Climate Change and Families: Review of Evidence And Policy Recommendations

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

مؤسسة قطر
Qatar Foundation

AUTHORS

Jorge Cuartas (j.cuartas@nyu.edu),
Department of Applied Psychology, New York University, U.S., & Centro de Estudios sobre Seguridad y Drogas (CESED), Universidad de los Andes, Colombia

Jenna Spitzer (j.e.spitzer@uu.nl),
Utrecht University, Netherlands

Lucero Ramirez Varela (lrv238@nyu.edu),
New York University, U.S.

Alexis Brieant (alexis.brieant@uvm.edu),
University of Vermont, U.S.

Ayesha Ghazanfar (ayeshaghazanfar6@gmail.com),
Duke University, U.S.

Jennifer E. Lansford (lansford@duke.edu),
Duke University, U.S.

Missaye Mulatie (mulate2002@yahoo.com),
University of Gondar, Ethiopia

Rose Opiyo (ropiyo@mmust.ac.ke),
Masinde Muliro University of Science and Technology, Kenya

Ann Sanson (annvs@unimelb.edu.au),
The University of Melbourne, Australia

Ahmed Aref (aaref@qf.org.qa),
Doha International Family Institute

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

Duke SANFORD | CENTER *for* CHILD & FAMILY POLICY

ACKNOWLEDGEMENT

We would like to thank the Doha International Family Institute, Dr. Evren Tok (Hamad Bin Khalifa University), and Dr. Charissa Cheah (University of Maryland, Baltimore County) for their valuable feedback.

We also acknowledge Developmental Scientists for Climate Action (DevSCA.org) for their support and input, noting that several authors are members of this group. Additionally, we are grateful to Carmen Alban and Ella He for their assistance.

Climate Change and Families: Review of Evidence and Policy Recommendations © 2024 by Doha International Family Institute & DUKE University is licensed under CC BY-NC 4.0. To view a copy of this license, visit **https://creativecommons.org/licenses/by-nc/4.0/**

CC BY-NC 4.0

ABSTRACT

Climate change consists of a constellation of acute shocks and prolonged risks that threaten societies, communities, and families' livelihoods and survival globally. The purpose of this report is to synthesize current scientific knowledge on the potential impacts of climate change on individual family members and the family system as a whole, and to identify policies and interventions that promote their resilience and well-being. To achieve this, we conducted three independent rapid reviews of the literature.

Findings suggest that climate change is already affecting the health and development of family members, influencing reproductive health and gestational outcomes, increasing the risk of mortality, injury, and respiratory, cardiovascular, and infectious diseases, and exacerbating depression and anxiety It is also compromising children's cognitive, social, and emotional development. Furthermore, there is emerging evidence that climate change may impact the family system as a whole, shifting fertility preferences, increasing the risk of early marriage, forced migration, family conflict, and separation, and negatively affecting familial relationships and parenting practices. However, some circumstances may bring family members closer as they navigate climate hazards.

These impacts are not equally distributed but are context-specific, likely reflecting structural inequities. They tend to be more severe in low- and middle-income countries and for families facing pre-existing disadvantages and discrimination. Our findings also highlight policies and interventions that can help prevent families from experiencing the negative impacts of climate change, prepare them to face the impacts, support them as they encounter challenges, and engage families in policymaking and action to address climate change.

Looking ahead, stronger policies are needed with attention to the specific needs of children and families. Additionally, evidence-based interventions must be expanded to mitigate the climate crisis and promote equity, preparedness, adaptation, resilience, and well-being in the context of climate change. Investing in and supporting bold research agendas and science-driven innovation are critical to ensuring a sustainable future for all.

Keywords: Families; Children; Family Relationships; Climate Change; Climate Crisis; Resilience

TABLE OF

CONTENTS

1. Executive Summary **8**

2. Setting the Scenes **12**

2.1. Climate change and families in the Arabian Gulf and MENA regions 15

3. Methodology **18**

4. How Climate Change May Impact Families **22**

5. Climate Change and Families: Review of the Evidence **26**

5.1. Outcomes for individual family members 30
5.1.1. Physical health 30
5.1.2. Social and Emotional Wellbeing and Mental Health 31
5.1.3. Child Development 32
5.2. Outcomes for the family system 32
5.2.1. Family structure and composition 32
5.2.2. Family separation and migration 33
5.2.3. Relationships 34
5.2.4. Parenting and Child Maltreatment 34
5.2.5. Intimate Partner Violence 35
5.3. Risks or barriers and protection or enabling factors 36

6. Lessons from Prior Policies and Interventions **38**

6.1. Introduction 40
6.2. Preventing families from experiencing the negative impacts of climate change 41
6.3. Preparing families to face the negative impacts of climate change 42
6.4. Supporting families as they face the negative impacts of climate change 42
6.5. Engaging families in addressing climate change 45

7. Conclusion and Recommendations **48**

7.1. Recommendations for Policy and Practice 50
7.1.1. To prevent families from experiencing the negative impacts of climate change 50
7.1.2. To prepare families to face thenegative impacts of climate change 50
7.1.3. To support families as they face the negative impacts of climate change 50
7.1.4. To engage families in addressing climate change 51
7.2. Future Directions for Research 51

References **54**

EXECUTIVE SUMMARY

Action and inaction by governments and societies have fueled a growing climate crisis with already visible impacts and looming threats that scientific studies have enabled us to anticipate. Increased global temperatures, more frequent and severe weather events, ecological degradation, and the spread of infectious diseases are all symptoms of a growing crisis affecting families around the globe. At the same time, these climate hazards are not equally distributed. Pre-existing structural inequities and discrimination can amplify their impacts, putting low- and middle-income countries (LMICs), families living in humanitarian settings, low-income households, women, children with disabilities, and individuals facing exclusion, racism, and oppression at higher risk.

1

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

The impacts of climate change can be substantial for families living in the Arabian Gulf and the Middle East and North Africa (MENA) region, considering that the region is already heating up at a rate nearly twice as fast as the global average, breaking temperature records in recent years. Furthermore, the region faces severe water scarcity, with Qatar being the most water-stressed country in the world. These challenges will likely be exacerbated by rapid demographic changes, increased desertification, and the loss of fertile land. Given that economies in the region largely rely on hydrocarbons, switching to cleaner energies to reduce economic reliance on fossil fuel exports will require substantial efforts and investments.

Within this context, this report synthesizes global evidence on the impact that climate change is having on families, including individual family members and the family system as a whole. We then discuss policies and interventions that can help promote resilience and family well-being in the context of this unprecedented environmental situation. While the report is global in scope, we highlight case studies from the Arabian Gulf and MENA region when available in the literature.

While the evidence on the effects of climate change on families is still developing, a considerable body of work indicates already visible impacts on individual family members. Systematic reviews and meta-analyses show that climate change can affect: (1) reproductive health and gestational outcomes like fertility, (2) children's and adults' health, including higher risks for respiratory, cardiovascular, and infectious diseases, and (3) mental health, including depression, anxiety, post-traumatic stress disorder, and eco-anxiety—chronic anxiety and worry caused by increased awareness of the existential threat of climate change. Furthermore, recent studies suggest climate change may compromise young children's cognitive, social, and emotional development, potentially leading to negative lifelong individual and societal outcomes unless the right policies and interventions are put in place to promote positive adaptation and resilience.

A more limited number of studies show that climate change may also impact the family system as a whole, and these impacts are highly context-specific. For instance, there is evidence linking climate change to shifts in fertility preferences, rising divorce rates, and a higher risk of early marriage, particularly in vulnerable settings where growing economic pressures intensify stress within the family system. This stress prompts families to resort to early marriages as a coping mechanism. There is also mixed evidence on the specific impact of climate change on family separation, relationships, and interactions. The impacts of the crisis on societies and communities can impose significant burdens on families and exacerbate the risk of conflict and violence. Overall, existing research is limited, and methodological shortcomings make it difficult to understand the specific effects of climate change on family dynamics as a whole.

Even though there is limited specific evidence about policies and programs that can help families in climate hazard settings, the review of the literature showed promising policies and interventions that can help promote resilience and family well-being. First, policies and interventions can help prevent families from experiencing the negative impacts of climate change, such as those that reduce current and future greenhouse gas emissions and create sustainable economic systems. Second, policies and programs that promote equality of opportunity and enhance living conditions can prepare families to face the impacts of climate change. Third, mental health interventions, cash transfer programs, and parenting programs, among other strategies, can support families as they encounter the impacts of climate change. Finally, policies and interventions can support families in engaging in policymaking to catalyze collective action to address climate change. Importantly, these policies and interventions should consider pre-existing inequities and seek to engage and serve at-risk populations.

Collectively, findings from this report have significant implications for policymakers, practitioners, researchers, and funding agencies, including:

Policymakers and Practitioners:

- There is an urgent need for evidence-based policies and interventions to prevent families from experiencing the negative impacts of climate change, prepare families to face these impacts, support families as they encounter challenges, and engage families in policymaking and action to address climate change.
- We already have strong evidence for policies and interventions that could help families navigate challenges amid climate change (e.g., cash transfers, parenting supports), but there is a need for additional investments to ensure these strategies reach all families at scale.
- Issues of equity should be addressed to ensure preparedness and adaptation to climate hazards, through reducing economic, regional, ethnic, racial, and gender inequalities, among others.
- It is important to include children's, youths', and families' voices and promote their engagement in policy decisions and program design to ensure policies and interventions are acceptable, relevant, feasible, and sustainable in context.

Researchers and Funding Agencies:

- The current body of evidence on the impacts of climate change on families is growing, but there are significant gaps and methodological limitations that should be addressed using longitudinal data, stronger methodological designs that allow identification of causal effects, and participants from more settings and diverse populations to understand how and for whom climate change impacts different family outcomes.
- We need more research on how existing evidence-based policies and programs may work in climate hazard settings and how we can optimize policies and interventions to ensure effectiveness at scale amid climate change.
- Funding agencies can support novel, bold research agendas on families and climate change, as well as research-policy-practice partnerships that inform current and future policies and interventions aimed at promoting preparedness, adaptation, and resilience.

Addressing current research gaps and investing in policies and interventions to promote family resilience and well-being at scale will not only benefit families and communities in the short term, but will also catalyze collective action and ensure a sustainable future for all.

SETTING THE SCENES

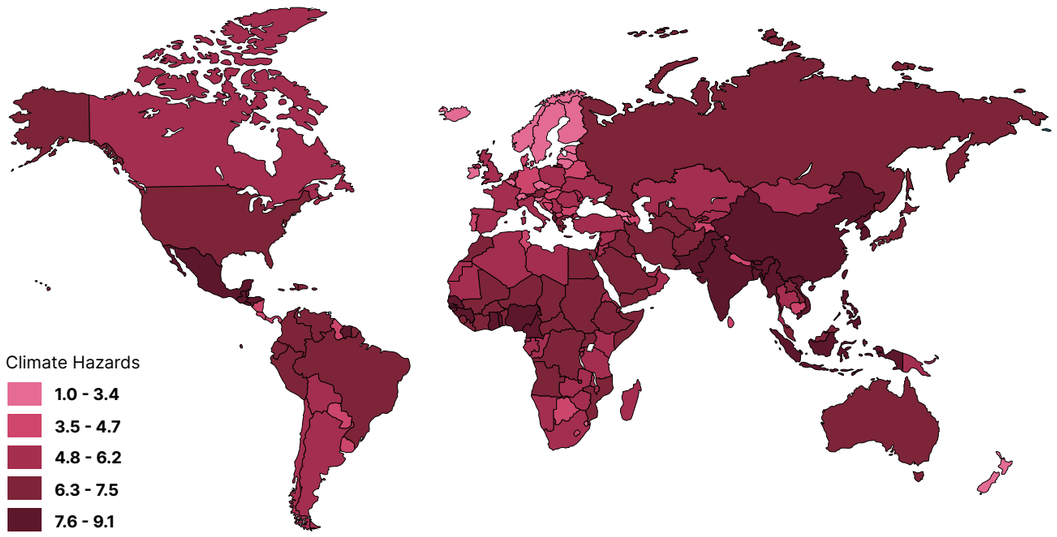
Climate change, driven by both governmental and societal actions (and inaction), is having profound impacts on human livelihoods and survival globally. Current policies and behaviors could result in a **2.7°C median increase** in global temperature relative to pre-industrial levels (Climate Action Tracker, 2022). Rising global temperatures, coupled with increasing air pollution, are causing shifts in weather patterns (including precipitation), **prolonged** ecological degradation, extreme weather events, and the outbreak and spread of infectious and zoonotic diseases, among other climate change-related risks (Romanello et al., 2022). The climate crisis is not a future threat but a **present reality** affecting everyone in one way or another.

2

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

The United Nations recently identified climate change as a "mega-trend" due to its current and projected impacts on families and their local and global communities (Trask, 2020). For instance, UNICEF estimates that **99% of children** worldwide are currently exposed to at least one climate hazard (Figure 1; UNICEF, 2021a). Additionally, there is **increasing anxiety, worry,** and feelings of hopelessness among children, adolescents, and adults due to climate change (Bechard et al., 2023; Hickman et al., 2021). Although the impacts of climate change are global, they are unequally distributed. Countries contributing the least to the climate crisis (i.e., low- and middle-income countries), and historically marginalized, oppressed communities and families who have faced barriers due to structural inequalities, are likely to be the **least prepared** and **suffer the most** severe consequences from the crisis (Cuartas et al., 2023).

