouse gas emissions. Despite that, these people and their ecosystems are experiencing heavy burdens with severe public health risks [15,16]. Understanding and addressing those complex issues fosters planetary health, and building the capacity to comprehend those dynamics and systemic relationships between climate changes and their effects on natural and social systems that affect human health at multiple scales is essential [16].

If we conceptualize society as a living social organism, the ongoing assaults on the natural and social systems threaten planetary health-i.e., the health of current and future generations. The socially and politically marginalized groups and poor communities face a greater risk of those negative consequences. The people in the Horn of Africa are conditioned to carry the heavy burden of climate change. Public health policies are the joint productions of contemporary science and art, i.e., policymaking. When we change how we understand our social problems, we change our reality. When we explore what actions to take to prevent and reduce the health impacts of climate change, we generate new knowledge, and the evidence will inform and guide policy actions. This research project is part of the effort to understand and inform policymakers of the reality of people in the HA.

The outstanding question is how to capture and analyze if climate change causes violence. Can we apply the "upstream" public health metaphor or Abraham Maslow's theory to answer this question? A famous USA psychologist, Abraham Maslow, studied human needs and motivations closely. He grouped human needs into five categories, which he named a) Physiological, b) safety, c) belonging or social need, d) esteem, and e) self-actualization needs [17]. The central analysis of Abraham Maslow's hierarchy of needs is that human needs stimulate their desire and motives. Human motives are higher to acquire physiological needs. The need for security comes next, and the need to belong follows.

The more basic and urgent needs are physiological, i.e., food, water, shelter, clothing, comfort, sleep, and procreation. The second urgent need is security, which includes social order, stability, predictability and control of their lives, and physical safety. It also includes the rule of law and protection against unpredictable and harmful situations. Belonging is a social need and part of the human emotional need for interpersonal relationships, affiliating, connectedness, and being part of a group. These social needs involve the desire for interpersonal relationships and being part of a group, i.e., cultural racial/ ethnic friendship, intimacy, trust, acceptance, receiving, and giving affection and love [17]. Would the cascade effects of deficiency in physiological, security, and social needs caused by climate change lead to violence? This paper consists of four major parts. After the background of the research, research methodology, and the topic's significance, case examples in Eritrea, Ethiopia, Somalia, and Sudan are closely examined and contextualized. Then, discussion and conclusions will be covered.

2. Research Questions

This paper tries to answer the following questions. If climate change creates unprecedented challenges, does it impact the social determinants of peace and foster violence? If climate change erodes people's choices and deprives them of the possibility of feeding their families and communities, would it intensify competition for limited resources and onset violence? If yes, what are the pathways in which climate change contributes to violence?

3. Objectives

Applying Abraham Maslow's theory of hierarchy of needs and motivation, this paper explores if climate change acts as the social determinant of violence, aggravates the deficits in physiological needs (i.e., food, water, shelter, clothing, comfort, sleep, and procreation), safety and security needs, as well as social/belonging needs and instigate the motives to violence. The secondary objective is to provide a public health framework of thinking and fostering to build people's capacity to think and act "upstream level" and advance "social medicine."

4. Methodology

Knowledge construction is a learning activity attained by rigorously researching, i.e., systematically collecting data, analyzing, synthesizing, interpreting, evaluating, and answering outstanding questions. Meanings are inherently socially constructed through such a systemic approach. In this paper, research methodology is the underlying theory on which data are collected and analyzed. It includes a systemic data-gathering method, analyses, interpretation, and conclusion [18,56]. Theory enables us to see the world around us and assemble the patterns of relationships and causality events, and it is essential in knowledge construction. Applying Abraham Maslow's theory of hierarchy of needs and motivation, this paper collected data and explored if climate change causes deficits in physiological needs (i.e., food, water, shelter, clothing,

comfort, sleep, and procreation), safety and security needs, as well as belonging contribute to violent motives.

Why am I interested in examining Climate Change and Violence?

First, I came to this research from my lived and research experiences. I was born and raised among the Oromo people, who, with extreme violence, incorporated into the Ethiopian state [19,20]. As a result of the conquest, the Oromo people are denied the right to decide on their social, economic, political, cultural, and environmental affairs [21]. Most of the Oromos became serfs to the invaders [22]. I grew up observing the widespread human rights violations, impoverishment, and fierce resistance to subjugation. One of the prior knowledge areas that informed me to ask and research this topic is the famous resistance songs and poems of the time and the present that say the following.

Lafti gamaa, lafaa hinbaatu   The land across the river will not be left without plowing in season. Talbaa facafaataa taati It can be used at least to grow flaxseed.

Tokko qotee, tokko nyaatee, tokko hinta'u While one plow land and the others eat the harvest, the farmed should not sit and act as indifferent. Waali gagalafaata taati. If this is the case, it will lead to killing each other.

The song tells the landlords that the serfs will resist more actively if they continue to take their earned harvest. It notifies the landlords and others who subjugated and exploited them that they are ready more vigorously to fight and guarantee themselves food security. It warns that, if necessary, they will fight violently, which can lead to killing each other. As the song professed, from 1972-74, when food scarcity and famine openly surfaced throughout Ethiopia, led to the upraising of people, which led to the 1974 "Ethiopian Revolution" and the demise of monarchial rule. Oromo revolutionary artist Hacaalu Hundesa [23] used the song to remind the Tigray Peoples Liberation Front (TPLF) led government what the generation before him had reminded King Haile Selassie. The song suggests that injustice and food insecurity make violence eminent.

Second, I am interested in exploring the relationships between climate change and violence and trying to offer answers because the core objective of public health is founded on thinking "upstream level," identifying the root causes of the problems, and finding socially acceptable and financially feasible intervention methods. Public health methods can contribute to preventing and reducing violence and reversing the causal relationships between climate change and violence. The intent to investigate the topic sprouted when I noticed hope for peace and stability had been dashed, and the long-standing political skirmish had turned into a full-scale civil war in Ethiopia and Sudan.

Third, my episteme sprouted from the Oromo worldview [24,25] and flourished by the social constructionist ideas of social realities [1,2] and the famous public health "upstream-midstream-downstream" parable [26]. Professionally, I have been researching the social construct of public health for over two decades and have been immensely influenced by the works of the fathers of Social Medicine, such as Rudolph Virchow [27]. Having health equity in mind, I have been researching how meanings in health and diseases are constructed and

produced through data collection, analysis, and interpretation. I am interested in how socially created knowledge has offered solutions to one group, created pathological conditions for others, and created health inequality between and within countries [28]. I have been promoting that the government should effectively work thinking "upstream addressing the structure" for the public good in understanding the relationships between health/diseases and social factors and systematically integrating and idealizing the framework of social medicine. This understanding inspired me to investigate the topic.

