MAPPING THE LINKAGES BETWEEN CLIMATE CHANGE, HEALTH, GENDER AND SOGIESC FOR THE ASIA-PACIFIC REGION

Literature Review – January 2021 – Alyson Brody

Contents

Glossary[1]

Adaptation
In ***human systems***, the process of adjustment to actual or expected ***climate*** and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.

Adaptive capacity
The ability of systems, *institutions*, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences. This glossary entry builds from definitions used in previous IPCC reports and the Millennium Ecosystem Assessment (MEA, 2005)

Air pollution
Degradation of air quality with negative effects on human health or the natural or built environment due to the introduction, by natural processes or human activity, into the ***atmosphere*** of substances (gases, ***aerosols***) which have a direct (primary pollutants) or indirect (secondary pollutants) harmful effect.

Biodiversity
Biological diversity means the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ***ecosystems*** and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (UN, 1992).

Disaster
Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.
(IPCC)

Climate change
A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.1 See also Climate variability and Detection and attribution.

Climate justice
Justice that links development and ***human rights*** to achieve a human-centred approach to addressing ***climate change***, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts ***equitably*** and ***fairly***. This definition builds upon the one used by the Mary Robinson Foundation – Climate Justice (MRFCJ, 2018)

Disaster risk management (DRM)
Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of ***disaster*** risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the

[1] The majority of these definitions are taken from the IPCC Glossary of Terms (Annexes (ipcc.ch).

explicit purpose of increasing ***human security***, ***well-being***, quality of life, and ***sustainable development***.

Equity
Equity is the principle of ***fairness*** and justice regarding benefits and needs of different groups. Gender equity recognises that women, girls, and LGBTI people are often historically disadvantaged in comparison to cisgender men and boys, and treating them equally may reinforce the existing inequities or create further disadvantage.

In the context of climate change, equity is a basis for understanding how the ***impacts*** and responses to ***climate change***, including costs and benefits, are distributed in and by society in more or less equal ways, and in the sense of who participates and controls the processes of decision-making.

In the context of ***climate change*** gender equity recognises that climate change impacts can often differ by gender and sexuality owing to historical and current gender inequalities and multidimensional factors. They are also often more pronounced in developing countries and for local communities and indigenous peoples. In particular, women and LGBTI people are often more vulnerable to the ***impacts*** of climate change and may be disadvantaged in the process and outcomes of climate ***policy***.

Equality
A principle that ascribes equal worth to all human beings, including equal opportunities, rights, and obligations, irrespective of origins.

Gender equality refers to the equal rights, responsibilities and opportunities of people of all genders. Equality means that a person's rights, responsibilities and opportunities will not depend on whether they are assigned male or female at birth and whether they identify with that sex. Gender equality implies that the interests, needs and priorities of people of all genders are taken into consideration, recognizing the diversity of different gender identities, gender expression, and sex characteristics.[2]

Inequality
Uneven opportunities and social positions, and processes of discrimination within a group or society, based on gender, class, ethnicity, age, and (dis)ability, often produced by uneven development. Income inequality refers to gaps between highest and lowest income earners within a country and between countries.

Extreme weather event
An extreme weather event is an event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile of a probability density function estimated from observations. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. When a pattern of extreme weather persists for some time, such as a season, it may be classed as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., ***drought*** or heavy rainfall over a season).

Food security
A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001)

[2] Based on UN Women definition (OSAGI Gender Mainstreaming - Concepts and definitions (un.org))

Global warming
Global warming refers to an increase in combined surface air and sea surface temperatures averaged over the globe and over a 30-year period.

Greenhouse gases
Greenhouse gases are those gaseous constituents of the ***atmosphere***, both natural and ***anthropogenic***, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and by clouds.

Mitigation (of climate change)
A human intervention to reduce emissions or enhance the ***sinks*** of ***greenhouse gases***.

Nationally Determined Contributions
NDCs refer to post 2020-climate commitments by signatory countries of the Paris Agreement to reduce carbon emissions and adapt to the impacts of climate change.

1. Introduction

As the third decade of the 21st century unfolds, the 2020 Human Development Report warns of an existential challenge to the planet and all its inhabitants. The report delivers the stark message that human actions are largely responsible for the rapid global warming, loss of biodiversity and environmental degradation that are threatening the very systems on which all species depend (UNDP 2020). A growing body of evidence confirms the impacts of burning fossil fuels and the associated release of climate pollutants on the rise in greenhouse gases that cause global warming, leading to climate change. According to the IPPCC (2018), human-induced warming reached 1% above pre-industrial levels in 2017 and has been increasing at up to 0.3% per decade. This is resulting in significant changes in weather patterns unprecedented rises in sea levels and extreme weather events (UNDESA 2020; WHO 2015). Human-induced global warming has contributed to changes in land and ocean temperatures, and to more frequent heatwaves, leading to an increase in both the frequency and severity of heavy rainfall and storms and extended periods of drought.

The Asia-Pacific region suffers from some of the most severe impacts of climate change, including increases in the intensity and/or frequency of disasters and extreme events such as heat waves, tropical cyclones, prolonged dry spells, intense rainfall, tornadoes, snow avalanches, thunderstorms, severe dust storms and sea level rise (Habtezion 2013). The rise in temperatures on land and sea are affecting productivity for crops that include staples such as rice, maize and wheat, particularly in South East Asia,and reducing grazing land for livestock. Ocean warming is contributing to the depletion of fish stocks and the loss of ecosystems that support marine life. The rise in sea levels is creating direct impacts for coastal areas and small islands that include flooding, damage to infrastructure and salination of fresh-water supplies (IPCC 2018). These phenomena are leaving a devastating mark on the poorest populations in developing countries, contributing to the reversal of downward trends in poverty and hunger and increasing insecurity on a global scale (UN 2020).[3] As a result, "if left unaddressed, climate change will lead to increased inequality both within and among countries and could leave a substantial part of the world further behind" putting the achievement of the Sustainable Development Goals (SDGs) in jeopardy (UNDESA 2020: 82). The devastating COVID-19 global pandemic has further stymied progress in achieving the SDGs by 2030, affecting the poorest and most vulnerable and pushing an estimated 71 million people back into poverty (UN 2020).

Notably, climate change has been described as the "biggest global health threat of the 21st century" (Costello et. al. 2009), with serious implications that include threats to personal safety, food security and under-nutrition, the spread of zoonotic, air and water-borne diseases and physical and mental health. The COVID-19 pandemic has exposed and exacerbated fault-lines of social injustice that dramatically increase risks to health for already vulnerable groups (UN 2020). The global disaster has provided a stark reminder that health is the most fundamental cornerstone of humanity and that, as the UN Secretary-General has stated: "we are only as strong as the weakest health system in our interconnected world."[4] In the Bangkok Charter for Health Promotion in a Globalized World the UN "recognizes that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without discrimination." Yet the issue of health has been badly neglected in climate change policy, interventions and research despite the huge associated human and economic costs (Van Daalen et. al. 2020; WHO nd; Hashim and Hashim 2016). This report draws on recent research on climate change and health to highlight the criticality of the issues and to identify gaps in knowledge and action, with a focus on the Asia Pacific region.

Following Rudolph and Gould (2015), the report aims to demonstrate the complex relationships between climate change and health inequities, with a focus on gender. The human implications of climate change

[3] UNFCCC, Climate changes threatens progress across sustainable development, warns new UN report, Climate Change Threatens Progress Across Sustainable Development, Warns New UN Report | UNFCCC

[4] "We are only as strong as the weakest, Secretary-General stresses, at launch of economic report on COVID-19 pandemic", March 2020, 'We Are Only as Strong as the Weakest', Secretary-General Stresses, at Launch of Economic Report on COVID-19 Pandemic | Meetings Coverage and Press Releases

are strongly influenced by gender. An emerging body of evidence is reflecting the disproportionate impacts on women and girls, largely due to entrenched gender inequalities that are often compounded by poverty. These messages have been gradually influencing climate policy: gender is now acknowledged as a key driver of vulnerability in the face of climate change and there is also recognition that full, meaningful and equal participation of women in all aspects of climate policy and action is vital for achieving long-term climate goals. The commitment to address climate change in a more gender-responsive way is reflected in the adoption of the first ever action plan to the UNFCCC in November 2017 at the 23rd International Climate Change Conference (COP). A growing body of literature– referenced extensively in this report – is also pointing to the links between gender, health and climate change and the need to address these in comprehensive ways. However, these connections are not yet being made by decision-makers or translated into concrete measures and actions in National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs) and other climate policy instruments.

The report also draws attention to built-in exclusions to understandings of 'gender' in the context of climate change. Rather than being understood as a relational concept that confers particular roles and expectations on all people, gender is very often narrowly equated with women and girls. This limited perspective means that men and boys, and those identifying as lesbian, gay, bisexual, transgender and intersex (LGBTI) often fall out of climate change impact analyses and targeted interventions. Consequently, the specific needs and vulnerabilities of these groups are all too often invisible and ignored. This is especially concerning given the social marginalisation, stigma and poverty experienced by many LGBTI people, which increases susceptibility to climate-related shocks.[5] This report is grounded on a more inclusive understanding of gender that recognises the diversity of sexual expression, gender identity, gender expression and sex characteristics (SOGIESC).

The report is intended to inform policy planning, research and action for the Asia Pacific region in ways that contribute to people-focused, gender-transformative, rights-based, and equity-oriented approaches to health in the face of challenges posed by climate change, pandemics and other shocks. In addition to identifying knowledge and gaps on climate change, gender and health the report aims to inspire by identifying opportunities for promoting gender-equitable health outcomes and greater resilience through effective health system development, community-based interventions and policy formulation. It also touches on the larger question of climate mitigation, and particularly the enormous health co-benefits of reducing carbon emissions.

Chapter two outlines the human health impacts of climate change, with a focus on gender, SOGIESEC and other forms of vulnerability. Where possible it provides contextualised examples from the Asia Pacific region. Chapter 3 focuses on health and adaptation interventions in the context of climate change, and Chapter 4 provides a mapping of the current policy environment, identifying entry points for integrating gender and health.

[5] See New Security Beat August 2016, Left Out and Behind: Fully Incorporating Gender Into the Climate Discourse (newsecuritybeat.org);

2.The human health impacts of climate change: Knowledge and Gaps

"*The effects of climate change on health are overwhelmingly negative and they are not the same across genders (Van Daalen et. al. 2020).*

This section provides a discussion on the human health impacts of climate change and environmental degradation, with a focus on the co-contributors of gender, SOGIESC and other intersecting forms of vulnerability. The section draws on available data, highlighting Asia Pacific examples where possible. It also points out significant gaps in knowledge.