Figure 1. Number of climate hazards and shocks experienced by children around the globe.



Source: data from UNICEF, 2021a

Definitions

Climate Change	Refers to long-term shifts in temperatures and weather patterns. These shifts can occur naturally due to factors like changes in solar activity or large volcanic eruptions. However, since the 1800s, human activities—particularly the burning of fossil fuels such as coal, oil, and gas—have been the primary driver of climate change" (United Nations, 2024).
Climate Resilience	The ability to prepare for, respond to, adapt to, and recover from climate-related threats and hazards, while achieving positive social and individual outcomes.
Families	Groups of individuals who are related by blood, marriage, or close social ties, which can be legal (e.g., adoption) or conventional (e.g., cohabitation).
Resilience	The capacity of a system (such as individuals, families, or communities) to successfully adapt to potential threats to its viability, functioning, or development (Masten, 2019).

The history of humankind illustrates the scientific principle of resilience in human development, showing that individuals, families, and communities continually evolve and adapt to changes in social and environmental systems. However, the current climate crisis presents an unprecedented challenge, marked by both acute shocks and prolonged climate hazards across multiple ecological contexts. This distinctive dual time frame demands innovative, global, science-based strategies that foster resilience and enable all families to adapt and thrive.

The primary goal of this report is to synthesize current scientific knowledge on the potential impacts of climate change on families and to identify pathways for promoting preparedness, adaptation, and resilience in the face of the climate crisis. By doing so, this report aims to guide policy and programmatic efforts that promote family well-being, encourage climate change mitigation behaviors, and ultimately ensure a sustainable future for all.

2.1

Climate change and families in the Arabian Gulf and MENA regions

The economies of Gulf region countries are closely linked to large hydrocarbon reserves, with 40% of global oil exports and 15% of global gas exports originating from the Gulf and the broader Middle East and North Africa (MENA) region (Häfner et al., 2023). As global demand for hydrocarbons shifts and the world moves towards cleaner energy, these countries' economies and political systems will be significantly impacted. The transition to cleaner fuels to reduce carbon emissions and mitigate climate change will require structural changes and economic diversification. In response, the region has committed to increasing the share of renewables in its energy mix. Bahrain aims to reach 10% renewables by 2035, the United Arab Emirates (UAE) 30% by 2030, Saudi Arabia 30% by 2040, Kuwait 15% by 2030, Qatar 20% by 2030, and Oman aims for net-zero emissions by 2050 (van den Bosch, 2023).

This energy transition will be challenging, but it is essential, as Gulf states are already experiencing the effects of climate change. The Gulf ranks among the regions most likely to face severe water crises within the next decade. Additionally, the region is heating up at twice the global average rate, with summer temperatures projected to rise by 4°C by 2050 (van den Bosch, 2023). Over the past five years, several MENA countries have set temperature records, including Iran, where the heat index reached 70°C in August 2023.

The region is also grappling with water scarcity due to low rainfall and high evaporation rates. Qatar, for example, is already the most water-stressed country globally (Haghirian & Al-Sarihi, 2024). The UAE has the highest water consumption rate in the world, and rapid population growth is exacerbating water depletion. The World Bank estimates that climate-related water scarcity could cost Middle Eastern countries 6-14% of their GDP by 2050 (Alaaldin, 2022). Desalination plants, which supply 20% of the region's water, have high energy costs and are increasing the salinity of local water sources, threatening biodiversity and marine life, including the Gulf's coral reefs (van den Bosch, 2023). In addition, coastal cities in countries like Saudi Arabia and Yemen face increased flooding risks due to rising sea levels, requiring significant investment in infrastructure to meet the energy demands for air conditioning, water supply, and flood protection.

These climate challenges are further compounded by rapid demographic changes in the MENA region, which is experiencing a "youth bulge" due to high fertility rates and declining infant mortality (Häfner et al., 2023). The large proportion of children and young people, combined with the effects of climate change, poses serious risks Approximately 82 million children in the region face high or very high climate risks, including heatwaves, vector-borne diseases, water stress, and air and water pollution. Climate-induced desertification and agricultural loss are contributing to increased migration from North African countries to the Gulf (Gowayed, 2022). Between 2016 and 2021, climate change displaced over 1.1 million children. Displacement and mass migration (see DIFI report on migration) put more children at risk of exploitation, trafficking, abuse, school drop-outs, and increased likelihood of armed conflict and political instability (UNICEF, 2023b).

The impacts of climate change are particularly severe for females, as climate-related food insecurity contributes to high anemia rates among young girls, and the lack of clean water and sanitation services affects their reproductive health. Without proper sanitation, more girls drop out of school and assume household responsibilities. Forced migration, poverty, and insecurity further increase the prevalence of gender-based violence and child marriage (UNICEF, 2023a). Given these realities, it is unsurprising that 74% of youth in Gulf countries report that climate change is already negatively affecting their lives, and 56% of young Arabs want their governments to set accountable targets to achieve net-zero emissions (ASDA'A BCW Arab Youth Survey Middle East, n.d.).

METHODOLOGY

The research for this report comprised three independent rapid literature reviews. The first review (R1) focused on the potential effects of climate change on outcomes for individual family members. The second review (R2) examined the potential effects of climate change on outcomes at the family system level. The third review (R3) aimed to understand interventions and policies that may address some of the effects of climate change-related risks on families.

3

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

Rapid reviews provide an alternative to systematic reviews when time constraints exist (King et al., 2022). While systematic reviews are comprehensive and can take months or even years to complete, rapid reviews seek to assess key findings on a focused topic using some components of the systematic review process, but with a narrower scope and search strategy. This approach allows for faster results and conclusions, making it suitable for informing research, policy, or practice in a timely manner (Grant & Booth, 2009; Smela et al., 2023). Thus, the rapid review method enabled us to offer a rigorous overview of what is known about families and climate change, while meeting the time demands of policy and practice.

Before conducting formal literature searches, we performed a rapid preliminary search to gauge the amount of evidence linking climate change to individual family member outcomes (R1), family system outcomes (R2), and interventions or policies (R3). It became clear that there was a significant amount of research related to R1, including numerous systematic reviews and meta-analyses. In contrast, less research was available for R2 and R3. Consequently, we focused R1 exclusively on reviews of the literature (e.g., systematic reviews, meta-analyses, and other types of reviews) to provide a thorough overview of the existing evidence. For R2 and R3, we expanded our searches to include primary studies as well.

For each review, we conducted independent searches using relevant keywords and specialized terms across APA PsycINFO, PubMed, and Google Scholar, which index psychological and health sciences research. For R1, we used search terms related to outcomes for individual family members (e.g., “health,” “mental health,” “safety,” “human development”) and climate change (e.g., “climate change,” “global warming,” “extreme events”), limiting the searches to reviews published in English or Spanish after 2013. In R2, search terms related to the family system (e.g., “family,” “divorce,” “marital status,” “coparenting”) and climate change were used, with a similar publication date limitation. For R3, search terms focused on families, climate change, and policy and intervention (e.g., “public policy,” “family policy,” “public program,” “intervention”).

In addition to these searches, we consulted experts in the field via email, asking for recommendations on key literature to include in the review. These experts included members of Developmental Scientists for Climate Action (https://www.devsca.org/) and other scholars.

After screening all studies retrieved from the databases, we identified those that met the report’s inclusion criteria. For R1 and R2 (but not for R3, due to the diversity of relevant sources), we used pre-piloted templates to extract key information, including author, country, methodological approaches, main results, and findings from any moderation analyses. For all three reviews, we conducted a qualitative appraisal to define key themes that helped organize and summarize the information from the studies.

HOW CLIMATE

CHANGE MAY IMPACT FAMILIES

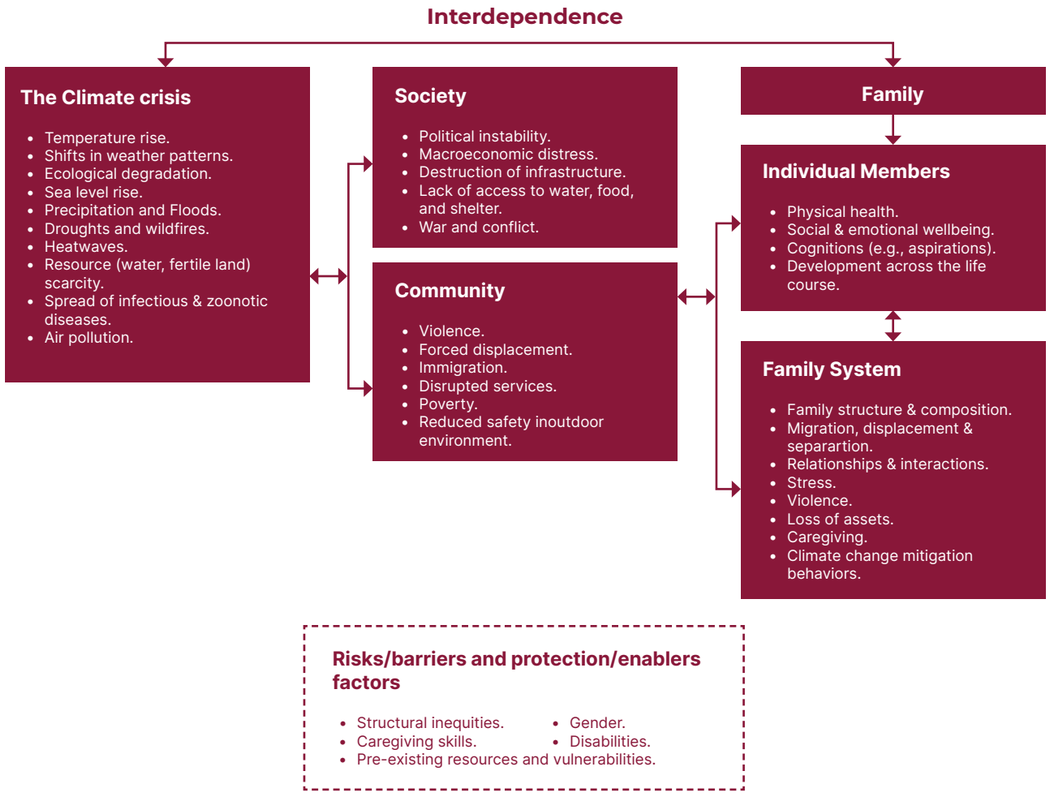
Climate change encompasses a constellation of risks, including temperature rise, shifts in weather patterns, air pollution, more frequent and intense extreme weather events, resource scarcity, and the spread of infectious and zoonotic diseases, among others (Romanello et al., 2022). From a social-ecological perspective (Bronfenbrenner & Morris, 2006), these climate change-related risks can directly and indirectly affect individual family members and the entire family system by impacting societies and communities (Figure 2).

At the same time, there is interdependence between climate change and families, as the well-being, stability, and positive behaviors of individual family members and the family system are critical to mitigating the climate crisis and ensuring a sustainable future for all (Aref, 2022). Below, we describe how and why the climate crisis may impact families (i.e., mechanisms), as well as for whom these impacts may be most pronounced (i.e., moderators).

4

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

Figure 2. Pathways between the Climate Crisis and Family Outcomes



The climate crisis has been (and is expected to continue) producing societal impacts, including political instability, macroeconomic distress, destruction of infrastructure, resource scarcity (e.g., clean water, food, and shelter), and war and conflict (Couttenier & Soubeyran, 2013; Ghimire & Ferreira, 2015; Iyigun et al., 2024; Salehyan & Hendrix, 2014). These societal consequences can also impact communities, including displacement as families are forced to flee their homes due to extreme weather events or economic pressures, increased immigration to climate-resilient settings, disruptions in key social, health, and educational services, increased poverty, and reduced safety in outdoor environments (UNICEF, 2021b).

The economic consequences, lack of access to food and clean water, conflict, displacement, changes in immigration patterns, and disruption of key social services, among others, can affect outcomes for both individual members within the family and the family system as a whole. At the individual level, these contextual risks may increase physical and mental health problems (Trudell et al., 2021) and compromise young children's and adolescents' exposure to adequate learning opportunities, impacting their development across the life course. For the family system, these impacts can put additional strain on families, causing family separation and/or changes in family composition, increasing family stress, interpersonal conflict, and violence, and potentially undermining the quality of relationships (Cuartas et al., 2023).

Importantly, the climate crisis is already serving as a "threat multiplier," amplifying pre-existing structural inequities and impacting more severely traditionally marginalized, oppressed, and underserved settings and families (see "Risks/barriers and protection/enabler factors") (Cuartas et al., 2023). For instance, although high-income countries have contributed the most to global emissions, low-income countries that have contributed the least to the climate crisis have so far faced the worst consequences (Magnan et al., 2021; Romanello et al., 2021). Within communities, low-income families that already face exclusion and lack basic goods and services (e.g., clean water, adequate housing, access to high-quality health services) may find it harder to cope with extreme temperatures and weather events (Hallegatte & Rozenberg, 2017; Pelling & Garschagen, 2019).

