

# Climate Change Women and Water



**A research report exploring the effects of Climate Change on Gender Based Violence by Linda Witong, 2019**

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## Climate change

**The future of our planet appears to still be on “life support” as the evidence becomes “stronger every day that humanity’s survival depends on our natural systems, yet we continue to destroy the health of nature at an alarming rate.”<sup>i</sup>**

### Introduction

Although climate change has been described as the defining challenge of our time.<sup>ii</sup> it would appear that the world is still “sleepwalking into a catastrophe”<sup>iii</sup> Over 11,000 scientists recently tried to change that trend based on “their moral obligation to clearly warn humanity of any catastrophic threat “and” tell like it is” by clearly and unequivocally informing the world that planet Earth was “facing a climate emergency.”<sup>iv</sup> Recent scientific reports prepared for the United Nations,<sup>v</sup> also weighed in on this issue acknowledging that the sea levels had risen and ice loss or extreme weather had increased during 2015-2019. They also observed that climate impacts were also hitting harder and sooner than climate assessments indicated even a decade ago and that this trend had resulted in appalling impacts on our environment including our land, our freshwater systems, our oceans, the air we breathe, our ecosystems and all of earth’s inhabitants<sup>vi</sup> or what is left of them.

A recent report which dealt with the impact of climate change on women or girls also agreed with this assessment observing that:

“The climate crisis has arrived and is accelerating faster than most scientists expected It and is also more severe than anticipated, threatening natural ecosystems and the fate of humanity (IPCC 2019). Especially worrisome are potential irreversible climate tipping points and nature’s reinforcing feedbacks (atmospheric, marine, and terrestrial) that could lead to a catastrophic “hothouse Earth,” well beyond the control of humans (Steffen et al. 2018). These climate chain reactions could cause significant disruptions to ecosystems, society, and economies as well as potentially making large areas of Earth uninhabitable.<sup>vii</sup> Decision-makers and all of humanity were then urged to “join in a declaration of climate emergency and immediate action if we are to sustain life on planet Earth, our only home.”<sup>viii</sup> To do otherwise, it was argued, would result in the children and future generations enduring a slow and steady erosion of their environment and eventually leaving them with a polluted, degraded planet and a uninhabitable birthplace for future generations as well as irrevocably threaten their human rights.<sup>ix</sup>

Yet, despite repeated and urgent warnings by scientists as well subsequent negotiations which began in earnest 40 years ago,<sup>x</sup> most of the world continues to conduct business as usual and have still largely failed to address “the greatest challenge of the 21st century which threatens all aspects of the society in which we live”.<sup>xi</sup> Nor does the future offer us much hope at this point.

Climate change continues to amplify the risks to humanity by creating and multiplying existing social, environmental, political and economic risks which continue to contribute to or worsen gender inequality, gender-related violence, illiteracy, loss and damage, poverty, natural resource depletion, environmental degradation, migration, urbanization, conflict and health problems; leaving no country “unscathed”.<sup>xii</sup> And although the world is struggling to cope with warming, it now appears to be occurring faster than governments are able, or willing to respond. An unprecedented challenge demands an unprecedented response, and it will take the work of the 7.5 billion people currently alive to ensure that the health and future of a child born today is not defined by a changing climate. <sup>xiii</sup>

## **Climate Change is Aggravating Gender Inequality**

And what is the impact of this climate crisis on women or girls? To begin with, it has been acknowledged that climate change does not affect people equally as its impact may vary in terms of socioeconomic circumstances, disabilities, age and gender. It is also well established that climate change has a greater impact on those sections of the population that are most vulnerable, whether in developed or developing countries. But where are women or girls in this equation? On the climate crisis’ present course, the inequality and discrimination experienced every day by girls and women will be magnified by climate change within the inequalities they already suffer due to existing roles, responsibilities and cultural norms. In addition, it will also exacerbate their unequal access to health, sexual reproductive health and rights, education, economic or political participation and protection; especially among those from the most vulnerable, poorest communities who have the fewest resources to cope. In other words, climate change will continue to seriously threaten if not obliterate all of their human rights.<sup>xiv</sup>

### **Part One: Examples of Some of the Negative Impacts of Climate Change on Women and Girls**

During crises, whether an armed conflict or a natural disaster, gender inequalities are often exacerbated. Girls and women in countries facing humanitarian emergencies are also among the most vulnerable to gender based violence yet the least visible.

Armed conflict and climate change are both considered to be impacts which often occur together to create what is known as a “fragile” region. For example, of the 76 countries that deteriorated in peacefulness in the past year, 91% have high or very high risk to a single climate hazard.<sup>xv</sup> Eight of the 25 least peaceful countries <sup>xvi</sup>have ten per cent or more of their population in high climate hazard areas, amounting to 103.7 million people, including women and girls at risk.<sup>xvii</sup> Climate change can indirectly increase the likelihood of violent conflict, insecurity and fragility through its impacts on resource availability, livelihood security and migration <sup>xviii</sup> Consequently, non-state armed groups can take advantage of increased fragility often filling the gap left by the state. Further, with deteriorating livelihoods as a result of climate change, community members often have little choice in making ends meet, turning to non-state armed groups, who may or may not be in favor of gender equality, for alternative livelihoods and income opportun-

ities. Recent research regarding Lake Chad suggest that climate change was a key driver in the political instability and insurgency<sup>xix</sup> and that the protracted crisis at Lake Chad presented adolescent girls with numerous challenges including being subjected to various and extensive forms of violence in all areas of their life, within and outside the home, as well as heightened levels of harassment and other forms of insecurity. The economic crisis, and associated food and water crises further exacerbated the insecurities that girls faced, including sexual violence, child early and forced marriage (and the health risks associated with early pregnancy), being forced to withdraw from school, and the burden of additional household chores.<sup>xx</sup>

Extreme weather events driven by climate change are also creating more frequent and more destructive natural disasters from which people, including women and girls flee from. While future forecasts vary, according to the International Organization for Migration, the most frequently cited number of environmental migrants, which would include women or girls, is expected worldwide by 2050 is 200 million, with estimates as high as 1 billion. <sup>xxi</sup>

In the past, experts have also linked climate change to trafficking and a higher risk of other types of violence. Climate change was predicted to affect migration or displacement in three distinct ways. First, the effects of warming and drying in some regions would reduce agricultural potential and undermine “ecosystem services” such as clean water and fertile soil. Second, the increase in extreme weather events – in particular, heavy precipitation and resulting flash or river floods in tropical regions – would affect ever more people and may generate mass displacement. Finally, sea-level rises were expected to destroy extensive and highly productive low-lying coastal areas that are home to millions of people, who would then have to relocate permanently.<sup>xxii</sup> The *World Disaster Report* recognized the widespread consensus that as a result of these factors, “women and girls were at higher risk of sexual violence, sexual exploitation and abuse, trafficking, and domestic violence in disasters” (IFRC, 2007) especially if they were migrating or displaced from their homes. Women who were subjected to violence before a disaster were also more likely to experience increased violence after the disaster where they might become separated from family, friends and other potential support and protective systems. In addition, after a natural disaster, women were also more likely to become victims of domestic and sexual violence and might even avoid using shelters as a result of fear. (Davis et al , 2005; IFRC, 2007) Psychological stress was also likely to be heightened after disasters, particularly where families were displaced and had to live in emergency or transitional housing. Overcrowding, lack of privacy and the collapse of regular routines and livelihood patterns were also viewed to contribute to anger, frustration and violence, with children and women most vulnerable.(Bartlett, 2008)<sup>xxiii</sup>

Within the last several years, authorities have also continued to acknowledge that the climate crisis has exacerbated gender inequalities in relation to discrimination, loss of livelihood, displacement, migration, poverty, human trafficking, gender - based violence, child early and forced marriage, sexual exploitation, food insecurity, and access to infrastructure and essential

services.<sup>xxiv</sup> and recent reports still discuss the tragedies including that of forced marriage or trafficking that have impacted children who had been forced from their homes by such climate impacts as a devastating drought.<sup>xxv</sup>

For example, In a Motion for European Parliament Resolution on Women, Gender Equality and Climate it was observed that climate change impacted exacerbated gender inequalities in relation to threats to health, loss of livelihood, displacement, migration, poverty and vital health services.<sup>xxvi</sup> Moreover, the CEDAW Committee has recently acknowledged that women and girls face a heightened risk of gender-based violence during and following disasters.<sup>xxvii</sup> Domestic violence, early and/or forced marriage, trafficking in persons and forced prostitution were acknowledged by the CEDAW Committee to be “more likely to occur during and following disasters.”<sup>xxviii</sup> CEDAW also observed that women and girls with disabilities continued to be at particular risk of gender-based violence and sexual exploitation during and following disasters, owing to discrimination on the basis of physical limitations, barriers to communication and the inaccessibility of basic services and facilities. It was also observed that, In the absence of social protection schemes and in situations in which there is food insecurity combined with impunity for gender-based violence, women and girls were also often exposed to sexual violence and exploitation even as they attempted to gain access to food and other basic needs for family members and themselves. Moreover, camps and temporary settlements, the lack of physical security, as well as the lack of safe and accessible infrastructure and services, including drinking water and sanitation, also result in increased levels of gender-based violence against women and girls.<sup>xxix</sup>

UNICEF has also recently acknowledged climate change as both feeding on and exacerbating inequalities including those involving a girl or boy.<sup>xxx</sup> UNICEF has specifically acknowledged that extreme environmental events can displace children and subject them to dangerous situations where they could be at risk of emotional, physical and sexual violence, be forced into early marriage, or suffer from violence and displacement because of a disaster<sup>xxxi</sup> particularly if they have lost the company of parents or other trusted adult guardians along the way.<sup>xxxii</sup>

Child Marriage and Human Trafficking have been specifically focused on as being real and growing crises within the context of climate change within the last 6 years.<sup>xxxiii</sup> As early as 2013, it was observed that 25 countries with the highest rates of child marriage were almost all affected by conflict, fragility, or natural disasters.<sup>xxxiv</sup> In 2017, many experts also warned of a real and growing crisis: the emergence of a generation of child brides as a direct result of a changing climate.<sup>xxxv</sup> Yet it is still reported that each year 15 million girls are still married before the age of 18 many of them in countries particularly vulnerable to climate change.<sup>xxxvi</sup>

In the past few years there has also been growing evidence that weather and natural disasters continue to be the drivers behind increasing child marriage rates. In reviewing the research regarding the circumstances of many of these countries a trend has become evident. Although girls are married off in both times of stability and crisis, climate change is a driver of child, early

and forced marriage (CEFM) in many communities due to deteriorating, unsustainable livelihoods putting pressure on family income and, in many cases, even destroying livelihoods, creating economic desperation, insecurity, hunger and threatening the families very survival.. These pressures result in negative coping strategies which justify the belief that a girl is less valuable than a boy and, as such, is allowed to be treated as a commodity in a financial transaction which will serve to lessen the financial strain on the family as well perhaps ensure that the girl is provided for by being married. Evidence also shows that families may also believe that child marriage is a way to protect adolescent girls and the family honor ,after disasters and when migrating, as the family honor may be otherwise threatened by their daughter being particularly susceptible to violence and exploitation – including rape, sexual and gender-based violence and abuse, and trafficking.<sup>xxxvii</sup>

The future for many impoverished girls regarding being the victim of child marriage does not offer any solace. Many of the girls in the poorest communities already live in an constant state of “emergency.” Humanitarian crises only intensify their need for survival and caretaking capacities, while aggravating their vulnerabilities. The frequency and intensity of emergencies, including natural disasters, conflicts, and infectious disease outbreaks such as Ebola, appear to be growing and, in some cases, could become permanent in nature. As such it appears likely that the number of child brides will only increase as natural disasters, conflicts or infectious diseases increase in their numbers and their intensity due to climate change.

### The Effects of Climate Change and the Water Crisis On Human Trafficking

The water crisis has also been viewed as one of the important contributing drivers in aggravating a woman or child’s vulnerability to climate change. Warning signs regarding the desperate situation girls or women might face in the future began decades ago. For years, climate change, including that of safe drinking water, has been recognized as affecting the social and environmental determinants of health. <sup>xxxviii</sup> As far back as 1990, scientists at the NASA Goddard Institute of Space Studies expressed concern over the prediction that severe to extreme drought in the United States, then happening every 20 years, could become an every- other-year phenomenon by the middle of the twenty-first century. <sup>xxxix</sup> Throughout the following years, the issue of a water crisis was either mentioned in the news or in reports. In 2009, climate change was recognized as the biggest global health threat of the twenty-first century and its affects were noted in the increased frequency and intensity of weather-related disasters such as Hurricanes Katrina and Sandy in the United States in 2005 and 2012, flooding in Pakistan and Australia in 2010 and 2011, drought in East Africa in 2011, and a deadly heatwave in Europe in 2003. <sup>xl</sup> In 2010, Russia experienced a once-in-a-thousand- year heatwave that devastated crops and led the government to ban wheat exports for more than a year, a key trigger for the jump in food prices. One study determined that global warming would make this kind of heatwave a once- in-a-decade event for Russia by the 2060s. <sup>xli</sup> In 2013, a UNICEF report on climate change and children similarly found that more frequent natural disasters, food crises and changing rainfall patterns threatened a wide spectrum of children’s rights, including their basic rights to education, health, clean water, and the right to food. <sup>xlii</sup> The World Health Organization (2012) ob-

served that people's sources of livelihood were being disrupted, whether through flooding or extreme weather events<sup>xliii</sup> and in November of 2012, the World Bank issued a blunt report entitled Turn down the heat: Why a 4°C warmer world must be avoided warning which observed that we were "on track for a 4°C warmer world marked by extreme heat waves."<sup>xliv</sup>

A number of major recent studies in 2014 also confirmed those early findings.<sup>xlv</sup> Climate change was observed to have increased the frequency and intensity of weather-related disasters including floods, droughts, cyclones and hurricanes which directly affected an estimated 66.5 million children worldwide with the number affected predicted to rise to 175 million a year.<sup>xlvi</sup> Warmer temperatures; rising incidence of heatwaves and drought; longer periods of water shortages; increased and increasingly concentrated rain- fall levels; all of these were also causing more severe and prolonged flooding of urban drainage systems and were referred to as the climate change realities that city managers were struggling with even in 2014.<sup>xlvii</sup>