According to the IPCC: "Climate change currently contributes to the global burden of disease and is projected to increase threats to human health" (Preet, Nilsson et. al. 2010). Climate change is projected to cause an additional 250,000 deaths per year between 2030 and 2050 due to increased rates of malaria infection, diarrhoea, heat stress and undernutrition, with South East Asia set to be the worst affected by 2050. These health damages will cost an estimated $2 billion to $4 billion a year by 2030 (WHO 2018a and 2018b). Yet, while increasing global attention has been paid to the human impacts of climate change there has been far less emphasis on the serious implications of climate change for human health (Van Daalen et. al. 2020; WHO nd; Hashim and Hashim 2016). According to Van Daalan, Jung et. al.: (2020:4) "Despite obvious disparities between genders, gender-disaggregated health data are often either underrepresented or non-existent as a variable when assessing the health effects of climate change in medical research, environmental research, and strategic planning of mitigation and adaptation policies" (2020).

Rudolph and Gould (2015) have developed a framework for better understanding the health risks of climate change. The framework has been adopted and adapted by the WHO, with the following three categories of human health impacts:

- **Direct impacts,** such as those arising from damages and illness due to increased frequency and severity of extreme weather events.

- **Environmental system mediated impacts**, such as rising air pollution and changing patterns of vector-, food- and water-borne diseases.

- **Socially mediated effects** that occur via effect of climate change on social and human systems, such as health effects resulting from undernutrition, occupational heat stress and mental illness, as well as potential increases in population displacement, slowing of economic growth and poverty aggravation; and violent conflict over increasingly scarce resources.

These health impacts and risks, which are further elucidated in sub-sections 2.1 – 2.3, are most prevalent for the most vulnerable groups who are least resilient to climate change living in low and middle-income countries - including the poor, children, the elderly and those with pre-existing medical conditions. These existing vulnerabilities are further compounded by inequalities along axes that include gender, sexual orientation, race, ethnicity, disability and citizenship. It is therefore vital to understand the social determinants of climate-related health risks if they are to be addressed and mitigated (Venkatapuram 2010).

Climate change exposes and magnifies existing fault-lines of inequality both between and within countries:

"the relationship between climate change and social inequality is characterized by a vicious cycle, whereby *initial* inequality makes disadvantaged groups suffer *disproportionately* from the adverse effects of climate change, resulting in greater *subsequent* inequality. First, inequality increases the *exposure* of the disadvantaged social groups to the "adverse effects of climate change" ("climate hazards," for short). Second, given the exposure level, inequality increases the disadvantaged groups' *susceptibility* to damages caused by climate hazards. Third, inequality decreases these groups' relative ability to *cope* with and *recover* from the damages they suffer." (Islam and Winkel 2017: 2).

Poverty is an overriding social determinant of climate-related health risks, creating a "climate gap" (Rudolph, Gould and Berko 2015a; UNDESA 2020), with the poorest people often obliged to live in areas most susceptible to extreme weather events. Climate change also has the most severe human impacts in countries with few resources to prevent and respond to natural disasters, poorly equipped health services, and low financial capacity to withstand shocks. People living in countries with low human development are 10 times more likely than those in developed countries to die as a result of natural disasters (UNDP 2019). According to the IPCC "Poverty and disadvantage have increased with recent warming (about 1 degree centigrade) and are expected to increase for many populations" (IPCC 2018). The poorest are also usually the least resilient to hazards such as climate-related disasters, with few resources to help buffer against shocks and consequently less money for physical or psychological health impacts (Rudolph, Gould and Berko 2015; UNDESA 2020). This creates a vicious cycle of vulnerability for those already affected by climate change (Sorenson et. al. 2018; Smith 2014; Preet, Nilsson, Schuman et. al. 2010; Islam and Winkel 2017). CARE sums up this predicament: "In eroding their assets to survive hard times, the poorest people become less able to cope with the impact of disasters. Each climatic shock, such as a drought, flood or storm, which will become more frequent and more intense with climate change, makes poor households more vulnerable to the next, trapping many in a downward spiral" (CARE 2014: 34).

Specifically, climate change is magnifying and exacerbating fault-lines of gender inequality on a global scale, while at the same time gender inequality is deepening the health impacts of climate change, particularly for the most disadvantaged (Skinner 2011; CARE 2014; Brody et. al. 2008). Women and girls comprise the majority of the world's poorest – for example 122 women between the ages of 25 and 34 live in poor households for every 100 men of the same age group, and 105 girls for every 100 boys live in extremely poor households.[6] Poverty is a cause and effect of persistent gender inequitable social norms that leave many women and girls, and LGBTI individuals doubly disadvantaged in terms of the opportunities available to them, their access to productive resources such as land and property and strategic resources such as information and market linkages, and the roles and expectations that often constrain them (see Habtezion 2013; CARE 2014).

Socially ascribed gender roles and norms, coupled with biological physiological differences, mean that women and men and those identifying as LGBTI experience different climate-related health impacts. It is therefore vital to take a gender-responsive approach to mitigating and addressing these (Easterling, 2000; Wisner et al., 2004; WHO nd, Skinner 2011; Van Dalaan et. al. 2020, Preet, Nilsson et. al. 2020)

Gender inequalities also intensify vulnerability in the face of climate change and contribute to gender-based health disparities, particularly in low and middle-income countries (WHO nd; Sorenson et. al. 2018; Easterling, 2000; Wisner et al., 2004). Women and girls are more likely to face difficulties in accessing healthcare for financial and socio-cultural reasons - for example healthcare costs are often higher for women than for men (WHO 2009). Women often have fewer resources than men and may choose to prioritise the health care needs of other family members (Fanzo et. al. 2017). Consequently: "Climate change threatens to widen existing gender-based health disparities, especially in low- and middle-income countries" (Sorenson et. al 2018: 1).

[6] No, 70% of the world's poor aren't women, but that doesn't mean poverty isn't sexist (worldbank.org – accessed 27/11/20)

Yet "Although some governmental and nongovernmental organisations have begun to address the inequity of gender-based climate change effects, global efforts are falling short by failing to recognise the impact that gender has on health." (Van Dalaan et. al. 2020: 44; Rudolph and Gould 2015).

Factors that include age, ethnicity, disability and sexuality also exacerbate climate-related health impacts (see for example Rudolph and Gould 2015), often intersecting with gender in ways that compound vulnerability. LGBTI and non-binary people often face specific barriers to healthcare, including discrimination and stigma, and additionally may be excluded from research, creating knowledge 'blindspots' around their experiences (Zeeman, Shariff et. al.; Whiteness et. al. 2016; Duvivier and Wiley 2015; Parry and Radel 2019). Yet, despite the lack of robust data on the links between climate change, health and SOGIESC, emerging stories reveal how discrimination and exclusion can deepen poverty of LGBTIQ+ people, increasing their vulnerability to climate-related impacts and coping capacity and dramatically reducing their coping capacity.[7]

Sections 2.1. to 2.3. use the WHO operational framework (2015) introduced above, to shed light on the direct and indirect human health impacts of climate change, with an emphasis on gender and SOGIESC.

2.1. Direct health impacts of climate change

The direct human health impacts of climate-related disasters

Climate change is contributing to the increased frequency and severity of extreme weather events such as hurricanes, heavy rainfall and typhoons as well as protracted periods of dry weather. These are resulting in natural hazards from wind damage, flooding and drought. In the last 50 years 70% of disasters have involved weather, climate or water-related hazards (WMO 2020).[8] The Asia Pacific region is one the most disaster-prone areas in the world (UNDESA 2020), and people in the region are up to 25 times more vulnerable to natural disasters when compared with people in Africa and North America/Europe (UNESCAP and UN International Strategies for Disaster Reduction 2010). Since 2000, approximately 1.2 billion people in the region have been exposed to hazards caused by extreme weather events (Hashim and Hashim 2016).

An estimated two million people were killed in disasters between 1970 and 2011 in the region, representing 75% of all disaster fatalities globally. As table 1 indicates, of the 10 countries most affected by extreme weather events globally between 1993 and 2012, six are located in the Asia Pacific region. Myanmar experienced the highest climate-related death rate in the world (13.5 deaths per 100 000 population, amounting to around 7135 people) from 38 events, including Cyclone Nargis in 2008 which killed at least 138,400 people (Uji 2012). Bangladesh has recorded the second highest number of deaths globally at 816 - 0.56 per 100,000 inhabitants – linked to 242 events: 50% of global deaths due to cyclones are registered in Bangladesh where over 80 million people (around 70% of the population) are vulnerable to flooding (Uji 2012). The Philippines accounts for the largest number of recorded extreme weather events (311), resulting in around 643 deaths – 0.79 per 100,000 inhabitants (Hashim and Hashim 2016).

Table 1. The Long-Term Climate Risk Index (CRI): Results (Annual Averages) in Specific Indicators in the 10 Countries Most Affected From 1993 to 2012

[7] "Responses to climate change must be LGBTQ-inclusive, experts say" (Devex, Responses to climate disasters must be LGBTQ-inclusive, experts say | Devex, September 2020, Accessed 27/11/20)

[8] World Meteorological Organization (WMO), 2020, State of Climate Services 2020 Report: Move from Early Warnings to Early Action, State of Climate Services 2020 Report: Move from Early Warnings to Early Action | World Meteorological Organization (wmo.int) (Accessed 3/12/20).

CRI 1993-2012	Death toll	Deaths per 100,000 inhabitants	Number of events
1 (Honduras)	329.80	4.86	65
2 (Myanmar)	7135.90	13.51	38
3 (Haiti)	307.50	3.45	60
4 (Nicaragua)	160.45	2.81	44
5 (Bangladesh)	816.35	0.56	242
6 (Vietnam)	419.70	0.52	213
7 (Philippines)	643.35	0.79	311
8 (Dominican Republic)	212.00	2.43	54
9 (Mongolia)	12.85	0.52	25
10 (Thailand)	160.35	0.26	193
11 (Guatemala)	82.35	0.69	72

Adapted from Kreft S, Eckstein D. Global Climate Risk Index 2014: Who Suffers Most From Extreme Weather Events? Weather-Related Loss Events in 2012 and 1993 to 2012. Bonn, Germany: Germanwatch

The degree to which climate change poses a threat to human populations is directly related to a country's level of economic development and overall disaster preparedness. For example, Singapore is ranked as the country most exposed to climate-related weather events out of 192 countries.[9] However, its overall level of climate risk is the 9th lowest out of 181 countries, largely due to its developed infrastructure, high disaster preparedness and the structure of its economy. Yet, human health risk levels are massively exacerbated by poverty, which often drives people to live in more affordable yet risky areas in flood plains, coastal land exposed to storms, and the bottom of hill slopes, which are prone to mudslides that are increasing in frequency (Islam and Winkel 2017, United Nations, 2016b; Sepúlveda and Petley, 2015). For example, in Bangladesh during Cyclone Aila in 2009 one in four poor households were affected - many located in slums constructed in low-lying areas - compared to one in seven non-poor households (UN 2016a; UNICEF, 2009; Akter and Mallick, 2013). Climate-related disasters also expose inequalities within developed countries, as the devastating effects of Hurricane Katrina in the USA on the poorest communities Illustrated (UNDESA 2020; United Nations, 2016a; Logan, 2006). Small island developing States are particularly susceptible, with three in 10 people living in locations less than five metres above sea level (World Social report 2020; UNDP 2017).