Other factors within the family system can also modify the potential impact of climate change on families, including:

Caregiving skills:

Caring for others (children, adults, elders, the sick, individuals living with disabilities) is challenging, and people need resources, knowledge, self-confidence, self-regulation, and other key skills to do so effectively (Bornstein et al., 2017; Cuartas et al., 2022). This is particularly true in crisis situations, when care demands are higher, and people may find it harder to care for others while also trying to cope with the crises themselves. Therefore, in climate hazard situations, some individuals with more knowledge (e.g., on early childhood development) may be better prepared to care for others, whereas others (e.g., those coping with mental health challenges) may require additional support.

Gender:

UN Women has clearly shown that the climate crisis is not "gender neutral;" on the contrary, it is compounding pre-existing gender disparities and hitting women and girls particularly hard (UN Women, 2022). For example, although women tend to have less access to natural resources globally, they are often responsible for securing food, fuel, and water (Tallman et al., 2022). Similarly, girls and women have traditionally been excluded from or have received lower quality healthcare and education. The increased pressures from climate change, coupled with these inequities, can further exclude girls and women from educational and health opportunities, increasing risks to their health and safety as they struggle to access food, water, and other basic resources for themselves and their families.

Disability:

Individuals living with disabilities are often more vulnerable to climate change-related risks than the general population because (1) disability indicators and disaggregated data for developing disability-inclusive policies are often missing, (2) most policies, programs, and climate change adaptation strategies do not consider accessibility issues, (3) critical medical care can be disrupted during climate hazard situations, and (4) people with disabilities often face social and economic disadvantages and exclusion, making it harder for them to prepare for and adapt to climate risks (Izutsu, 2019; US EPA, 2022). Indeed, the World Bank estimates that persons with disabilities experience mortality rates up to four times higher than those without disabilities during natural disasters (Auerbach et al., 2023).

Within this context of structural inequities, historical marginalization, and injustice, it is critical to consider the potential consequences of climate change on families from an equity perspective to inform policy and programmatic efforts that reduce opportunity gaps and help all families thrive.

CLIMATE

Change and Families: Review of the Evidence

The scientific literature on the potential impacts of climate change on families has been growing. There is robust evidence suggesting that climate change is affecting the physical and mental health of individual family members. Some research also indicates that climate change may compromise young children's development. However, there is less, and often lower-quality, evidence on how climate change may affect the family system, including family separation, early marriage, family conflict, violence, and parenting.

5

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

Figure 3. Summary of findings from the literature review

Family separation and migration

More frequent and severe extreme weather events and ecological degradation accelerate forced displacement and family separation. Climate change significantly impacts family geographic location and migration, driving temporary migration and family relocation in response to disasters.

Relationships

Climate change can strain family relationships, but current evidence is mixed and limited. Some studies also show it can increase intergenerational conflict, but also strengthen relationships when older and younger generations communicate and engage in climate action together.

Physical and mental health

Climate change can exacerbate the risk of adverse physical and mental health outcomes for individual family members, including reproductive health problems, respiratory, cardiovascular, and infectious diseases, depression, anxiety, and eco-anxiety.

Child development

There is strong rationale and growing evidence that climate change may impact healthy child development, but there is a need for more research in this area.

Child maltreatment and gender-based violence

Climate change can increase women and children's vulnerability to experiencing violence. The evidence shows increased rates of intimate partner violence after extreme weather events, particularly in agrarian societies. Climate related stress can also increase parental risk of child maltreatment, but there is a need for more research to understand these links.

Parenting

Some studies link climate hazards with reduced parental engagement in play and learning activities and communication, but the evidence-based is limited and confined to specific countries and regions.

Family structure and composition

Some studies link climate change with rising divorce rates, reproductive choices, and incidences of early marriage, but existing research is limited, has significant methodological shortcomings, and these results may be highly context-specific.

5.1 Outcomes for individual family members

5.1.1. Physical health

The evidence indicates that climate change can undermine the physical health of children, adolescents, and adults across the lifespan.

Climate change can affect individual family members' reproductive health and gestational outcomes, weakening the foundations for lifelong health. Two reviews of the literature, comprising more than 100 studies (Canelón & Boland, 2020; Segal & Giudice, 2022), concluded that climate change could impact reproductive health outcomes, including male and female fertility and the timing of menarche. These impacts may be explained by the increased release of toxins into the environment and the decreased availability and intake of protein and nutrients. Regarding gestational outcomes, exposure to temperature extremes has been associated with stillbirth, low birth weight, and shortened gestational age (Kuehn & McCormick, 2017; Weeda et al., 2024). Similarly, a review of 22 studies found that pre-conception exposure to air pollution (including ozone, particulate matter, and carbon monoxide) is linked to a higher risk of birth defects, low birth weight, and preterm birth (Blanc et al., 2023), which are significant predictors of health outcomes later in life (Crump, 2020).

Exposure to climate change-related hazards has been found to impair children's and adolescents' health outcomes. Extensive evidence has linked air pollutants like particulate matter and nitrogen dioxide to problems in the development of the nervous and respiratory systems early in life. A review of about 127 studies showed that exposure to air pollutants predicts respiratory infections, asthma, allergic symptoms, and other diseases related to the respiratory system in children (An et al., 2021). There is mixed evidence on whether physical activity can modify these respiratory effects, as some studies find that physically active children experience worse consequences from air pollution, while other studies suggest that physical activity may be a protective factor (DeFlorio-Barker et al., 2022). In addition, evidence from 26 studies has linked exposure to atypical temperatures to cases of childhood diarrhea (Carlton et al., 2015).

The literature has also documented the potential detrimental effects of climate change on adult health outcomes. For instance, multiple global reviews and meta-analyses have documented that short- and long-term exposure to air pollutants, including ozone and particulate matter, increases the risk of numerous respiratory and cardiovascular diseases (Fajersztajn et al., 2017; Requia et al., 2018; Shah et al., 2013). A scoping review of studies conducted in Africa (Coates et al., 2020) concluded that heatwaves, higher temperatures, and extreme weather events can increase the prevalence of vector-borne diseases, skin problems, and general morbidity and mortality. Finally, a global review of 94 studies (Youssouf et al., 2014) found that wildfires, along with their particulate matter emissions, can increase disease and mortality both in the immediate vicinity and for individuals far from the fire.

Climate Change and Physical Health in the Arabian Gulf and MENA Region

People in the MENA region face serious health risks due to hot, dry conditions and limited water, which worsen diseases like cholera and trachoma (International Trachoma Initiative, 2016; WHO and EMRO, 2009). Climate change is expected to exacerbate these problems by affecting water supply, quality, and sanitation. Studies show that climate change could increase the spread of diseases such as malaria, lymphatic filariasis, and leishmaniasis in the region (Slater & Michael, 2012; Toumi et al., 2012). Dengue fever is also becoming a growing threat, particularly in Saudi Arabia and Yemen, with climate change potentially making areas like the Arabian Peninsula and southern Iran more suitable for the dengue mosquito (Khormi & Kumar, 2014).

Extreme weather events, such as heatwaves, floods, droughts, and landslides, directly cause illness and death, with high summer temperatures making people particularly vulnerable to heat-related health risks (Habib et al., 2010). Heatwaves have been linked to increased emergency hospital visits, and projections indicate a significant rise in the number of hot days in many capital cities (Lelieveld et al., 2013; Novikov et al., 2012). Additionally, air pollution—already a major health issue—is likely to worsen due to increased ozone formation from heat extremes, exacerbating respiratory problems like asthma (Portier et al., 2010).

5.1.2. Social and Emotional Wellbeing and Mental Health

Climate change significantly impacts **mental health and social and emotional well-being** through various exposures, including extreme weather events and rising temperatures. A systematic review of 30 studies highlighted the disproportionate effect of heat, temperature variability, and air pollution on older populations, increasing their morbidity and mortality risks, particularly for cardiovascular and respiratory diseases (Leyva et al., 2017). Floods, in particular, were linked to higher incidences of post-traumatic stress disorder (PTSD), depression, and anxiety. Similarly, an analysis of 35 articles concluded that higher ambient temperatures and heatwaves exacerbate mental health conditions such as bipolar disorder, depression, schizophrenia, substance misuse, and suicide, emphasizing the broad and severe mental health consequences of climate change (Thompson et al., 2018).

Children and young people are also vulnerable to the mental health impacts of climate change. Exposure to extreme weather events negatively affects children's mood and behavior, manifesting as symptoms of PTSD, depression, anxiety, and externalizing (i.e., aggressive) behaviors (Barkin et al., 2021). Additionally, a review of 92 studies identified climate change-related risks as contributing to mental health problems among young people, highlighting the need for targeted interventions to protect this group (Ma et al., 2022). Increasing awareness of climate change itself can lead to anxiety and worry in children (Martin et al., 2022), further compounding the psychological burden on younger generations.

Air pollution, a significant byproduct of climate change, has been consistently linked to adverse mental health outcomes. Multiple meta-analyses have established associations between exposure to pollutants such as PM2.5, PM10, NO2, SO2, and CO and increased risks of depression, anxiety, and suicide (Cao et al., 2024; Liu et al., 2021). The evidence suggests that both long-term and short-term exposures to these pollutants can lead to significant psychological distress, emphasizing the urgent need for policies aimed at reducing air pollution to mitigate these mental health risks.

The psychological impact of climate change extends beyond acute mental health conditions to broader **social and emotional well-being.** Rising temperatures and extreme weather events contribute to psychological distress, interpersonal conflict, and reduced quality of life (Evans, 2019). These events can compromise children's cognitive development and increase interpersonal conflicts due to heightened stress levels. The

existential threat posed by climate change also leads to **chronic anxiety and psychological distress** about the future, affecting individuals' overall sense of well-being and security (Palinkas & Wong, 2020). Thus, addressing climate change is imperative not only for physical health but also for maintaining and improving mental health and social and emotional well-being.

Climate Change, Displacement, and Mental Health in the Arabian Gulf and MENA Region

A study by Marzouk et al. (2022) surveyed 202 internally displaced people in the Hassan Sham, Kabarto, and Qadia camps in Iraq to understand their perceptions of climate change and its impacts on mental health and psychosocial well-being. The research focused on participants' interest in and knowledge of climate change, their perceptions of its causes and effects, and possible mitigation actions. Climate change was found to significantly impact mental health, leading to PTSD, depression, anxiety, and substance abuse, as well as social issues like loss of autonomy and eco-anxiety (Ursano et al., 2017). Seventy-four percent of participants reported that climate change had affected their lives.

The study revealed significant differences between camps: those in Hassan Sham experienced a greater reduction in the ability to concentrate, socialize, and sleep, along with increased irritability during extreme hot weather. In contrast, residents of Duhok camp showed more irritability in extreme cold weather. These findings underscore the urgent need for targeted mental health and psychosocial support programs to address the diverse and severe impacts of climate change on displaced populations in the Arabian Gulf and MENA region.

5.1.3. Child Development

Current and future generations will face unprecedented exposure to extreme weather events and climate-related hazards if action is not taken to limit global warming. A modeling study by Thiery et al. (2021) shows that children born in 2020 could experience up to seven times as many heatwaves and other climate hazards (e.g., droughts, floods, cyclones) in their lives compared to children born in 1960. These exposures will be unequally distributed, with the MENA region and low-income countries likely facing the worst impacts (Thiery et al., 2021). Experiencing these climate hazards early in life can be particularly consequential, as children's developing biological systems are more vulnerable to environmental threats (e.g., heat, pollutants, lack of clean water, zoonotic diseases) and less capable of regulating body temperature compared to adults (Burghardt et al., 2023; Sanson et al., 2022).

Growing empirical evidence indicates that climate change may impact **young children's development,** although this line of research is less developed than the literature on its potential physical and mental health consequences. A literature review of more than 100 studies, most of which were conducted with young children living in high-income countries, showed that air pollution has the potential to undermine early cognitive, motor, executive function, social, and emotional development (Cuartas et al., 2023). Other climate hazards, such as flooding and extreme temperatures, have also been associated with detrimental cognitive, social, and emotional outcomes for young children. Finally, the same review found some evidence that zoonotic diseases, which may worsen amid the climate crisis, can also undermine children's cognitive development.

The adverse impacts of climate change on early childhood development can cascade into negative lifelong individual and societal outcomes. The first years of life are considered a sensitive period of development, when the neural system and foundational skills develop in response to context and experience (Bick & Nelson, 2016; Black et al., 2017). Longitudinal and experimental studies have shown that the development of these early skills predicts lifelong learning, economic, and societal outcomes (Gertler et al., 2014). Therefore, the impacts of climate change on child development can be particularly consequential, perpetuating pre-existing inequities and vulnerabilities, and making it even harder to mitigate the climate crisis and promote preparedness, adaptation, and resilience.

5.2

Outcomes for the family system

5.2.1. Family structure and composition

The impact of climate change on **family dynamics and women's fertility preferences** has been a growing area of research, with studies highlighting diverse outcomes based on different environmental exposures. Huang and Ma (2024) conducted a primary study revealing that increases in greenhouse gas emissions, floods, and extreme temperatures are associated with rising divorce rates at the country level. Their findings suggest that although droughts have a negligible effect on divorce rates, other climate-related stressors significantly strain familial relationships, potentially leading to higher divorce rates. This underscores the broader socio-emotional impacts of climate change, where extreme weather conditions and environmental stressors disrupt the stability and cohesiveness of families.