In August of 2016, Reuters reported that the worst drought in decades across several states in India was forcing tens of thousands of people to migrate from rural areas in search of water, food and jobs, increasing the risk that they may be trafficked or exploited. Around 330 million people, almost a quarter of the country's population, were affected by that drought. Destitute women, children and older family members left behind in the villages were described as being most at risk of exploitation as the drought had aggravated the situation leaving them so desperate as they had absolutely nothing,<sup>xlviii</sup>

Extreme rainfall also was described as being particularly damaging in 2017 as, of the 10 natural disasters that caused the most deaths in the first half of 2017, eight involved floods or landslides. Storms and other weather-related hazards were also a leading cause of displacement. Data obtained in 2016 corroborated this : 76% of the 31.1 million people displaced during 2016 were forced from their homes as a result of weather-related events.<sup>xlix</sup>

And even if one had water, if it was contaminated, women and girls were placed in a vulnerable position as soil and water pollution could cause about half again as many deaths, according to findings published in October 2017 by the Lancet Commission on Pollution and Health. Subsequent to that study, microplastic fibers had also emerged in 2018 as a new threat regarding water pollution as it had been found in 83% of the world's tap water. This was of concern as these micro-fibers could bind with compounds containing toxic pesticides or metals, providing these toxins with a route into the body.<sup>l</sup>

The threat of polluted water was not limited to developing countries. In 2019, reports revealed that, between 2015 and 2018, nearly 30 million people in the U.S. were supplied drinking water that had excessively high levels of lead, from Portland, Oregon to Providence, Rhode Island according to an analysis of EPA data by the Natural Resources Defense Council, an environmental group. In addition, a yearlong investigation by more than 120 journalists from nine universities and 10 media organizations, including The Associated Press and the [Institute for Investigative Journalism at Concordia University in Montreal](#) , collected test results that measured exposure



to lead in 11 cities across Canada. Out of 12,000 tests since 2014, one-third — 33% — exceeded the national safety guideline of 5 parts per billion and 18% exceeded the U.S. limit of 15 ppb. Even in California, new state testing had found nearly 300 drinking water wells and other water sources in California to have traces of toxic chemicals linked to cancer. An analysis by the Los Angeles Times found that within this class of chemicals, called perfluoroalkyl and polyfluoroalkyl substances, the two most common compounds were detected in 86 water systems that served up to 9 million Californians<sup>li</sup> in communities across California, from densely-populated cities with large and complex water systems to mobile home parks. Exposure to these chemicals, commonly known as PFAS, had been traced to kidney and testicular cancer, as well as high cholesterol and thyroid disease. Mothers and young children were thought to be the most vulnerable to the chemicals as it could affect reproductive and developmental health.

In addition, recent studies had even connected climate change and the water crisis to other adverse health conditions such as pregnancy outcomes, specifically premature birth and low birth weight, both of which often have life-long consequences, as well as stillbirth. Research had also shown that the fetus and the child were also especially susceptible to physical and psychological trauma, nutritional deprivation, infectious agents and environmental contaminants because of their dynamic developmental physiology and immature defense systems. They could even be affected by environmental exposures that had no apparent effects in adults. In addition the fetal period represented a window of susceptibility to genetic damage and epigenetic dysregulation from exposure to xenobiotics and stress which could be inherited trans-generationally, thereby affecting the health of future generations.<sup>lii</sup> Climate change had also been associated with increasing heat and air-pollution, an increase in asthma in adolescent girls, a higher risk of acquiring lung cancer and heart disease in mid-life, and heart attacks, strokes, and dementia in older women.<sup>liii</sup>

As recently as 2019, exposure to heat, droughts, floods and heatwaves were still predicted to increase globally.<sup>liv</sup> To begin with, in 2019, the report of the World Health Organization: COP24 Special Report Health and Climate Change and the 2019 report of The Lancet Countdown on health and climate change<sup>lv</sup> also again observed that climate change was increasing the occurrence of heat waves, droughts, extreme rainfall and severe cyclones in many areas and continuing to make people ill or even worse die as a result of their impact. For example, the COP24 report observed that, by the late 21st century, climate change would increase the frequency and intensity of drought at a regional and global scale. Floods and extreme precipitation were also expected to continue to increase throughout the current century all of which would contaminate freshwater supplies, heighten the risk of water-borne diseases, and create breeding grounds for disease-carrying insects such as mosquitoes as well as also cause drownings and physical injuries, damage homes and disrupt the supply of medical and health services. Rising temperatures and variable precipitation were also likely to decrease the production of staple foods in many of the poorest regions which would only increase the prevalence of malnutrition and undernutrition, which currently caused 3.1 million deaths every year and, even in some cases, suicide.<sup>lvi</sup> Moreover, work from the 2015 *Lancet* Commission showed that a business as usual tra-

jectory was expected to result in an additional 2 billion flood exposure events per year by 2090, which would likely overwhelm health systems and public infrastructure. <sup>lvii</sup>

The 2019 report of The *Lancet* Countdown on health and climate change also agreed with the COP24 report in adding wildfires as a new climate impact as globally, as 77% of countries had experienced an increase in daily population exposure to wildfires from 2001–14 to 2015–18, with an increase, for example, of over 21 million exposures in India and 17 million exposures in China over this time period.<sup>lviii</sup> This increase not only posed a threat to public health, but also resulted in major economic and social burdens in both high-income and low-income countries as the global economic burden per person affected by wildfires was more than twice that of earthquakes and 48 times higher than that of floods. <sup>lix</sup>

It was against this backdrop of ominous warnings that a study in 2018 by Michael Gerrard of Columbia University was published. Gerrard specifically linked the water crisis and climate change to the trafficking of women and girls who were “climate migrants”. Gerrard began by observing that climate change was a major contributor to migration and displacement in multiple ways. The most prominent being water shortages and desertification that threaten food supplies and livelihoods, extreme weather events, sea level rise, and loss of Arctic sea ice.<sup>lx</sup> All of which were now reported to be on the increase. Often these conditions are further aggravated by existing poverty and political instability.<sup>lxi</sup>

Gerrard also acknowledged that women and girls, were likely to fall victim to human trafficking and become subject to sexual exploitation or forced labor “climate migrants,” in their desperate search for security and work. Gerrard observed that it was “well documented that displacement leads to a considerable increase in human trafficking. The UN Environment Programme has indicated that trafficking may increase by 20- 30% during disasters, and INTERPOL has warned that disasters or conflict may increase the exposure of women to trafficking as families are disrupted and livelihoods are lost. There are also multiple instances in which trafficking has been shown to increase in the aftermath of cyclones, flooding, earthquakes and tsunamis. Some of this is for sex trafficking, some of it is for forced labor.”<sup>lxii</sup>

This danger to women was going to only increase. Gerrard observed that while no reliable estimates existed regarding the number of people who will be displaced partly or wholly by climate change, due to uncertainties concerning the rate of climate change, the ability of different societies to cope with this change, and other factors., several estimates put the number of people in the hundreds of millions in the latter part of this century. Moreover, if nothing continued to be done, the world in 2100 might see a rise in temperatures that would be 3.5°C (6.3°F) above pre-industrial conditions which, in Gerrard’s words, “would be utterly catastrophic.” In such a case, Gerrard observed that while there appeared to be no estimates of the number of people who would be displaced in such a situation, it would no doubt be in the billions. This would, in turn, lead to a massive amount of conflict, smuggling and trafficking.”<sup>lxiii</sup>

Gerrard ended his analysis by citing the Encyclical in the hope that the world would awaken from its indifference to the dismal fate of an increasing number of climate migrants: <sup>lxiv</sup>

“There has been a tragic rise in the number of migrants seeking to flee from the growing poverty caused by environmental degradation. They are not recognized by international conventions as refugees; they bear the loss of the lives they have left behind, without enjoying any legal protection whatsoever. Sadly, there is widespread indifference to such suffering, which is even now taking place throughout our world. Our lack of response to these tragedies involving our brothers and sisters points to the loss of that sense of responsibility for our fellow men and women upon which all civil society is founded”.<sup>lxv</sup>

## **Part 2 Other Factors Which Make Women and Girls More Vulnerable to Climate Change**

Why are women and girls more vulnerable to climate change? How does each particular climate impact specifically affect them? The answer to this question is best answered by addressing each of these impacts separately:

### **Air Pollution**

According to several reports, the human activities that are destabilizing the Earth’s climate also contribute directly to ill health. The most direct link between climate change and ill health is air pollution. Burning fossil fuels for power, transport and industry is the main source of the carbon emissions that are driving climate change and a major contributor to health-damaging air pollution, which every year kills over seven million people due to exposure inside and outside their homes. Over 90% of the urban population of the world breathes air containing levels of outdoor air pollutants that exceed WHO’s guidelines. In addition to what has been previously discussed regarding the effect of air pollution on women or girl’s health on page 7, other research also recognized air pollution inside and outside the home as being the second leading cause of deaths from NCDs worldwide; it is responsible for 26% of deaths from ischaemic heart disease, 24% of those from strokes, 43% from chronic obstructive pulmonary disease and 29% from lung cancer. Effectively all exposure to indoor air pollution, which causes almost four million deaths a year, is from use of solid fuels for cooking in poor households.<sup>lxvi</sup> Women and girls are most affected by house- hold indoor air pollution because of the time they spend in and around the home. <sup>lxvii</sup> Finally, new environmental, climatic and health issues are emerging and require rapid identification and response. Recent examples include the management of electronic waste, nanoparticles, microplastics and endocrine-disrupting chemicals. <sup>lxviii</sup> Air pollution is a particularly acute problem in Asia, with an estimated 2.2 million premature deaths annually, accounting for approximately a third of the global total.<sup>lxix</sup>

According to the 2019 report of The Lancet Countdown on health and climate change, exposure to ambient air pollution , most importantly fine particulate matter (PM2.5), constituted the largest global environmental risk factor for premature mortality, and resulted in several million

premature deaths from cardiovascular and respiratory diseases every year. In 2016 there were 2.9 million premature deaths globally that were associated with ambient PM<sub>2.5</sub> pollution, with minimal improvement in global mortality from 2015.<sup>lxx</sup> More than 90% of children were also exposed to PM<sub>2.5</sub> concentrations that were above the WHO guidelines, which could affect their health throughout their life, with an increased risk of lung damage, impaired lung growth and pneumonia, and a subsequent risk of developing asthma and chronic obstructive pulmonary disease.<sup>lxxi</sup> Worldwide, although more than 440,000 premature deaths were still estimated to be associated with coal burning, the carbon intensity of the energy system remained unchanged, with coal supply increasing, reversing the 2014–16 downward trend.<sup>lxxii</sup>

It was also reported that exposure to air pollution, which caused as many as one in eight deaths worldwide, resulted in US\$ 5.11 trillion in welfare losses globally, nearly doubling the losses in 1990. Moreover, in the 15 countries that emit the most GHGs, the health impacts of air pollution were estimated to cost more than 4% of their GDP.<sup>lxxiii</sup>

Urban citizens also have continued exposure to high levels of air pollution, with 83% of cities<sup>lxxiv</sup> exceeding the WHO's recommended safe concentrations. Energy use, particularly residential combustion, is a major contributor to this pollution.<sup>lxxv</sup> Unfortunately, the world is becoming increasingly urbanized, with almost 70% urbanization of the global population expected by 2050. Because of the increased population and higher concentrations of emissions, many cities have become hot spots of air pollution. Moreover few cities worldwide have achieved PM<sub>2.5</sub> concentrations that are below the WHO guideline of an annual mean of 10 µg/m<sup>3</sup>, and many cities exceed this guideline amount several fold. The highest measured concentrations currently have been reported in south and east Asia, while data gaps exist in other world regions.<sup>lxxvi</sup> The fact that these high PM<sub>2.5</sub> concentrations have been further increasing or stagnant in many regions of the developing world is “particularly concerning”.

The last three decades have witnessed the release of increasingly concerning scientific data showing the importance of a reduction in greenhouse gas emissions however CO<sub>2</sub> emissions have continued to still rise.<sup>lxxvii</sup> A warming climate will worsen air quality. If current emissions continue, ground-level ozone events are expected to intensify, especially in densely populated areas, leading to more respiratory illness. In addition, in certain areas, the frequency and extent of wildfires – and with them, emissions of particulate matter and other pollutants – are also projected to increase. In other areas, a drier climate could lead to more dust storms or lead to pollen and other airborne allergens being more likely to become more prevalent.<sup>lxxviii</sup>

The 2019 report of The Lancet Countdown on health and climate change observed that, although the health implications of these climate impacts were apparent today, they would most certainly worsen without immediate intervention. Yet, despite increasing public attention over the past 12 months, the world had yet to see a response from governments which matched the scale of these challenges.<sup>lxxix</sup>

## Biodiversity

The Climate Crisis' impact on biodiversity had been described by some as being a part of a wider pattern of global environmental change in which the rapid loss of biodiversity and ecosystem stability will undermine food and water security, protection from extreme weather, and the discovery of new medicines. <sup>lxxx</sup> The WWF 2018 Living Planet Report went further in explaining its global importance by describing biodiversity as the 'infrastructure' that supported all life on Earth as the natural systems and biochemical cycles that biological diversity generated allowing "the stable functioning of our atmosphere, oceans, forests, landscapes and waterways". As such, they were, "simply, a prerequisite for our modern, prosperous human society to exist, and to continue to thrive" <sup>lxxxi</sup> In addition, the WWF 2018 Living Planet Report also observed that there was "no precedent for the current losses of biodiversity and ecosystems and this extends to all parts of the world, even where there is not direct impact from human activities." <sup>lxxxii</sup> In fact, the report had to refer to extinctions which occurred a very long time ago to even locate a similar situation. It concluded that : "For now, we can understand today's ongoing destruction of ecosystems and biodiversity in the context of even longer-term and larger-scale changes in the Earth system. We can see that current levels of decline and degradation are not normal – they increasingly resemble some of the catastrophic extinctions in the geological past 165,166 years, giving us reason to be concerned about planetary health, not just the state of local ecosystems." <sup>lxxxiii</sup> As to the status of biodiversity in 2019, 25% of animals and plants were threatened with extinction (nearly 1 million species), many in the coming decades and 75% of our crops were at risk due to loss of pollinators. <sup>lxxxiv</sup> This loss of biodiversity could also compound insecurity for women because many rural women in different parts of world depended on non-timber forest products for income, traditional medicinal use, nutritional supplements in times of food shortages, and a seed bank for plant varieties needed to source alternative crops under changing growing conditions. Thus, loss of biodiversity was also challenging the nutrition, health and livelihood of women and their communities. <sup>lxxxv</sup>