Evidence indicates that women and girls are at a far higher risk of mortality or serious injury from exposure to natural disasters than men and boys. In 1991, 90% of the 140,000 people killed in a devastating tropical cyclone in Bangladesh were women (Aguilar, 2004). In May 2008, 61% of the 130,000 people who died or were reported missing as a result of Cyclone Nargis in Myanmar were female (Care Canada 2010). This disproportionate impact on women and girls is partly attributable to biological and physiological differences. For example, some men and boys may be stronger and more able to withstand the force of strong winds or currents that could sweep women and girls away, especially if they are very

[9] ND-GAIN index 2019, Notre Dame Global Adaptation Initiative // University of Notre Dame

young, elderly or in the final stages of pregnancy. On average women are also less able to run as quickly or to climb post, trees and other elevated points than men (Neumayer and Plümper 2007).

However, physical differences tell only part of the story – research shows that women and girls' increased vulnerability is in large part due to the compounding effects of gender inequitable social and cultural norms, further exacerbated by poverty (Neumayer and Plümper 2007). Oxfam's research on the human impacts of the 2004 tsunami, which hit many coastal areas in countries that included Thailand, Indonesia and Sri Lanka, demonstrates the importance of learned skills such as swimming and climbing that are often traditionally taught predominantly to boys - in self-rescue attempts (Oxfam International 2005; Aguilar 2004). Gender-specific dress codes may also impede women's capacity to flee disaster-hit areas quickly – for example in South Asia the saris that many women are expected to wear can become easily waterlogged in cyclone-induced floods (Neumayer and Plümper 2007). A key contributing factor is women's primary responsibility for young or elderly dependents in many countries, which means they are more likely to remain at home awaiting assistance when natural disasters strike, even after warnings have been issued (WHO nd). In many cases women also often have less access to practical information on disaster mitigation and preparedness (Skinner 2011).

Emerging evidence shows the compounding effects of other intersecting axes of vulnerability for health and mortality. For example, a 2014 study on Vietnam found that that the elderly, widows, and disabled people – in addition to single mothers and women-headed households with small children – were most susceptible to direct health impacts caused both by floods and storms and by slow-onset events such as recurrent droughts (IPCC, 2014). There is little to no data on the specific health risks for LGBTI people in the face of climate-induced disasters. However, it is clear that many share characteristics with the most vulnerable, given the levels of social and economic exclusion they often face and the extent to which this can undermine their resilience. Research from the Indian Ocean tsunami in 2004 and other natural disasters shed light on the ways LGBTI individuals are often ignored or side-lined during and in the aftermath of emergencies (Outright International 2020; Pincha, Chaman et. al. 2007; Knight 2016). According to a senior technical advisor at the Red Cross Red Crescent Climate Centre: "prior to a disaster, members of the LGBTQ community may not have access to the same assets, resources, and information as the general population because of potential exclusion, isolation, and restricted social networks…This can affect resilience and how a person might experience a climate shock."[10] For example a smallholder farmer in Nepal who identified with a third gender was excluded from helping build and take cover in shelter houses - which are often sex-segregated - designed to protect the community from extreme weather events.[11] Research by UNDP, ODI and GALANG (2020) similarly found evidence of LBT women being excluded from disaster relief and livelihood initiatives in the Philippines, including being unable to access housing benefits and sanitation facilities

Gender-specific norms and codes also influence men and boys' health risks in extreme weather events. 'Toxic masculinity' can compound male susceptibility to disasters, with evidence of men more likely to take risks or display 'heroic' behaviour that result in fatality or injury (WHO nd, Kovats and Allen, 2008, Bradshaw, 2010). As a consequence, men are more likely to drown than women in climate-induced storms (Kovats and Allen 2008).

The direct health impacts of increasing temperatures

Climate change is resulting in rising temperatures and prolonged heatwaves globally. The rise in temperatures is magnified for countries with hot climates, while urban settings often amplify the impacts of heatwaves (IPCC website). This has severe implications for human health, including heat-related morbidity and mortality (IPCC, accessed November 2020). Extreme temperatures aggravate

[10] Responses to climate change must be LGBTQ-inclusive, experts say, Devex September 2020, Responses to climate disasters must be LGBTQ-inclusive, experts say | Devex (Accessed 28/11/20)
[11] Devex September 2020 (ibid).

cardiovascular and respiratory disease and increase mortality, particularly for the elderly (UNFCCC, 2017; UNDP 2019; Hutton 2008) and contribute to illness or death from heat stroke, dehydration and other conditions. it is estimated that a 2 °C rise would double the annual death rate from heatwaves in many cities (McMichael & Bertollini, 2009).

Many European studies indicate that women are more at risk of dying in heatwaves (see for example McCall Beckmann et. al. 2019). However, it is important to examine data in a nuanced way that reflects all aspects of gender difference. For example, unmarried men may be at greater risk than unmarried women, with social isolation a potential risk factor, particularly for elderly men (WHO nd). Men may also be more at risk of heatstroke mortality because they are more likely than women to be active in hot weather, particularly those who are less-skilled, low-paid workers whose work is more likely to include manual labour (CDC, 2006, World Social Report 2020). For example, outdoor labourers, who are often male but also include female farmers and an increasing number of female labourers in urban building sites, are also at greater risk for health impacts such as cardiovascular, respiratory diseases, dehydration and heat exhaustion caused by rising temperatures (UNDESA 2020; McMichael, Woodruff, and Hales 2006; Watts et al. 2015; WHO 2009a). There is no easily available evidence on the links between SOGEISC and heat-related illness, morbidity or mortality.

Temperature rise combined with prolonged dry spells, is also increasing the risk of fires close to human habitation, often with devastating effects for human lives and livelihoods. There are gaps in the availability of gender-disaggregated evidence on the rates of mortality, injury or illness caused by fires but those who are most vulnerable are likely to live in the crowded urban communities or arid areas favoured by the poorest, of whom women and marginalised groups, including LGBTIQ+ people, often comprise the majority.

2.2. Environmental system-mediated effects

"Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress" (WHO 2018)

Incidences of death and injury from natural disasters often attract the most media attention. However, the real disasters are the slow, protracted effects of climate change on the environment and on the humans who rely on environmental systems that provide water, food and other basic necessities for life. This section looks at the impacts of these longer-term disasters on human health, with an emphasis on the implications of gender and other forms of inequality.

The indirect health impacts of water scarcity

Climate change is having a dramatic effect on the availability of clean drinking water sources. Mountain glaciers and snowpack that act as natural reservoirs, storing and supplying the drinking water for millions of people around the world, are shrinking leaving less surface water for use in the dry season (Rudolph, Gould and Berko 2015). Shifting rainfall patterns and long periods of drought are adding to the shortage of potable water, with water scarcity affecting the poorest people, particularly those living in the most densely populated areas. The number of people living in water-stressed water basins is expected to rise from about 1.5 billion in 1990 to 3–6 billion by 2050 (Arnell 2004). Around four billion people, about two-thirds of the global population, are faced with severe water scarcity for at least one month of the year, while around half a billion people face water scarcity year-round (UNDP 2019).

The quality as well as the availability of water is being affected by climate change. Rises in sea levels, particularly in coastal areas, is resulting in the salination of water sources, making the water unsuitable for drinking or for agricultural irrigation. Heavy rainfall and flooding may also cause contamination of drinking water supplies with sewage, chemicals and other pollutants (Rudolph, Gould and Berko 2015).

Often poor communities are obliged to drink water from these polluted sources – as of 2017, 29 % of people worldwide lacked access to safe drinking water – with specific health impacts for women and children. Dirty water is resulting in the rise of waterborne health threats such as cholera, typhoid fever, hepatitis and diarrhoea – one of the major global causes of death for children under the age of five (WHO and UNICEF 2005; Levy et. al. 2016). A WHO assessment estimates that between 2030 and 2050 there will be an additional 48 000 deaths globally due to diarrhoea (WHO 2018). Diarrhoeal diseases are widely prevalent across Asia Pacific countries: around one million cases are reported in the Philippines and Vietnam annually and was the second leading cause of morbidity in Cambodia in 2004. More than 450,000 deaths were attributed to diarrhoeal diseases in India in 2002 (WHO 2008).

This increased susceptibility to waterborne diseases places added pressure and stress on women, who are often primary carers of infants and sick family members. Because women often spend more time at home, they may be more reliant on unhygienic water from local tube wells, which frequently become polluted, and are therefore themselves often more susceptible to these diseases (WHO nd). Women may also sacrifice their own drinking water needs in favour of other family members (Buor 2003).

Water scarcity can also seriously undermine sanitation due to lack of infrastructure and the prioritisation of water for drinking and cooking. Fifty-five percent of the global population lack access to adequate sanitation (UNDP 2019). The lack of hygiene can be a key contributor to diseases such as trachoma and scabies, also referred to as "water-washed diseases" (WaterAid, 2007).

As they are often responsible for fetching water for households, many women and girls are faced with the physical and psychological burden of travelling further to access supplies and carrying heavy loads over increasingly long distances. A family of five people needs approximately 100 litres of water, weighing 100 kg, each day to meet its minimum needs. Consequently, women and sometimes girls may need to walk to the water source two or three times each day, often returning with water in pots or buckets balanced on their heads or hips. During the dry season in rural India, 30% or more of a woman's daily energy intake is spent fetching water. Carrying heavy loads over long periods of time can also cause cumulative damage to the spine, the neck muscles and the lower back, leading to early ageing of the spinal column (Mehretu and Mutambirwa, 1992; Dasgupta, 1993; Seaforth, 2001; Research Foundation for Science, Technology and Ecology, 2005; Ray, 2007). Travelling long distances to remote areas can also increase women and girl's vulnerability to sexual harassment or violence, potentially resulting in physical and mental trauma (Skinner 2011).

Direct and indirect health impacts of flooding and sea level rise

Increased flooding is one of the impacts of climate change, caused by factors that include higher levels of rainfall and rising levels of groundwater. It is a particular concern in parts of the Asia Pacific region: for example, the WHO reports that floods triggered by a continuous sea level increase are likely to affect 94 million people in South Asia by 2100 (Uji 2012).