Fourth, public health made it crystal clear that health and diseases are socially determined. I am interested in the relationships between social justice and public health [28,29]. Collective violence, injustice, structural inequality, and ongoing colonial settlement continued in Oromia from the 1880s. The first wave of colonial settlement occurred from 1887 to 1910, when the unsalaried Menelik II army and starving Abyssinians resulting from the rinderpest virus arrived in Oromia. The second wave of settlement occurred following the Second Ethiopian-Italian War, or WW II, from 1941 to 1960. The third wave of the settlement occurred from 1972 to 74, which resulted from the famine in the Wallo and Tigray provinces. The fourth wave occurred from 1984 to 86, instigated by the war and famine in Tigray and Wallo provinces. The fifth wave of settlement is ongoing from 1992 to the present [22].

The core reasons for the first four waves of the colonial settlement were famine resulting from the rinderpest virus, drought, and war. In those settlements, the Oromo people were evicted, dispossessed of their land, and forced to feed and shelter the settlers. The Ethiopian government's objective in settling those people was to control the political activities of the Oromo people, assimilate them into Amhara culture, and enhance the settlers' quality of life [29,30]. The fifth wave is part and parcel of the global land grab policy, which provides business opportunities for local and international corporations without considering the needs of the Oromo people. The predicaments of those settlements are twofold. First, they have created a sense of entitlement in the minds of Abyssinians and provided theoretical and practical reasons to claim the Oromo lands. Second, the settlement has created structural inequality, overlapping social problems, and deep sentiments in the minds of the Oromo people. Those ongoing injustices have created fertile ground for violence, and as climate change is a multiplier of risks, it can easily tip off to instigate it. When studying climate change and violence, I refer to how multiple, overlapping environmental shocks and hazards turn tipping points, eroding coping strategies, exacerbating inequalities, pushing tipping points, and leading to conflict.

Fifth, as a public health nutrition researcher, I have been exposed to the scientific literature on the biology and physiology of starvation [31,35]. The impacts of food insecurity and nutritional deficiencies include physical and mental health. Evidence shows that starvation erodes society's morality, ethics, and social responsibility, creates fierce competition for food, and makes conflict in the family, community, and between communities eminent. Subsequently, power is exercised at the community and family levels. Among the community members, people

experiencing poverty and marginalized groups suffered the most. Markedly, power is exercised within the family, resulting in women and children often starved. Notably, there are records in human history where starvation led to cannibalism [12]. Biological and security needs transcend the community's social values and ethics.

Sixth, the theory of knowledge construction in public health clarified that public health interventions depend on how the problems are defined. Our understandings are dependent on our prior knowledge and are subject to be different. Although climate change has seriously impacted public health, the nature of the problems and the magnitude and adaptation efforts differ. Knowledge construction (KC) is a systemic knowledge production-oriented approach focused on understanding how health science evolved. It includes analyses of the historical origin of the ideas and methods of creating it, identifying strategies scientists employ in their works, discursive evidence production, and the future of evidence construction shared across contemporary health sciences [36,65]. This necessitates contextualizing our efforts and validates the need to explore the public health impacts of climate change that are more common and severe in the HA.

Seventh, navigating complex population health issues, integrating the information, and providing workable solutions require a well-thought-out approach. To that end, public health developed four fundamental methods: surveillance, risk factor identification, intervention, evaluation, and implementation [32]. For the surveillance, establish the problems, their magnitudes, and who are affected. In risk factor identification, closely look at the causes and try to specify the biological and social factors. In the intervention-evaluation stage, study what works to prevent and mediate the problem and evaluation of the intervention. In the implementation stage, they strategize to prevent and intervene more effectively. Understanding that knowledge is socially constructed, researching the relationships between climate change and violence spurs learning and problem-solving skills. Problem-solving is creative thinking, seeing things through the mind's eye, critical reasoning, deep understanding, building the problem-solving capacity of people, and widening their choices in life.

Eighth, in the HA, the imposed formal and informal institutions advance unequal social structure, and they do not adhere to the principles of human rights, democracy, accountability, and fairness [33,34,37]. In the HA, belonging to ethnic-national groups is the means to guarantee physiological needs and security. Indigenous institutions that adhere to the idea of collective security are suppressed. The absence of good governance, disregard for human rights and the rule of law, and poor economy have created pathological social conditions. When climate change erodes access to physiological needs, we must monitor their actions to guarantee safety. Climate change creates adequate feeding grounds for conflict and violence, and public health must advocate thinking and acting at the "upstream level."

Ninth, the worldview of society provides ethical conviction. Under colonial rule, the imposed episteme fostered the development of an unequal social structure [33,64]. The unequal social structure erodes long-standing harmonic relationships between different social groups and the land. Climate change is widening structural inequality and creating a violent social environment. This predicament necessitates redefining the ecological and human relationships and reclaiming that humanity is part and parcel of planetary health.

Tenth, our future depends on how we understand our social and ecological world and what we do about it. Our social and natural worlds are connected. As equally as anthropologic activities impact our planet, our natural system affects our social system [8]. The COVID-19 epidemic taught us to broaden our thinking and focus on global health [66,34]. The 2023 heat waves, destructions from forest burns, and flooding further necessitated us to widen our scope and think and act with "planetary health" in mind. The challenges we face from climate change are daunting, and fostering evidence-informed policymaking is essential. The pressing time has emerged to advance planetary health and orient our efforts to understand human activities' impacts on our planets and, vice-versa, i.e., the natural systems on human health, such as violence.

Violence and Public Health

Social changes and scientific advances make us better comprehend many social problems and pave evident-based paths. This includes how we understand violence and deal with it. For example, colonialism is a violation of people's collective rights, and it constitutes "collective violence" [9,34]. However, it is presented positively as "a civilizing mission" [36,38,39]. Openly, the motives of colonialism are driven by biological/cultural racist episteme and interests to exploit the human and natural resources of others. As such, under colonial rule, the colonized people's social, economic, political, cultural, and environmental rights are violated [22,34]. The violations of those rights created pathologic social conditions, which were ideal for the spread of endemic, epidemic, and pandemic diseases [34,36]. Public health literature extensively covered the relationships between colonialism and infectious diseases. Most of those authors were not critical of their governments and did not mention that colonialism/collective violence is a disease or disease-causing agent. Instead, they presented it as "a civilizing mission," mimicking it as healing. Accumulated epidemiological evidence and human rights/equity lenses revealed that violence is contagious, predictable, preventable, and has an incubation period. This makes colonialism and other forms of violence a public health issue [9,10].