## Children

"How is it in the 21st century that we still have 149 million children under 5 with stunting and almost 50 million with wasting?" <sup>lxxxvi</sup>

Henrietta H. Fore UNICEF Executive Director

In the past it has been observed that: "Climate change *magnifies* inequality – it hurts the poor first and worst, and so accentuates the differences between the rich and poor, the advantaged and disadvantaged. It also *exacerbates* inequality." It was concluded that climate change and inequality were, "therefore, closely related and these interlinkages are perhaps most pronounced for children." <sup>lxxxvii</sup>

It has been accepted that children enter the arena of climate change at a disadvantage as they are more vulnerable to its impacts than other groups by virtue of their physiology, metabolism, physical size and strength, and dependence on others for resources and protection. If they are also victims of social or economic inequalities, their vulnerability to weather related events is further heightened as inequalities in income, location and gender have been shown to have a dramatic impact on children's chances of survival, their health, nutritional status and education. lxxxviii

In the event of weather-related disasters, these disadvantages could mean the difference between life and death. For example, children who were malnourished or otherwise unwell might be less able to escape physically (from a flood, for example). Children who have not been immunized might be more likely to succumb to the diseases that often immediately followed disasters (for example, diarrhea or measles). lxxxix

Floods could also displace thousands of people including children, temporarily or for extended periods before houses and infrastructure, such as roads, power and communication links were rebuilt. Children, in particular, were highly vulnerable during population displacements. When a catastrophe occurs, parents or relatives could die and child protection systems become disrupted, increasing children's susceptibility to abuse, child labor, trafficking and exploitationxc

These existing inequalities would continue to be reinforced as the impacts of climate change intensified in coming decades – increasing children's vulnerability to shocks and pressures. xci

In 2012, The World Health Organization (2012) acknowledged that the negative effect of climate impacts was borne by children. The World Health Organization estimated that children suffered more than 80 per cent of the morbidity and mortality produced by climate change – with those in poorer areas inevitably being the worst affected. As rising temperatures produced a spread of malaria into previously unaffected areas, for example, it was the lives of children that were most endangered. When people's sources of livelihood were disrupted, whether through flooding or extreme weather events, it was also the youngest members of the community who would suffer most from undernutrition and diarrheal disease. xcii

In 2013, a UNICEF report on climate change and children again confirmed that children bore the brunt of the impact of climate change and that more frequent disasters, food crisis and changing rainfall patterns continued to threaten a wide spectrum of children's rights, including their basic rights to education, health, clean water and the right to food. xciii

In 2014, UNICEF also acknowledged that close to 90 per cent of the burden of disease attributable to climate change was borne by children under the age of 5. The drivers of air pollution were the same as those of climate change yet approximately two billion children lived in

areas where air pollution levels exceeded standards set by the World Health Organization (WHO) – causing them to breathe toxic air and putting their health and brain development at risk. The result? Every year, over half a million children under the age of 5 died from air-pollution-related causes. Even more would suffer lasting damage to their developing brains and lungs.<sup>xciv</sup>

In 2014, [Pneumonia](#) also remained the leading infectious cause of death among children under 5, killing approximately 2,400 children a day. Child deaths caused by pneumonia were also strongly linked to undernutrition, lack of safe water and sanitation, indoor air pollution and inadequate access to health care – all challenges that were exacerbated by climate change. For children who were already disadvantaged, the stakes were even higher. Poorer families had a harder time coping with shocks. The most vulnerable were already losing their homes, health and education. And, as climate change made crises more common, it became harder to recover from them. Moreover, it was predicted that, by 2040, almost 600 million children would live in areas where the demand for water would exceed the amount available. It was observed that without immediate action, climate change would exacerbate the inequalities that children already face, and future generations would suffer. Although the evidence for the impact of climate change and air pollution on children was firm and growing, time was running out fast.<sup>xcv</sup>

By 2014, it also appeared evident that the scientific debate over whether human-induced climate change is ‘real’ was effectively over as it was as evident that humans were dramatically changing the planet’s climate “as it was that smoking causes cancer.”<sup>xcvi</sup> But children still remained in danger. Although no particular outcome could be predicted with certainty, it was clear even then that, unless there was a significant reduction in emissions over the next decade, by 2050 there would be a major climatic changes that would make human life on the planet much more difficult.<sup>xcvii</sup> Under these circumstances all of these impacts’ effects on children would be magnified and exacerbated as temperatures continued to rise over the coming decades, and as many millions of people are displaced by sea-level rise, drought or other climate change-related conditions. The IPCC at that time had even determined that, on average, total warming from pre-industrial levels was headed beyond 4°C (7°F) by 2100. In such an environment, children would experience permanent Dust Bowl conditions which would exist over many regions around the globe that were heavily populated and/or heavily farmed. Their future would also include a sea level rise of around 1 foot by 2050, then 3 to 6 feet by 2100 and rising 6 or more inches each decade thereafter. Massive species loss on land and sea -perhaps 50 per cent or more of all biodiversity- would occur. The world would see more extreme weather, particularly intense heatwaves, droughts, superstorms and floods and myriad direct health impacts. These would all be happening simultaneously around the world and getting worse decade after decade. The concern was voiced that, when disasters occurred, the world had always rallied to help the victims, especially the children who were most at risk. But in the future, it was predicted that every country in the world would be dealing with the above problems at the same time. As such, countries would largely have to fend for themselves when super- droughts and superstorms occurred.<sup>xcviii</sup> If emissions continued to rise unabated at the current rate, children

born today are likely to face a world at least 2.5°C degrees (and possibly as much as 6°C) warmer by the end of their lives. <sup>xcix</sup>

In 2014, a UNICEF report agreed with this assessment and also found that children’s vulnerability to climate change fundamentally threatened the realization of many, if not all, of their rights as stated in the Convention on the Rights of the Child.<sup>c</sup> In addition while the rhetoric and case for action on the increasing threats of climate change for vulnerable populations had gained significance and traction in recent years, often the impacts of climate change on children, and specifically their rights, were still being overlooked or States were going on record as noting, as 12 countries in 2011 did, that environmental degradation and climate change were a barrier to

the countries even implementing the Convention on the Rights of the Child. <sup>ci</sup>

In the next decade, it was estimated that extreme weather events – which were becoming more frequent and more intense as a consequence of climate change – were likely to affect 175 million children a year. Food insecurity was also increasing and appeared to continue to be likely to be the climate impact that affected most of the people in the coming decades— especially children, hundreds of millions of whom already suffered from food insecurity and malnutrition. <sup>cii</sup> When climate change was taken into account, the prevalence of severe stunting was expected to be 9–22 per cent, in Africa or an increase of between 31 and 55 per cent in the proportion of children severely stunted. <sup>ciii</sup> Human-induced climate change which had already significantly harmed children’s health and well-being was projected to place current and future children on a predicted trajectory of increasing ill health and an unsustainable future. <sup>civ</sup> Children’s immature immune systems would continue to make them more susceptible to infectious disease pathogens (e.g., cholera and other diarrheal diseases) from crop and water contamination due to storms and floods, as well as to vector-borne diseases (e.g., malaria and dengue fever) which had already increased in certain regions due to climate change. <sup>cv</sup> The direct effects of heat-waves on children would include hyperthermia, heat stress, renal disease and respiratory illness, to which infants and children were especially vulnerable due to their immature regulatory systems. Air pollution levels which had already significantly increased as a result of climate change and fossil fuel burning would continue to have direct impacts on children’s health including increased infant mortality, lower birth weight, deficits in lung function, respiratory symptoms, childhood asthma, bronchitis, developmental disorders, and an increased risk of cancer. Exposure to air pollution in childhood might also result in a reduction in lung function and ultimately in increased risk of chronic respiratory illness as well as greater susceptibility to cardio-vascular disease in adulthood. <sup>cvi</sup> In addition to increased mortality, an increase in ozone levels would continue to be associated with decreased lung growth and function, and exacerbation of asthma and respiratory tract infection in children. <sup>cvii</sup> Another element of children’s susceptibility was that they would have more future years of life during which exposures were ongoing and during which latent effects of early undernutrition, neurodevelopmental, physical and psychological health and reproductive and respiratory effects could manifest in disease or impairment<sup>cviii</sup> Epigenetic effects of *in utero* and post-natal exposure to both toxic and psycholo-



gical stressors might also be inherited trans-generationally, thereby affecting the health of future generations. Poor and minority group children, especially those in urban areas and developing countries, would also be most at risk, because the effects of toxic exposures were magnified by the inadequate nutrition and psychosocial stress produced by poverty or racism. The striking socio-economic inequalities that existed in 2014 regarding children's health within and between countries would also be exacerbated by global climate change.<sup>cxix</sup> What an appalling future this appeared to be for any child.

In 2018, the World Health Organization again confirmed that children – in particular, children living in poor countries – were among the most vulnerable to the resulting health risks and would be exposed longer to the health consequences.<sup>cx</sup> Pollen and other aeroallergen levels would continue to be higher in extreme heat which could, in turn, trigger asthma, which affected around 300 million people. Ongoing temperature increases were expected to increase this burden on children as well as adults. Increasingly variable rainfall patterns were likely to affect the supply of fresh water. A lack of safe water could compromise hygiene and increase the risk of diarrheal disease, which killed over 500 000 children aged under 5 years, every year. Floods were also increasing in frequency and intensity, and the frequency and intensity of extreme precipitation was expected to continue to increase throughout the current century. Floods contaminated freshwater supplies, heightened the risk of water-borne diseases, and created breeding grounds for disease-carrying insects such as mosquitoes. They also caused drownings and physical injuries. Rising temperatures and variable precipitation were also likely to decrease the production of staple foods in many of the poorest regions. This would increase the prevalence of malnutrition and undernutrition, which currently caused 3.1 million deaths every year. All of these factors would have a negative impact with many specifically focusing on children. Changes in climate were predicted to also lengthen the transmission seasons of important vector-borne diseases and to alter their geographic range. Malaria was strongly influenced by the climate crisis and, transmitted by mosquitoes, malaria killed over 400 000 people every year – mainly African children under 5 years old. The *Aedes* mosquito vector of dengue was also highly sensitive to climate conditions, and studies suggested that climate change was also likely to continue to increase children and adult's exposure to dengue.<sup>cxix</sup>

According to, the 2019 World Health Organization COP24 Special Report Health and Climate Change, a highly conservative estimate of 250 000 additional deaths each year due to climate change has been projected between 2030 and 2050; of these, 48 000 were from diarrhea, 60 000 were from malaria and 95, 000 were from childhood undernutrition. These estimates were calculated “within an optimistic scenario” in terms of future socioeconomic development and adaptation.<sup>cxii</sup>

The 2019 report of The Lancet Countdown on health and climate change also dealt with the effects of climate change on children.<sup>cxiii</sup> It was predicted that a child born today would experience degrees warmer than the preindustrial average, with climate change impacting human health from infancy and adolescence to adulthood and old age. Across the world, children were still among the worst affected by climate change. Downward trends in global yield potential for all

major crops tracked since 1960 threatened food production and food security, with infants often the worst affected by the potentially permanent effects of undernutrition. Malaria and dengue fever were still endemic in many parts of the world and continued to contribute substantially to burden of disease, with young children continuing to be particularly vulnerable. Children continued to also be among the most susceptible to diarrhea and experience the most severe effects of dengue fever. Trends in climate suitability for disease transmission were particularly concerning, with nine of the ten most suitable years for the transmission of dengue fever on record occurring since 2000. Similarly, since an early 1980s baseline, the number of days suitable for *Vibrio* (a pathogen responsible for part of the burden of diarrheal disease) had doubled, and global suitability for coastal *Vibrio cholerae* had increased by 9.9%.<sup>cxiv</sup> Through adolescence and beyond, air pollution— principally driven by fossil fuels, and exacerbated by climate change—would continue to damage the heart, lungs, and every other vital organ of the child. These effects would accumulate over time, and into adulthood, with global deaths attributable to ambient fine particulate matter (PM<sub>2.5</sub>) remaining at 2.9 million in 2016 and total global air pollution deaths reaching 7 million.<sup>cxv</sup>

Vulnerability to extremes of heat would also continue to rise in every region of the world, with young children having a greater risk of electrolyte imbalance, fever, respiratory disease, and kidney disease.<sup>cxvi</sup>

Nor did it appear that these conditions would improve as either prolonged drought or floods, heat and a lack of biodiversity would continue to create one of the most dangerous environmental determinants of premature mortality, affecting water scarcity, hygiene and sanitation, as well as resulting in reduced crop yields, food insecurity, and malnutrition.<sup>cxvii</sup> Undernutrition would continue to overwhelmingly affect children younger than age 5 years, causing intrauterine growth restriction, stunting, severe wasting, micronutrient deficiencies, and poor breast feeding.<sup>cxviii</sup>

Exposure to ambient air pollution, most importantly fine particulate matter (PM<sub>2.5</sub>) would also continue to be the largest global environmental risk factor for premature mortality, and be responsible for negatively affecting the health of more than 90% of children, who were exposed to PM<sub>2.5</sub> concentrations that are above the WHO guidelines, affecting their health throughout their life, with an increased risk of lung damage, impaired lung growth and pneumonia, and a subsequent risk of developing asthma and chronic obstructive pulmonary disease.<sup>cxix</sup>

## **The Present Challenges Children Face**

### **Water**

Nearly 4 billion people – roughly half of the world’s population – are affected by severe water scarcity for at least one month each year, and approximately 2 billion of this number suffer severe water scarcity for at least six months of the year.<sup>cxx</sup> Moreover, it was predicted that by 2025, 1.8 billion people would experience absolute water scarcity and two-thirds of the world’s population would be living in water stressed conditions.<sup>cxxi</sup> Today, more than 2 billion people are also drinking contaminated water, and every two minutes, a child dies from a water-related dis-

ease. Some 785 million people live without access to any kind of safely managed drinking water service; more than half of those who obtain drinking water from surface water sources live in sub-Saharan Africa, and 80 per cent of those who lack basic services live in rural areas.<sup>cxxii</sup> Fragile regions are defined as including those who are affected by climate change. Moreover, it was predicted that by 2040, one in four children would live in areas of extreme water stress and thousands will be made sick by polluted water.<sup>cxxiii</sup> Women and girls continued to be threatened with harassment or violence when they searched for water for their families.