Flooding can result both in direct damages to life and property and longer-term physical and mental health impacts. The poorest are often worst affected because they are usually compelled to live in areas that are more prone to flooding, and because cheaper housing is increasingly being built in flood plains. Flooding can have direct impacts on crops, which can result in food insecurity and food price rises as well as loss of livelihoods for farmers. Emerging research has reflected on the mental health impacts of flooding – for example studies from Vietnam in the Mekong Delta area found high levels of stress, anxiety and intra-household tensions (Few and Tran 2010).

There has, however, been only limited systematic research and gender analysis on the health outcomes of flooding (Few et al., 2004). It is important to recognize that vulnerability to flooding is differentiated by social dimension. In both developing and industrialized nations, health and other impacts may fall disproportionately on women, children, people with disabilities and elderly people (Few et al., 2004).

The climate-related rise in vector-borne diseases

Connections are being made between climate change and the global rise in vector-borne diseases that include malaria, dengue fever and lyme disease (see IPCC). Climate change is accelerating parasite replication, increasing insect and tick biting rates and prolonging transmission seasons. This is changing the distribution and abundance of disease vectors and reducing the effectiveness of vector control interventions (WHO nd). The ***Aedes*** mosquito vector of dengue is highly sensitive to climate conditions, and studies suggest that climate change is likely to continue to increase exposure to dengue (WHO 2018; (Ebi and Nealon 2016; Senior 2008). Dengue threatens the health of 2.5 billion people with a global estimate of 50-100 million infections every year (WHO 2012). Over 70% of the global population at risk of dengue list in the Asia Pacific region (WHO 2010) and the number of recorded cases has been rising along with the temperatures. For example, in Malaysia the number of cases rose from 1,000 in 1973 to 46,000 in 2007 (Benitez 2009) and in Bhutan, Timor-Leste, and Nepal dengue epidemics were reported for the first time in 2004, 2005, and 2006, respectively (WHO 2006).

Malaria, which is transmitted by ***Anopheles*** mosquitoes, is strongly influenced by climate. Malaria kills almost 1 million people every year and causes around 300 million acute illnesses, and the WHO anticipates 60 000 more deaths globally between 2030 and 2050 due to climate-accelerated malaria (WHO 2018). The Asia Pacific region is the second most vulnerable region to malaria after Africa (WHO 2010a). People living in poverty are often the most susceptible to malaria (Hallegatte et. al. 2016), with specific implications for poor women. Pregnant women have a risk of severe malaria that is three times as high as that of nonpregnant women (Sorenson et. al. 2018). They are particularly vulnerable to malaria because of increased body heat and moisture. Changes in behaviour of pregnant women can also increase exposure to night-biting mosquitoes: pregnant women leave the protection of their bednet at night to urinate twice as frequently as non-pregnant women. Maternal malaria increases the risk of spontaneous abortion, premature delivery, stillbirth and low birth weight (WHO nd)

The human health effects of rising air pollution

Drivers of climate change, such as air pollution and ground-level ozone, influence human health, and a cause of 3.7 million deaths annually (Fanzo et. al. Al. 2017; Watts et. al. 2015). Air pollution has been linked with cancer, cardiovascular disease, and respiratory diseases, (for example see Contini, D. 2020). The human health impacts of higher ozone levels and increasing pollen levels include asthma attacks, heart attacks and decreases in lung function (Rudolph, Gould and Berko 2015; WHO 2018). Additionally, the increased frequency and intensity of wildfires is exposing people to smoke that contains particulate matter and numerous chemicals, exacerbating asthma and other respiratory disease, and worsening heart disease (Rudolph, Gould and Berko 2015). Respiratory and cardiovascular disease from poor air quality affects more women than men as they are more predisposed to deposits of particulate matter in lung tissue (WHO nd).

Household air pollution produced by inhalation of smoke from solid fuels used for cookstoves or fires in poorly ventilated dwellings is contributing to 4.3 million deaths globally. Women and children are often worst affected by indoor air pollution because they tend to spend more time indoors (ADB 2012; Skinner 2011).

Zoonotic diseases and COVID-19

Zoonotic diseases – those transferred from animals to humans - account for around 60% of all infectious diseases. Environmental degradation, loss of biodiversity and air pollution all contribute to the spread of zoonotic viral epidemics and pandemics, including COVID 19, which infected at least 67 million people globally and led to 1.5 million deaths in 2020[12] (UNEP, UNHCR, 2020). Many of the poorest countries in the Asia and Pacific region have been faced by the double threat of COVID-19 and the onslaught of natural hazards, intensifying the human health impacts. South-East Asia has seen over 11

[12] WHO COVID 19 Dashboard, WHO Coronavirus Disease (COVID-19) Dashboard | WHO Coronavirus Disease (COVID-19) Dashboard (Accessed 7/12/20).

million confirmed cases of the disease and is the third worst hit region after the Americas and Europe[13], but often with the fewest resources to battle the virus. In December 2020 India had the second highest number of confirmed cases in the world (after the USA), at 9.5 million and the third highest death toll (after the USA and Brazil) at around 140, 600.[14]

As has been evident from the COVID 19 crisis, those most affected by zoonotic diseases are often the most vulnerable - including the poorest, elderly and those with underlying health conditions that may already be exacerbated by environmental hazards such as unsanitary living conditions and poor access to clean water or polluted air. The pandemic has demonstrated that "society can only be as healthy as its most vulnerable members" (UNEP and UNHCR 2020).

COVID 19 has exposed and magnified existing inequalities. Although data indicates that men account for slightly more confirmed COVID-19 cases than women at 53% (apart from in the over 85 age group where women represent 63% of cases), the pandemic has had disproportionate effects on women globally due to their over-representation in paid and unpaid caring roles which have placed many at a high risk of infection: an estimated 70% of health and social care sector workers are female (Azcona et. al. 2020), while women are usually expected to bear the primary burden of caring for sick children and other relatives in the home, particularly in parts of the Asia-Pacific region.[15] Infection rates among female health workers are three times higher than males (Azcona et. al. 2020). Factors that include poverty and ethnicity have compounded these risks: in the USA and the UK rates of infection and death have been higher among black and ethnic minority people who are more likely to be frontline key workers and to live in overcrowded conditions. Poor nutrition and obesity, both linked to poverty and rising food prices, are also contributing factors to morbidity from COVID-19 and other infectious diseases. Preliminary findings of a rapid survey of young people living with HIV in Asia Pacific countries by the Interagency Task Team (IATT) on Young Key Populations (YKP) indicate that many are facing negative socio-economic impacts that have repercussions on their health. 46% of participants said that restrictions associated with COVID-19 were affecting them in accessing food supplies and other basic commodities, 11% found it difficult to access clean water while 53% had little or no access to health clinics and services.[16]

However, a paucity of data disaggregated by gender, ethnicity, age, SOGIESEC and other dimensions means that a full picture of the human health impacts of the disease may not emerge for some time (Azcona et. al. 2020). There is also a large gap in information on the mental health impacts of COVID-19 due to loss of livelihoods, bereavement and other traumatic events.

A worrying indirect impact of COVID-19 for women has been the reduced availability of critical sexual health and reproductive services such as maternal health care, contraceptives and family planning, abortions, cervical cancer screening and treatment (UN Women 2020). A UN Women rapid assessment survey indicated that In Asia and the Pacific, 60% of women report facing more barriers to seeing a doctor as a result of the pandemic. Emerging evidence from 2020 indicates that COVID-19 has contributed to as many as 56,700 additional maternal deaths globally (Azcona 2020).

One notable gap is in data on rates of COVID 19 among LGBTIQ+ populations. However, there is increasing evidence of disproportionate impacts for these groups. For example, a report from India indicates that the COVID-19 lockdown has left the country's estimated two million transgender people at heightened risk of poverty and ill health, since many survive through work on the streets (Bannerji, A.,

[13] WHO COVID-19 Dashboard (Accessed 7/12/20)

[14] WHO COVID-19 Dashboard (Accessed 7/12/20).

[15] For example women and girls spend more 11 times more time than men and boys on unpaid care and domestic work in Pakistan, compared to 1.7 times as much in New Zealand (UN Women 2020)

[16] Preliminary Findings: YKP COVID-19 Survey, Preliminary Findings: YKP COVID-19 Survey - Youth LEAD (youthleadap.org), (accessed 6/1/21). The survey assesses information needs, available medication and ability to access HIV services and support networks among YKP and young people living with HIV from the Asia and Pacific region during the pandemic.

2020). In his statement on the International Day against Homophobia, Transphobia and Biphobia on May 17, 2020, UN Secretary-General António Guterres said: "Already facing bias, attacks, and murder simply for who they are or whom they love, many LGBTI people are experiencing heightened stigma as a result of the virus, as well as new obstacles when seeking healthcare".[17] A rapid SOGIE assessment of Jakarta by Sanggar SWARA[18] found that 90 % of transgender women surveyed were at high risk of contracting COVID-19 due to their living conditions in slums and cramped areas, and their work involving high degrees of interaction with other people (UN Women 2020).

Reports mapping the impacts of COVID-19 on LGBTI groups, including a UN report based on a consultative process engaging 1000 LGBTIQ+ representatives from more than 100 countries, have found that COVID-19 has increased psychological stress due to social exclusion and had reduced access to anti-viral drugs for those diagnosed with HIV – of particular concern for the over 2 million women living with HIV in the Asia-Pacific region (UN Independent Expert on Protection Against Violence and Discrimination Based on SOGI 2020; UNAIDS 2019; Outright Action International 2020). The reports also reflect experiences of greater exposure to violence for LGBTI groups (UN IE on SOGI 2020; Outright Action 2020). For cis-women too, one of the most serious and concerning indirect health impacts of COVID-19 has been the visible rise in the number of reported cases of domestic violence (Azcona 2020). This issue will be explored in more detail in the next section.

Personal accounts from Asia-Pacific and other regions reveal explicit biases within COVID-19 responses that result in the exclusion of LGBTI people. For example, a lesbian couple from the Philippines reported being denied government food aid because they were not classed as a family unit, while in In Sri Lanka people must be registered as a resident of their municipality if they wish to access government food aid. The process involves sharing a permanent address with the police, which unnerves many sexual and gender non-conforming people.[19]

Many of the steps taken to prepare in the longer term for unexpected shocks, such as a pandemic, are similar to those required to adapt to the extremes of weather and new threats expected from climate change. These steps include the need to identify vulnerable populations, assess the capacity of public health systems, develop and invest in preparedness measures, and emphasise community resilience and equity (Lancet 2021; 397: 129–70)

2.3. Climate change impacts mediated by human systems

Human health impacts of population displacement and migration

Climate change influences mass human displacement and migration for a number of reasons that include the erosion of habitable low-lying coastal areas or the constant threat of flooding, causing communities to seek refuge elsewhere; the effects of warming and drought on crop production and "eco-system services" such as clean water (WHO nd); and conflicts over available resources in the face of climate change. Between 2008 and 2018 an estimated 24.1 million per year globally were forced to relocate as a result of weather events and natural disasters (UNDESA 2020).