Colonialism and capitalist systems intensively exploit human and natural resources, polluting the environment. The capitalist system fosters globalization and makes national sovereignty less relevant [38]. As we learn from the COVID-19 pandemic, the speed of travel and our mobility made the traditional quarantine standards insufficient. Although instant communication makes human rights violations an international concern, the distribution of the gaps in wealth and power between countries and within countries is widening. The rich and powerful countries extensively exploited natural and human resources, polluted the environment, and immensely contributed to climate change. As the rich and powerful groups accumulate wealth and power, the poor and marginalized groups are forced to carry heavy burdens. Practically, this creates social conditions where people

experiencing poverty compete and even fight for the limited resources they have.

In precolonial times, all people in the HA were fully autonomous, and members of the groups lived with no or little structural inequality [19,20]. However, in the formation of the state, the empire builders imposed colonial ideas and structural inequalities and, unfortunately, legitimized them. For example, the formation of the Ethiopian state eroded people's autonomy and protective social system. It broke harmony between and within groups, causing environmental degradation, social dysfunction, marginal living conditions and creating lifelong and intergenerational disadvantageous conditions [33,40]. The imperial ideas and marginalization fostered social and environmental injustice and created what an indigenous scholar called pathological social conditions [34,36], which are part and parcel of violence.

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Public Health Approach Violence Prevention

Public health is the place where science and the art of policymaking in disease prevention and health promotion converge. It focuses on thinking at the "upstream level," identifying the root causes of social problems, and offering optimum solutions. The Ottawa Charter of Health Promotion introduced the idea that peace is essential to health [41]. Public health activities focused on protection strive to protect people from exposure; prevention identifies and arrest health threats and identify at-risk groups; promotion strives to keep the health conditions and improve unhealthy conditions over time; prognosis and make continuous efforts to anticipate threats; and provision always geared developing plans of actions and deliver them in culturally acceptable and financially feasible ways [5]. Public health can offer cost-effective, culturally acceptable, and adaptable tools to prevent violence.

In the Oromo episteme, peace and health are intertwined. The Oromo episteme teaches seeking personal health/peace, peace/health in the family and community, with the natural world and divine power [24,42]. The Oromo episteme is constant is constant with planetary health. The World Health Organization [9] and the American Public Health Association [10] produced unwavering evidence that violence is a public health issue. Violence, inequality, poverty, food insecurity, water scarcity, and bad governance are intertwined. Not only that, but violence is also contagious, predictable, preventable, and has incubation periods [11,43]. The

WHO [9] provided the typology of violence and distinguishes four types. This includes physical, sexual, and psychological attacks and different forms of deprivation. WHO further categorized the nature of violence into self-directed, interpersonal, and collective violence. Collective violence is criminal acts committed by a group on another group, which can be social, political, and economic violence [9]. From the Horn of African people perspective, collective violence includes cultural and ecological violence. Violence is growing over time in the HA, and children suffer the most [45]. These problems would not disappear accidentally overnight because we wish for it. It requires us to deeply understand the social causes of the problem and make sustained and coordinated efforts to prevent it. Climate change is accepted as a multiplier of risks and would do the same to the risks of violence. Public health's epistemological goal is to prevent disease and enhance population health. It is instrumental in identifying social and environmental disorders, the causes of social disturbances, the nature of risks, and protective factors, advancing social and environmental justice and creating the foundation for equity in health. It draws on knowledge from various academic disciplines such as medicine, microbiology, nutrition, epidemiology, sociology, psychology, criminology, education, economics, and policy. Those broad fields of disciplines provided tools to public health to understand the root causes of social problems and respond timely to various population health concerns. Public health can help understand the relationship between climate change and violence. Leaving the matter of violence to the court and police hinders us from profoundly understanding and preventing it [45]. Hence, public health can help us understand and solve our longstanding problems [5,44].

Public health approaches instrumental in violence prevention includes a) defining and monitoring social/health problems, b) identifying risks and protective factors, c) developing and testing prevention strategies, and d) assuring adaptation. Public health defines the problem by systematically collecting information on the magnitude, scope, characteristics, and consequences. Establish why it occurs, determine the causes, correlations, factors that increase or decrease the risks, and conditions that can modified through interventions. It strives to determine what works to prevent and offer actionable strategies promising interventions on risk factors and monitoring the impacts. Then, design, implement, and evaluate intervention. Understanding that climate change is the primary global challenge of the century and accepting that violence is a public health issue necessitates us thinking about evidence-based policy directions in violence prevention [32].

What is climate Change?

Climate change is a long-term shift in temperatures and weather patterns. The consequences of climate change include intense droughts, water scarcity or flooding, food insecurity, the spread of zoonotic diseases, severe forest fires, rising sea levels, catastrophic storms, declining biodiversity, and declining pollination. Climate change affects the ability to grow and preserve food. It redefines what constitutes safe housing and workplace. It harms health through air pollution, the spread of disease, extreme

weather events, forced displacement, food insecurity, and pressures on mental health [46].

In 2023, several extreme weather events were recorded globally. Extreme heat and widespread forest burns consumed millions of hectares of natural forests, villages, and towns in North America, Europe, and Asia. A prime example of a city destroyed by fire is Lahaina- in Hawaii in the Pacific. Simultaneously, the world witnessed extreme flooding and rising sea levels, swamping homes and farmlands in different parts of the world. Those extreme events caused damage to private and public properties, eroding public services and displacing people [47]. It has caused trillions of dollars in damage and eroded millions of people's living conditions. In areas with a lean economy, it will lead to competition between communities on resources and create fertile ground for conflict.

Evidence shows that for every one-degree Celsius increase in atmospheric temperature, there is a chance of a seven percent increase in moisture. The more moisture accumulates in the atmosphere, the more it cools and falls as rain - risking flooding in certain areas and draught for others. The atmospheric temperature and humidity have been in equilibrium for millions of years. In season, the wind carries away the moisture in the atmosphere, cools down, and empties itself as it pours rain and gives life routinely. The increased weather temperature and atmospheric humidity alter those routines. For example, in the first week of September 2023, the Nevada Desert received two to three months of rain in 24 hours, which is rare. The rain caused unexpected flooding in Burning Man, instigated conflict among the festival goers, and killed one person [48]. Scientists predict that the highlands regions of the HA will get more rain and flooding, and the lowlands will get less rain. The prediction suggests it causes unprecedented challenges to both regions.