On the other hand, Somefun et al. (2024) explored **the relationship between drought exposure and women's fertility preferences and contraceptive behaviors** across multiple countries. Their study indicates that drought exposure influences fertility preferences, with some women expressing a desire to either hasten or delay having another child. However, the impact of drought on contraceptive access was minimal and only notable in three countries, suggesting variability in how environmental stressors affect reproductive health decisions. These findings highlight the complex interplay between climate change and reproductive choices, where the direct impacts of drought on fertility preferences and contraceptive use are nuanced and context-specific.

Furthermore, climate change has been associated with the incidence of **early marriage** through various environmental exposures. Exposure to growing-season drought during adolescence is linked to faster transitions into first unions, including both marriage and cohabitation, as well as pregnancy among young women in sub-Saharan Africa (Andriano & Behrman, 2020). Similarly, climatic events such as droughts and floods predict higher incidences of child marriage in South Asia, even after controlling for other factors like education (Dietrich et al., 2022). These findings suggest that environmental stressors from climate change can exacerbate socioeconomic pressures, prompting families to resort to early marriages as a coping mechanism.

Supporting this link, a scoping review revealed that environmental crises, including droughts, floods, heatwaves, and ecological degradation, increase pressures on the existing drivers of child marriage (Pope et al., 2023). The review concluded that environmental breakdowns affect access to resources and education and lead to increased instances of sexual violence and displacement. These factors collectively influence decisions around child marriage, as families often view early marriage as a protective measure against sexual violence and a way to maintain family honor.

Asadullah et al. (2020) also highlighted that in coastal Bangladesh, natural disasters such as tornadoes and floods are associated with higher incidences of child marriage. This indicates that child marriage is often adopted as a strategy to cope with increased vulnerability to natural disasters, underscoring the need to address the socio-environmental determinants of early marriage exacerbated by climate change.

5.2.2. Family separation and migration

More frequent and severe extreme weather events, ecological degradation, and downstream consequences on the availability of soil, clean water, and food can exacerbate forced displacement and family separation. Of the record 100 million forcibly displaced people in 2022, the vast majority (more than 80%) were displaced due to climate hazards (UNHCR, n.d.). Moreover, the UN estimates that about 700 million people may be at risk of displacement due to drought alone (UN, n.d.).

The impact of climate change on **family geographic location and migration** is significant, as demonstrated by various studies focusing on different environmental exposures. An observational study in rural India revealed a positive association between drought occurrences and the likelihood of households having at least one temporary migrant member (Sarkar et al., 2022). The study used binary logistic regression models and highlighted that this probability is higher among socio-economically marginalized groups compared to their better-off counterparts. This finding indicates that droughts drive temporary migration as a coping mechanism, particularly affecting the most vulnerable populations who seek alternative livelihoods to mitigate the adverse impacts of climate-induced agricultural disruptions.

In a different context, Wang et al. (2022) used a quasi-experimental approach to investigate the effects of tornadoes on **family colocation**, measured by the proximity of individuals to their family members. Their study found that following a tornado, there was an 18.9% increase in family colocation (i.e., family members staying in close physical proximity) in the U.S., compared to pre-tornado levels. This suggests that disasters elevate the need for family comfort and social support. Interestingly, partially affected cities exhibited an even stronger increase in family colocation compared to directly hit cities, indicating that the psychological and behavioral impacts of disasters extend beyond the immediate disaster zones. These findings underscore the resilience and adaptive behaviors of families in response to environmental crises, emphasizing the profound influence of climate events on family dynamics and geographic distribution.

5.2.3. Relationships

The evidence generally indicates that the strain climate change places on families can affect the **relationships and interactions within the family system.** Two longitudinal quantitative studies with data on couples collected before and after Hurricane Harvey in the U.S. obtained somewhat contradictory findings. The first study analyzed the trajectory of family conflict before and after the hurricane, finding slower-than-expected declines in marital conflict, indicating a detrimental effect on married couples (Hammett et al., 2022). The second study found that spouses' satisfaction with their relationships increased significantly from before to after the hurricane, but only temporarily, as relationship satisfaction returned to baseline levels over time (Williamson et al., 2021).

Other climate hazards, including extreme temperatures, can interfere with healthy family relationships and interactions. An ethnographic study with 40 pregnant and postpartum women from Burkina Faso (Kadio et al., 2024) found that women perceive extreme heat as interfering with their interpersonal relationships, increasing feelings of isolation, causing family disharmony, and making it difficult for them to care for their newborns. For example, mothers indicated that extreme heat strains their relationship with their partner, affecting intimacy. They also reported that extreme heat impacts their physical (e.g., increased fatigue and skin problems) and psychological well-being (e.g., increased sadness and anxiety), which may partially explain the impacts on their social relationships.

A review of 20 articles (Ayalon et al., 2022) found that climate change has triggered **intergenerational conflict,** though in some cases has **strengthened intergenerational** relationships. Social media content and voters' attitudes show that younger generations tend to believe that older generations do not understand the severity of climate change but still suppress and exclude young people from related policy decisions. Yet, the involvement of older people in the climate change movement and the sharing of experiences with young people foster positive intergenerational relationships. Similarly, a study of 18 grandparents and 14 children affected by a forest fire (Barber, 2014) found that grandparents reported more closeness with their grandchildren and increased interactions (e.g., higher-quality conversations) after the fire. The study also showed that grandparents were a major source of resilience, helping grandchildren reframe the event in a positive way. Likewise, a qualitative study of 19 families showed that although families experienced strain and were busy with multiple demands after a wildfire, the experience also strengthened the family unit and collective coping mechanisms (Pujadas Botey & Kulig, 2013).

5.2.4. Parenting and Child Maltreatment

Climate change may impact **parenting**, with downstream consequences on children's development. For example, one study (Brando & Santos, 2015) examined the impacts of "La Niña" weather patterns (i.e., a season of heavy rains) on young children's development and their parents' behaviors in Colombia. The study used a longitudinal national sample of more than 2,000 children and their parents, with data collected before (2010) and after (2013) "La Niña" (2010–2011). Findings suggest that exposure to heavy rains during early childhood increased social-emotional problems and reduced the cognitive performance of children. Moreover, parents exposed to the rains talked less to their children, but no significant impacts were found on other parenting behaviors such as engaging in play and learning activities.

Climate change may also increase **child maltreatment.** Indeed, prior global crises like the COVID-19 pandemic demonstrate that the strain caused to families with young children can increase parenting stress, conflict, and child maltreatment (Cuartas et al., 2023). A study of 118 children living in an area affected by a hurricane in the U.S. found increases in children's aggressive behavior after the disaster (Terranova et al., 2015). Mediation analyses showed that post-disaster increases in parental hostility may explain some of the observed increases in aggression, suggesting that climate hazards may affect parenting in ways that are detrimental to the family system and young children.

Another study also provided evidence that climate hazards can **undermine parenting,** ultimately affecting children's development and mental health. Maclean et al. (2016) assessed the potential effects of experiencing a natural disaster, including fires and hurricanes, early in life on mental health outcomes in adulthood. Findings revealed associations between exposure to climate hazards during early childhood and adult mental health problems, particularly anxiety disorders. Notably, experiencing climate hazards was also associated with changes in parenting, including increased child abuse (but not child neglect) and emotional support. While increases in both negative (maltreatment) and positive (emotional support) behaviors may seem contradictory, these findings suggest that parents alter their parenting strategies after climate disasters, likely due to the challenges of dealing with stress while also trying to provide support and comfort to their children.

5.2.5. Intimate Partner Violence

The evidence indicates that climate change-related hazards may increase **intimate partner violence.** One cross-cultural study used data from more than 80,000 women aged 15–49 years living in 19 Sub-Saharan African countries to examine

the potential effects of drought on intimate partner violence (Epstein et al., 2020). Women who experienced severe drought had a higher likelihood of reporting a controlling partner and experiencing physical or sexual violence compared to women who did not experience drought. However, another study of 149,000 women from 17 countries failed to replicate these findings, showing little evidence that rainfall shocks affect intimate partner violence (Cools et al., 2020). A later study sought to resolve these inconsistencies using global data and found little evidence for associations between droughts and most forms of intimate partner violence, though some evidence suggested an association between drought and women's partners exhibiting controlling behaviors (Cooper et al., 2021).

Extreme weather events have also been linked to an increased risk of intimate partner violence, particularly in agricultural settings. One study (Munala et al., 2023) analyzed data from Uganda, Zimbabwe, and Mozambique on women's reports of intimate partner violence and weather disasters. By comparing regions affected by extreme weather events to those not affected, the study found that the odds of women reporting intimate partner violence were 25% higher in regions with disasters in Uganda, 38% higher in Zimbabwe, and 91% higher in Mozambique.

Finally, a recent systematic review provided summative evidence that climate change may exacerbate **gender-based violence** (van Daalen et al., 2022). The review included 41 quantitative and qualitative studies on different extreme weather events (e.g., floods, droughts, heatwaves) and gender-based violence (e.g., physical and sexual violence). Most studies showed increases in gender-based violence during or after extreme weather events, often caused by economic and food insecurity, the distress triggered by the events, and increased gender inequality. Therefore, the evidence suggests that climate change can exacerbate the risk of intimate partner and gender-based violence by amplifying risk factors while eroding sources of protection within societies, communities, and families.

5.3

Risks or barriers and protection or enabling factors

The effects of climate change on family outcomes are multifaceted and may be context-specific and unequally distributed, moderated by various factors. At the same time, climate risks may interact with other ecological factors, leading to unique impacts on families. For example, one study found that increased greenhouse gas emissions, floods, and extreme temperatures are associated with higher divorce rates, whereas drought has little predictive effect (Huang & Ma, 2024). This study concluded that higher gender inequality exacerbated the relationship between climate change and divorce rates, suggesting that the socioecological context plays a critical role in how climate stressors impact family dynamics.

Similarly, there is evidence indicating that demographic factors such as age and employment status can partially moderate some of the potential impacts of climate change on families. For instance, the study by Epstein et al. (2020) on the impact of drought on intimate partner violence (IPV) highlighted that the association between drought and IPV was moderated by age and employment status, with adolescent girls and unemployed women being more vulnerable. However, the related study by Cooper et al. (2021) found that the link between drought and partners' controlling behaviors was not moderated by factors such as wealth, employment, household drinking sources, and urbanicity.

Psychosocial stressors could potentially moderate the impact of climate change on families, but the current evidence is inconclusive. For example, Williamson et al. (2021) explored the effects of natural disasters on relationship satisfaction among newlywed couples. Their study on the aftermath of Hurricane Harvey revealed that spouses experienced a temporary boost in relationship satisfaction following the disaster. However, this increase was short-lived, as satisfaction levels declined over time. Interestingly, the level of hurricane exposure, stress, and social support did not predict changes in satisfaction, suggesting that the initial increase in satisfaction might be driven by a temporary surge in solidarity and shared experience. However, further research is needed to fully understand this phenomenon.

In summary, the relationship between climate change and family outcomes is complex and influenced by various moderating factors such as gender inequality, age, employment status, and social support. While current evidence underscores the importance of considering contextual and demographic factors when assessing the impact of climate stressors on family dynamics, further research is needed to better understand protection versus risk factors that may inform policies and interventions aimed at promoting resilience and positive adaptation amid the climate crisis.

LESSONS
from Prior Policies and Interventions

6

6.1
Introduction

As families face climate and environmental crises, policies and interventions (see Box 4 for definitions) are critical to ensuring well-being and promoting resilience. Policies from local to international levels can contribute to climate mitigation and adaptation efforts. Indeed, **action is needed** to support families effectively amid climate change and to respond to the concerns of young people around the world, who report feelings of betrayal and distress regarding the current level of government response to climate change (Hickman et al., 2021; UNICEF, 2021b).

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

Building on the evidence demonstrating the varied impacts of climate change on families (as described in Section 5), this section reviews how specific policies can help to: (1) **prevent** families from experiencing the negative impacts of climate change; (2) **prepare** families to face the impacts of climate change; (3) **support** families as they encounter the impacts of climate change; and (4) **engage** families in policymaking and action to address climate change. Our literature review found very few climate policies and interventions that focus explicitly and exclusively on families, so we include examples that we believe are relevant and have important implications for families, even if families were not the primary focus.

These examples of policies and interventions are taken from around the world, and we provide specific examples from the Arabian Gulf and MENA regions in Box 5. Importantly, this is not an exhaustive list of policies and interventions, but a selection of promising examples to guide further policy work and discussion.

Definitions

Policies	Refer to formal statements of laws, regulations, rules, or procedures made by governments or organizations.
Interventions	Refer to systematic actions or programs designed to change beliefs, behaviors, or health outcomes.
Climate Migitation	Refers to "measures to reduce the amount and speed of future climate change by reducing emissions of greenhouse gases or by increasing their removal from the atmosphere" (U.S. Environmental Protection Agency; European Environment Agency).
Climate Adaptation	"includes actions taken at the individual, local, regional, and national levels to reduce risks from today's changed climate conditions and to prepare for impacts from additional changes projected for the future" (U.S. Global Change Research Program).