Displacement can have profound physical and psychological health implications due to the trauma of leaving home and living in a constant state of liminality coupled with the poor sanitation and living conditions of many refugee camps, and the reduced access to primary health care (Rudolph, Gould and Berko 2015). Women and girls and LGBTI people are at particular risk of sexual and physical violence both

[17] Voice of America, May 17 is International Day Against Homophobia, Transphobia and Biphobia, May 17 Is International Day Against Homophobia, Transphobia, Biphobia | Voice of America - English (voanews.com) (Accessed 6/1/21).
[18] Sanggar SWARA is part of the CRM Coalition, a coalition focusing on crisis management for the LGBTQI community in Indonesia (UN Women 2020)
[19] The New Humanitarian, LBTQ+ people left out by exclusionary COVID-19 aid practices, The New Humanitarian | How COVID-19 aid is leaving LGBTQ+ people out (accessed 6/1/21).

in the home and in refugee camp settings (Davis et al., 2005; IFRC 2007). Adolescent girls report especially high levels of sexual harassment and abuse in the aftermath of disasters and complain of the lack of privacy in emergency shelters (Bartlett, 2008). Overall, however, there is little research on health impacts for those displaced by climate change, probably in part due to the investigative blind spots for 'invisible' groups such as refugees in many data-sets (Parry and Radel 20129).

There are also data gaps for members of communities who are excluded from the migration process and may be forced to remain behind in the aftermath of disasters, with implications for their mental and physical health. For example, in Pakistan transgender people were refused access to internally displaced people (IDP) camps because their identification documents did not reflect their transgender status. Following the 2004 tsunami, aravanis (transgender women) were denied access to social care and medical support because of entrenched discrimination that rendered them invisible in this context.[20]

Food insecurity, climate change and health

Unpredictable weather patterns caused by climate change are having serious effects on human food systems globally. Persistent rain or drought leading to the failure of vital crops such as cereals and a drop in production of highly nutritious foods such as vegetables, fruit and animal-source foods in many of the world's poorest countries. This is affecting food availability for the poorest people, both for farmers producing food for their families' consumption and for the most disadvantaged groups who do not have land or live in urban poverty faced with inflated food prices (Islam and Winkel 2017). The clearing of forests, grassland, and wetlands also results in a loss of biodiversity, including the edible plant and animal species on which poorer communities may rely (Fanzo et. al. 2017). Higher carbon dioxide levels have also been linked to poorer nutritional quality in crops and may compromise food safety through increasing foodborne pathogens, or by inducing chemical changes that raise the concentration of toxic compounds in agricultural produce (FAO, 2018). The result is increasing levels of chronic hunger and poor dietary diversity, with implications for nutrition – particularly micronutrient availability (Arimond et al. 2010; Ruel, Alderman, and Maternal and Child Nutrition Study Group 2013; IFPRI 2017). The World Meteorological Organization has warned that global progress made in ending hunger and malnutrition may be reversed, particularly in developing countries (WMO, 2019). The IPCC-4 report (Cruz et. al. 2007) predicts that climate change could reduce agricultural yields by up to 30% in Central and South Asia, leading to "a very high risk of hunger" and malnutrition in some countries of the regions. Climate change is also likely to affect the availability of marine fish with a potential decrease of up to a 40% in tropical countries. This will have serious impacts for the 2.6 billion people worldwide who rely on fish as a dietary staple, including many in the Asia Pacific region (UNEP 2008).

Malnutrition is a major problem in Asia and the Pacific, which accounts for around 67% of the world's 150 million malnourished children globally (UNICEF 2002). It is a particular concern for South Asia: one-third of malnourished children live in India (Gragnolati et. al. 2005). There is a close correlation between higher levels of gender inequality and food insecurity, malnutrition (FAO 2012) and other nutrition deficiencies. Socio-cultural norms and practices in many countries, including those in the Asia Pacific region, mean that women and girls are often worst hit by hunger and malnutrition because their nutritional needs are considered secondary to those of men and boys, and they are often expected to eat 'last and least' (BRIDGE 2014). For example, despite rapid economic growth in India, thousands of women and girls still lack food and nutrition security, largely because of entrenched gender inequalities in many areas (Ramachandran 2006: 1; FAO 2012). Evidence indicates that, as household guardians of food security in many countries, the poorest women often restrict their own food intake in times of scarcity to ensure their families do not go hungry (BRIDGE 2014).

Even when food is available, the quality is being affected by significant micronutrient deficiency, or 'hidden hunger' (FAO 2012: 23; form BRIDGE). Low-income households are often unable to diversify their

[20] Humanitarian Practice Network, Making disaster relief and reduction programmes LGBTI-inclusive: examples from Nepal, Making disaster risk reduction and relief programmes LGBTI-inclusive: examples from Nepal - Humanitarian Practice Network (odihpn.org) (Accessed 7/12/20).

food consumption in the face of rising prices and may resort to eating mainly staple foods at the expense of more expensive but nutrient-rich vegetables and protein-rich foods (FAO 2018). Hidden hunger affects 2 billion of the world's population, contributing to child stunting and increased rates of illness and death (Fanzo et. al. 2018, Concern et. al. 2013): deficiencies in vitamin A, iron and zinc rank within the top ten leading causes of death through disease in developing countries (Brown *et al.* 2009; World Bank 2008). The WHO estimates that an additional 95 000 people will die globally between 2030 and 2050 due to climate-related childhood undernutrition, while IFPRI has predicted that medium-high climate change will result in an additional 4.8 million undernourished children by 2050 (IFPRI 2017).

Women and girls are disproportionately affected by micronutrient deficiency and are differently affected depending on their stage of life and other social factors (Holmes, Jones and Marsden 2009). Around half of pregnant women in developing countries are iron deficient and also lack proper maternal care, resulting in over 300,000 women who die annually in childbirth. Malnutrition also renders pregnant and lactating women more susceptible to infection, miscarriage and premature labour (BRIDGE 2014). According to the Food and Agriculture Organization (FAO), in places where iron deficiency is prevalent, the risk of women dying during childbirth can be increased by as much as 20% (FAO, 2002). Additionally, poor nutrition causes half of the deaths in children under five, with girls often most affected. A study in India found that girls are four times more likely to suffer from acute malnutrition than boys (FAO 2003). These gender disproportionate outcomes are socially mediated. For example, in parts of South Asia there are indications that girls are being de-prioritised in household distribution of food under these crisis conditions. In Bangladesh a high prevalence of wasting for girls aged 0–50 months was reported, compared to boys of the same age (Holmes, Jones and Marsden 2009).

There is clear evidence that empowering women in multiple ways contributes to their own food security and nutrition and that of their families. One study of 36 countries found that women's status is a key factor in child nutritional status, because more empowered women have better nutritional status themselves, are better cared for and provide better care for their children (Smith *et al.* 2003).

Climate-related food insecurity and HIV/AIDS

One notable gap in literature on food insecurity is the over 35 million people worldwide who are currently living with HIV or AIDS. Poverty and hunger can exacerbate the effects of HIV and AIDS, accelerating the spread of the virus and the course of the disease. For people who are already infected with HIV, hunger and malnutrition increase susceptibility to opportunistic infections, leading to an earlier onset of AIDS (Global Donor Platform 2010). There are direct gender-specific implications - women living with HIV or AIDS often lack sufficient resources to replace breastfeeding with appropriate replacement feedings, thus harming their children. There are also indirect implications – the care burden of tending the sick and looking after orphans typically falls to women, which can severely limit agricultural production in both male- and female-headed households (UNFPA/ UNAIDS/UNIFEM 2004). Better understanding of the impacts of food insecurity and malnutrition for LGBTI groups affected by HIV/AIDS is also vital, given the fact that they are at much higher risk of HIV infection than the general population. Estimates indicate that gay men and other men who have sex with men are 27 times more likely to contract HIV, while rates of HIV are 13 times higher among transgender people. At the same time many among these groups avoid seeking health care because they are concerned about stigma and discrimination.[21]

[21] UNAIDS Press release: UNAIDS and the LGBT Foundation launch ground-breaking study on happiness, sex and quality of life for LGBTI people, UNAIDS and the LGBT Foundation launch groundbreaking study on happiness, sex and quality of life for LGBTI people | UNAIDS (accessed 2/12/20)

Mental health impacts of climate change and COVID-19

Mental health is a much-neglected area within research and health intervention priorities, and is little mentioned in climate-related health literature (Parry and Radel 2019; Berry et. al. 2018). In addition to death and physical injury, exposure to natural hazards such as hurricanes, floods and drought is associated with symptoms of acute depression as well as post-traumatic stress disorder (Obradovicha, Migliorinic et.al. 2018; Fernandez, Black et.al. 2015). Evidence also indicates that psychiatric hospital visits increase during hotter temperatures, while both heat and drought amplify the risk of suicide, particularly for the poorest, with high rates among male farmers due to loss of livelihoods (WHO nd: Sorenson et. al. 2018). In India, there has been consistent reporting of increased suicide among poor male farmers following periods of droughts in contiguous semi-arid regions (Behere and Behere 2008; Nagaraj 2008). Empirical evidence indicates that drought increases suicide risk among men aged 30-49 by 15% in Australia (Hanigan et.al. 2012). The decline in food security and livelihood opportunities can also cause considerable stress for men and boys, given the socially ascribed expectation that they should provide economically for the household. This can lead to mental illness in some cases (Masika, 2002: Skinner 2011).

The issue of mental health has gained traction in public awareness as a result of the COVID-19 pandemic, which has had wide-spread psychological as well as physical and socio-economic impacts. Emerging evidence reveals the extent to which the pandemic has affected the mental health of many LGBTI people, due to factors that include socio-economic instability, social isolation, domestic violence and increased anxiety. LGBTI participants in qualitative research by Outright International spoke of the mental health impacts of not being able to gather in safe spaces such as community centres, cafés, or others' homes, and fears of being rejected by family members, and/or having difficulty finding work (Outright International 2020). In some cases, rising mental trauma is contributing to an increase in calls to suicide helplines by LGBTI individuals (UN IE on SOGI 202). The reported increased violence experienced by LGBTI individuals during the pandemic may also be compounding existing psychological impacts of violence that can result in attempted suicide and suicide (UNDP, ICRW, APCOM 2018).