Knowledge Construction in Climate Change and Violence

The foundations of our knowledge about our social and natural world are based on the questions we ask and the efforts we systematically make to seek the answers. The construction of knowledge occurs through a complex dynamic process. As people experience the world and reflect upon these experiences, they incorporate new information into their pre-existing knowledge. The history of science clearly shows that it begins by asking questions as a form of intellectual exploration [18,28]. There is compelling evidence that knowledge is socially constructed; thus, it varies from culture to culture. Knowledge and experiences practically represent the two sides of the same coin. The social circumstances in which we are born, live, and play have a significant role in what we know and what we better learn. We construct knowledge on our prior knowledge. We learn best when provided with necessities in life and when we feel safe [1,2]. When granted our physiological necessities, we can take risks and more willingly explore new things and ideas and secure our needs. In other words, learning is about enhancing problem-solving skills, which includes understanding the causes of our social problems and developing workable solutions to mitigate and prevent them [28].

Climate change creates unprecedented challenges [15,45,49,50]. It causes people to struggle to acquire their daily needs. Struggling to acquire daily means does not give the means to collect data, interpret, and construct knowledge. Hence, climate change can hinder the capacity to learn and develop problem-solving skills. It alters morality and ethics. To analyze the relationships between climate change and violence, we need to deeply understand the meanings of the behaviours of individuals and communities and their dos and don'ts. We must closely examine the complex social interactions in the family, community, and between the communities and compare the past and present. Considering Abraham Maslow's theory, we must ask whether basic physiological, security, and belonging needs alter people's motives and observe how far individuals' and groups' motives go to acquire those needs. In societies where formal institutions do not adhere to the principles of human rights, democracy, accountability, inclusion, and fairness, when climate change erodes their access to physiological needs, we need to monitor what actions they take to guarantee their security.

Abraham Maslow's Theory and violence in the HA

As noted above, a growing body of research suggests climate change widens resource competition. In the next section, I will apply Abraham Maslow's theory of the hierarchy of needs and human behaviour to examine if physiological and security needs deficiencies intensify the need for belonging and lead to ethnic/national conflict. The intense competition for physiological and security needs informs members of the necessity for belonging and collectively strives to guarantee the group's needs. This means that climate change further intensifies national/ ethnic conflicts. For example, researchers in national/ ethnic conflicts identified that nationalism grows out of the protection of common interest and enhancement of common destiny. The identified five primary roots of nationalism are a) historical attachment to longstanding conditions and practices; b) political desire for power or autonomy; c) social concern for group value, custom, and tradition; d) economic concern for the standard of living and e) geographical affiliation with a particular territory [68].

The episteme of a society has significant impacts on environmental sustainability. Likewise, the natural environment informs the episteme of a society. Abyssinians are conservative Coptic-orthodox Christians with structured social and ecological narratives. In Abyssinia, the landscape is highly eroded and degraded. The land is mismanaged and dissected for a long time, creating fragile and sloping terrain. It is deforested and has poor soil and harvest. Seemingly, the people became the most religious in response to those unprecedented environmental challenges. For example, Abyssinians have 44 religious Holidays in a month and spend more time in prayer than working. The 44 religious holidays are society's prayer responses to social problems. Such narratives denote that celebrating those holidays and begging on the street makes you closer to God and guarantees necessities in life [51]. When they realized that such practice did not solve the environmental degradation and poor harvest, they accused others of falling to pray and hindering God's goodwill.

Cultural violence erodes sustainable development. We can observe this reality in the case of Ethiopia. In Northern Ethiopia - the Abyssinian homeland, people are

conservative Coptic/orthodox Christians, and the environment is highly degraded in the region. Informed by the culture, there are times when the Ethiopian government deliberately burned the natural forests of Oromia [67,52]. However, the people in Oromia and Southern Ethiopia have a relatively ecologically friendly culture. The Abyssinian church clergy sees the ecologically friendly ethics common among the people in Oromia and Southern Ethiopia as "tree worshipers." The Abyssinian cultural impositions gradually altered the harmonious social and ecological relations and caused the landscape in Oromia and the South to degrade.

In the HA, the intent to belong and defend clan/ethnic/national identity is firm. To build a defense against existing or emerging threats, those groups work collectively to protect themselves. For those reasons, the HA has been in turmoil for over four decades. Some of those countries are fighting each other and conducting bloody civil wars. For example, from 1977-79, Somalia and Ethiopia fought a bloody war. Although the Cold War era politics, which compounded with the national question aggravated, the conflict was on the land and water. The Somali government intended to redraw the colonial border. It claimed the territories the Ethiopian government controlled from 1890 and the land the British colonial force handed to Ethiopia when they left the region. The intent of the Somali government goes beyond claiming the lowland areas where predominantly Somali language speakers settled; it also included the vast highlands regions of Oromia, i.e., Eastern, Central, and Southern Ethiopia. Claiming the highland regions of Oromia reveals that the true motives are access to greenery and fresh water. In revenge, the Ethiopian government organized certain Somali clans against the central government, leading to the Somalian government's collapse and creating chaotic situations [13]. Although ecological reasoning instigated the war, the war did not provide the intended solution. War causes enormous casualties to humans, destruction to social structures, harms social relations and ecosystems, and has long-lasting negative implications [53].

From 1998 to 2000, the Ethiopian and Eritrean governments fought a bloody war in a dispute on Badame, a barren land, differently interpreting the colonial border. Although most of the disputed land is barren and worth little to pay heavy causalities, claiming the land gives access to fresh river water. After two years of bloody war, over 150,000 deaths, and half a million wounded, both countries agreed to settle the dispute through independent arbitration. When the arbitration sided with the Eritrean government's narratives, the Ethiopian government refused to hand over the disputed land. The skirmish between the two countries continued for over two decades. In those years, both countries supported the opposition groups of the other and contributed to instability, degradation of the ecosystem, and creating a spiral of vulnerabilities [54]. In the hope of taking control of Bademe, the Eritrean government supported the Ethiopian government fully engaged in the 2020/22 Ethiopian Civil War.

Civil War and Climate Change

Climate change degrades natural environments, eroding crop yields, food storage, and access to fresh water and threatens food security and ecosystem management. It elevates crop pests and zoonotic diseases and intensifies competition for access to fresh water and fertile land [15,49,50]. The conflict in the Darfur region in Sudan is an excellent example of such a conflict. In the conflict, the Arabs openly claimed the Fur indigenous land as they theorized that they had the lineage of Prophet Mohammed and were entitled to fertile land. Using such racist theory, the Arab militia known as Janjaweed attacked the Fur villages, burned them to ash, killed as many people as possible, and claimed the fertile- greenery and watered lands. The Janjaweed militias are nomadic Arabs, predominantly cattle breeders' and dwindling rainfall and drought instigated them to compete over natural resources such as grazing lands and farmland [55].