### **Water : Fragile and Conflict areas**

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones.<sup>cxxiv</sup>

Of the 76 countries that deteriorated in peacefulness in the past year, 91% have high or very high risk to a single climate hazard.<sup>cxxv</sup> Eight of the 25 least peaceful countries have ten per cent or more of their population in high climate hazard areas, amounting to 103.7 million people at risk.<sup>cxxvi</sup> Climate change can *indirectly* increase the likelihood of violent conflict, insecurity and fragility through its impacts on resource availability, livelihood security and migration. Consequently, non-state armed groups can take advantage of increased fragility often filling the gap left by the state. Further, with deteriorating livelihoods as a result of climate change, community members often have little choice in making ends meet, turning to non-state armed groups for alternative livelihoods and income opportunities. Recent research from Lake Chad suggest that climate change is a key driver in the political instability and insurgency.<sup>cxxvii</sup>

Every child has the right to water and sanitation but climate change impacts are already contributing to a growing water crisis that puts millions of children at risk due to changes in precipitation, extreme weather events, increasing temperatures and a rise in the sea level. As we have already learned, these climate impacts had negatively affected the availability and quality of drinking water and undermined sanitation and hygiene services for children.<sup>cxxviii</sup>

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones.<sup>cxxix</sup> Where no adequate water and sanitation services exist to begin with, the onset of conflict also exacerbates the problem – particularly where water itself is a scarce resource, under increasing threat from a changing climate.<sup>cxxx</sup> In 2019, fragility and armed conflict continued to increase worldwide displacing tens of millions of people globally – many of them children – and also placed under strain the host communities that had to deliver basic services such as water and sanitation to a growing population.<sup>cxxxi</sup> As a result of this climate impact, every day, hundreds of millions of children went without safe water or sanitation.. Globally, across fragile and conflict-affected contexts, 420 million children lacked basic sanitation and 210 million children lacked access to safe drinking water.<sup>cxxxii</sup>

When referring to fragile contexts and children, the difference in survival and development indicators is stark when comparing the fate of children who live in fragile regions and those who do not. For example, alarmingly low proportions of households in extremely fragile contexts have access to basic water and sanitation services (57 per cent and 26 per cent respectively). Compared with non-fragile contexts, children in extremely fragile contexts are more than eight times as likely to lack basic drinking water and almost four times as likely to lack basic sanitation. Open defecation rates are also high (19 per cent) – almost three times the rate in non-fragile contexts. <sup>cxxxiii</sup> More than 800 million children live in 58 fragile contexts across the globe, including more than 220 million children living in 15 extremely fragile contexts. Also great concern is the prediction that more than 80 per cent of the world’s poorest people could be living in fragile contexts by 2030, further widening the gulf of inequity. <sup>cxxxiv</sup> In addition, growing challenges across fragile contexts – including climate change impacts, population growth (the world population is expected to reach 9.7 billion by 2050, an increase of 2 billion people <sup>cxxxv</sup> and migration, rapid urbanization, malnutrition, and new and persistent epidemics like Ebola, Zika and cholera – may compound the difficulties of providing safe water and sanitation for families <sup>cxxxvi</sup>

For a people living in fragile regions, climate change aggravates particular threats to its population, particularly women and girls, which see an increase in gender-based violence when women or girls sought to collect water or relieve themselves. They are even more vulnerable to sexual violence as they collect water or venture out to use communal latrines; and they deal with increased affronts to their dignity as they bathe and manage menstrual hygiene. If they even have access to education, children also face additional security risks and difficulties managing menstrual hygiene – dangers that can interfere with their enrolment, attendance and success in school. Though systematic gathering of evidence on WASH and GBV in emergency and development contexts was challenging due to the sensitive nature of GBV, reports of many cases also existed in those areas as well. For example, in a programme run by UNICEF from 2009 to 2010 in the Democratic Republic of the Congo’s North Kivu the connection between sanitation and GBV became apparent due to a lack of private latrines: As a result, women had no choice but to find private places to defecate, often at night and at a considerable distance from their homes, putting them at increased risk of sexual assault. Moreover, women also faced violence – including rape – when collecting water from springs outside of the village. A joint report by the Office of the United Nations High Commissioner for Refugees (UNHCR) and Save the Children reported that children were not exempt from these threats. Documented experiences of refugee children in camps in Guinea, Liberia and Sierra Leone revealed that children often reported experiences of rape in connection to using the toilet or taking a bath, and described men lying in wait for them to enter toilet blocks. <sup>cxxxvii</sup>

### **Food: children**

Climate-related disasters cause severe **food crises**: drought is responsible for 80 per cent of damage and losses in agriculture, dramatically altering what food is available to children and families, as well as its quality and price. This is true in both rural areas – for small-scale food

producers, agricultural laborers and families who buy their food – and urban areas, where resulting food price hikes determine what food is accessible. <sup>cxxxviii</sup>

Because of the ongoing food crisis as a result of climate-related disasters, globally, at least 1 in 3 children under 5 is not growing well due to malnutrition in its more visible forms: stunting, wasting and overweight. <sup>cxxxix</sup> In 2018, 149 million children under 5 were stunted and almost 50 million were wasted. <sup>cxli</sup> Undernutrition continues to exert a heavy toll. <sup>cxli</sup> Malnutrition underlies 45 per cent of deaths in children under 5 years of age. Diarrhea is particularly deadly when children are undernourished, killing over 700 children under 5 every day in 2016. Most childhood cases can be traced back to unsafe drinking water, foods contaminated in the home, or fecal contamination from poultry. <sup>cxlii</sup> The greatest burden of all forms of malnutrition is shouldered by children and young people from the poorest and most marginalized communities, perpetuating poverty across generations. <sup>cxliii</sup>

Climate change's impact also contribute to pesticides contaminating the food which children also eat. For example, Pre-natal exposure to pesticides can increase the risk of foetal death and birth defects, while exposure in childhood can disrupt the endocrine system, cause cancer and delay neurodevelopment. A chemical pesticide is up to 10 times more toxic to a child than to an adult, and acute poisoning usually results in death. <sup>cxliv</sup>

Climate Change's impact is also contributing to the destruction of any existing biodiversity which is not only essential for healthy ecosystems but also directly affects food security and nutrition. Children's dietary diversity is also at stake as if there is less diversity in crop production, diets become increasingly homogenous around the world which is already a issue as just three crops – rice, wheat and maize – now make up nearly two-thirds of the global caloric intake. <sup>cxlv</sup> Without improvements to today's dietary patterns and food production, children, their families and future generations are likely to face greater risk of food insecurity and malnutrition brought on by climate shocks and environmental degradation. <sup>cxlvi</sup>

## Nutrition in Fragile Regions

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones. <sup>cxlvii</sup>

Chronic malnutrition among children under 5 years of age is found in 100 per cent of extremely **fragile contexts** – i.e., each context demonstrates stunting prevalence above 10 per cent in children under 5 – compared with 61 per cent of non-fragile contexts. The prevalence of acute malnutrition among children under 5 years of age is also concerning: 90 per cent of extremely fragile contexts demonstrate wasting prevalence above 5 per cent in children under 5, compared with 27 per cent of non-fragile contexts. Most emergencies also occur in settings where children already suffer from chronic malnutrition. <sup>cxlviii</sup>

## Children's Health Status

Much of climate change's impact on children's health has been addressed in above sections. Several other issues need to be addressed as well. In a recent open letter to the world's children, UNICEF Executive Director Hienritta H. Fore made the following observations:

"Poverty, inequality, discrimination and distance continue to deny millions of children their rights every year, as 15,000 children under 5 still die every day, mostly from treatable diseases and other preventable causes. We are facing an alarming rise in overweight children, but also girls suffering from anaemia. The stubborn challenges of open defecation and child marriage continue to threaten children's health and futures."<sup>cxlix</sup>

The first deals with the fact that climate change's impact on the health of children will also be compounded by the impact of air pollution, toxic waste and groundwater pollution damaging children's health. In 2017, approximately 300 million children were living in areas with the most toxic levels of outdoor air pollution – six or more times higher than international guidelines, and it contributed to the deaths of around 600,000 children under the age of 5. Even more will suffer lasting damage to their developing brains and lungs.<sup>cl</sup>

Another issue that area of risk for adolescents reveals an "extremely worrisome trend in the wrong direction - one that reminds us of the invisible vulnerability that young people still carry inside of them." In this day and age, climate change and its consequences, as well as access to the internet in certain cases, has exposed many vulnerable children to suffer from unthinkable traumas, gender discrimination, extreme poverty, sexual violence, disability and chronic illness, living through conflict and other experiences that can place them at high risk of mental distress.<sup>cli</sup> As such, it should not be a surprise that mental health disorders among children under 18 have been reported to be rising steadily over the past 30 years and depression is now among the leading causes of disability in the young. In addition, the World Health Organization (WHO) estimates that 62,000 adolescents died in 2016 because of self-harm, which is now the third leading cause of death for adolescents aged 15 -19. This is not just a rich country problem - WHO estimates that more than 90 per cent of adolescent suicides in 2016 were in low or middle-income countries.<sup>clii</sup> The cost is not only personal, it is societal - the World Economic Forum consistently ranks mental health as having one of the greatest economic burdens of any non-communicable health issue. Despite this overwhelming evidence of a looming crisis and the alarming trends in rising self-harm and suicide rates, adolescent mental health and well-being have often been overlooked in global health programming.<sup>cliii</sup>

## Children’s Health in Fragile Settings

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones. <sup>cliv</sup>

In fragile regions, poor water and sanitation is a leading contributor for diarrhea as communities that are poor and vulnerable and without readily accessible safe water, sanitation and health care suffer disproportionately from diarrheal diseases. Under-five mortality is more than three times greater in extremely fragile contexts and is responsible for 8.9 per cent of under-five deaths in extremely fragile contexts. One of the deadliest diseases that causes diarrhea is cholera, which is also endemic in 93 per cent of extremely fragile contexts and can kill within hours through rapid dehydration. Outbreaks of the disease are also often attributed to the failure of long-term WASH systems and behaviors. <sup>clv</sup>

## Education

1. 8 billion young people between the ages of 10 and 24 are in the world, one of the largest cohorts in human history yet too often, they lack access to an education. <sup>clvi</sup> For example, roughly one in five school-aged children are not in school at all. Children and adolescents are excluded from education for many reasons. Poverty remains one of the most obstinate barriers, with children from the poorest households almost five times more likely to be out of primary school than those from the richest. For girls in some parts of the world, harmful gender norms can have severe effects for them which results in education opportunities that are especially limited. For example, only 66 per cent of countries have achieved gender parity in primary education. Children with disabilities and from ethnic minorities are also more likely to be left behind and location also keeps children from school. Children from rural areas are more than twice as likely to be out of primary school than their urban peers. In conflict zones, 27 million children are out of school. <sup>clvii</sup>

In addition, even though more children and adolescents today are enrolled in pre-primary, primary and secondary education than ever before, for many of them, schooling does not lead to learning. A lack of trained teachers, inadequate learning materials, makeshift classes and poor sanitation facilities make learning difficult for many children. Others come to school too hungry, sick or exhausted from work or household tasks to benefit from their lessons. The consequences are grave: An estimated 617 million children and adolescents around the world are unable to reach minimum proficiency levels in reading and mathematics – even though two thirds of them are in school. This learning crisis has been described as being “the greatest global challenge to preparing children and adolescents for life, work and active citizenship”. <sup>clviii</sup>

Without safe water, sanitation and hygiene, children’s rights to nutrition, health, protection and education are at risk as will be illustrated below, they will be at risk of malnutrition and exposed

to preventable diseases including diarrhea, typhoid and cholera, which threaten their survival and development; fertilizers put aquatic systems at risk of contamination, and pesticides pose direct risks to children.<sup>106</sup> In addition to ingesting food with pesticide residue, many children are exposed to pesticides while working in agriculture, which accounts for 71 per cent of child labour. <sup>clix</sup>

## Education and Girls

Girls have the right to high-quality education as enshrined in Article 28 of the UNCRC and is considered one of the most important sectors as it underpins all of the SDGs. However, in 2015, an estimated 39 million girls were out of school because of war and disasters.<sup>clx</sup> Climate change significantly impacts a girl or woman's right to quality education. Girls' education is often the first thing families sacrifice when faced with the impacts of the climate crisis. Girls are pulled out of school to help their families make money, find food and water or take care of siblings.. If they are out of school, they are less likely to learn about climate change and how to deal with its effects.<sup>clxi</sup>

Girls are also more likely to be out of school than boys due to child marriage, for example or because of attacks on girls' education in conflict-affected states. These risks are magnified in a changing climate, especially for those households that rely on natural resources for income. A deterioration of livelihoods associated with shifting weather patterns and changes in seasonality affects household-level decisions about sending children to school. Girls' attention, cognitive ability to learn and performance are all impacted due to their heightened risk of malnutrition caused by climate change. Further, extreme weather events cause more children to miss school because of damaged schools and access routes or the use of school buildings as evacuation centres.<sup>clxii</sup> Girls are also more likely not to return to school after a disaster - in Pakistan, after the 2010 floods, 24% of girls in Grade 6 dropped out of school, compared with 6% of boys.<sup>clxiii</sup>

The ultimate result of girls' reduced access to quality education can be injury or death in extreme weather events as girls' limited access to quality education puts them at further risk as they have less access to information, knowledge on climate and disaster risks, and skills on how to prepare, anticipate, reduce, adapt to and respond to these including learning key survival skills such as swimming.<sup>clxiv</sup> Brookings Institute even shows for every additional year of girls' schooling on average, a country's level of climate resilience is improved.<sup>clxv</sup> Other research of 187 countries shows that education.<sup>clxvi</sup> influences the number of deaths from disasters more than economic growth and that countries that have focused on female education have suffered far fewer losses from droughts and floods than countries with lower levels of girls' education.<sup>clxvii</sup>