Gender-based violence in the face of climate change and COVID-19

Recent research from the UN and other development actors is confirming the serious growing problem of gender-based violence (GBV) at home, in communities and in schools for young women in particular in many developing countries.[22] Globally, an estimated 243 million women and girls aged 15 to 49 have been subjected to sexual and/or physical violence by an intimate partner between 2019 and 2020 (Azcona 2020). Emerging evidence reveals the increased risk from GBV for women and girls in the context of direct and indirect climate change effects that include water and fuel scarcity that force them to travel further and migration following natural disasters. The public health measures associated with COVID-19 have had the effect of amplifying the issues considerably.[23] Lock down has left many women in already difficult situations unable to escape from abusive situations in the home, and also has left many with reduced support networks and financial capacity, further hampering any desire to flee. In countries that include Argentina, Cyprus, France and Singapore, reports of domestic violence and calls to abuse hotlines increased during the first weeks of the lockdown. Yet, at the time when it has been most needed, safe access to support services and emergency measures, including legal assistance and judicial remedies, has been curtailed in many countries with key support staff such as social welfare workers, health care professionals and police already over-burdened by the demands of the pandemic (UN Women 2020; Azcona 2020).

[22] The SDG Report 2020 notes: "According to surveys conducted between 2005 and 2017 in 106 countries, 18 per cent of ever-partnered women and girls 15 to 49 years of age experienced such violence by a current or former intimate partner in the 12 months prior to the survey" (Un 2020, SDG Report (page 34). UN Women estimates that 35% of women worldwide have experienced either physical and/or sexual intimate partner violence or sexual violence by a non-partner (not including sexual harassment) at some point in their lives, and some national studies indicate that up to 70% of women have experienced physical and/or sexual violence from an intimate partner in their lifetime (UN Women, Facts and Figures: Ending Violence Against Women, https://www.unwomen.org/en/what-we-do/ending-violence-against-women/facts-and-figures (accessed September 2020).

[23] UN, 2020, SDG Report.

COVID-19 is also a key driver of intensified violence experienced by LGBTI individuals. Government directives to stay at home are leading to increased threat of domestic violence from hostile family members, particularly for elderly and younger LGBTI people (UN IE on SOGI 2020). Participants in the Outright International study reported either feeling at increased risk themselves or knowing others at increased risk of violence and abuse within their homes due to forced cohabitation with unsupportive family or abusive partners during quarantines or lockdowns. The closure of counselling and other services is also leaving victims of abuse without support (Outright International 2020).

3. Climate change and Health Interventions

The 2015 Lancet Commission stated that tackling climate change could be "the greatest global health opportunity of the 21st century" (Watts, Adger et. al. 2015: 1861). It highlights the critical importance of measures that include strengthening climate resilient health systems, promoting mitigation against global warming and the reduction of air pollution through carbon-neutral energy programme, developing better targeted adaptation approaches and investing in climate change and public health research (Watts, Adger et. al. 2015). This section looks at global literature, with an emphasis on the Asia Pacific region, to ask what measures are in place to address the health-related risks and impacts of climate change and to what extent these take gender and other axes of inequality into account? It also aims to identify critical gaps in terms of types of interventions and target groups.

3.1. Health systems

The WHO has emphasised the central role of effective health systems for tackling the impacts of climate change and creating greater human resilience. It has developed an operational framework with the goal of "enhance [ing] the capacity of health systems to protect and improve population health in an unstable and changing climate. It notes the critical importance of developing health systems that are flexible, adaptable and able to respond to shifting health risks as a result of climate change. The WHO framework focuses on 1) reducing overall vulnerability, for example by creating local-level resilience through community mobilization, and information dissemination; and 2) developing public health and health system capacities that are attuned to climate realities (WHO 2015) by guiding professionals working in health systems and in health determining climate-sensitive sectors that include water and sanitation, food and agriculture, energy and urban planning. The foundational principles for achieving these aims include:

- Properly funded health systems that provide value for money
- Health professionals with the capacity to building capacity to recognise, monitor, anticipate, communicate and prepare for changing climate-related health risks
- Climate-proofed infrastructure in local facilities to control climate-sensitive diseases and improve response to local emergencies.
- Surveillance systems to monitor population health and environmental exposure.
- Good practices of health governance and decision-making.
- Health and climate change research

This framework provides a useful starting point for thinking about what is needed in terms of developing and improving climate-responsive health systems but in its current form it fails to integrate learning on gender gaps in health and on the potential of health systems to play a key role in addressing these gaps (Venkatapuram 2010). Research has shown that lack of access to public health infrastructure is a risk intensifier for climate-related health impacts (Rudolph, L, 2015). Yet, as the WHO has pointed out, women and girls - particularly the poorest - may face barriers to accessing health care services due to lack of economic assets, decision-making power and cultural or practical restrictions that may prevent them from travelling to seek health care. Elderly women and men are particularly vulnerable and at the same time may be least able to travel long distances to the nearest health facilities or be unaware of their rights to access health care (WHO nd; Parry and Adel 2019). Research has also shown that men are less likely than women to actively seek health care, creating a different set of challenges (Masika 2002).

Emerging research also indicates that LGBTI disproportionately experience victimisation, biases, discrimination and stigmatisation when seeking healthcare, in ways that present significant barriers to healthcare utilization (Zeeman, Shariff et. al.; Whiteness et. al. 2016; Duvivier and Wiley 2015). There are indications that LGBTI people are delaying care-seeking in the context of the COVID-19 pandemic because of concerns about discrimination and negative attitudes (Outright International 2020). These negative

experiences are often a function of health professionals' poor understanding of the specific health needs of LGBTI people or of SOGIESC-related issues, particularly in rural areas (Whitehead et. al. 2016). These experiences can contribute to negative impacts for both physical and mental outcomes. For example, a comprehensive review of relevant papers and reports covering mainly Europe and North America published in 2018 revealed that LGB people reported significantly worse physical and mental health than those who were heterosexual/cis gender, are at a higher risk of developing certain cancers at a younger age (Zeeman, Sherriff et. al. 2018). LGBTI individuals are also more susceptible to HIV/AIDS and other communicable illnesses, mental health disorders, violence against them and suicide than the general population (Duvivier and Wiley 2015).

It is essential that the specific needs and concerns of these groups are taken into account as part of planning climate-responsive health systems, preferably by grounding decisions in robust research and consultative processes with a representative cross-section of communities in rural as well as urban areas. In line with the WHO Operational Framework, the planning process should include vulnerability, capacity and adaptation assessments in order to understand and mitigate against health risks and understand who is most vulnerable and what is needed to protect them (WHO 2015; Watts, Adger et. al. 2015). As part of mitigation measures efforts should be made to understand the extent to which basic nutritional, water and sanitation needs are being met and the types of equality-sensitive interventions (reflecting and responding to the particular situations of women and girls, LGBTI+ people, the poorest and other vulnerable and/or excluded groups) that would increase resilience in the context of climate-related events.

It is clear that – at the very least - effective, climate-responsive primary health care should include affordable (or government-funded), accessible services for pregnant and lactating women and infants, for the elderly, the poorest and other groups who may be particularly vulnerable to different effects of climate change. These groups must also have equitable access to treatment and vaccines for COVID-19. It is vital that measures for addressing mental health are an integral part of health system design or improvement, given the extent to which climate-related phenomena can contribute to depression or deepen existing mental health conditions. Further research is needed to gain a more detailed picture of mental health needs in the Asia-Pacific context.

Importantly, climate and COVID-responsive health systems must include provisions for the treatment of women, girls and LGBTI people affected by GBV – whether the abuse is physical, sexual or psychological. This means building awareness among healthcare staff to create an enabling environment grounded on trust and understanding, and ensuring survivors have access to appropriate shelters and on-going support, including psychological counselling (Azcona 2020).

Training should be provided for staff on climate-related health issues – including GBV – with attention to the specific impacts and systemic blind spots for those who have been traditionally excluded, including the poorest women, LGBTIQ+ people, the differently-abled, refugees and minority ethnic groups. To ensure comprehensive outreach and consistency within and between countries equality-sensitive climate change awareness should be incorporated into curricula for medical students and other healthcare professionals.

Strong community-centred approaches and strategies can enhance primary health care, particularly in remote or poorer areas. For example, in Thailand community pharmacists were successfully trained to identify and refer people with high-risk diabetes and hypertension (Sookaneknun, P., Saramunee, K., Rattarom, R. et. al. 2010). In South Asia community health workers have contributed to the decline of maternal and child mortality rates and helped decrease the burden of tuberculosis and malaria (Rattanavipapong, W., Luz ACG, Kumluang. S. et. al., 2016) and In Pakistan, the community-based Lady Health Worker programme has been associated with reduced infant and maternal mortality and improved contraceptive prevalence (Wazir, MS, Shaikh BT and Ahmed A., 2013). A long-running programme in rural India aimed to empower communities by providing data on health status, access to services and determinants of health, and supporting advocacy for improved services. A review of the

programme revealed sustained levels of community engagement and increased knowledge of health inequities and their causes (Garg, S., 2017). Where possible awareness of and responses to climate-related health issues needs to be integrated into these community-based approaches in ways that are gender and SOGIE-sensitive.

To underpin these measures, it is vital to scale-up financing for climate resilient health systems in the Asia-Pacific region and world-wide, and to ensure interventions are properly costed (Watts, Adger et. al. 2015).

3.2. Climate Resilience Measures

In many cases measures designed to promote resilience against climate change effects can help reduce risks to human health and livelihoods and aid recovery following natural disasters, particularly for the most vulnerable groups identified in this report. CARE has emphasised the limitations of a gender-blind approach to resilience:

"Building resilience – stabilising a system in the face of increasingly volatile climate and markets, and social instability – is becoming a unifying goal in humanitarian action and development… Resilience alone, however, does not reduce inequality, or enable people not just to survive but to thrive despite changes and shocks. The policy and practice of integrating gender in disaster-risk reduction plans needs to go beyond considering women and girls as vulnerable groups or as economic resources. Everyone should be treated as rightful stakeholders and leaders in risk reduction and resilience efforts. The fundamental causes of inequality that underlie vulnerability and resilience need to be addressed. This means securing basic services – health, education, social protection and insurance, emergency early warning and climate information" (CARE 2014: 35).

Climate Change Adaptation in the Asia Pacific Region

Given the vulnerability of many Asia Pacific countries to the direct and indirect impacts of climate change, creating and implementing adaptation strategies has become imperative. This means creating adaptive capacity across a range of activities and sectors, including agriculture, water management, energy, natural resource management and health. Progress in creating this capacity has been slow in many Asia Pacific countries (Anbumozhi, Breiling et. al. 2012) but the submission of National Adaptation Plans of Action (NAPAs) by 13 countries in the region[24] signals a growing level of commitment to putting adaptation measures in place by countries in the region, particularly those that contribute least to global warming but are being most affected by climate change impacts such as rising sea levels and extreme weather events.