The Ethiopian state was formed by brutal violence [19,20,40]. The primary motive of Amhara king Menelik II was derived from the European empire builders' racist views and openly claimed racial/cultural superiority and environmental degradation. The Amhara elites openly claimed a racist narrative coming from ancestry in the Biblical legend of King Solomon [21]. Most of the Menelik II armies voluntarily joined the force - because they were perused by the racist discourse and promised food. At that time, they were starving from the calamity caused by the rinderpest virus that wiped out their cattle. Most of Menelik's army was unsalaried. The unsalaried armies were instructed to make their living and pay taxes to their king from the looting of the people they brutally conquered. In the state's formation, the European empire builders provided the Abyssinian king with firearms and racist discourse. The Ethiopian government paid for the firearms of the enslaved people from the conquered people. After state formation, the Ethiopian rulers employed racist ideologies in their policies. As a result, non-Abyssinians were enslaved, the Amharic language became the official language, and the Orthodox church became the state religion. In other words, the African state banned African languages, religion, and other institutions. The European racist discourse and environmental degradation in the Abyssinian homeland played a vital role in the Ethiopian state formation [37,56]. Ethiopia is one of the countries where state violence is widespread [34,37,56].

In 2023, the Amhara[1] group known as Fanno rebelled against the Ethiopian Federal government and revitalized longstanding racist narratives. When they explained the political motive of their movement, they openly said, "The ethnic/national groups whom the Amhara people have civilized betrayed us." Referring to the Ethiopian state, "the state the Amhara forefathers formed is not giving the due credit and appropriating the founder status that we deserve." Instead of referring to the Amhara people as pioneers and founders, they call us the colonizers and the Neftenya." We fight to change those narratives and reclaim the Amhara past glory. We formed Ethiopia; hence, the Amhara people have the right to settle anywhere in other regional states. The Amhara people should not be limited to the Amhara regional state." Consistent with the Arab Janjaweed militia entitlement

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[1] Amhara ethnic/nationals are the second largest group, and Oromo is the largest. As stated earlier, the Abyssinian lands, including the Amhara, are extensively degraded.

theory in Darfur, Sudan, in Ethiopia, the Fanno is claiming the entitlement of the Amhara people to the lands of people their forefathers colonized in the 1880s. Although the narrative of the claim has racist ideas and ideologies, in both cases, the core issue is land, and climate change is the major contributing factor.

The Ethiopian government has a long history of perpetuating collective violence. In the Ethiopian state formation, many ethnic/national groups were conquered in the bloody war. It has been deliberately starving people, burning their properties, and proactively eroding the social conditions of people who demand social justice [21,56]. In the 1970s, the Oromos, Ogden, Sidama, Tigray, and Eritrean people who had experienced collective violence, marginalization, and spiral vulnerability demanded social justice. The Ethiopian elites, who have benefited from the conquest, decided to crush those who demand social justice. Each group built their resistance to counterbalance the brutal Ethiopian armed forces. The alliance of resistance forces led by the Eritrean People's Liberation Front (EPLF), the Oromo Liberation Front (OLF), and the Tigray People Liberation Front (TPLF) in 1991 led to the demise of the Ethiopian military government [21]. The political motive of those groups was to guarantee the right to self-determination, i.e., autonomy and self-governance, which boils into control of land, culture, and political power.

Many cases reveal the direct relationship between climate change and violence. For example, from 1984 to 1986, a major famine occurred in Ethiopia, and the Northern provinces such as Eritrea, Tigray, and Wallo suffered the most. To guarantee themselves food, the people in Tigray and Eritrea massively joined the TPLF and EPLF armed forces. The rebel groups received food from international aid, promising to deliver it to needy people. Instead, they used food to recruit able men and women to their armed forces, and tipping off the military balance intensified the war against the government. The Ethiopian government also used food as a tool, and those who resisted its policies were left to die from starvation. In addition, the Ethiopian government used food to uproot people from those provinces and forcefully settled them in Oromia, Benishangul, Gambella, and other regions. The settlement also created conflict between the local inhabitants and new settlers on the land.

The EPLF, OLF, and TPLF alliances did not last long. Soon after the demise of the military government, the alliance ended. The EPLF decided to focus on declaring Eritrea's independence. The alliance between the OLF and TPLF ended when the TPLF decided to use the pseudo-Oromo organization they formed to rule Oromia. The demise of the military government did not foster the democratization of the empire. The Tigray people constitute less than six percent of the population of Ethiopia, and TPLF could not galvanize other nationals to their support. Tigray region is environmentally depleted and dry compared to Oromia and other regions. The Tigray region periodically experienced drought and famine. Therefore, instead of correcting the wrongs of the past and paving a better future, the TPLF adopted extreme violence to maintain their domination [40,57]. Under the TPLF rule (1991-2018), over two million people were killed, three million international refugees, and twenty million internally displaced.

Under the TPLF rule, federalism and self-rule were constitutionally legalized but never implemented. The TPLF did not implement the principle of self-rule because the Tigray region could not be self-sufficient. TPLF violently suppressed those who demanded self-rule. TPLF not only perpetuated state violence, but it also promoted inter-ethnic and intra-ethnic conflicts. The Oromo people vigorously resisted the TPLF domination and were targeted the most. To subside the Oromo resistance, TPLF used the longstanding resource competition between the Ogden and the Oromo people on water and grazing lands to make clashing points. The TPLF used this as an opportunity, armed and provided material initiatives for the Ogden to attack their Oromo neighbours and take their lands. From 2014 to 2018, over six million Oromos have been evicted from their homes [58].

The Oromo peaceful movement led by the Oromo youth known as Qerro led to the demise of the TPLF rule in 2018. Abiy Ahmed took power, pretending to deliver the demands of the people. Instead of democratizing the federal state structure shrined in the constitution, Abiy Ahmed was inclined to advance a unitary system government inherited from the imperial system. This has created a political division between those who want to dismantle the federal system and those who want to democratize the federal system, and competition for resources further aggravated violence. Although it seems there is a wide range of reasonings, if we apply the public health "upstream" metaphor, we see those conflicts are on resources, and climate change is a major contributing factor.