Better integration of financial literacy into education content and methods will empower girls to calculate the costs of climate change impacts on how they spend their time and income and will help them better prepare future livelihood strategies. Education can also support girls in secur-



ing other rights, through increased access to information and services. Accessing their rights is a vital way of strengthening their resilience to climate change.<sup>clxviii</sup>

### **Education in a fragile setting: Children**

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones.<sup>clxix</sup>

One in four children now live in countries affected by violent fighting or disaster, with 28 million children driven from their homes by wars and insecurity. Many lose several years of school – as well as records of achievements and qualifications for future learning and careers. Conflicts and natural disasters have also already disrupted learning for 75 million children and young people, many of whom have migrated across borders or been displaced.<sup>clxx</sup> In an extremely fragile setting, a staggering 43 per cent of school-aged children (across primary and secondary education) are out of school, compared with 10 per cent of children in non-fragile contexts. One in four children now live in countries affected by violent fighting or disaster, with 28 million children driven from their homes by wars and insecurity. Conflicts and natural disasters have already disrupted learning for 75 million children and young people, many of whom have migrated across borders or been displaced.<sup>clxxi</sup>

Though evidence linking WASH in schools to improved school attendance and better learning outcomes is weak, data indicates that girls worldwide are more likely to drop out of school or not even enroll in the first place – in part due to concerns around menstrual hygiene management. A small but growing body of evidence suggests that gender-sensitive WASH programs may be a driver for schoolgirls to both participate more fully in school and stay in school. In Zambia, for example, the ratio of female to male enrolment was raised and absence and drop-out rates for girls reduced, through the provision of improved sanitation facilities for girls.<sup>clxxii</sup>

### **Migration: Children**

Fragile regions include those areas which had been affected by climate change. In 2019 more than half a billion children lived in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones.<sup>clxxiii</sup>

In 2017, there were 258 million people worldwide living outside their country of birth; 30 million of them were children. Among the world's migrants are nearly 20 million refugees – some 10 million of whom are children – who have been forcibly displaced from their own countries. An additional 40 million people in 2017 were internally displaced due to conflict and violence, and estimated 17 million of those were children.<sup>clxxiv</sup>

People living in less developed countries without the ability to adapt to impacts associated with climate change are those most likely to migrate. Studies showed that [80 percent of people displaced by climate change around the globe are women](#), as women were more likely than men to experience poverty and have less socioeconomic power than men, making recovery from extreme weather events more difficult.

The impact of climate change on children has caused them to consider migration as not a positive choice but an urgent necessity as they simply do not have the opportunity to build a safe, healthy and prosperous life in the place they are born.<sup>clxxv</sup> And one of the greatest migrations the world has ever seen is happening not across borders, but within borders, with millions migrating internally from rural to urban areas. Inequalities can be so large that many of the most disadvantaged children in urban areas fare worse than children in rural areas. For example, the poorest urban children in 1 in 4 countries are more likely to die before their fifth birthday than the poorest children in rural areas. And the poorest urban children in 1 in 6 countries are less likely to complete primary school than rural children.<sup>clxxvi</sup> Under these circumstances, when migration is driven by desperation, it can lead to children migrating without the legal permissions they need, becoming so-called ‘irregular migrants’. As a result, they often take perilous journeys across deserts, oceans and armed borders, encountering violence, abuse and exploitation on the way.<sup>clxxvii</sup>

In the present day, we are surrounded by examples of children who have been impacted by climate change. For example, over 19 million children spread across Bangladesh are at the front-line of climate change disasters, a quarter of them under 5 years old. Floods and riverbank erosion are driving families to city slums, where they face overcrowding and a lack of access to healthy food, education, adequate health services, sanitation and safe water. In slums, children must often fend for themselves and are at greater risk of malnutrition, child labor, child marriage and exposure to pollution, violence and abuse and communicable and non-communicable diseases linked to changing climate conditions and unplanned urbanization such as hepatitis A, cholera, dysentery, typhoid, dengue and chikungunya fever.<sup>clxxviii</sup>

The Convention for the Rights of the Child and other Human Rights instruments guarantees children the basics to sustain healthy lives – a clean environment to live in, clean air to breathe, water to drink and food to eat. “It sounds obvious that all children need these basics to sustain healthy lives – a clean environment to live in, clean air to breathe, water to drink and food to eat – and it sounds strange to be making this point in 2019. Yet climate change has the potential to undermine all of these basic rights and indeed most of the gains made in child survival and development over the past 30 years. There is perhaps no greater threat facing the rights of the next generation of children.”<sup>clxxix</sup>

## Drought

Drought and water scarcity are considered to be the most far reaching of all natural disasters, causing short- and long-term economic and ecological losses. By 2025, 1.8 billion people will experience absolute water scarcity and two thirds of the world population will be living under water-stressed conditions. The situation will ultimately deteriorate if no interventions are carried out, especially since demand for water is expected to increase by 50 per cent. As populations increase, especially in dryland areas, more and more people are becoming dependent on freshwater supplies in land that are becoming degraded. <sup>clxxx</sup> The health impacts of drought and their gender dimensions may be exacerbated further by impacts of climate change. Almost 90% of the burden of diarrheal disease is attributable to lack of access to safe water and sanitation reduction in the availability and reliability of fresh water supplies is expected to amplify this hazard. <sup>clxxxii</sup>

In arid, semi-arid and dry sub-humid areas, drought already presented a serious threat to the well-being and health of the local populations. According to the 2018 report regarding the State of Food Security and Nutrition In the World, as with increased levels of hunger, major contributors to crisis-level food insecurity were climate-related, in particular droughts. <sup>clxxxii</sup> The focus on drought was well justified – 83 percent of the damage and losses caused by droughts affected the agricultural sector, especially crop production and livestock. <sup>clxxxiii</sup>

According to the above report, evidence showed that recent years (2011–2016) had been characterized by a number of severe droughts in many regions. Some of these featured among the most extreme droughts historically (e.g. the state of California in the United States of America; Australia), while others were unusually prolonged and spread over larger areas (e.g. Somalia, Southern Africa, India and the Dry Corridor of Central America). <sup>clxxxiv</sup>

In addition, according to the above report, in almost 36 percent of the countries that experienced a rise in undernourishment since 2005, this coincided with the occurrence of severe drought. This association was further corroborated by a number of studies that showed a strong link between drought and stunting in children.

<sup>clxxxv</sup>

In a recent study, the 2019 report of The *Lancet* Countdown on health and climate change also analyzed the effect of droughts and floods. It observed that extremes of precipitation, resulting in flood and drought, have impacted human health and wellbeing, with South American and South- East Asian populations experiencing long-term increases in both of these natural disasters. <sup>clxxxvi</sup> Analysis across time and space reveals regional trends for drought and extreme heavy rain that were more significant than global trends, reflecting the varying nature of climate change depending on the geographical region. It also observed that prolonged drought remained one of the most dangerous environmental determinants of premature mortality, affect-

ing hygiene and sanitation, as well as resulting in reduced crop yields, food insecurity, and malnutrition. Finally, it also acknowledged that the change in the number of severe droughts in 2018 demonstrated areas of significantly increased exposure in all six WHO regions, with areas of Brazil experiencing a full 12 months of drought throughout 2018. <sup>clxxxvii</sup>

Extended periods of drought have been linked not only to water shortages and food insecurity but also to increased risk of fires, decreased availability of fuel, conflicts, migration, limited access to health care and increased poverty. Droughts and drying were also described as leading to social instability, food insecurity and long-term health problems and could damage or destroy related livelihoods. <sup>clxxxviii</sup> Drought had also been determined to threaten local food security and nutrition and aggravate humanitarian conditions, which could trigger large-scale human displacement and create a breeding ground for conflict. Moreover, some studies indicated that, as drought intensified and lingered, the likelihood of conflict rose significantly. <sup>clxxxix</sup>

Studies were also available on the consequences of droughts for human health and all of them point to differing impacts on men and women. <sup>cx</sup> In most developing countries, women are intrinsically tied to water and cope with enormous physical burdens on a daily basis. They are responsible for collecting, storing, protecting and distributing water. Women and girls fetch water in pots, buckets and more modern narrow-necked containers, which are carried on the head or the hip. A family of five people needs approximately 100 litres of water, weighing 100 kg, each day to meet its minimum needs. Women and children may need to walk to the water source two or three times each day. The first of these trips often takes place before dawn, which involves sacrificing sleeping hours, which can pose a serious strain on health. During the dry seasons in certain regions, 30% or more of a woman's daily energy intake may be spent fetching water. Carrying heavy loads over long periods of time causes cumulative damage to the spine, the neck muscles and the lower back, thus leading to early ageing of the vertebral column (Mehretu & Mutambirwa, 1992; Dasgupta, 1993; Page, 1996; Seaforth, 2001)

Drought also increases the family's physiological need for water and also results in women or girls having to travel greater distances to a water source. According to available data, the quantity of collected water per capita is reduced drastically if the walk to a water source takes 30 minutes or longer (WHO & UNICEF, 2005). As a result, the quantity of collected water often does not even cover the basic human physiological requirements. This puts women in a very difficult position, as in many societies women are socially responsible for the family's water supply. As women or girls travel the extra distance in order to obtain their water, they also become more vulnerable to gender-based violence as they search for this precious resource. In addition, according to a study on water needs and women's health in some regions, women who maintain traditional norms are particularly vulnerable during water scarcity, as they often also give priority to their husbands, ensuring that the man's water needs are met before their own (Buor, 2003). <sup>cxci</sup>

Increased drought conditions can also lead to infertile soil, and flooding from unexpected downpours uproots vegetation and crops, which cause agricultural yields to decline. In such

cases, women and the elderly are often left to fend for themselves as young people and men leave in search of profitable work. In addition, increased suicide among poor male farmers following periods of droughts in contiguous semi-arid regions also occurs again leaving the women and her family to fend for themselves. (Behere & Behere, 2008; Nagaraj, 2008)<sup>cxcii</sup>

The potential for climate change impacts such as drought to exacerbate existing conflicts or contribute in some way to future conflicts cannot also be ignored.<sup>cxci</sup> An example of how drought may increase violence and conflict within countries could include the Sahel region of Africa as it is particularly vulnerable to rapid temperature rises and water scarcity, which serve as potential conflict accelerators both within and between groups. In the Sahel, temperatures are rising 1.5 times faster than the global average, increasing the frequency of droughts and floods, and in turn affecting water supply, food production and livelihoods. Such effects have been associated with an increase in violence and conflict, especially between farmer and herder groups – often from different ethnic backgrounds – who compete for scarce resources. As these more traditional conflicts have escalated, the emergence of extreme violence and militancy has introduced greater complexity and more acute violence to the conflict dynamics. In conflict and displacement settings that happen to be located within a disaster-prone area, the more protracted the crisis becomes, the greater the likelihood that multiple crises (e.g., including climate-related hazards) will occur at the same time, complicating humanitarian action, slowing development progress and typically overwhelming all of those involved.<sup>cxci</sup> Another example of how drought may affect countries could also include Ethiopia which has been victim to regular famines since the 1980s, with droughts being a significant contributing factor. A consequence of this is child undernutrition and wasting. For instance, in areas affected by moderate drought in Ethiopia, child wasting was 34% higher than areas unaffected by drought. Areas of conflict also showed clear links with higher levels of undernutrition, as a result of decreased food security.<sup>cxv</sup>

## Forests

World forests have also been disappearing at an alarming rate. No less than 1.3 million square kilometres of forests have been lost since 1990, mostly in tropical areas (Latin America, sub-Saharan Africa and South-East Asia), which are equivalent to the size of South Africa.<sup>cxvi</sup> Forests support livelihoods directly for over 1.6 billion people, including around 350 million people living in or near dense forests who use forest resources for income and subsistence (World Bank 2009b; FAO 2015). People living near forested areas often have limited access to markets, and thus can be even more dependent on forest livelihood sources. This is particularly true for women who may rely for up to half of their income on forests, and thus require secure access and use rights to these resources (World Bank 2016; Moss and Swan 2013). The loss of forests has had a negative impact on women who continue to be very dependent on forest goods and services – whether these through regulating water, sustaining agriculture and providing livelihoods and energy resources for women and men via firewood, fodder, soil and water protection, or

regulation of the climate for their agricultural activities. Forest degradation has also meant that women have had to walk longer distances into the forests to source materials, with negative impacts on their time poverty, income and personal safety (FAO 2015).<sup>cxcvii</sup>

## **Flooding, Sea levels and Heavy Rain**

According to the 2018 report regarding The State of Food Security and Nutrition in the World floods caused more climate-related disasters globally than any other extreme climate event, with flood-related disasters seeing the highest increase – 65 percent – in occurrence over the last 25 years.<sup>cxcviii</sup>

Floods are increasing in frequency and intensity, and the frequency and intensity of extreme precipitation is expected to continue to increase throughout the current century. Floods contaminate freshwater supplies, heighten the risk of water-borne diseases, and create breeding grounds for disease-carrying insects such as mosquitoes. They also cause drownings physical injuries and even death<sup>cxcix</sup>, mental issues<sup>cc</sup>, damage homes and disrupt the supply of medical and health services. Rising temperatures and variable precipitation are also likely to decrease the production of staple foods in many of the poorest regions. This will increase the prevalence of malnutrition and undernutrition, which currently cause 3.1 million deaths every year.<sup>cci</sup> Rising temperatures, floods and droughts can also affect food safety; for example, flooding increases the risk that pathogens will spread from livestock. More extreme storms and flooding may also disrupt energy distribution and result in chemical and biological contamination of water supplies and sanitation. Health facilities are vulnerable to extreme weather events and to increasing demand as a result of hazards, the spread of vector- and waterborne infectious diseases, food insecurity and forced migration. <sup>ccii</sup>

The average number of extreme rainfall events in the 2000–18 period reveals that South America and South East Asia are experiencing the largest increases. <sup>cciii</sup> However, in 2017 and 2018 alone, populations around the world were also exposed to severe flooding such as China, France and India. <sup>cciv</sup> In the case of floods and storms, a statistically significant trend in occurrence was identified individually across Africa, Asia, and the Americas. A statistically significant increase in the number of people affected by floods and storms in Africa was also noted, although no statistically significant increase in the lethality of these events was identified. <sup>ccv</sup> Importantly, work from trajectory is expected to result in an additional 2 billion flood exposure events per year by 2090, which will likely overwhelm health systems and public infrastructure.<sup>ccvi</sup>

Examples of how flooding has affected regions includes Pakistan which, over the last 40 years, has had more than 90% of natural disasters affecting Pakistan which have been triggered by climate change. Flooding has been increasingly affecting Pakistan. For example, in 2010, over 15 million people were affected by flooding, with 6 million people in need of urgent medical care.