NAPAs

NAPAs focus on strengthening adaptive capacity of least developing countries (LDCs) to climate change and its impacts and helps them prioritise their action based upon their needs and interests. They are submitted to the secretariat of UNFCCC, which qualifies the country to apply for funding from the LDC Fund (LDCF) of the Global Environment Facility. The NAPA provides a comprehensive assessment of the country's climate change adaptation situation, needs, challenges and priorities. Included in the NAPAs are sectors and issues linked to health such as agriculture and food security, water resources and energy, climate-induced disasters, forests and biodiversity. Measures for building public health system capacity may also be included in NAPAs. Recommended measures include: gathering and responding to robust evidence; integrating health adaptation to climate change into national health planning, processes and monitoring systems; providing for a flexible and context-specific approach to health adaptation to climate change; and maximising synergies across health-related sectors such as food, water, energy and housing (Ebi and Prats 2015).

[24] Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Maldives, Myanmar, Nepal, Samoa, Soloman Islands, Timor-Leste, Tuvalu and Vanuatu (Submitted NAPAs | UNFCCC). Accessed January 2021.

A review of the inclusion of health within NAPAs found that 39 of 41 (95%) NAPAs identified health as a priority sector negatively affected by climate change, and 30 of 41 (73%) countries listed health interventions among their priority adaptation needs and proposed actions (Manga et. al. 2010). Many countries have conducted vulnerability and adaptation assessments to inform NAPAs. For example, Kiribati assessed risks to health and sources of vulnerability. Identified adaptation needs included policies and programmes to improve management of water safety and water-borne disease; food safety and food-borne diseases; and vector-borne diseases. Improving disease surveillance was also outlined as critical to managing most climate-related health risks in Kiribati (Ebi and Prats 2015). However, only approximately 4% of the portfolio of the LDCF supported health adaptation. According to Ebi and Prats (2015): "Having health represented in the overall national adaptation planning process could facilitate access to urgently needed adaptation funds to address current and projected health risks of climate change."

There is also a significant gap in information with regard to mainstreaming gender and SOGIE issues into NAPAs, despite the clear evidence that women and LGBTI groups are not only experiencing the most climate change impacts in many countries but that they have an important role to play in adaptation strategies (GGCA 2013). NAPAs therefore provide a critical entry point for integrating gender and SOGIE into adaptation policy, planning and implementation.

The value of community-led approaches for climate adaptation and mitigation

Effective implementation of adaptation measures is often contingent on the participation of local communities in natural resource use, sustainable farming methods, reforestation and disaster management strategies. For example, a project entitled 'Disappearing Lands: Supporting Communities Affected by River Erosion' in in an area of Bangladesh vulnerable to flooding took a holistic approach that included community-based DRR such as early warning systems, the provision of alternative livelihood options to people at risk, and the establishment of basic services to people displaced by river erosion. The project engaged community members in identifying priorities, planning and implementation. Benefits of the project have included improved household-level consumption, higher food security and better management of basic health, water and sanitation. This stakeholder engagement is critical to the success of projects, ensuring they are properly targeted and achieve a high level of take-up (Kobayashi and Kikusawa 2012). Such projects could provide entry points for the direct involvement of women and LGBTI groups, but it is important not to replicate gender stereotypes and norms by excluding them from decision-making or more 'hands-on' activities rather than being placed in caring or 'support' roles. For example, in Japan the National Basic Plan for Disaster Prevention emphasises "the role of women" in decision-making but in many cases the neighbourhood-community–based association systems that translate the plan into practice fail to involve women as decision-makers as they are not regarded as 'formal members' or household representatives (Aoyagi 2012).

Putting women at the centre of adaptation approaches in Bangladesh

South-western Bangladesh is particularly vulnerable to floods, waterlogging, and increasing salinity – all of which are exacerbated by climate change. Participatory vulnerability assessments have highlighted the particular vulnerability of women, in part due to cultural norms that limit their mobility and decision-making power. In addition to improving women's livelihood security through climate-resilient income generating strategies (such as duck rearing), CARE and partners have tackled underlying constraints on women's power. As a result of project activities, women's participation in community organisations and local government institutions has increased. Women involved in the project reported greater confidence to speak out in public and negotiate important household decisions with their husbands.

Case study from CARE, nd, Adaptation, Gender and Women's Empowerment, CARE International Climate Change Brief

Women's engagement in flood and watershed management in South-East Asia

The Mekong basin in South-East Asia is a densely populated area that is highly vulnerable to increased flooding as well as droughts and water shortages in the face of worsening climate change. Traditionally, watershed management issues have excluded women and failed to take account of issues of sustainable livelihoods and equality. GIZ, the German bilateral aid agency, implemented a project to address this by systematically involving women as trainers, participants and target groups in watershed management. It found that using a quota system to ensure the involvement of women in the watershed management committees led to a significant improvement in the quality of the committees‟ work, as well as an improvement in the local population taking greater responsibility, increasing the likelihood of the sustainable application of resource-friendly approaches for society as a whole.
Case Study from Skinner 2011, based on GIZ, 2011, *Gender & Climate Change: Gender Experiences from Climate-Related GIZ Projects*

Disaster Risk Reduction (DRR)

Community and national-level early warning systems (EWS) about approaching extreme weather events and risks of flooding can give communities vital time to move away from exposed areas and - where possible - protect their homes and crops against severe damage.[25] These systems rely on the availability of information via phones and other mobile devices as well as on training in appropriate reactions. Studies have shown that community resilience in these situations is much improved when women play an active leadership role. They are usually better at sharing information and also display better coping strategies in the aftermath of disasters (UNDESA 2020; IPCC 2007). For example, one study found that women in South Asia displayed enormous strength and capacity throughout the entire disaster cycle: preparing for hazards, managing after a disaster and rebuilding damaged livelihoods. Activities included ensuring food and water for the family, securing seed and other productive material and taking care of the sick and elderly (UNDESA 2020). After Hurricane Mitch in 1998 the lack of deaths in Masica, Honduras, was linked to the training of women in EWS and hazard management and their role in alerting the population in time to evacuate (Buvinic et al., 1999). Deploying these gender-sensitive approaches to more 'slow-moving' disasters such as heatwaves and flooding could help prevent physical and mental health impacts or even deaths. For example, training for health workers and people of all genders in local communities could include heatwave early warning systems (HEWS) (Watts, Adger et. al. 2015).

The Sendai framework for DRR 2015-30 points out the value that women and other often marginalised groups - children and youth, persons with disabilities, the elderly, indigenous people and migrants - can bring to DRR efforts. Given the particular vulnerabilities and experiences of LGBTIQ+ people in disaster situations it is paramount that they are also included in the design and implementation of DRR interventions and policy.

Knowledge sharing on good practices and on the health benefits of inclusive adaptive processes in the Asia Pacific and other global regions could support the effective and timely delivery of these mechanisms. The framework also highlights the need for better data collection on disaster-related morbidity and mortality, and for improved recovery schemes to provide psychosocial support and mental health care for those in need. Where possible this data should be gender disaggregated and services must be gender responsive.

[25] For a good Asia Pacific example see Lacombe, G., Hoanh, C. and Valéro, T., 2012, Effectiveness of Early Warning Systems and Monitoring Tools in the Mekong Basin' In Climate Change in Asia and the Pacific: How can Countries Adapt? (Ambumozhi, V., Breiling, M., Pathmarajah, S. and Reddy, V. eds), New Delhi: Sage

4. Policy and Strategies

The WHO has emphasised the critical importance of putting people at the heart of climate change policy, noting that "poorly designed policies could easily undermine gender equality, climate and health equity goals and reduce public support for their implementation" (WHO nd: 19). A key message from the available literature is that it is vital to address the complex, intersecting issues of climate change and health in ways that "[break] down silos and [make] connections" (UNDP 2020: 8). 'Joined up' multi-sectoral policy development grounded in principles of climate justice is viewed by many as essential to tackle the causes and effects of climate change in ways that promote climate and environment-friendly human behaviour, reduce the inequalities that exacerbate impacts on health and livelihoods and ensures no-one affected physically or psychologically by climate change is left behind (UNDESA 2020' Walpole et. al. 2009). For example, Watts, Adger et. al. (2015) have emphasised the human health co-benefits of reducing carbon emissions and protecting eco-systems. The 17 SDGs could potentially provide critical opportunities for promoting synergised policy and action on gender equality, health and well-being, clean water and energy and climate change, currently are reported on separately.

4.1. Policy Coordination

As Sorenson et al. (2018: 2) have noted: "ensuring that policies move beyond traditional separations of health, gender, and environment and embrace proactive and gender-based solutions is paramount to protecting women's health and mobilizing their vast social potential to mitigate, adapt to, and respond to climate threats." Global climate change policy has demonstrated progress in this respect over the past 10 years. The Paris Agreement (see box below), adopted in 2015, marks a global commitment to reduce carbon emissions. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. It includes measures to reduce global carbon emissions and to support people in developing countries, who have been affected by climate change. The Agreement has been criticised for its lack of attention to gender equality, but a Gender Action Plan adopted at the UNFCCC COP 25 in 2019[26] provides a unique opportunity for countries to set out concrete measures and targets on gender and health equity, based on more inclusive understandings of 'gender'. The formal acknowledgement of the integral links between gender and climate change needs to be translated into action supported by gender-disaggregated data in all affected areas - particularly health - given that gender is "often either underrepresented or non-existent as a variable when assessing the health effects of climate change in medical research, environmental research, and strategic planning of mitigation and adaptation policies" (Van Daalan 2020).

Paris Agreement (IPCC)
The Paris Agreement under the *United Nations Framework Convention on Climate Change (UNFCCC)* was adopted on December 2015 in Paris, France, at the 21st session of the *Conference of the Parties (COP)* to the UNFCCC. The agreement, adopted by 196 Parties to the UNFCCC, entered into force on 4 November 2016 and as of May 2018 had 195 Signatories and was ratified by 177 Parties. One of the goals of the Paris Agreement is 'Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels', recognising that this would significantly reduce the risks and impacts of climate change. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change. The Paris Agreement is intended to become fully effective in 2020. See also *United Nations Framework Convention on Climate Change (UNFCCC)*, *Kyoto Protocol* and *Nationally Determined Contributions (NDCs)*.

[26] The Gender Action Plan | UNFCCC

Yet, as this report has shown, a more nuanced understanding of the human health impacts of climate change is required if interventions are to be effectively targeted. For example, Van Daalan, Jung et. al. (2020: 44) note that "there is an unacceptable scarcity of research on climate change health effects for non-binary people, who might also be particularly vulnerable as a result of compounding discrimination." This means taking an intersectional approach based on data that responds to these gaps, reflecting dimensions such as poverty levels, age, ethnicity, citizen status and disability which can both shape and compound health impacts. It also means going beyond the narrow category of 'gender' to an inclusive SOGIESC perspective that no longer renders LGBTI people invisible in climate change policy. Asia Pacific countries could lead the way by investing in data collection, knowledge sharing and inclusive grassroots consultative processes, and through the direct involvement of those most affected by climate change in planning for adaptation and mitigation strategies and climate-responsive health systems.