There is substantial evidence that climate change increases resource competition. For example, in the 2020-22 conflict between the Ethiopian Federal government and the Tigray Regional government, one of the outstanding issues is whether the Welkait and Tsegede zones belong to the Amhara or Tigray region. Welkait and Tsegede zones are fertile lands on the border between two regional states. The dwellers of the zones speak both languages. According to the current constitution, the Welkait and Tsegede are part of the Tigray region. From the perspective of the Amhara regional state, most of the people in the zone speak Amharic, and historically, they were part of the Amhara province. Those zones were incorporated into the Tigray region in the 1996 constitution under the TPLF rule. Hence, the regional state argues that those two zones must be part of the Amhara region. From the Tigray government's perspective, those zones used to be part of the Tigray region before 1887. After King Menelik II conquered the area, he made it part of the Amhara province, forcefully assimilating Tigrigna speakers and settling Amharic speakers. Indirectly implying that the core issue is the resource, both groups describe the significance of the disputed land and highlight sunflower farming and food oil production.

Let me add another underpinning point and substantiate that violence is contagious, predictable, preventable, and has incubation periods. Violence, inequality, poverty, food insecurity, water scarcity, and bad governance are intertwined. The social causes of violence are traceable, and interventions are possible [43,44]. In Ethiopia, one of the reasons why state violence has continued for over a century is that violent leaders are openly romanticized. The horrendous crimes of those leaders are subsequently

presented as acts of bravery, desirable and morally justifiable [45]. For example, King Menelik II, whom the Oromos, Wolaitas, Hadiyas, and many others charged with genocide and slave trade, Tedy Afro - the Ethiopian famous artist, presented him in his popular songs as a holly man and his actions as the blessed. Amharic speakers refer to their king, Menelik, as "a mother" because he faded them when they starved, looting, and starving the Oromo people. Since violent leaders are openly romanticized, many imitate to be like them. Romanticizing makes violence not a contagious disease that society wants to control but propagate. Even here, if we closely look at "upstream" the reasons for romanticizing the king, we see the footprint of food insecurity and the ecosystem [21].

In Ethiopia, from 2018 to 2023, over 1 million people died from internal conflicts, and over seven million were internally displaced [55]. Although most killings and displacement occurred in Tigray, Oromia and Benishangul regions also paid heavy prices. The primary cause of the conflict is the Ethiopian government's failure to uphold the principle of diversity and equity of ethnic/national groups; however, competition for resources such as agricultural land and access to fresh water plays a contributing factor [45,56]. Here, security, safety, and welfare are primarily guaranteed by and for the clan/ethnic/national group members. For that reason, many people oppose the idea of centralized government. Climate change poses a real threat, forcing people to rebuild and vitalize the institutions providing them security and safety.

Ethiopia is the home of unequal multilingual/cultural/religious, ethnic/national groups. The Ethiopian state has been formed and maintained violently; as a result, it built unequal social structures. Colonialism, i.e., Collective violence and unequal social structures, widen food insecurity and violence. Violence is not a unique Ethiopian problem. Although Somalia has a population of a single language- Somali, and one religion- Islam, climate change is drifting them apart and conditioning them to get organized on clan bases and compete for resources. The Ethiopian government exploited the impacts of climate change and clan differences, making it a political issue, and armed certain groups to fight against the central government led by Siad Barre. In the 1980s, the Siad Barre government adopted the same strategy and used his clan as a shield to maintain political power. Unfortunately, the conflict led to the demise of the Somali central government. Thirty-five years after the collapse of the central government, the Somali people are still struggling to have a stable government. Although the conflict that led to the demise of the centralized Somali government is commonly presented as a dispute between clans, the real cause is competition for resources [13].

Ethiopia is building the largest dam on the Nile River. Since Ethiopia declared building the dam, diplomatic skirmishes have been going on between the Ethiopian, Sudan, and Egyptian governments. Ethiopia needs the dam to generate electricity and irrigation to provide light and food for its growing population. The unpredictable weather events caused by climate change, poverty, and violence sprout from resource competition, necessitating Ethiopia to build the dam. Sudanese and Egyptians depend on the Nile River for electricity, drinking water, and irrigation. Those countries demand that the dam would not impact the water flow. The Ethiopian government could not guarantee them. Climate change- increases weather temperatures, which in turn escalates water evaporation. Unless effective, well-thought social and ecological policies that embody collective good are implemented and the degree of water evaporation controlled, the water flow will be impacted. The effort to minimize water evaporation might go beyond the capacity of the Ethiopian, Egyptian, and Sudan governments because it is part of the global problem. Unfortunately, the conflict would not offer solutions- instead, cooperating, coordinating their resources, and addressing them helps [15,45]. Whether the current diplomatic skirmish led to military conflict or not, climate change is the contributing factor.

5. Discussions

Human beings are entirely dependent on the ecosystem. Our social and natural worlds are connected and stand together as a system. An interaction of parts and their interconnections come together for the purpose. Disruptions of the delicate balance create unprecedented challenges. When climate change alters the equilibrium of ecosystems on the land and the atmosphere or planetary health, the conditions in which humans and nature have flourished together are remodeled. Those changes expose us to unknown territories.

We have long known that the places where we are born, live, work, and play directly and indirectly impact our health. The physical and social environments significantly influence the patterns and causes of diseases/health and health service deliveries. There is scientific consensus that the impacts of climate change on health vary through the social and institutional structures. Interlocking forms of oppression and cumulative disadvantage in life widen poverty levels and vulnerabilities. The broader poverty level and risks necessitate social needs. As the vulnerability persists and exceeds the hard and soft limits to adaptation, it bypasses the tipping point and intensifies competition [43,44].

The unpredictable and extreme weather events lead to unknown social territories, erode the social protective conditions, and increase vulnerability and hazards. This leads to the deterioration of livelihoods, causing various unprecedented social problems. Those impacts include food insecurity, environmental pollution, altering working conditions, occupational health, housing, water scarcity, sanitation and dermatological concerns, lifestyle and behaviour, social cohesion, transportation, and the economy. The known health impacts go from mental health, infectious, chronic diseases, maternal and child health, and the health of older adults.

What are the possible pathways in which climate change is embroiled in violence in the HA? Whether or not we think, track, and act at the "upstream and midstream" level, knowing the pathways of our early detection and actions makes differences at the "downstream" level. Understanding the pathways in which climate change causes violence can be instrumental in predicting, intervening, and preventing it. Based on our current knowledge, the possible pathways in which

climate change causes violence can be grouped into direct and indirect. Prevailing evidence shows that tracing the indirect impacts of climate change on violence is a complex task. For example, natural disasters do not randomly occur, and the impacts are not necessarily randomly distributed. Evidence shows that the most socially marginalized communities are the most vulnerable, which suggests a "web of social causation" at work. Such distribution reveals that the impacts of climate change are complex. The social condition of people can provide protection or increase their vulnerabilities. This reveals that indirect pathways in which climate change impacts violence are multiple.