Attending to these health needs was extremely difficult, as over 200 health care facilities were destroyed by the floods. <sup>ccvii</sup>

Small island Developing States (SIDS) are also at particular risk of climate-related disasters such as extreme floods, storms, droughts and sea-level rise and of the associated risks of water-, vector- and foodborne diseases, which are exacerbated by environmental and climate variation and change. For instance, between 1976 and 2015, 622 climate-related storms, floods and droughts were recorded in SIDS, causing over 14 000 deaths, affecting 38.5 million people and at least US\$ 33.3 billion worth of damage. Climate-related disasters also affect food security in SIDS by damaging food crops and fisheries, which compounds the dietary transition from local, traditional, healthy diets to greater dependence on imported foods with more fat, sugar and salt. <sup>ccviii</sup>

Rising sea levels and increasingly extreme weather events will destroy homes, medical facilities and other essential services. More than half of the world's population lives within 60 km of the sea. People may be forced to move, which in turn heightens the risk of a range of health effects, from mental disorders to communicable diseases. <sup>ccix</sup>

### **Women and Flooding**

In 2018, the UN women also issued a report which dealt with the impact of climate change on women or girls access to adequate food or nutrition. It was observed that human-induced climate change including flooding and droughts were having a profound impact on the natural ecosystems on which all life depends. Significant changes in the temperature of land and water bodies were increasing the frequency and intensity of extreme weather events and natural disasters, including droughts, fires and floods. Women's livelihoods were also impacted by these adverse effects of climate change, including through reduced crop and forest yields and acidification of the ocean, which negatively affects the harvesting of marine life. Globally, women were heavily engaged in agriculture (SDG 2), were largely in charge of foraging (SDG 7 and 15) and fetching water (SDG 6) and played an important role in small-scale fisheries and seafood marketing (SDG 14)—all areas facing disruption caused by, for example, flooding or droughts. <sup>ccx</sup>

Severe floods could also lead to crop failure or to reduced access to safe water and adequate sanitation which could also indirectly affect the utilization of food and nutrition, as a result of reduced quality and safety of food and disease outbreaks. The cumulative effect of these direct and indirect impacts led to a downward spiral of increased food insecurity and malnutrition. <sup>ccxi</sup> The impacts of floods and droughts on peaks in acute malnutrition (through crop damage or disease) were also well documented. <sup>ccxii</sup> Crop destruction due to tropical cyclones could also include salt damage from tides blowing inland, insufficient oxygen caused by overhead flooding, flash floods, wind damage to plants, and water stress induced by enforced respiration, all of which could occur at the same time

Increasing temperatures were also contributing to sea-level rises, and precipitation is becoming heavier and more variable in many regions, potentially increasing flood risks and multiple associated health hazards. In both developing and industrialized nations, health and other impacts

fell disproportionately on women, children, people with disabilities and elderly people (Few et al , 2004) For example, Saline contamination was expected to be aggravated by climate change and sea-level rises (Nicholls et al , 2007). A report on saline contamination of drinking water in Bangladesh had also indicated that large numbers of pregnant women in coastal areas were being diagnosed with pre- eclampsia, eclampsia and hypertension.<sup>ccxiii</sup>

In Bangladesh and the eastern region of India, where the arsenic contamination of groundwater is high, flooding also intensifies the rate of exposure of arsenic among rural people and other socioeconomically disadvantaged groups (Khan et al , 2003) in particular when their educational and nutritional status is considered.(Mitra et al , 2004; Rehman et al , 2006; Maharajan et al , 2007) In the south-west region of Bangladesh, waterlogging (local increases in groundwater levels) has also emerged as a pressing concern regarding its negative health consequences on women. Women are often the primary caregivers of the family, shouldering the burden of managing and cooking food, collecting drinking water, and taking care of family members and livestock. Because of these responsibilities, women often spend more time in waterlogged premises and other settings than men. Research reveals that waterlogging severely affects the health of women in affected communities. For example, women are forced to stay close to the community and drink unhygienic water, as tube wells frequently become polluted. Pregnant women have difficulty with mobility in marooned and slippery conditions and thus are often forced to stay indoors. Local health-care workers have reported that there are also increasing trends of gynecological problems due to unhygienic water use. Since men are often out of the area in search of work, they are frequently not as severely affected as their female counterparts. Waterlogging, therefore, has given rise to differential health effects in women and men in coastal Bangladesh (Neelormi et al , 2009).<sup>ccxiv</sup>

In flooded areas of Bangladesh, women have also often been the last people to receive assistance, as some men push them out of the way in the rush for supplies .Women who have lost clothing in the flood may also be unable to enter public areas to access aid because they cannot cover themselves sufficiently. (Skutsch, 2004) A further example of this is the loss of culturally appropriate clothing, which inhibits women from leaving temporary shelters to seek medical care or obtain essential resources .(Neumayer & Plümper, 2007).<sup>ccxv</sup>

Another example involved the severe flash floods in 1993 in the district of Sarlahi in the southern plains of Nepal which resulted in flood-related fatalities which were 13.3 per 1000 girls aged 2–9 years, 9.4 per 1000 boys aged 2–9 years, 6.1 per 1000 adult women and 4.1 per 1000 adult men. The difference between boys' and girls' fatalities existed mostly among children under 5 years of age. This result could have been due to the gender-discriminatory practices that were known to exist in this poor area: i.e. when hard choices had to be made in the allocation of resources, boys were more often the beneficiaries. This result could have also been the result regarding rescue attempts as much as in the distribution of food and medical attention.<sup>ccxvi</sup> Another factor would also again involve women's relative lack of decision-making power posing a serious danger itself, especially when it keeps them from leaving their homes in spite of rising wa-



ter levels and dying while waiting for a male authority to grant them permission or to assist them in leaving (Bradshaw, 2010) .ccxvii

Even if a warning is issued, many women die while waiting for their relatives to return home to accompany them to a safe place. Other reasons include that many women or girls do not know how to swim. For example, in in some Latin American and Asian countries, women and girls are often not taught to swim, for reasons of modesty (Aguilar, 2004) In the South Asian context, social norms that regulate appropriate dress codes in accordance with notions of modesty may hinder women and girls from learning to swim, which can severely reduce their chances of survival in flooding disasters (Oxfam, 2005).ccxviii Moreover, clothing such as a sari restricts the movement of women and puts them more at risk at the time of a tidal surge, and women are often less well-nourished and hence physically less able than men to deal with these situations (Chowdhury et al , 1993; WEDO, 2008) In 2019, women and children continue to be 14 times more likely than men to die during natural disasters.ccxix

## Heat waves /Extreme heat

In the last 130 years, the world has warmed by approximately 0.85°C. Each of the last 3 decades has been successively warmer than any preceding decade since 1850.ccxix Warming trends have continuing worldwide, accompanied by increasing numbers of extreme weather events, rising by 46% between 2000 and 2013. Reports showed that the number of additional people exposed to heatwaves since 2000 increased markedly between 2017 and 2018, from 125 million to 157 million in 1 year. ccxxi

As the fourth hottest year on record, 2018 saw a record breaking 220 million additional exposures to extremes of heat, coupled with corresponding increased vulnerability to heat across every continent. In 2017 and 2018 alone, populations around the world were exposed to heatwaves (for example, in Japan and the United Kingdom)ccxxii For example, heatwaves across the northern hemisphere also made headlines in 2018, reaching new highs for a number of countries. The increase in heatwave exposure events (220 million, which is 11 million more than the 2015 record) was due to a series of heat waves across India (45 million additional exposures); across central and northern Europe (31 million additional exposures in the EU); and across northeast Asia, where heatwaves affected Japan, the Korean peninsula, and Northern China. 32 million exposures affected people older than age 65 years in Japan alone, the equivalent of almost every person in this age group experiencing effects of a heatwave in 2018.ccxixiii In addition, it was also reported that human populations were concentrated in the areas most exposed to warming thereby experiencing a mean summer temperature change that was four times higher than the global average ccxxiv

The most immediate and direct impact of a changing global climate on human health was also seen in the steady increase in global average temperature, and the increased frequency, intensity, and duration of extremes of heat. The pathophysiological consequences of heat exposure in humans are well documented and understood, and include heat stress and heat stroke, acute kidney injury, exacerbation of congestive heart failure, and increased risk of interpersonal, and collective violence. In particular, during periods of extreme heat, young children have a greater risk of electrolyte imbalance, fever, respiratory disease, and kidney disease. <sup>ccxxv</sup> High temperatures also raise the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory disease. <sup>ccxxvi</sup> Extreme high air temperatures also contributed directly to deaths from cardiovascular and respiratory disease, particularly among elderly people. For example, in the heat wave of summer 2003 in Europe, more than 70 000 excess deaths were recorded. <sup>ccxxvii</sup> In addition, in a 11 year study in Burkina faso it had shown that exposure to moderate or extreme heat significantly increased excess daily premature mortality from NCDs; cardiovascular disease accounted for 50% of years of life lost in this study. <sup>ccxxviii</sup> Pollen and other aeroallergen levels are also higher in extreme heat and as such, can trigger asthma, which affects around 300 million people. <sup>ccxxix</sup> Rising temperatures also affect food safety; for example, rising temps can increase the levels of pathogens in food sources (such as ciguatera in fish). <sup>ccxxx</sup> As a result of heatwaves and broader climatic changes, vectoral capacity for the transmission of dengue fever was also the second highest recorded, with 9 of the past 10 most suitable years occurring since 2000. <sup>ccxxxi</sup> Ongoing temperature increases were expected to increase this burden. For example, climate change was expected to cause approximately 250 000 additional deaths per year between 2030 and 2050 including 38 000 additional deaths due to heat exposure in elderly people. <sup>ccxxxii</sup>

Populations aged 65 years and older were also particularly vulnerable to the health effects of climate change, and especially to extremes of heat. Vulnerability to extremes of heat continued to rise among older populations in every region of the world, with the Western Pacific, South-East Asia and African regions all seeing an increase in vulnerability of more than 10% since 1990. <sup>ccxxxiii</sup> For example, from 1990 to 2018, populations in every region have become more vulnerable to heat and heatwaves, with Europe and the Eastern Mediterranean remaining the most vulnerable. In 2018, these vulnerable populations experienced 220 million heatwave exposures globally, breaking the previous record of 209 million set in 2015. Already faced with the challenge of an ageing population, Japan had 32 million heatwave exposures affecting people aged 65 years and older. <sup>ccxxxiv</sup> This occurred at a time when demographic vulnerability to these extremes continued to increase across every region. <sup>ccxxxv</sup> The increase in vulnerability from 1990 to 2017 has been seen in the Western Pacific (33·1% to 36·6%) and African (28·4% to 31·2%) regions. Overall, Europe remained the most vulnerable region to heat exposure (followed closely by the Eastern Mediterranean region), due to its ageing population, high rates of urbanization, and high prevalence of cardiovascular and respiratory diseases, and diabetes. <sup>ccxxxvi</sup>

Climate change was expected to cause approximately 250 000 additional deaths per year between 2030 and 2050 including 38 000 additional deaths due to heat exposure in elderly people. <sup>ccxxxvii</sup>

Reduced labor productivity is often the first symptom of the health effects of heat, and, if not addressed, can lead to more severe health effects, such as heat exhaustion and heat stroke. The following reports illustrated the important impact of climate change on labor capacity in vulnerable populations. <sup>ccxxviii</sup> Temperature rise and heatwaves temperatures continued to affect *people's ability to work within* various populations. Even outdoor workers, while younger and healthier overall, were vulnerable due to heightened exposure to heat and sunlight. <sup>ccxxix</sup> In 2018, 133.6 billion potential work hours were recorded as being lost globally, 45 billion more than the 2000 baseline, and southern areas of the USA lost 15–20% of potential daylight work hours during the hottest month of 2018. <sup>ccxi</sup> Even workers in the southern parts of the USA (below a latitude of 34°N, with Alabama, Georgia, Florida, Louisiana, Mississippi, and Texas particularly affected), lost 15–20% of potential daylight work hours in the hottest month of 2018. <sup>ccxli</sup>

It has been reported that warming trends are continuing worldwide, accompanied by increasing numbers of extreme weather events, rising, for example, by 46% between 2000 and 2013. A changing, more variable climate, including increased temperatures is now recognized as the most likely, highest-impact global risk to society as a whole and that which presents a clear and present danger to health security. The problem with any increase in temperature is that health adaptation is limited, particularly under scenarios of a temperature rise above 2 °C. For example, the human body has a physiological limit to the temperature it can bear; sustained exposure to a “wet-bulb” temperature > 35 °C will raise the core body temperature to a fatal level. Already, approximately 30% of the world’s population is exposed to catastrophic heat events every year (which are particularly dangerous for vulnerable populations such as the elderly), yet the number of such events is predicted to increase by as much as 74% this century if emissions remain high. <sup>ccxlii</sup>

There is evidence that vulnerability varies by sex: more women than men died during the 2003 European heatwave, and the majority of European studies have shown that women are more at risk, in both relative and absolute terms, of dying in such events (Kovats & Hajat, 2008) There may be some physiological reasons for an increased risk among elderly women (Burse, 1979; Havenith et al, 1998) It is estimated that a 2 °C rise would increase the annual death rate from heatwaves in many cities by approximately two- fold (McMichael & Bertollini, 2009). <sup>ccxliii</sup>

## NATURAL RESOURCES

**Natural Resources:** Climate change has also been shown to affect, in profoundly adverse ways, some of the most **fundamental determinants of health such as food, air or water**. Climate change is causing natural resource shortages (water, food, energy) on which 75% of those living in poverty, including women and girls, rely in order to survive. <sup>ccxliv</sup>