6.2

Preventing families from experiencing the negative impacts of climate change

Climate change already threatens the well-being of families around the world, **but the extent to which the crisis escalates depends on current decision-making** (United Nations Framework Convention on Climate Change, 2015). Mitigation efforts can prevent families from experiencing the most negative consequences of climate change by putting communities, countries, and the world on track to meet sustainability targets. These efforts require **world leaders to engage in international collaboration and make substantial financial investments**. The Paris Agreement, a landmark international climate change treaty, affirms that "developed countries should take the lead in providing financial assistance to countries that are less endowed and more vulnerable" (United Nations Framework Convention on Climate Change, 2015). When these investments are made, mitigation policies can benefit families both now and in the future by promoting current health and preventing future harm (Sharifi et al., 2021).

Policies that reduce current and future greenhouse gas emissions have the highest potential to safeguard the well-being of families by slowing, and ideally reversing, the development of human-induced climate change. Critical mitigation policies include investing in new technologies and regulating carbon markets to encourage the transition from fossil fuels to sustainable energy (e.g., solar, wind, and nuclear). Ireland's Climate Action Plan provides an example of a multi-sectoral effort to reduce greenhouse gas emissions by subsidizing sustainable energy, improving public transportation infrastructure, and encouraging low-emissions food production (Government of Ireland, 2021). The United Arab Emirates' Dubai Clean Energy Strategy 2050 also offers an example of how governments can promote the transition to clean energy production while meeting growing energy demands (UAE Government, 2022). Family support policies can also improve environmental sustainability by contributing to family stability. For example, divorced households use more electricity and water per person than married households, with estimates in the United States showing that 42%–61% more resources per person were used after than before marital dissolution (Yu & Liu, 2007). Policies that reduce poverty and unemployment and increase access to affordable housing might reduce divorce rates by providing more supportive environments for families (Aref & Zahran, 2024). Likewise, programs that support healthy communication, conflict resolution, and positive family relationships might also strengthen family stability in ways that contribute to environmental sustainability (Aref & Zahran, 2024).

Creating the social, political, and physical infrastructure needed to prevent generations of families from falling victim to climate change will take time and significant financial resources (UNCTAD, n.d.). For example, China is investing $800 billion

over the next six years to create an energy grid that relies on renewables rather than coal (White & Ding, 2024). While costly, such wide-scale investments can lead to economic growth (Murtaugh, 2024), and investing now in the creation of sustainable systems can prevent millions, if not billions, of families from being affected by climate-related relocation, separation, disease, and death (Institute for Economics and Peace, 2020; Pearce & Parncutt, 2023).

Such investments are not only beneficial for families in the future; **families today can already benefit from mitigation policies.** For example, China's pilot policy implementing an emissions trading system reduced infant mortality and improved infant health by promoting pollution emission reductions and increasing sustainable economic growth (Shao et al., 2022). Policies guiding agricultural production and establishing nutrition guidelines can simultaneously tackle the related health threats of obesity and malnutrition while ensuring that a growing population has access to healthy, sustainable food (Binns et al., 2021). For instance, increasing breastfeeding rates can reduce greenhouse gas emissions while improving infant and adult health (Doan et al., 2020). Systematic reviews also demonstrate the previously underestimated benefits of mitigation policies for child and adolescent health (Picetti et al., 2023), suggesting that such **policies can be cost-effective when accounting for their improvements to public health** (Gao et al., 2018). Active efforts to prevent the future impacts of climate change can thus enhance the well-being of families today while protecting the well-being of future generations.

6.3

Preparing families to face the negative impacts of climate change

With climate change already underway, policies can help families prepare for new, and likely challenging, circumstances, including more frequent and/or severe temperature and weather events and their downstream consequences on societies and communities (IPCC, 2022). By helping individuals, families, and societies respond proactively to climate change, these policies have the potential to **protect families from negative consequences while creating opportunities for increased equity, resilience, and well-being** (UN Committee for Development Policy, 2024). Indeed, many approaches to climate adaptation simultaneously support mitigation and facilitate health co-benefits.

Adaptation policies can prepare families for a changed and changing climate by **securing and enhancing the conditions under which families operate.** For example, improved building codes and regulations can ensure that families' **homes, schools, health facilities, and other critical infrastructure are strong enough** to withstand increasingly extreme weather events (e.g., Climate Resiliency Design Guidelines; NYC Mayor's Office of Climate and Environmental Justice, 2022). Heat action plans, as implemented in Germany and India (Hess et al., 2018; Mücke et al., 2020), and early warning systems, as in Bangladesh (Alam et al., 2023), can also provide families with the short- and long-term information they need to avoid harm. Investments in establishing and maintaining technological systems that facilitate timely warnings and predictions of climate impacts (e.g., the UN's Climwarn project; Digital Twins of the Earth, Stevens et al., 2024) are critical to ensuring that families can prepare for hazardous climate-related events (International Climate Initiative, n.d.). Similarly, supporting families that rely on agriculture by helping them adopt new technologies and navigate extreme weather events and heightened climate variability (e.g., information services and safety nets) can be beneficial not only for farmers, but also to ensure communities' and societies' food security (Vermeulen et al., 2012).

In addition, **psychosocial and educational interventions** (e.g., at school or with pediatricians) can help families understand the risks of climate change and how to prepare for climate-induced disasters (e.g., creating emergency action plans; Early Years Climate Action Task Force, 2023; Ahdoot et al., 2024). Policies can also increase families' financial stability and future well-being by establishing (re)education programs that prepare individuals for changing industries and new economic opportunities (World Food Programme, n.d.). By using tools like CalEnviroScreen (which tracks census data, including exposure to environmental risks; August et al., 2021) and following just transition guidelines (which seek to ensure financial and social security for all those affected by the transition to a green economy; International Labour Organization, 2023), policymakers can work to protect families from negative consequences while using these investments to redress inequities and improve opportunities for vulnerable families.

6.4

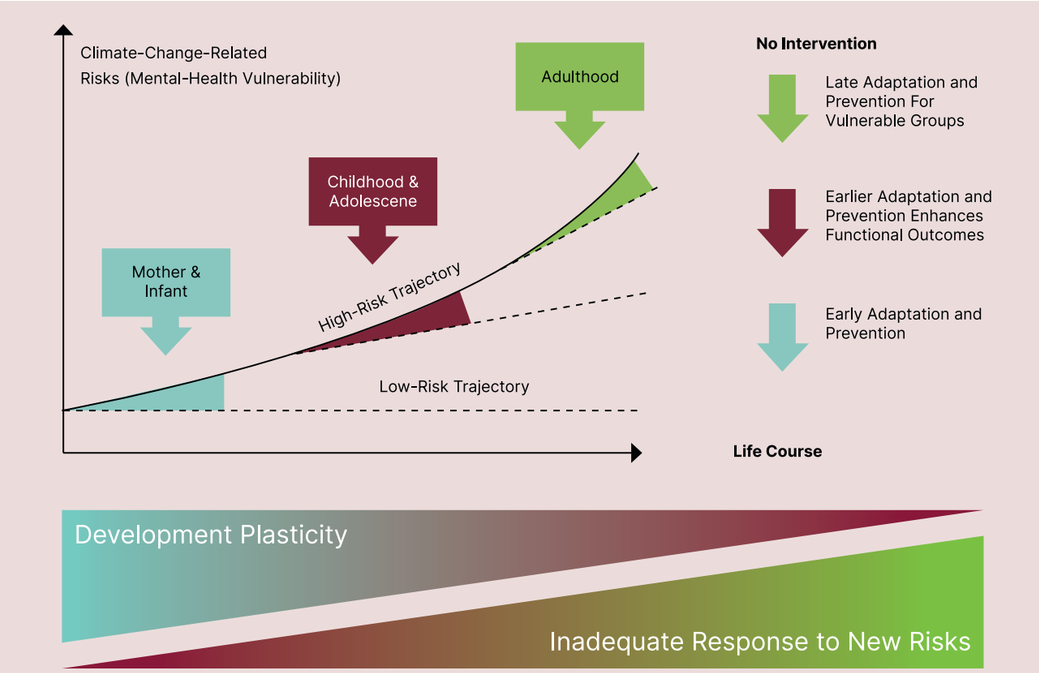
Supporting families as they face the negative impacts of climate change

Targeted policies and interventions are crucial to **supporting families as they face the consequences of climate change.** Efforts to support adaptation can be enacted across multiple levels, including individual, local, regional, and national scales. This section outlines key issues central to climate adaptation and presents possible strategies to promote climate resilience and support the long-term well-being of children and families.

Mental health prevention and intervention programs can mitigate the impacts of climate change on child and family mental health. Acute climate-related events, such as extreme weather disasters, can increase the risk of PTSD and other stress-related mental health disorders (see section 5.1.2). Thus, timely, evidence-based ecological interventions for families and communities following disasters are of critical importance (Crandon et al., 2022). One example is the **Skills for Life Adjustment and Resilience (SOLAR)** program, a flexible and adaptable intervention that has been shown to reduce distress and adjustment problems following disasters (Gibson et al., 2021; O'Donnell et al., 2020). More chronic concerns, such as climate anxiety, can similarly be addressed through psychosocial interventions, although very few have been developed and tested (Baudon & Jachens, 2021).

While there are not yet evidence-based interventions specific to climate anxiety, many well-established interventions promote positive coping in the face of stress and trauma, which could be adapted and tailored to support adaptation to climate change (Mah et al., 2020). Intervention and prevention efforts will be most effective when implemented earlier in the life course, when there is greater developmental plasticity and climate-related risks have not yet accumulated (Vergunst & Berry, 2021; see Figure 4).

Figure 4. Responding to climate-related risks across the lifecourse (open-access figure reprinted from Vergunst & Berry, 2022)



Cash transfer programs can also contribute to reducing mental health challenges while alleviating economic pressures that families may face due to climate change. Governments have increasingly used conditional and unconditional cash transfer programs due to rigorous evidence on their effectiveness in improving livelihoods, reducing mental health challenges, increasing access to healthcare services, and improving educational outcomes, among others (Baird et al., 2014; Fuller et al., 2022; Kabeer & Waddington, 2015). These programs can support families and ensure preparedness and adaptation by helping low-income and migrant families meet basic needs and respond to climate risks and shocks. They can also serve as safety nets or facilitate saving for vulnerable households, allowing them to invest in innovations (e.g., climate-resilient infrastructure) that increase their adaptive and response capacity (Wood, 2011). Conditional cash transfers may even help families engage in behaviors that mitigate climate change, for example, by incentivizing the consumption of environmentally friendly products or modes of transport (Pega et al., 2015).

Parenting programs are promising strategies to promote positive family relationships and prevent violence amid the climate crisis. These programs are social and behavioral interventions aimed at supporting the development of key parenting capabilities, including knowledge, attitudes, and positive behaviors and practices to promote positive relationships, caregivers' mental health and well-being, and children's development (Doyle et al., 2023; Jeong et al., 2021). These programs can also include gender-transformative components, which have been shown to be effective in addressing harmful gender norms, improving couple relationships, and preventing intimate partner violence (Bacchus et al., 2024).

Although there is no evidence on the effectiveness of parenting programs in climate hazard settings specifically, extensive global evidence

demonstrates that parenting programs have been broadly effective in reducing detrimental parenting behaviors, including those that could be impacted by the climate crisis (see section 5.2). Indeed, these programs have been effective in promoting positive child development, parent-child relationships and interactions, reducing violence against children, and benefiting adult caregivers by mitigating mental health problems and intimate partner violence (Backhaus et al., 2023; Jeong et al., 2021; Jervis et al., 2023). Parenting programs can be implemented through multiple platforms, including home visits, group meetings in community settings, educational institutions, healthcare settings, and online or hybrid delivery using SMS, WhatsApp, and chatbots (Backhaus et al., 2023; Doyle et al., 2023; Jeong et al., 2021). Much more research is needed to understand how these digital and hybrid approaches can be used in climate hazard settings (Cuartas et al., 2022).

There is also a need for more research on how to include climate-related content in parenting programs, such as promoting parent-child communication about the environment and coping with eco-anxiety. One example of moving in this direction is the guidance and toolkits published by UNICEF and the Australian Psychological Society for parents and caregivers on how to talk to children about climate change, which could be incorporated into existing or novel environmentally conscious parenting programs.

Scalability is a key challenge in the successful implementation of these types of interventions. Mental health, parenting, and physical health programs often require more financial resources and trained providers than may be available. Brief, low-intensity interventions can be implemented more widely and efficiently. For example, the SOLAR intervention requires only five sessions and can be effectively administered by community members and frontline healthcare workers rather than relying exclusively on extensively trained providers (Gibson et al., 2021; O'Donnell et al., 2020). Furthermore, novel digital technologies (see DIFI report on Families and Technology), like chatbots, can also be leveraged to provide remote mental health and parenting support as complements to in-person services (i.e., hybrid delivery) or as alternatives when in-person support is unfeasible. School-based interventions may also be fruitful avenues for supporting youth on a larger scale (Brown et al., 2023).