The direct impacts could be chronic and acute, and the effects are usually proportional to the dose and duration. The known direct pathways in which climate change causes violence are few. A well-researched and established theory by epidemiologists [60] and clinical psychologists is that hot weather increases aggressive behaviour. Epidemiologists have established the direct correlation between hot weather and aggressive behaviour as they record different patterns of crimes in seasons and geographical locations in the U.S.A. Data shows an increase in the annual weather temperature by 2 degrees Fahrenheit on average and an increase of seven more assaults per 100,000 people. This means that for a country with a population of 270 million, an estimated 24,000 additional murders annually [61]. Clinical psychologists substantiated those relationships as they observed higher rates of aggressive behaviour among people when they feel hot than in room temperature conditions. How much such evidence is relevant to climate change and the HA? In the HA, climate change has increased the weather temperature by one degree Celsius. Since climate change is relatively new, we are still determining if those findings are country-specific.

It is too scary if the negative social consequences revealed in Craig's work apply to the HA. Several global climate theoretical models projected global temperature increases of at least 2 degrees Celsius over the next fifty years. The model analyses imply that if nothing changes, the rise in the temperature of the weather could amplify the risk of conflicts between families and communities, including civil wars, increasing by 50 percent in several parts of the world. As mentioned earlier, the HA is one of the most vulnerable regions. The model did not give distinctions whether it refers to direct or indirect impacts of climate change or the combinations of the two. The report named different mechanisms likely to operate in different social settings. The most critical social factor is conflict in competition for scarce resources [28].

Indirect Pathways

Climate change causes violence proportional to the dose and duration of extreme weather events. It threatens the essential ingredients of quality of life and good health – clean air, safe drinking water, nutritious food supply, and circumspect shelter – and can potentially limit people's choices and dwindle the little public health progress in the HA. For example, healthy soil is vital in guaranteeing food security and having healthy social relations. Healthy soil regulates humidity and ensures plants and animals grow and procreate. It sustains plants,

animals, and microorganisms. Soil can absorb, filter, and detoxify. As it absorbs and filters, it buffers against, remediates, and detoxifies pollutants. As a result, soil cycles nutrients and creates ecosystem stability. Due to climate change, the capacity of the soil to meet its vital ecological functions, i.e., maintaining biodiversity and microflora, is eroding. This erodes the productivity of soil [49,50]. Attrition of food production further aggravates food insecurity and increases competition for resources. This is observable in Northern Ethiopia and Sudan.Unhealthy soil exacerbates deficits in physiological and security needs and intensifies resource competition. Insecurity in the physiological and security needs further necessitates social needs and fosters ethnic/national identity politics. Those needs inform individuals' and groups' motivation to strive to acquire them by all means possible. Evidence shows that violence is contagious, predictable, preventable, and has incubation periods [11,44]. All forms of collective violence driven by resource competition and racist views, ideas, and ideologies that promulgated the exploitation of others are all implicated in the current epidemic of violence, which threatens the current and future generations' physical, mental, and social well-being.

Our social and natural worlds are intricately intertwined. Those relationships are complex and set in equilibrium. The idea and ideology that promulgated racial hierarchy and the exploitation of marginalized groups also allowed the unrestrained exploitation of the natural world. They eroded biodiversity, altered our atmosphere's chemical composition, and caused climate change. Most chemical discharges that have contributed to climate change occurred by cultural groups with little or no ethical conviction toward the environment. People like the Oromos have developed an ecological conscience that promulgates harmony between the social and natural world, and their moral standards and ethics extend to the natural world; however, they are conditioned to carry the heavy burdens imposed upon them [15,45].

There is consensus that climate change is causing increased weather temperatures, severe storms, flooding, droughts, and other weather extremes. Those extreme events degrade natural environments, erode crop yields and food storage, compromise access to fresh water, and widen food insecurity. It disrupts and complicates ecosystem management and breaks the sustained food system. It creates competitive advantages for some organisms and increases crop pests, even introducing a new one and widens food and water-borne diseases and zoonotic diseases. Those events increased property loss, structural breakdown, and hindrance to public services and sustainable ecosystems. Those conditions intensify competition for access to fresh water, food, fertile land, and safe living places, ruining harmony in and between communities.

Of greater significance, climate change erodes food sovereignty, compromises political sovereignty, and causes climate refugees. Extreme events such as storms, floods, droughts, extreme heat, high humidity, and disturbance of public services and economic activities are loss of assets, injuries, and death. Internal and cross-border human migrations create conflicts between communities. As such, the most significant impacts of climate change on violence are through indirect pathways

[45]. For those reasons, addressing climate change at the upstream level is paramount to improving health and preventing conflicts.

What did we learn?

This paper made seven contributions to public health literature. First, it provided substantive evidence and clarified that as climate change widens, the deprivation of physiological needs (food, water, shelter, clothing, comfort, rest, and procreation) increases the risk of violence. Physiological needs are essential for survival. Individuals and groups' formidable drive stems from their instinct to survive physically and culturally. For that reason, the motivation to acquire physiological needs is boundless. Unless those needs are fulfilled, there is no morality, rule of law, fear of God, or hope for the future. Hence, deficiencies in physiological needs create fertile ground for competition for available resources and violence.

In the HA, most of the people are farmers. They make their living cultivating crops and rearing cattle. This makes the relationships between the people and the land strong. The land feeds people like a mother feeds her child. When farmers sow seeds, the land gives them back lives and life-sustaining foods. For example, the Oromo people explain their land in the metaphor of their mother/father and their bones. Other times, they relate their land with the divine power, describing it as "Nitii Waaqaa," the wife of God. They resemble their land in different metaphors because their land is many things and everything to them. The land is loved, cared for, respected, and related harmoniously as a living body and divine power.

What is the significance of such a view? We all experience the impacts of social and natural environments differently based on the conditions in which we are born, raised, work, and live. The Oromo's ethical convictions toward the land and the ecosystem are part of their ontology and episteme, and such values are ingrained in the culture. For example, given that they deeply value their lands, the land is not a commodity for sale. The strong bond between the people and the land indicates how far communities go to protect their lands. If climate change causes displacement of one cultural group and settlement in other lands, violence is imminent.