## Food

Conflict, drought and disasters have all been linked to climate change which, in turn, was cited as being among the key factors causing the reversal in the long-term progress in fighting **global hunger** as well as making the prospect of ending hunger and malnutrition by 2030 more difficult. <sup>ccxlv</sup> This belief was confirmed by the fact that, in 2018, climate shocks and stresses had pushed another 29 million people into situations of acute food insecurity, the majority of which were in Africa, where nearly 23 million people in 20 countries were already acutely food insecure due to climate shocks.<sup>ccxlvii</sup> The risk of food insecurity and malnutrition was also seen to be greater in recent years because livelihoods and livelihood assets – especially of the poor – were more exposed and vulnerable to changing climate variability and extremes.<sup>ccxlvii</sup>

The 2018 report regarding the State of Food Security and Nutrition In the World, mirrored this assessment describing climate variability and extremes as a key driver behind the recent rises in global hunger and one of the leading causes of severe food crises. In addition, to make matters worse, the changing nature of climate variability and extremes was believed to be negatively affecting all dimensions of food security (food availability, access, utilization and stability), as well as reinforcing other underlying causes of malnutrition related to women, girls, child care and feeding, health services and environmental health.<sup>ccxlviii</sup> The Food and Agriculture Organization agreeing with that assessment added that, as escalating droughts and flooding degraded food production, the next generation of children would bear the greatest burden of hunger and malnutrition. <sup>ccxlix</sup>

In 2019, the report of The Lancet Countdown on health and climate change added that the data from all major crops tracked—maize, wheat, rice, and soybean—showed that increases in temperature had reduced global crop yield potential. <sup>ccl</sup> It also observed that evidence suggested that crop production was also threatened in complex ways by changes in the incidence of pests and pathogens; increasing water scarcity; increases in frequency and strength of extreme weather conditions that could damage or even wipe out harvests. <sup>ccli</sup>

In addition, the 2019 report of The Lancet Countdown on health and climate change also addressed the issue of marine food security as well observing that, between 2003 and 2018, sea surface temperature had risen in 34 of 64 investigated territorial waters, presenting a risk to marine food security, with a maximum increase of 3.5°C observed in Finland. <sup>cclii</sup> This was important as fish provided almost 20% of animal protein intake to 3.2 billion people, with a greater reliance on fish sources of protein in low-income and middle-income countries, particularly small island developing states. The 2019 report of The Lancet Countdown on health and climate change also described the number of ways in which climate change threatened fisheries and aquaculture including through sea surface temperature rise; change in intensity, frequency, and seasonality of extreme events; sea level rise; and ocean acidification. Acute disturbances such as thermal stress also led to impaired recovery of the coral reefs, which threatened marine fish populations and subsequently marine primary productivity—a key source of omega3 fatty acids for many populations.<sup>ccliii</sup> Other reports predicted that the coral reefs would be all but destroyed

with this level of warming, a significant issue for the half a billion people who relied on fish from coral reefs as their main source of protein.<sup>ccliv</sup>

Women and girls were among the vulnerable groups which were negatively affected by this climate impact as many of them worked in rural areas which were increasingly affected by climate change as those areas were highly reliant on the environment for livelihoods, particularly on agriculture (crop cultivation, fisheries, livestock). In 2017, this irony was also acknowledged by the UN when it observed that, while women contributed more than 50 per cent of the food produced worldwide, they also accounted for 70 per cent of the world's hungry as women and that girls were disproportionately affected by hunger, food insecurity and poverty, in part as a result of gender inequality and discrimination.<sup>cclv</sup> It was also acknowledged that almost twice as many women as men suffered from malnutrition and that in many countries girls were even twice as likely as boys to die from malnutrition and preventable childhood diseases.<sup>cclvi</sup>

Malnourished mothers confronted other major risks as a result of climate change's impact on food security including iron deficiency anemia which increased women's risk of death during or shortly after childbirth,<sup>cclvii</sup> a compromised immune system, lower productivity and the lack of a capacity to generate income, and greater difficulty in caring for their families.<sup>cclviii</sup> According to reports, the prevalence of anemia in women was also increasing with one in three women of reproductive age globally still being affected by anemia which had significant health and development consequences for both women and their children. These facts were described as being "shameful" by the 2018 report regarding the State of Food Security and Nutrition In the World.<sup>cclix</sup> Women and girls were also more likely to go hungry as they are "particularly vulnerable to cultural norms that dictate that they are often the last member of the household to eat and the first to go hungry when food is in short supply."<sup>cclx</sup>

Recent evidence continued to also signal a rise in world hunger as some of the latest statistics showed that the number of undernourished people was estimated to have increased to 821 million – around one out of every nine people in the world.<sup>cclxi</sup> It was also equally alarming that the number of people facing crisis-level food insecurity also continued to increase. In 2017, almost 124 million people across 51 countries and territories faced "crisis" levels of acute food insecurity or worse, requiring immediate emergency action to safeguard their lives and preserve their livelihoods. This represented an increase compared to 2015 and 2016, when 80 and 108 million people, respectively, were reported as facing crisis levels.<sup>cclxii</sup>

According to the 2018 report regarding the State of Food Security and Nutrition In the World, simple correlations also showed higher levels of food insecurity in countries with high levels of exposure to climate shocks. Those countries experiencing climate extremes for more than three years in the period of 2011–2016 were defined as having high exposure, irrespective of whether they are countries of low or middle income. This indicated a high frequency of exposure to climate shocks, repeated within a short period of time. <sup>cclxiii</sup>For example, in 2017, almost 124 million people across 51 countries and territories faced "crisis" levels of acute food insecurity or worse requiring urgent humanitarian assistance to safeguard their lives and preserve their live-

lihoods. In 34 of these countries more than 76 percent of the total populations facing crisis levels of acute food insecurity or worse – nearly 95 million people – were also affected by climate shocks and extremes. <sup>cclxiv</sup> Moreover, where conflict and climate shocks occurred together, the impact on acute food insecurity was even more severe. In 2017, 14 out of the 34 food-crisis countries experienced the double impact of both conflict and climate shocks, which led to significant increases in the severity of acute food insecurity. A total of 65.8 million people required immediate humanitarian assistance in 2017, of which 15.5 million people suffered very extreme levels of acute food insecurity requiring urgent life-saving assistance. <sup>cclxv</sup>

As we will see in another section, children are also not exempt from being victims of hunger or malnutrition. According to the 2018 report regarding the State of Food Security and Nutrition In the World, areas where climate shocks and conflict interacted to drive food crises also had very high to high prevalence rates of acute malnutrition in children under five years of age – these included Darfur in the Sudan (28 percent), South Sudan (23 percent), the Lake region of Chad (18 percent), Yemen (10–15 percent), the Diffa region of the Niger (11 percent), the Democratic Republic of the Congo (8–10 percent), and Afghanistan (9.5 percent). <sup>cclxvi</sup>

It was also acknowledged that illness and disease became more likely if climate variability and extremes prompted people to consume inadequate or insufficient food, or to engage in crisis and emergency coping strategies. There could also be further repercussions for access to and utilization of food if people's immune systems were compromised or if people were more exposed to disease risk factors vectors, particularly in situations with insufficient health services.

<sup>cclxvii</sup>

## **Freshwater availability**

The effect of the climate crisis could also be clearly observed in the case of **freshwater availability** for women and children. Nearly 4 billion people – roughly half of the world's population – are affected by severe water scarcity for at least one month each year, and approximately 2 billion of this number suffer severe water scarcity for at least six months of the year. <sup>cclxviii</sup>

Moreover, it was predicted that by 2025, 1.8 billion people would experience absolute water scarcity and two-thirds of the world's population would be living in water stressed conditions. <sup>cclxix</sup> Today, more than 2 billion people are also drinking contaminated water, and every two minutes, a child dies from a water-related disease. Some 785 million people live without access to any kind of safely managed drinking water service; more than half of those who obtain drinking water from surface water sources live in sub-Saharan Africa, and 80 percent of those who lack basic services live in rural areas. <sup>cclxx</sup> Drought and water scarcity are considered to be the most far reaching of all natural hazards, causing short and long term economic, health and ecological losses. <sup>cclxxi</sup> Water is also at risk of becoming a 'threat multiplier' for conflict in other geographical regions and riparian countries– including in the Middle East, the Nile Basin and Mekong River Basin, between India and Pakistan in the Indus River Basin, and

between Afghanistan and the Islamic Republic of Iran. Continuous population growth, (the world population is expected to reach 9.7 billion by 2050, an increase of 2 billion people. <sup>cclxxii</sup> Unsustainable economic development and climate change may also exacerbate water scarcity, further heightening the risk of disputes overwater arising both locally and between riparian countries. <sup>cclxxiii</sup>

Changes in precipitation, extreme weather events, increasing temperatures, and sea level rise have negatively affected the availability and quality of drinking water and undermine sanitation and hygiene services. <sup>cclxxiv</sup> A warming climate will accelerate the cycle of evaporation, condensation and precipitation, reducing how much water seeps into groundwater aquifers and flows into surface water sources. Climate change will also cause more intense Atlantic hurricanes and global tropical cyclones – with both increased rainfall and storm surge – affecting safe water and sanitation still further. These factors will exacerbate the effects of conflict and fragility on water and sanitation systems, fuel migrations and indirectly affect the hunger and health of entire populations. <sup>cclxxv</sup> Climate change is expected to cause more frequent heatwaves and more frequent and intense droughts and floods in the coming years. <sup>cclxxvi</sup>

We have already addressed some of the negative impacts regarding water scarcity on women or girls. Water-borne and vector-borne diseases may also affect girls more than boys if they are already suffering from malnutrition with an increased impact on young pregnant women and girls and/or young mothers at different lactation stages. <sup>cclxxvii</sup> Pregnant and lactating women also faced additional challenges, as they have an increased need for food and water limiting their mobility and thereby creating another highly vulnerable population within a group that is already at risk. <sup>cclxxviii</sup>

Girls and women also usually have primary responsibility for household duties, such as cooking, cultivating vegetables in home gardens, child-rearing, caring for other family members, low-income or unpaid labour, and energy and water collection. Further, child marriage often means adolescent girls become responsible for managing their own households and have primary responsibility for the above activities. <sup>cclxxix</sup> In some regions affected by droughts or extreme weather events, clean water supply might be affected and in areas with no nearby boreholes or traditional wells. women or girls may have little choice but to carry water home from unsafe sources, including natural springs used by animals or streams and ponds that are likely to be contaminated. This lack of clean water supply exposes girls to additional health risks as dirty water is used for cooking, washing and laundry. The risks are particularly high during menstruation and pregnancy. <sup>cclxxx</sup> Communities that are poor and vulnerable, and places without readily accessible safe water, sanitation and health care can also suffer disproportionately from diarrheal diseases. Diarrhea is particularly deadly when children are undernourished, killing over 700 children under 5 every day in 2016. Most childhood cases can be traced back to unsafe drinking water, foods contaminated in the home, or fecal contamination from poultry <sup>cclxxxi</sup> One of the deadliest diseases that causes diarrhea is cholera, which is endemic in 93 per cent of extremely fragile contexts which include those areas which are affected by climate change. Cholera can kill within hours through rapid dehydration, and outbreaks of the disease are often attributed to

the failure of long-term WASH systems and behaviors. <sup>cclxxxii</sup> Malaria and dengue fever are also endemic in many parts of the world and continue to contribute substantially to burden of disease, with young children particularly vulnerable. Moreover, when water is scarce, hygienic practices are also commonly sacrificed to more pressing needs for water, such as drinking and cooking. The lack of hygiene can be followed by diseases such as trachoma and scabies, also referred to as “water-washed diseases” (WaterAid, 2007)

Finally, girls and women are also susceptible to harassment, abuse or rape while walking to collect water. For example, in some areas of prolonged drought has increased the length of time to collect water from 2 hours to 6 per day, resulting in girls’ absences from school and increased risk of sexual violation during their water collecting journeys. <sup>cclxxxiii</sup> In South Sudan, women typically identified having to travel long distances (especially during the evening and at night) as the main barrier to accessing WASH services such as water points and defecation areas, since this exposed women and children to gender-related violence risks related to sexual harassment, violence and exploitation. Women and girls also reported frequently experiencing sexual harassment related to stigma around menstrual hygiene and practicing open defecation These dynamics restrict women’s and girls’ ability to maintain proper hygiene and sanitation practices, directly increasing their risk of disease. <sup>cclxxxiv</sup>

By 2050, it is estimated climate change will create up to 86 million additional migrants in sub-Saharan Africa, 40 million in South Asia and 17 million in Latin America as agricultural conditions and water availability deteriorate. <sup>cclxxxv</sup>

## ENERGY

One of the main responsibilities of women and girls in developing countries is also ensuring energy supply and security at the household level. Further, child marriage often means adolescent girls also become responsible for managing their own households as well as have primary responsibility for the above activities. Effectively all exposure to indoor air pollution, which causes almost four million deaths a year, is from use of solid fuels for cooking in poor households. The burning of such fuels in inefficient cookstoves causes an estimated 3.8 million deaths per year due to household air pollution. Women and girls were most affected by household indoor air pollution because of the time they spend in and around the home. <sup>cclxxxvi</sup>

Unreliable access to energy, also known as ‘energy poverty’ also has gender dimensions due to rural girls and women being primary energy providers for the household. For example, natural resources such as wood are particularly susceptible to climate shocks and stresses and highly variable precipitation and increased temperatures in some areas can lead to water stress on woody plants which can be a primary source of fuel for women. This climate impact can directly affect their household duties as energy collection becomes more challenging when climate change increases the long hours women and girls spend collecting wood to use as fuel. <sup>cclxxxvii</sup>



Energy poverty also has implications for other aspects of girls' and women's well-being or livelihoods - more time spent finding energy sources means less time available for school work, paid work and increased health risks. Girls and women are also susceptible to harassment, abuse or rape while walking to collect wood. For example, there have also been reports of displaced women in the Darfur region of Sudan being beaten or sexually assaulted when they leave the crowded camps to collect wood for their cooking fires or fodder for their animals.