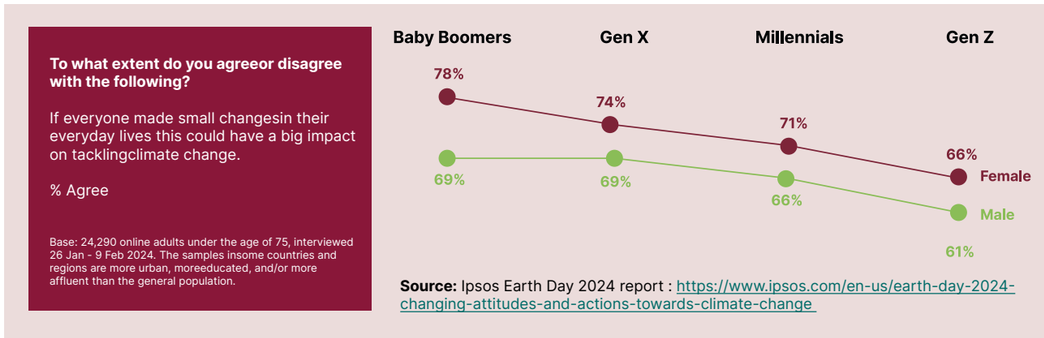
6.5

Engaging families in addressing climate change

Families can be key actors in preventing and responding to climate change. Policies and interventions can empower individuals and families to make informed decisions that work in their short- and long-term interests by ensuring access to information and creating markets where sustainable options are available and accessible. Moreover, including individuals and families, especially from traditionally underrepresented and disadvantaged communities, in the process of developing policies and interventions can enhance their uptake, relevance, and capacity to create fairer and more equitable societies.

Creating awareness among families and individuals about the causes and consequences of climate change can lead to more climate-friendly behavior at the individual, family, and community levels. For example, educational and information programs, participatory modeling, climate services, and indigenous and local knowledge can heighten risk awareness and motivate behavior change in families (IPCC, 2022). However, **many families and individuals still lack the information they need to take action.** For instance, research in Egypt among urban and rural communities shows that many families are proactively responding to climate change by insulating their homes and purchasing cooling appliances. Still, 50% of those who had not yet taken action were unable to do so due to a lack of information (Froehlich & Al-Saidi, 2018). Providing environmental education to youth can also increase environmental beliefs, attitudes, and behavior (van de Wetering et al., 2022). Accordingly, countries such as Sweden, Cambodia, and the UAE have **integrated environmental education into their national curricula** (MECCE, n.d.; Ministry of Education - UAE, 2021; Sargren et al., 2019). Engaging youth appears especially urgent given recent evidence that, compared to older generations, youth exhibit lower levels of environmental efficacy (i.e., the belief that individual and collective action can reduce the negative impacts of climate change), which is a critical motivator of pro-environmental engagement (see Figure 5).

Figure 5. Gender and generational differences in environmental efficacy



Importantly, for these behavioral and educational strategies to be effective, governments and policies must **address structural and economic factors** that drive market dynamics and choice architectures. For example, marketing campaigns can influence families' decision-making through deception and taking advantage of cognitive biases (e.g., greenwashing; Netto et al., 2020), making producers and companies ultimately responsible for downstream impacts on the environment and population health. Policies that prevent such deception (e.g., the European Union's marking regulations; European Parliament, 2024) and that make sustainable options more widely available on the market (e.g., building green affordable housing; Jeddi Yeganeh et al., 2019) can enable individuals and families to act on their environmental knowledge and concern.

Additionally, **bringing individuals and families into dialogue to create a multi-stakeholder process for developing climate policies and interventions** is preferable to top-down decision-making (Larson et al., 2022). Indeed, "climate resilient development processes link scientific, Indigenous, local, practitioner, and other forms of knowledge, and are more effective and sustainable because they are locally appropriate and lead to more legitimate, relevant, and effective actions" (IPCC, 2022). For example, research in Egypt found that urban women sought networks to learn how to adapt to climate change, while men requested financial support and tools for their workshops, and rural dwellers expressed demand for capacity-building training to become better farmers and ensure better harvests. These findings demonstrate **that community engagement can provide policymakers with localized insight into what families actually need** (Froehlich & Al-Saidi, 2018).

Furthermore, **an inclusive and participatory policy process can help address issues of climate injustice,** in which the most underrepresented and vulnerable segments of society (e.g., female-headed households, Indigenous people, and children) disproportionately bear the brunt of climate change despite having contributed to it minimally. For example, Australia has taken steps to make Indigenous communities partners in clean energy projects (e.g., the 2023 Aboriginal Clean Energy Partnership, a 75% Indigenous-owned green hydrogen venture that also increases access to capital; Young et al., 2024). Engaging vulnerable and minoritized communities in developing and adopting policy solutions can reveal opportunities to address both climate change and create fairer and more equitable societies.

Example Policies and Interventions in the Arabian Gulf and the MENA region

Preventing families from experiencing the negative impacts of climate change

Several countries in the Arabian Gulf and MENA region, including the UAE, Saudi Arabia, Qatar, Oman, Bahrain, and Kuwait, have adopted wide-scale policies to reduce greenhouse gas emissions. For example, Oman's Vision 2040 and National Energy Strategy aim to scale up renewables and improve energy efficiency (Ministry of Energy and Minerals - Oman, 2022). However, many countries in this region continue to produce and sell oil and natural gas, leading to poor rankings in frameworks used to evaluate national efforts to mitigate and adapt to climate change (e.g., Climate Change Performance Index, 2024). Morocco stands out as a leader in promoting clean energy transitions, notably through the development of the Ouarzazate Solar Power Station.

Preparing families to face the negative impacts of climate change

Recognizing that climate change is set to have dramatic and devastating consequences for people in the Arabian Gulf and MENA regions (Telecommunications and Digital Government Regulatory Authority, 2024), many countries have adopted policies aimed at protecting and preparing families. For example, the UAE's National Climate Change Plan supports the development of resilient infrastructure and advanced water management and has integrated climate change education into school curricula for all youth (Telecommunications and Digital Government Regulatory Authority, 2024). Under Saudi Vision 2030, Saudi Arabia also promotes technical and vocational training in energy-related programs to help develop a workforce for a green economy that responds to the demands of a changing climate (Telecommunications and Digital Government Regulatory Authority, 2024).

Supporting families as they face the negative impacts of climate change

Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE have implemented the **Mother Child Education Program (MCEP),** a home visiting parenting program for families living in poverty (Qatar Foundation, 2007). In the home visits, facilitators help caregivers learn how to stimulate their young children and use learning materials at home. Evaluations indicate the program has been effective in supporting families, positively impacting parenting and child development (Hadeed, 2011) (see Ben Brik et al., 2018 for additional discussion on policies and programs to support child development and well-being in the Gulf countries).). However, there is not yet evidence on the effectiveness of the MCEP in climate hazard situations, and whether including specific components on communication about climate change and dealing with eco-anxiety would be beneficial.

Engaging families in addressing climate change

Countries in the Arabian Gulf and MENA region are trying to engage families through communication campaigns, educational programs, and inclusive approaches to policy development. For example, the UAE government launched the **"Our Generation" initiative** to raise awareness about climate change among students by developing a school curriculum that encourages students to reduce their carbon footprint (UAE Government, 2024). In addition, the National Climate Change Policy of the Hashemite Kingdom of Jordan 2022–2050 includes a **Stakeholder Engagement Plan (SEP)** to ensure that all stakeholders, including women, children, and vulnerable groups, are included in dialogues on climate change-related policy formulation (Ministry of the Environment & United Nations Development Programme, 2022). The government of Iraq and the International Rescue Committee (IRC) have also launched the **Climate Resilience and Environmental Justice Initiative** in southern Iraq, which aims to engage women and vulnerable groups by setting up committees to identify the needs of communities affected by climate change (International Rescue Committee, 2024).

CONCLUSION
and Recommendations

7

In this report, we have:

1. **Delineated** the varied ways in which climate change can impact families, and
2. **Provided** examples of how policies and interventions can help prevent, prepare, support, and engage families in response to these effects of climate change.

Based on this body of scientific work, we offer a selection of recommendations for policymakers and practitioners that hold particular promise for promoting the well-being of children and families amidst a rapidly changing climate. Below, we provide a brief description of each recommendation and refer readers to prior sections for specific examples and greater detail.

7.1. Recommendations for Policy and Practice

7.1.1. To prevent families from experiencing the negative impacts of climate change

Recommendation 1: Establish economy-wide policies to curb greenhouse gas emissions. For example, create a decarbonization plan with sector-specific, measurable targets and implement family support policies that increase family stability, as stable families consume fewer resources than unstable ones (see section 6.2).

Recommendation 2: Promote market conditions that facilitate individuals' and families' adoption of low-carbon lifestyles. For example, make sustainable modes of transportation (e.g., subways, trains, bikes) accessible, affordable, and desirable (see section 6.2).

Recommendation 3: Engage in international, collaborative efforts to reduce greenhouse gas emissions. For example, wealthier developed countries should provide financial assistance to more vulnerable countries to support global mitigation initiatives (see section 6.2).

7.1.2. To prepare families to face the negative impacts of climate change

Recommendation 1: Build resilient infrastructure and societal institutions that are equipped to provide essential services in the context of a more extreme, changed climate. For example, construct resilient and energy-efficient buildings (e.g., housing, schools, hospitals) that both reduce climate impacts and can keep families safe in the face of extreme weather events (see section 6.3).

Recommendation 2: Equip individuals and families with the technology and skills necessary to maintain a reliable livelihood while contributing to societal needs. For example, provide farmers with information and education services to navigate heightened climate variability, as well as safety nets to cope with productivity shocks (see section 6.3).

Recommendation 3: Invest in climate services that provide families with access to early warning systems and reliable climate and weather forecasting. For example, ensure the establishment and maintenance of meteorological technologies and communication systems that convey information about impending climate-related hazards in an accurate and timely manner (see section 6.3).

7.1.3. To support families as they face the negative impacts of climate change

Recommendation 1: Enable access to resources that promote physical and mental health and address the potential damage inflicted by climate change. For example, expand training opportunities for community members and frontline healthcare workers to provide physical and mental health support following climate-related disasters (see section 6.4).

Recommendation 2: Implement parenting programs at scale, prioritizing at-risk families, that integrate climate-related content. For example, expand access to in-person or digital parenting programs that reduce detrimental parenting behaviors and equip parents with the skills they need to face the challenges of a changing climate (see section 6.4).

Recommendation 3: Alleviate economic pressures for families through cash transfer programs. For example, provide unconditional payments to families experiencing climate-related challenges to help meet their basic needs (see section 6.4).

7.1.4. To engage families in addressing climate change

Recommendation 1: Raise youth and families' knowledge of climate change and build their sense of environmental efficacy, so they are aware of the need for action and their potential to contribute to mitigation and adaptation efforts. For example, integrate environmental education into national school curricula (see section 6.5).

Recommendation 2: Make sustainable lifestyles affordable, accessible, and desirable for individuals throughout society. For example, regulate markets such that climate impacts are reflected in the costs of goods, and prohibit dishonest marketing strategies (e.g., greenwashing) that can mislead family purchasing and decision-making (see section 6.5).

Recommendation 3: Organize opportunities for youth and families—especially in at-risk communities—to express their concerns, ideas, and priorities regarding climate mitigation and adaptation policies. For example, provide forums for communities to communicate their climate-related needs to policymakers to ensure that local priorities are addressed (see section 6.5).

7.2. Future Directions for Research

The climate crisis is unprecedented and requires urgent action and novel policies and interventions to achieve transformational impacts. To do so, bold research agendas that take risks and explore innovative solutions are needed.

Our literature review showed that there is extensive literature and robust evidence linking climate change to negative physical and mental health outcomes for individual family members, whereas there is less evidence and mixed findings regarding child development outcomes. For outcomes related to the family system as a whole, the evidence appears to be scarce, mixed, and limited in terms of internal (i.e., causality) and external validity (i.e., generalizability). Most related research has relied on cross-sectional and correlational designs, making it difficult to understand the causal effect of climate change, beyond other contextual factors, on family outcomes and the potential mechanisms (or mediators) underlying these effects. Furthermore, prior research has focused on select countries, settings, and populations, making it challenging to determine whether the impacts of climate change on families are universal or context-specific, and for whom these impacts may be more pronounced. Finally, there are few longitudinal studies, so little is known about the short-, medium-, and long-term effects of climate change on families.

Future research should **aim to strengthen knowledge about the causal links between climate change and family outcomes over time, examine the mechanisms underlying these impacts (i.e., mediators), assess variation in these effects (i.e., moderators), and conduct studies in multiple settings, countries, and diverse populations to assess the generalizability of findings.** One promising approach is to combine satellite data on climate change (e.g., NASA's data) with global, representative household surveys that include geographic location data and family outcomes (e.g., the **Multiple Indicators Cluster Survey** and the **Demographic and Health Surveys**). These global datasets can enable researchers to leverage temporal and spatial variation in climate hazards relative to household locations, using quasi-experimental approaches with samples from multiple countries to strengthen internal and external validity. Researchers can also employ country-specific longitudinal data to assess issues of timing and persistence in the effects of climate change on family outcomes.