Second, the motivation to guarantee security and safety is formidable. People want social order, predictability, and control in their lives. They want the rule of law and protection against unpredictable and harmful situations. This entails finding shelter from the outdoors, dangerous situations, health hazards and illness, economic security, food security, work stability, consistent income, and savings. Humans first consider their immediate physical safety before stability and security. Our understanding of social and physiological needs is growing. Clinical medicine is less interested in "upstream" structural inequalities and pathological social conditions like climate change. The growth of clinical medicine could not make the services painless, cost-effective, or effectively improve life expectancy. Clinical medicine aimed at individuals' good is driven by biomedical models focused on "downstream" treating the sick and the wounded. For example, in the U.S.A., Hurricane Katrina of 2005, i.e., natural disaster and the COVID-19 pandemic, revealed that the impacts of those calamities are not equally distributed among their citizens and showed "the deep crack" in the structural inequalities and "downstream" thinking that are ravaging the society. Drawing attention to those facts, when public health scholars recognized violence as a health issue, they justified it on the understanding that violent behaviours arise from biological, environmental, systemic, and social stressors.

Third, social and belongingness needs are human emotional needs that guide interpersonal relationships, affiliating, connectedness, and being part of a group. These social needs involve the desire for interpersonal relationships and being part of a group, i.e., cultural/racial/ethnic, friendship, intimacy, trust, acceptance, receiving and giving affection and love. Deficiencies in physiological and security needs further necessitate the need for belonging. If climate change causes deficiencies in physiological, security, and social needs, individually and synergistically, it will increase the risk factors for violence.

Fourth, as with many other public health problems, violence has an incubation period, contagious, predictable, and preventable. In the HA, violence is incubated by altered rainy seasons or flooding, droughts, food insecurity, famine, and migration, ultimately leading to violence. Contagiousness goes as food insecurity widens in one country/ region, the food prices in the neighboring areas dramatically increase, which leads to food insecurity for people experiencing poverty and escalates competition for resources. Climate change, violence, poverty, and injustice are interdependent and work synergistically to enhance competition and ethnic/ national tensions. Violence prevention is thinking "upstream" at the planetary health level, envisioning building the capacity to identify the risks and assuring a sustainable future.

Fifth, our understanding of the social and natural world and their complex interactions is growing. Both social and ecological systems are permeable, and they influence each other. Changes in the natural world influence the social system, and in turn, the social system influences the ecosystem. When researchers say violence is predictable, preventable, and socially determined, they denote that the relationships between climate change and violence might differ in diverse social settings. Those relationships might be more apparent in socially marginalized and impoverished societies. Indeed, in the HA, the social contributing factors that reinforce climate change and violence include poverty, historical injustice, undemocratic governance, structural inequality, and the absence of law and order. If people are empowered, they develop the capacity to understand the risks, identify solutions, make leaders and institutions accountable, and guarantee sustainable development.

Sixth, this paper enhanced the public health social determinants of health theory. Climate change enlarges the flawed and pathological social system. It widens the "upstream" problems, contributing substantially to aggravating the poverty level at the "midstream" and "downstream," fostering competition in the family and creating chaotic households and communities. People in the HA have poor socio-economic status. Since climate change multiplies social problems, they risk facing multiple burdens.

Seventh, public health applies to a wide range of academic fields. Therefore, it can help us logically reason, study, and define social problems, identify the risks and

protective factors, develop healthy social policies, and foster transforming social relations. This makes public health adaptable, flexible, and instrumental in developing nibbling social policies. Public health methods are nimble enough to adapt to study various social issues, including understanding the relationships between climate change and violence.

6. Conclusions

This paper elaborated that climate change is one of the social determinants of violence. Climate change impacts violence in complex ways. Those complex processes represent an incubation period. Those processes are reliably predictable and preventable, and they are also contagious. When climate change increases physiological, safety, and security deficits, it intensifies social/belonging needs. The physiological and security needs enhance social needs, i.e., belonging to a family, community, ethnicity/national group. Individually and collectively, those needs exacerbate competition for resources and aggravate violence risk. Another contributing factor that aggravates the impacts of climate change on violence in the HA is the unhealed past violence and structural inequality, some of them indeed caused by climate change. Therefore, healing the past and present wounds of violence and effectively thinking and acting "upstream" to mitigate climate change are crucial in preventing violence.

In the HA, security, safety, and social welfare are usually guaranteed by and for the clan/ethnic/national members. Insecurity caused by climate change widens the risk of conflict between groups. Those conflicts are more prevalent and severe when food insecurity and water scarcity reach the tipping point. The local governments and international organizations often think and act at the "downstream level" and treat the wounded, offer food to the displaced, and mediate the disputes between the groups. Given that those institutions acted without thinking "upstream level" and understanding the primary causes, the solutions they offered would not last long. Some agencies offer the Euro-American welfare system and act critically to the African system. The problem is not the deficit of the African welfare system; it is climate change that can effectively shift the balance, push the community off from the tipping point, and lead to conflict.

Healthy social relationships are dependent on well-functioning ecosystems. Climate change throws community relations off balance. The unwavering understanding of this dependency makes it apparent that there will be no health without planetary health. Building people's social, economic, political, cultural, and environmental capacities is essential to understanding and mitigating the risk factors and enhancing protective factors. In the HA, as equally as climate change fosters violence, violence also degrades the environment. The social structures that provide unfair privileges for some are often complicit with environmental degradation. Asserting the people's collective rights and fostering all ethnic/national groups to determine their affairs freely are instrumental in building their capacity and guaranteeing peace.

Understanding that climate change aggravates deficits in physiological, safety, security, and belonging needs and

increases competition for resources, the people in the HA need to proactively work to mediate and mitigate the impacts of climate change. Violence harms physically and mentally and has long-lasting impacts on the social relationships in families, communities, and between communities. It harms harmony between the social and natural world and contributes to environmental degradation. Violence is contagious and might lead to revenge and instigate violence. It leads to a breakdown in infrastructure, further eroding the deficit in physiological, security, and safety needs. Those vicious cycles of social problems necessitate policymakers to develop people's capacity to think and act at the "upstream" level and work collectively to identify the risks and protective factors. Climate change fosters resource competition between communities and increases the risk of collective violence. Those social problems did not appear accidentally overnight; they will not disappear overnight because we wished for them. It requires profoundly understanding the social causes and making sustained and coordinated efforts to address them. Moreover, collective violence is responsible for the marginalization and impoverishment of people. For those reasons, people in the HA strive to foster further the development of sustainable culture, leadership, and institutions and prevent violence.

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