## Poverty

To begin with, when natural disasters strike, they hit poor communities first and with the worst effect. And since women make up an estimated 70 percent of those living below the poverty line, they are most likely to bear the heaviest burdens and, as such, "are disproportionately affected by extreme weather events, loss of agricultural productivity, destruction of life and property and so on, all of which stem from the climate crisis."<sup>cclxxxviii</sup> In addition, according to the European Parliament<sup>cclxxxix</sup> in 2017, the UN estimated that 70 % of the 1.3 billion people living in poverty worldwide were women who also frequently lived in marginal areas that were vulnerable to floods, rising sea levels and storms. Women were not alone in this predicament. It was observed that, even among other impoverished people, other groups could also be more vulnerable to climate change because of their age, gender, health status, geographic location, livelihood, or relative access to social protection. In other words, if any person suffered from inequalities which resulted in them having low incomes, living on marginal land, in exposed areas or in unsafe housing, being malnourished or having poor health – it could determine whether they or their household, community or even their state experienced just another climate event or they became a victim of a climate disaster.<sup>ccxc</sup>

The threat of poverty was even seen in the consequences of climate change which are felt daily by millions of young women who are farmers as they could also experience seeing their home and income being increasingly disrupted by climate change which would create less opportunities for millions of young women whose livelihoods are inextricably linked to natural resources. For example, for women farmers, insecurity due to erratic rainfall and unseasonal temperatures could be compounded by a comparative lack of assets and arable land, and in some cases to the right to own the land they farmed on. The lack of access to land rights could also increase women's vulnerability if women were excluded from inheriting land, or if their rights went unrecognised by local authorities or male family members. Unequal access to land rights could also result in limited income as well as access to credit and decision-making as well as limit the options women had for suitable agriculture technology (e.g. access to vital information on weather alerts and cropping patterns, watering implements, climate appropriate seed varieties, non-petroleum fertilizers, energy-efficient building design) as well as their capacity to rebuild post-natural hazards in this context.<sup>ccxci</sup>

Finally, even if access to land rights was improved, the land which girls stood to inherit would more than likely be less productive due to environmental degradation and climate change.<sup>ccxcii</sup>

## Wildfires

Globally, 77% of countries experienced an increase in daily population exposure to wildfires from 2001–14 to 2015–18. 152 of 196 countries saw an increase in annual daily population exposure to wildfires in 2015–18, compared with in 2001–04, with India alone experiencing an increase of 21 million annual daily exposures<sup>ccxciii</sup> and 17 million exposures in China over this time period.<sup>ccxciv</sup> In 2017 and 2018 alone, populations around the world were exposed to wildfires (for example, in Greece, Sweden and the USA)<sup>ccxcv</sup> This increase not only poses a threat to public health, but also results in major economic and social burdens in both high-income and low-income countries<sup>ccxcvi</sup>

Climate change can affect human health both directly and indirectly. The direct health impacts include physiological effects of exposure to death due to extreme weather events such as wildfires.<sup>ccxcvii</sup> Other health effects of wildfires range from direct thermal injuries to the exacerbation of acute and chronic respiratory symptoms due to exposure to wildfire smoke.<sup>ccxcviii</sup> Other effects short of death effects which may also be short- or long-term and direct or indirect, sometimes with life-long consequences for health and well-being. For example, NCDs such as mental illness after extreme weather events, climate-related displacement, immigration and loss of culture can be lifelong.<sup>ccxcix</sup> Additionally, the global economic burden per person affected by wildfires is more than twice that of earthquakes and 48 times higher than that of floods, although the global number of events and number of people affected by floods are much higher than for wildfires.<sup>ccc</sup>

## Windstorms and tropical cyclones

Between 1997 to 2016, there were 11,000 extreme weather events resulting in approximately 524,000 deaths and damages equivalent to USD3.16 trillion.<sup>ccci</sup> While it is difficult to attribute individual weather events to climate change, extreme weather events such as heatwaves or typhoons are likely increasing in frequency and intensity due to climate change, putting more people's lives, including women and girls at risk of even death.<sup>cccii</sup> For example, When a cyclone and floods hit Bangladesh in 1991, the death rate for women was almost five times higher than for men. Men were able to warn each other as they met in public spaces, but they communicated information to the rest of the family only sporadically. Many women were not allowed to leave their homes without a male relative. They waited, in vain, for their relatives to return home and take them to a safe place. Another example which occurred in May of 2008 involved Cyclone Nargis which came ashore in the Ayeyarwady Division of Myanmar. Among the 130 000 people dead or missing in the aftermath, 61% were female (Care Canada, 2010). Explanations for this include the fact that cultural or social norms have resulted in more women than men being homebound, looking after children and valuables. Even if a warning is issued, many

women die while waiting for their relatives to return home to accompany them to a safe place. Other reasons include that many women or girls do not know how to swim. For example, in some Latin American and Asian countries, women and girls are often not taught to swim, for reasons of modesty (Aguilar, 2004). In the South Asian context, social norms that regulate appropriate dress codes in accordance with notions of modesty may hinder women and girls from learning to swim, which can severely reduce their chances of survival in flooding disasters (Oxfam, 2005).<sup>ccciii</sup> Moreover, clothing such as a sari restricts the movement of women and puts them more at risk at the time of a tidal surge, and women are often less well-nourished and hence physically less able than men to deal with these situations (Chowdhury et al, 1993; WEDO, 2008). In 2019, women and children continue to be 14 times more likely than men to die during natural disasters.<sup>ccciv</sup>

Disasters such as these can also have severe impacts on a woman or girl's access to a safe location including housing, their social support networks, family ties, and coping capacity. As such, it makes sense that women, young people, and people with low socioeconomic status are also thought to be at comparatively high risk of anxiety and mood disorders after disasters (Norris et al, 2002). A follow-up study that looked at patterns and correlates of recovery from hurricane-related PTSD, broader anxiety and mood disorders and suicidal behavior found a high prevalence of hurricane-related mental illness widely distributed in the population nearly 2 years after the hurricane (Kessler et al, 2008).<sup>cccv</sup>

<sup>i</sup> WWF 2018 Living Planet Report : Aiming Higher Grooten M. and Almond, R.E.A(eds) WWF Gland Switzerland page 125

<sup>ii</sup> Antonio Guterres, U.N. Secretary General [Download PDF \(5.99 MB\)](#) United In Science A High-level synthesis report of latest climate science information convened by the Science Advisory Group of the UN for the UN Climate Action Summit 2019 page 3 the UN Climate Action Summit 2019 see also The [Political declaration of the high-level political forum on sustainable development convened under the auspices of the General Assembly A/HLPF/2019/L.1](#) September 9, 2019 the [Political Declaration](#)

<sup>iii</sup> The World Economic Forum 2019 Global Risk Report page 15

<sup>iv</sup> **World Scientists' Warning of a Climate Emergency** WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, PHOEBE BARNARD, WILLIAM R. MOOMAW, AND 11,258 SCIENTIST SIGNATORIES FROM 153 COUNTRIES (LIST IN SUPPLEMENTAL FILE S1) Viewpoint XXX/Vol XX No. X Bioscience 1 11-10-19: <http://academic.oup.com/bioscience> page 1

<sup>v</sup> United in Science A High-level synthesis report of the latest climate science information convened by the Science Advisory Group of the UN for the UN Climate Action Summit 2019 [Download PDF \(5.99 MB\)](#)

- vi **World Scientists' Warning of a Climate Emergency** WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, PHOEBE BARNARD, WILLIAM R. MOOMAW, AND 11,258 SCIENTIST SIGNATORIES FROM 153 COUNTRIES (LIST IN SUPPLEMENTAL FILE S1) Viewpoint XXX/Vol XX No. X Bioscience 1 11-10-19 <http://academic.oup.com/bioscience> page 1-3 see also **Climate Reality MARCH 14, 2018 | HOW IS CLIMATE CHANGE AFFECTING WOMEN?** See also e.g. [according to the National Centers for Environmental Information \(NCEI\)](#), 2019 is the fifth consecutive year (2015-2019) in which 10 or more billion-dollar weather and climate disaster events have impacted the United States. financial costs of the climate crisis as heatwaves, wildfires, and storms become more powerful and more frequent. For example, as of October 2019, 2019 (as of October 8), there have been 10 weather and climate disaster events with losses exceeding \$1 billion each across the United States. These events included 3 flooding events, 5 severe storm events, and 2 tropical cyclone events. Overall, these events resulted in the deaths of 39 people and had significant economic effects on the areas impacted. See also **Gender Climate Change and Health WHO Executive Summary pages 3-4** see also **Forest Market discussions show how wildfires can spark innovation in forest management Published: UN News 05 November 2019** It is estimated that in Europe approximately 25% of the 2018 timber harvest was damaged by either storms or insects and in North America an area larger than Switzerland burned, costing \$91 billion dollars in the US alone in lost homes, infrastructure and fire-fighting costs
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- x Scientists from 50 nations met at the First World Climate Conference (in Geneva 1979) and agreed that alarming trends for climate change made it urgently necessary to act...in 1979...
- xi WHO COP24 Special Report Health and Climate Change 2019 page 10
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Ethiopia has been victim to regular famines since the 1980s, with droughts being a significant contributing factor. A consequence of this is child undernutrition and wasting. For instance, in areas affected by moderate drought in Ethiopia, child wasting was 34% higher than areas unaffected by drought. Over the last 40 years, more than 90% of natural disasters affecting Pakistan have been triggered by climate change. Flooding has been increasingly affecting Pakistan. For example, in 2010, over 15 million people were affected by flooding, with 6 million people in need of urgent medical care page 24

lvii The 2019 report of The *Lancet* Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate by Nick Watts et al *Lancet* 2019; 394: 1836–78 Published Online November 13, 2019 [https://doi.org/10.1016/ S0140-6736\(19\)32596-6](https://doi.org/10.1016/ S0140-6736(19)32596-6) page 1844-145

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lxi Michael Gerrard, *Climate Change and Human Trafficking After the Paris Climate Agreement*, Sabin Center for Climate Change Law, Columbia Law School, 2016 (2016) page 3

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lxiii Michael Gerrard, *Climate Change and Human Trafficking After the Paris Climate Agreement*, Sabin Center for Climate Change Law, Columbia Law School, 2016 (2016). Pages 5-6

lxiv This is a Papal letter sent to all bishops of the Roman Catholic Church

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- lxvi WHO COP24 Special Report Health and Climate Change 2019 Executive summary, see also page 16 see also WHO Health, environment and climate change Draft WHO global strategy on health, environment and climate change: the transformation needed to improve lives and well-being sustainably through healthy environments Report by the Director-General EB/144/15 December 5, 2018 Paragraph 5
- lxvii WHO COP24 Special Report Health and Climate Change 2019 page 33
- lxviii WHO Health, environment and climate change Draft WHO global strategy on health, environment and climate change: the transformation needed to improve lives and well-being sustainably through healthy environments Report by the Director-General EB/144/15 December 5, 2018 Paragraph 7
- lxix WHO COP24 Special Report Health and Climate Change 2019 page 30
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- lxxiii WHO COP24 Special Report Health and Climate Change 2019 page 52
- lxxiv Concentrations in urban areas outside Europe (more than 3500 cities with more than 100000 inhabitants), with results aggregated to the WHO world regions—83% of these cities do not meet the WHO guideline regarding ambient PM2.5 concentrations *ibid* The 2019 report of The *Lancet* Countdown on health and climate change:
- lxxv The 2019 report of The *Lancet* Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate by Nick Watts et al *Lancet* 2019; 394: 1836–78 Published Online November 13, 2019 [https://doi.org/10.1016/S0140-6736\(19\)32596-6](https://doi.org/10.1016/S0140-6736(19)32596-6) Page 1858
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lxxxii WWF 2018 Living Planet Report : Aiming Higher Grooten M. and Almond, R.E.A(eds) WWF Gland Switzerland page 86

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lxxxiv Global Sustainable Development Report pages 94-95

lxxxv Gender Climate Change and Health WHO Shifts in farming and land use page 17 also citing (Boffa, 1999; Pisupati & Warner, 2003, Roe et al , 2006; Arnold, 2008)

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lxxxvii UNICEF Office of Research (2014). 'The Challenges of Climate Change: Children on the front line', Innocenti Insight, Florence: UNICEF Office of Research. Page 103

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lxxxix UNICEF Office of Research (2014). 'The Challenges of Climate Change: Children on the front line', Innocenti Insight, Florence: UNICEF Office of Research. Page 103

Unless we act now The impact of climate change on children UNICEF 2015 page 30

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According to Profesor Kevin Anderson, Director of the Tyndall Centre for Climate Change Research in the United Kingdom, 4°C warming is "incompatible with an organized global community, is likely to be beyond 'adaptation', is devastating to the majority of ecosystems and has a high probability of not being stable (i.e. 4°C [7°F] would be an interim temperature on the way to a much higher equilibrium level)". This is one more reason why aggressive climate action is so urgent – to avoid crossing carbon-cycle tipping points that will further accelerate global warming.

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- <sup>ci</sup> UNICEF Office of Research (2014). 'The Challenges of Climate Change: Children on the front line', *Innocenti Insight*, Florence: UNICEF Office of Research. Page 51
- <sup>cii</sup> UNICEF Office of Research (2014). 'The Challenges of Climate Change: Children on the front line', *Innocenti Insight*, Florence: UNICEF Office of Research. Executive Summary pages 1-2, Section 1 page 7 see also section 2 page 20: An example of how weather and climate events can affect food security is the prolonged drought in Syria that affected 1.3 million people in 2008 and 2009, with up to 800,000 severely affected.<sup>11</sup> There were significant losses of rain-fed and irrigated winter grain crops. Wheat production decreased by almost 50 per cent, with most farmers dependent on rain-fed production suffering complete or near-total loss of crops. Herders lost around 80 per cent of their livestock due to barren grasslands. Combined with an increase in the price of food and basic resources, many affected households could not afford basic supplies or food, thus increasing the rate of undernutrition, particularly among pregnant women and children under 5.
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- <sup>cvi</sup> UNICEF Office of Research (2014). 'The Challenges of Climate Change: Children on the front line', *Innocenti Insight*, Florence: UNICEF Office of Research. Page 19
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- cxixiv An Open letter to the world’s children by Henrietta H Fore UNICEF Executive Director <https://www.unicef.org/reports/open-letter-to-worlds-children-2019>
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- cxixvi 2019 Global Peace Index page 43
- cxixvii Gender Climate Change and Health WHO Sea-level rises, heavy rain and flooding page 13
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