Additionally, there is a need for **extensive ethnographic and qualitative work to understand the lived experiences of families in climate hazard settings,** as well as their needs and perceptions amid the growing climate crisis. Qualitative and mixed-methods approaches can help us understand the mechanisms linking climate change to individual and family-level outcomes. This research is also critical for understanding how families are preparing for, coping with, and adapting to the climate crisis, which is essential for developing policies and programs that are appropriate, relevant, feasible, sustainable, and effective in supporting families in this context.

In terms of policies and interventions, researchers should examine **the extent to which existing evidence-based policies and programs (e.g., parenting programs) promote preparedness, adaptation, and resilience in the context of cli-**

mate change, using experimental and quasi-experimental approaches. A bold research agenda should adopt systemic and ecological perspectives (Bronfenbrenner & Morris, 2006) to embrace the complexity of family and human development in context and assess how existing policies and interventions at different levels (e.g., educational settings) may have "spillover" effects on the family system (e.g., family relationships), as well as how strategies in different settings (e.g., community or healthcare settings) can complement each other to promote resilience more effectively.

Researchers can also **support the design and implementation of new policies and programs,** working towards maximizing their potential benefits, sustainability, and scalability. For example, systematic reviews, meta-analyses, multifactorial designs, and other approaches can help identify the core components (i.e., contents and delivery approaches) that make interventions most effective in climate hazard settings. By distilling these components and making them available, researchers can support the expansion of **low-cost, open-access solutions** that policymakers and practitioners can adopt and adapt to support families in specific contexts.

A transformative research agenda in the context of climate change should prioritize **equity issues,** examining how to engage and positively impact migrant and conflict-affected populations, families in low- and middle-income countries, individuals with disabilities, and racial, ethnic, and gender groups that are discriminated against, oppressed, and excluded from research and policy discussions. Some initial critical steps include addressing sampling biases in research projects (e.g., Draper et al., 2022), improving measurement approaches to reliably characterize the needs, perspectives, dynamics, and outcomes of diverse families, and encouraging journal editors to dedicate resources and special issues to research involving traditionally underrepresented participants.

Researchers can maximize the impact and reach of their work by engaging in **research-policy-practice partnerships.** These partnerships can benefit the design and adaptation of policies and interventions, ensuring culturally appropriate, relevant, and sustainable solutions for families. There is also a need for more implementation science research to understand how to implement policies and interventions at scale, ensuring cost-effectiveness. Research-policy-practice partnerships can support these efforts by including perspectives from different actors (policymakers, practitioners, communities, families) in the policy cycle.

Funding agencies can play a critical role in promoting fresh thinking and innovation by supporting novel ideas and research projects conducted in climate hazard settings. Given the multifaceted nature of climate change, multidisciplinary teams are well-positioned to address knowledge gaps. Funding the establishment and strengthening of research-policy-practice partnerships also offers promise for developing transformational research agendas in the context of climate change.

REFERENCES

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

,Ahdoot, S., Baum, C. R., Bono Cataletto, M., Hogan, P., Wu, C. B., Bernstein, A., Bole, A., Balk, S. J., Byron, L. G., Huerta-Montañez, G. M., Landrigan, P. J., Marcus, S. M., Nerlinger, A. L., Patel, L. H., Philipsborn, R., Woolf, A. D., Zajac, L., Gray, K. A., Briskin, J., & DeNicola, N. G. (2024). Climate change and children's health: Building a healthy future for every child. *Pediatrics, 153*(3). https://doi.org/10.1542/peds.2023-065504

Alaaldin, R. (2022, March 14). Climate change may devastate the Middle East. Here's how governments should tackle it. *Brookings*. https://www.brookings.edu/articles/climate-change-may-devastate-the-middle-east-heres-how-governments-should-tackle-it/

Alam, E., Collins, A. E., Islam, A. R. M. T., Paul, A., & Islam, M. K. (2023). Change in cyclone disaster vulnerability and response in coastal Bangladesh. *Disasters, 48*(2). https://doi.org/10.1111/disa.12608

An, F., Liu, J., Lu, W., & Jareemit, D. (2021). A review of the effect of traffic-related air pollution around schools on student health and its mitigation. *Journal of Transport & Health, 23,* 101249. https://doi.org/10.1016/j.jth.2021.101249

Andriano, L., & Behrman, J. (2020). The effects of growing-season drought on young women's life course transitions in a sub-Saharan context. *Population Studies, 73*(3), 1–20. https://doi.org/10.1080/00324728.2020.1819551

Aref, A. (2022). Family stability and environmental sustainability: An interdependent nexus. In E. Heggy, V. Bermudez, & M. Vermeersch (Eds.), *Sustainable Energy-Water-Environment Nexus in Deserts - Proceedings of the 1st International Conference on Sustainable Energy-Water-Environment Nexus in Desert Climates* (pp. 669–674). Springer, Cham; Fondazione C.I.M.E., Florence. https://doi.org/10.1007/978-3-030-76081-6_84

Aref, A., & Zahran, S. (2024). The interdependence of family and environment: A multidisciplinary approach. *United Nations Department of Economic and Social Affairs.*

Asadullah, M. N., Islam, K. M. M., & Wahhaj, Z. (2020). Child marriage, climate vulnerability, and natural disasters in coastal Bangladesh. *Journal of Biosocial Science, 53(6),* 1–20. https://doi.org/10.1017/s0021932020000644

ASDA'A BCW. (n.d.). *ASDA'A BCW Arab Youth Survey Middle East*. https://arabyouthsurvey.com/en/

Auerbach, A., Sacks, A., & Yusupov, D. (2023). Climate change highlights the need for disability-inclusive adaptation. *World Bank*. https://blogs.worldbank.org/en/climatechange/climate-change-highlights-need-disability-inclusive-adaptation

August, L., Bangia, K., Plummer, L., Prasad, S., Ranjbar, K., Slocombe, A., Wieland, W., Cogliano, V., Faust, J., Hirsch, A., Zeise, L., Garcia, Y., Reyes, D., Henderson, J., Galaviz, V., Yip, C., Hwang, K., Bonnell, J., Osborne, D., & Bodenreider, C. (2021). CalEnviroScreen 4.0. https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf

Ayalon, L., Roy, S., Aloni, O., & Keating, N. (2022). A scoping review of research on older people and intergenerational relations in the context of climate change. *The Gerontologist,* 63(5). https://doi.org/10.1093/geront/gnac028

Bacchus, L. J., Colombini, M., Pearson, I., Gevers, A., Stöckl, H., & Guedes, A. C. (2024). Interventions that prevent or respond to intimate partner violence against women and violence against children: A systematic review. *The Lancet Public Health, 9*(5), e326–e338. https://doi.org/10.1016/s2468-2667(24)00048-3

Backhaus, S., Leijten, P., Jochim, J., Melendez-Torres, G. J., & Gardner, F. (2023). Effects over time of parenting interventions to reduce physical and emotional violence against children: A systematic review and meta-analysis. *EClinicalMedicine, 60,* 102003. https://doi.org/10.1016/j.eclinm.2023.102003

Baird, S., Ferreira, F. H. G., Özler, B., & Woolcock, M. (2014). Conditional, unconditional, and everything in between: A systematic review of the effects of cash transfer programs on schooling outcomes. *Journal of Development Effectiveness, 6*(1), 1–43. https://doi.org/10.1080/19439342.2014.890362

Barber, C. E. (2014). Forest fire as a shared intergenerational experience: Perceived short-term impacts on the grandparent-grandchild relationship. *Journal of Intergenerational Relationships, 12*(2), 128–140. https://doi.org/10.1080/15350770.2014.901114

Barkin, J. L., Buoli, M., Curry, C. L., Esenwein, S. A., Upadhyay, S., Kearney, M. B., & Mach, K. (2021). Effects of extreme weather events on child mood and behavior. *Developmental Medicine & Child Neurology, 63*(7), 785–790. https://doi.org/10.1111/dmcn.14856

Baudon, P., & Jachens, L. (2021). A scoping review of interventions for the treatment of eco-anxiety. *International Journal of Environmental Research and Public Health, 18*(18), 9636. https://doi.org/10.3390/ijerph18189636

Bechard, E., Silverstein, J., & Walke, J. (2023). What are the impacts of concern about climate change on the emotional dimensions of parents' mental health? A literature review. *SSRN*.

Ben Brik, A., Lansford, J. E., & Al Fara, H. (2018). Policies and programs to promote child well-being in the Gulf countries. *Early Child Development and Care, 190*(12), 1–14. https://doi.org/10.1080/03004430.2018.1552949

Bick, J., & Nelson, C. A. (2016). Early experience and brain development. *Wiley Interdisciplinary Reviews: Cognitive Science, 8*(1-2), e1387. https://doi.org/10.1002/wcs.1387

Binns, C. W., Lee, M. K., Maycock, B., Torheim, L. E., Nanishi, K., & Duong, D. T. T. (2021). Climate change, food supply, and dietary guidelines. *Annual Review of Public Health, 42*, 233-255. https://doi.org/10.1146/annurev-publhealth-090419-102103

Black, M. M., Walker, S. P., Fernald, L. C. H., Andersen, C. T., DiGirolamo, A. M., Lu, C., McCoy, D. C., Fink, G., Shawar, Y. R., Shiffman, J., Devercelli, A. E., Wodon, Q. T., Vargas-Barón, E., & Grantham-McGregor, S. (2017). Early childhood development coming of age: Science through the life course. *The Lancet, 389*(10064), 77–90. https://doi.org/10.1016/s0140-6736(16)31389-7

Blanc, N., Liao, J., Gilliland, F. D., Zhang, J., Berhane, K., Huang, G., Yan, W., & Chen, Z. (2023). A systematic review of evidence for maternal preconception exposure to outdoor air pollution on children's health. *Environmental Pollution, 318,* 120850. https://doi.org/10.1016/j.envpol.2022.120850

Bornstein, M. H., Putnick, D. L., & Suwalsky, J. T. D. (2017). Parenting cognitions → parenting practices → child adjustment? The standard model. *Development and Psychopathology, 30*(2), 399–416. https://doi.org/10.1017/s0954579417000931

Brando, J. F., & Santos, R. J. (2015). La Niña y los Niños: Effects of an unexpected winter on early life human capital and family responses. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2631736

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (6th ed., pp. 793–828). John Wiley & Sons, Inc.

Brown, A., Collado, S., Evans, G. W., & Loebach, J. E. (2023). Designing learning environments for promoting young people's constructive coping with climate change. *Advances in Child Development and Behavior, 65*, 169–198. https://doi.org/10.1016/bs.acdb.2023.05.005

Burghardt, L. C., Harnett, N., Kendall-Taylor, N., Lee, A. G., Nadeau, K., Payne-Sturges, D., & Slopen, N. (2023). Extreme heat affects early childhood development and health. *Early Childhood Scientific Council on Equity and the Environment*. https://harvardcenter.wpenginepowered.com/wp-content/uploads/2023/03/ECSCEE-Heat-Paper.pdf

Canelón, S. P., & Boland, M. R. (2020). A systematic literature review of factors affecting the timing of menarche: The potential for climate change to impact women's health. *International Journal of Environmental Research and Public Health, 17*(5), 1703. https://doi.org/10.3390/ijerph17051703

Cao, T., Tian, M., Hu, H. H., Yu, Q., You, J., Yang, Y., An, Z., Song, J., Zhang, G., Wu, W., & Wu, H. (2023). The relationship between air pollution and depression and anxiety disorders: A systematic evaluation and meta-analysis of a cohort-based study. *International Journal of Social Psychiatry, 70*(2). https://doi.org/10.1177/00207640231197941

Carlton, E. J., Woster, A. P., DeWitt, P., Goldstein, R. S., & Levy, K. (2015). A systematic review and meta-analysis of ambient temperature and diarrheal diseases. *International Journal of Epidemiology, 45*(1), 117–130. https://doi.org/10.1093/ije/dyv296

CCPI. (2024). Climate Change Performance Index. *Climate Change Performance Index*. https://ccpi.org/

Climate Action Tracker. (2022, November). Temperatures | Climate Action Tracker. *Climateactiontracker.org*. https://climateactiontracker.org/global/temperatures/

Coates, S. J., Enbiale, W., Davis, M. D. P., & Andersen, L. K. (2020). The effects of climate change on human health in Africa: A dermatologic perspective: A report from the International Society of Dermatology Climate Change Committee. *International Journal of Dermatology, 59*(3), 265–278. https://doi.org/10.1111/ijd.14759

Cools, S., Flatø, M., & Kotsadam, A. (2020). Rainfall shocks and intimate partner violence in sub-Saharan Africa. *Journal of Peace Research, 57*(3), 377-390. https://doi.org/10.1177/0022343319880252

Cooper, M., Sandler, A., Vitellozzi, S., Lee, Y., Seymour, G., Haile, B., & Azzari, C. (2021). Re-examining the effects of drought on intimate-partner violence. *PLOS One, 16*(7), e0254346. https://doi.org/10.1371/journal.pone.0254346

Couttenier, M., & Soubeyran, R. (2013). Drought and civil war in Sub-Saharan Africa. *The Economic Journal, 124*(575), 201–244. https://doi.org/10.1111/ecoj.12042