Women-led climate change advocacy in Asia-Pacific countries

The Asia Pacific Forum for Women, Law and Development (APWLD) has set an excellent example of women-led action to inform climate change policy planning. APWLD led a Feminist Participatory Action Research (FPAR) programme that supported the collective work of indigenous women and LGBTIQ+ groups in nine communities in Asia-Pacific, including the Philippines, Nepal, India, Indonesia, Thailand, Papua New Guinea, Vietnam and Bangladesh. The programme supported women and LGBTI+ people to document their experiences, responses and needs to ensure that those most affected by climate change are able to shape policies at the local, national and international level. A key output was a statement and set of key recommendations aimed at ASEAN policy-makers.[27] The programme demonstrated that empowered women's movements are imperative to responding to climate change, to building resilience, to developing people-centred climate policies and, ultimately, to drive the system change required to shape just, equitable and sustainable futures.[28]

Bringing the voices of women to the climate change debate in Nepal

An Action Aid project in Nepal found that women had significant knowledge and skills in adapting to climate change, but were not participating in decision-making on climate change and were often excluded and overlooked in policies. The aim of the project was to bring women's voices to the debate by empowering them to capture their experiences and concerns about climate change on video and channelling these to policymakers. This empowered them to become advocates for change. As well as providing evidence for policymakers to make climate-related policies more responsive to local realities, the project provide an opportunity for women to reflect on their situations, articulate their concerns and identify the actions that they believed would translate into a positive change in their condition.

Case study from Skinner, 2011,based on Mitchell, T., Tanner, T. et al. (2007) *'We Know What We Need' South Asian Women Speak Out on Climate Change Adaptation*,

Rudolph and Gould (2015: 433) argue that "public health must not only control and contain but also seek to prevent climate-driven disease emergencies by looking upstream at real places, people and practices." They call for "both 'hard' and 'soft' scientific methods including considerations of the narratives and values that inform the development of models used to study climate change and health and the awareness of the health inequalities at play" (2015: 433). They have produced a useful framework for guiding a more inclusive, people-centred, multi-sectoral approach to climate change and health research and policy. The framework aims to:

1. Demonstrate the complex relationships between climate change and health inequities

[27] Statement from LGBTI and indigenous women affected by climate change – Asia Pacific Forum on Women, Law and Development (APWLD)

[28] Women from Asia-Pacific at COP 21 Demand a fair, gender equitable truly transformative Paris agreement – Asia Pacific Forum on Women, Law and Development (APWLD)

2. Explicitly build on prevalent public health practice models that address health inequities

3. Delineate the many opportunities for interventions to promote health and equity, prevent catastrophic climate change, increase climate resilience, and protect people and communities from the inevitable effects of climate change; and

4. Highlight the importance of collaborative action to address the institutions, social relations, and systems that simultaneously drive both climate change and health inequities.

4.2. Nationally Determined Contributions

The Paris Agreement is underpinned by climate action plans known as 'Nationally Determined Contributions' (NDCs). The NDCs provide countries with the opportunity to communicate nationally defined climate targets in the areas of mitigation, adaptation and resilience, with additional information on suggested measures and local processes for defining, implementing and evaluating these actions. Under the Paris Agreement countries are expected to be responsive and flexible, prepared to adjust their NDCs every five years as necessary to keep pace with the shifting realities of climate change.

By the end of 2020 42 Asia Pacific countries and island states had submitted NDCs[29], but only four (Tonga, Papua New Guinea, Nepal and the Marshall Islands) had submitted an updated NDC (UNFCCC NDC Registry). A 2020 UNESCAP assessment found that 38 out of 44 developing countries in the Asia Pacific region have specific climate change related laws in place for over three years or legal provisions supporting NDCs and climate actions. Yet many Asia Pacific countries have been slow to integrate climate change into national development plans. A UNESCAP report (2020) states that no developing countries in the region have demonstrated the level of effective readiness on mainstreaming of NDCs.

NDCs potentially provide a critical entry point for integrating health-related measures into climate-related policy and adaptation plans. As the WHO has pointed out: "ambitious national climate commitments have the potential to translate into significant health co-benefits… Countries can strengthen their NDCs by developing health-inclusive and health-promoting climate targets and policies" (WHO 2019: 2). In fact, 70% of NDCs submitted by December 2019 (129 out of 184) included health considerations. Around a quarter of these highlight the issues of climate-related vector-borne diseases and food security. However only 10% highlighted the health co-benefits of mitigation or adaptation with even fewer pledging to measure the health impacts of measures such as reducing air pollution. Less than 5 % mention mental health impacts of climate change (WHO 2019).

Signatory countries have demonstrated a level of commitment to integrating gender concerns into the NDCs, reflected in the intention of 67 nations intend to incorporate considerations about gender equality and women's empowerment into their revised plans. Yet, as already noted, definitions of gender are often narrow, reflecting only the vulnerabilities of women and girls in the face of climate change, and their potential role in mitigation and adaptation. Future iterations of NDCs should include more nuanced, inclusive approaches to gender that reflect LGBTI identities and concerns. Notably, as this paper has argued, it is also important for NDCs to move beyond the siloisation of issues towards a more coherent purview that recognises the interlinkages between gender, health and other related sectoral areas such as energy, water and food security.

[29] Afghanistan, Armenia, Australia, Azerbaijan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Cook Islands, Fiji, India, Indonesia, Japan, Kiribati, Kyrgyz Republic, Laos, Malaysia, Marshall Islands, Maldives, Micronesia, Mongolia, Myanmar, Nepal, New Zealand, Niue, Papua New Guinea, Pakistan, Republic of Korea, Samoa, Soloman Islands, Singapore, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Tonga, Turkmenistan, Tuvalu, Uzbekistan, Vietnam, Vanuatu (UNFCCC NDC Registry All NDCs (unfccc.int))

Finally, with regard to implementation, NDCs often lack the comprehensive range of actions needed to build climate resilient health systems, and health adaptation actions are not always linked to existing national adaptation policies or action plans in current NDCs. The means to resource health-promoting climate action is also left vague in many NDCs – as of December 2019 only 15% of NDCs linked health to climate finance (WHO 2019). UNESCAP has identified lack of allocated finances as a key barrier to developing and/or operationalising NDCs in the Asia Pacific region, noting that only 25% of signatory countries from the region had sufficient financial frameworks in place in 2020 (UNESCAP/UNEP 2020). The issue of climate financing is addressed in the next section.

4.3. Climate financing

There are high financial implications of health-related climate issues. For example, in Bangladesh the cost of treating *additional* cases of diseases due to climate change was estimated to be USD 2.8 billion, which is equivalent to around 3% of the country's GDP (Uji 2012). This report has shown that excluding health and gender equality principles and measures from climate change policy would be a false economy, yet limited resources often mean that these issues are deprioritised in favour of high-profile spending on sectors such as energy and water. Consequently, the assessments of NDCs have revealed, there are often significant gaps in financing responses to health impacts of climate change, particularly for developing countries. Any financial measures in place are also likely to have been seriously undermined by responses to the COVID-19 pandemic.

Climate financing provides a potential route for governmental and non-governmental organisations to ensure these issues receive the attention they warrant. As Habtezion notes: "Equitable climate finance can enhance the climate response effort while simultaneously promoting achievement of the 17 SDGs launched to guide development action for the next 15 years, including SDG 1 (poverty reduction) and SDG 5 (gender equality) (2016: 5).

The Green Climate Fund (GCF), established in 2010, is one of the key mechanisms for delivering against the Paris Agreement commitments and has a gender equality mandate underpinned by clear mechanisms for implementation. For example, all GCF implementing entities must have their own gender policies or action plans. Additionally, all proposals must include a project/programme-specific gender action plan. The GCF results management and performance measurement framework mandates the collection of sex-disaggregated data for both its mitigation and adaptation portfolio. Currently over a third of GCF-supported projects are in Asia-Pacific countries (GCF website).[30] The efforts of the GCF to fully integrate and monitor gender dimensions into all projects are ground-breaking. However, there is a risk that the overwhelming emphasis on including and targeting women in adaptation projects will leave LGBTI people side-lined. At the same time, the GCF could provide an opportunity to highlight intersectional concerns in proposals and to create traction and awareness of these issues.

Beyond the GCF there are also national-level climate finance tools, such as national climate funds (NCF)[31] and climate finance readiness strategies, which help countries manage, coordinate, implement and account for international and domestic climate finance. However, research is needed to map the availability of these funds and strategies in different Asia Pacific contexts, the extent to which they integrate equality and health concerns – and the degree to which they are being effectively mobilised.

[30] Green Climate Fund

[31] Blending_Climate_Finance_Through_National_Climate_Funds.pdf

5. Conclusion

This report has provided an evidence-based overview of the key issues associated with climate change and health equity. It has highlighted the ways in which gender disparities – including those faced by LGBTI people - intensify the multiple impacts of climate change and undermine the lives and opportunities of those who are already vulnerable. It has also demonstrated ways in which women and those from the LGBTI community can have agency in shaping solutions, but it is clear that radical changes are still needed to address critical gaps in knowledge, practical action and policy. A clear message is the **need for more joined up thinking and planning** is needed in order to reflect the interdependencies between climate change, gender and health.

This not only means **generating gender-disaggregated data** in assessments of the health effects of climate change, but ensuring this data informs policy in ways that lead to effective strategies. It means **taking an inclusive approach that widens perceptions of 'gender' beyond women and girls**, enabling knowledge production and sharing on the specific physical and mental health risks of climate change (and the linked issue of COVID-19) for the LGBTI groups who have been systematically written out of evidence bases, direct interventions and policy responses.

Another key point is the importance of building capacity for policy development, health promotion practice. It is of course vital to **identify gaps and needs in services and interventions**, and tools such as the WHO Operational Framework can be helpful for systematising these processes. However, capacity building should start with **learning from and building on what is already working**, in terms of gender equitable public health practices and climate-related interventions. Sharing this information and creating opportunities to adapt and scale up existing practices is not only cost and time effective; it is enabling valuable, transferable learning from human experience.

It is also vital to **identify opportunities for promoting health and gender responsiveness across a range of climate and COVID-related interventions**, whether related to mitigation, adaptation or the strengthening of resilience. International and national mechanisms such as the SDGs, NAPAs and NDCs provide entry points for integrating these concerns but these processes need to be supported through data and concrete implementation pathways and their progress measured in robust ways. They also need to be adequately financed, drawing on instruments such as the GCF where appropriate and necessary.

As the HDR notes: "we must reorient our approach from solving discrete siloed problems to navigating multidimensional, interconnected and increasingly universal predicaments" (HDR 2020: 5). It follows that creating and sustaining the momentum needed for these changes will require an unprecedented level of **collaboration** and **alliance building** between countries, sectors, organisations and communities.

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