Crandon, T. J., Dey, C., Scott, J. G., Thomas, H. J., Ali, S., & Charlson, F. J. (2022). The clinical implications of climate change for mental health. *Nature Human Behaviour, 6*(11), 1474–1481. https://doi.org/10.1038/s41562-022-01477-6

Crump, C. (2020). An overview of adult health outcomes after preterm birth. *Early Human Development, 150*, 105187. https://doi.org/10.1016/j.earlhumdev.2020.105187

Cuartas, J., Baker-Henningham, H., Cepeda, A., & Rey-Guerra, C. (2022). The Apapacho Violence Prevention Parenting Program: Conceptual foundations and pathways to scale. *International Journal of Environmental Research and Public Health, 19*(14), 8582. https://doi.org/10.3390/ijerph19148582

Cuartas, J., Bhatia, A., Carter, D., Cluver, L., Coll, C., Donger, E., Draper, C. E., Gardner, F., Herbert, B., Kelly, O., Lachman, J., M'jid, N. M., & Seidel, F. (2023). Climate change is a threat multiplier for violence against children. *Child Abuse & Neglect, 106430*. https://doi.org/10.1016/j.chiabu.2023.106430

Cuartas, J., Bhatia, A., Carter, D., Cluver, L., Coll, C., Draper, C. E., Donger, E., Gardner, F., Grueso, H., Herbert, B., Lachman, J., Maalla M'jid, N., Seidel, F., & Kelly, O. (2023). The climate crisis and violence against children. *The Lancet Child & Adolescent Health, 7*(9), 605–607. https://doi.org/10.1016/s2352-4642(23)00137-2

Cuartas, J., McCoy, D. C., Torres, I., Burghardt, L., Shonkoff, J. P., & Yoshikawa, H. (2024). The developmental consequences of early exposure to climate change-related risks. *Child Development Perspectives*. https://doi.org/10.1111/cdep.12503

DeFlorio-Barker, S., Zelasky, S., Park, K., Lobdell, D. T., Stone, S. L., & Rappazzo, K. M. (2022). Are the adverse health effects of air pollution modified among active children and adolescents? A review of the literature. *Preventive Medicine, 164, 107306*. https://doi.org/10.1016/j.ypmed.2022.107306

Dietrich, S., Meysonnat, A., Rosales, F., Cebotari, V., & Gassmann, F. (2022). Economic development, weather shocks and child marriage in South Asia: A machine learning approach. *PLOS ONE, 17*(9), e0271373. https://doi.org/10.1371/journal.pone.0271373

Doan, T. T. D., Binns, C., Pham, N. M., Zhao, Y., Dinh, T. P. H., et al. (2020). Improved breastfeeding by empowering mothers in Vietnam: A randomised controlled trial of a mobile app. *International Journal of Environmental Research and Public Health, 17*(15), 5552. https://doi.org/10.3390/ijerph17155552

Doyle, F. L., Morawska, A., Higgins, D. J., Havighurst, S. S., Mazzucchelli, T. G., Toumbourou, J. W., Middeldorp, C. M., Chainey, C., Cobham, V. E., Harnett, P., & Sanders, M. R. (2022). Policies are needed to increase the reach and impact of evidence-based parenting supports: A call for a population-based approach to supporting parents, children, and families. *Child Psychiatry & Human Development, 54*(3), 891-904. https://doi.org/10.1007/s10578-021-01309-0

Draper, C. E., Barnett, L. M., Cook, C. J., Cuartas, J. A., Howard, S. J., McCoy, D. C., Merkley, R., Molano, A., Maldonado-Carreño, C., Obradović, J., Scerif, G., Valentini, N. C., Venetsanou, F., & Yousafzai, A. K. (2022). Publishing child development research from around the world: An unfair playing field resulting in most of the world's child population under-represented in research. *Infant and Child Development, 32*(6), e2375. https://doi.org/10.1002/icd.2375

Early Years Climate Action Task Force. (2023). Flourishing children, healthy communities, and a stronger nation: The U.S. early years climate action plan. *Start Early*.

Epstein, A., Bendavid, E., Nash, D., Charlebois, E. D., & Weiser, S. D. (2020). Drought and intimate partner violence towards women in 19 countries in sub-Saharan Africa during 2011-2018: A population-based study. *PLOS Medicine, 17*(3), e1003064. https://doi.org/10.1371/journal.pmed.1003064

European Parliament. (2024, January 15). Stopping greenwashing: How the EU regulates green claims. *Topics | European Parliament*. https://www.europarl.europa.eu/topics/en/article/20240111STO16722/stopping-greenwashing-how-the-eu-regulates-green-claims

Evans, G. W. (2019). Projected behavioral impacts of global climate change. *Annual Review of Psychology, 70*(1), 449–474. https://doi.org/10.1146/annurev-psych-010418-103023

Fajersztajn, L., Saldiva, P., Pereira, L. A. A., Leite, V. F., & Buehler, A. M. (2017). Short-term effects of fine particulate matter pollution on daily health events in Latin America: A systematic review and meta-analysis. *International Journal of Public Health, 62*(7), 729–738. https://doi.org/10.1007/s00038-017-0960-y

Froehlich, P., & Al-Saidi, M. (2018). Local community perception of climate change adaptation in Egypt. IOP Conference Series: *Earth and Environmental Science, 191*, 012003. https://doi.org/10.1088/1755-1315/191/1/012003

Fuller, A. E., Zaffar, N., Cohen, E., Pentland, M., Siddiqi, A., Vandermorris, A., Van Den Heuvel, M., Birken, C. S., Guttmann, A., & de Oliveira, C. (2022). Cash transfer programs and child health and family economic outcomes: A systematic review. *Canadian Journal of Public Health, 113*(3), 433–445. https://doi.org/10.17269/s41997-022-00610-2

Gao, J., Kovats, S., Vardoulakis, S., Wilkinson, P., Woodward, A., Li, J., Gu, S., Liu, X., Wu, H., Wang, J., Song, X., Zhai, Y., Zhao, J., & Liu, Q. (2018). Public health co-benefits of greenhouse gas emissions reduction: A systematic review. *Science of the Total Environment, 627*, 388–402. https://doi.org/10.1016/j.scitotenv.2018.01.193

Gertler, P., Heckman, J., Pinto, R., Zanolini, A., Vermeersch, C., Walker, S., Chang, S. M., & Grantham-McGregor, S. (2014). Labor market returns to an early childhood stimulation intervention in Jamaica. *Science, 344*(6187), 998–1001. https://doi.org/10.1126/science.1251178

Ghimire, R., & Ferreira, S. (2015). Floods and armed conflict. *Environment and Development Economics, 21*(1), 23–52. https://doi.org/10.1017/s1355770×15000157

Gibson, K., Little, J., Cowlishaw, S., Ipitoa Toromon, T., Forbes, D., & O'Donnell, M. (2021). Piloting a scalable, post-trauma psychosocial intervention in Tuvalu: The Skills for Life Adjustment and Resilience (SOLAR) program. *European Journal of Psychotraumatology, 12*(1), 1948253. https://doi.org/10.1080/20008198.2021.1948253

Government of Ireland. (2021). Climate Action Plan 2021: Securing Our Future. *Department of the Environment, Climate and Communications.*

Gowayed, H. (2022, September 29). Climate change and migration in the Middle East and North Africa. *Arab Center Washington DC*. https://arabcenterdc.org/resource/climate-change-and-migration-in-the-middle-east-and-north-africa/

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal, 26*(2), 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Habib, R. R., Zein, K. E., & Ghanawi, J. (2010). Climate change and health research in the eastern Mediterranean region. *EcoHealth, 7*(2), 156–175. https://doi.org/10.1007/s10393-010-0330-1

Hadeed, J. (2011). The continued effects of home intervention on child development outcomes in the Kingdom of Bahrain. *Early Child Development and Care, 181*(10), 1291–1313. https://doi.org/10.1080/03004430.2010.524299

Häfner, M., Raimondi, P. P., & Bonometti, B. (2023). The energy sector and energy geopolitics in the MENA region at a crossroad. In Perspectives on development in the Middle East and North Africa (MENA) region (1st ed.). *Springer*. https://doi.org/10.1007/978-3-031-30705-8

Haghirian, M., & Al-Sarihi, A. (2024, January 18). Necessity will drive Gulf states to cooperate on climate change. *Middle East Council on Global Affairs*. https://mecouncil.org/blog_posts/necessity-will-drive-gulf-states-to-cooperate-on-climate-change/

Hallegatte, S., & Rozenberg, J. (2017). Climate change through a poverty lens. *Nature Climate Change, 7*(4), 250–256. https://doi.org/10.1038/nclimate3253

Hammett, J. F., Karney, B. R., & Bradbury, T. N. (2022). Effects of Hurricane Harvey on trajectories of hostile conflict among newlywed couples. *Journal of Family Psychology, 36*(7), 1043–1049. https://doi.org/10.1037/fam0001000

Hess, J. J., Lm, S., Knowlton, K., Saha, S., Dutta, P., Ganguly, P., Tiwari, A., Jaiswal, A., Sheffield, P., Sarkar, J., Bhan, S. C., Begda, A., Shah, T., Solanki, B., & Mavalankar, D. (2018). Building resilience to climate change: Pilot evaluation of the impact of India's First Heat Action Plan on All-Cause Mortality. *Journal of Environmental and Public Health, 2018*, 7973519. https://doi.org/10.1155/2018/7973519

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health, 5*(12), E863-E873. https://doi.org/10.1016/s2542-5196(21)00278-3

Huang, Y.-H., & Ma, Y. (2024). Climate change and divorce behavior: Implication for family education. *Innovation and Green Development, 3*(1), 100115. https://doi.org/10.1016/j.igd.2023.100115

Institute for Economics and Peace. (2020). Over one billion people at threat of being displaced by 2050 due to environmental change, conflict and civil unrest. https://www.economicsandpeace.org/wp-content/uploads/2020/09/Ecological-Threat-Register-Press-Release-27.08-FINAL.pdf

International Climate Initiative. (n.d.). A Global Early Warning System for Climate Change - A Case Study for Designing the System. https://www.international-climate-initiative.com/en/project/a-global-early-warning-system-for-climate-change-a-case-study-for-designing-the-system-12-ii-092-africa-m-clim-warn/

International Labour Organization. (2023). Just transition policy brief: Social protection for a just transition. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_867426.pdf

International Rescue Committee. (2024, May 27). The IRC launches Climate Resilience and Environmental Justice Initiative in southern Iraq | International Rescue Committee (IRC). https://www.rescue.org/press-release/irc-launches-climate-resilience-and-environmental-justice-initiative-southern-iraq

International Trachoma Initiative. (2016). Home | Trachoma Atlas. https://www.trachomaatlas.org/

IPCC. (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. *IPCC*, 1(1). https://doi.org/10.1017/9781009325844

Iyigun, M., Mueller, J., & Qian, N. (2024). The intensifying effects of prolonged climate change on conflict, 1400–1900 CE. *AEA Papers and Proceedings, 114*, 80–83. https://doi.org/10.1257/pandp.20241058

Izutsu, T. (2019). Disability-inclusive disaster risk reduction and humanitarian action: An urgent global imperative: United Nations World Conference on Disaster Risk Reduction and the Progress. https://www.un.org/development/desa/disabilities/wp-content/uploads/sites/15/2020/03/Final-Disability-inclusive-disaster.pdf

Jeddi Yeganeh, A., McCoy, A. P., & Hankey, S. (2019). Green affordable housing: Cost-benefit analysis for zoning incentives. *Sustainability, 11*(22), 6269. https://doi.org/10.3390/su11226269

Jeong, J., Franchett, E. E., Ramos de Oliveira, C. V., Rehmani, K., & Yousafzai, A. K. (2021). Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis. *PLOS Medicine, 18*(5), 1–51. https://doi.org/10.1371/journal.pmed.1003602

Jervis, P., Coore-Hall, J., Pitchik, H. O., Arnold, C. D., Grantham-McGregor, S., Rubio-Codina, M., Baker-Henningham, H., Fernald, L. C. H., Hamadani, J., Smith, J. A., Trias, J., & Walker, S. P. (2023). The Reach Up Parenting Program, child development, and maternal depression: A meta-analysis. *Pediatrics, 151*(Supplement 2), e2023060221D. https://doi.org/10.1542/peds.2023-060221d

Kabeer, N., & Waddington, H. (2015). Economic impacts of conditional cash transfer programmes: A systematic review and meta-analysis. *Journal of Development Effectiveness, 7*(3), 290–303. https://doi.org/10.1080/19439342.2015.1068833

Kadio, K., Filippi, V., Congo, M., Scorgie, F., Roos, N., Lusambili, A., Nakstad, B., Kovats, S., & Kouanda, S. (2024). Extreme heat, pregnancy and women's well-being in Burkina Faso: An ethnographical study. *BMJ Global Health, 8*(Suppl 3), e014230–e014230. https://doi.org/10.1136/bmjgh-2023-014230

Khormi, H. M., & Kumar, L. (2014). Climate change and the potential global distribution of Aedes aegypti: Spatial modelling using geographical information system and CLIMEX. *Geospatial Health, 8*(2), 405. https://doi.org/10.4081/gh.2014.29

King, V. J., Stevens, A., Nussbaumer-Streit, B., Kamel, C., & Garritty, C. (2022). Paper 2: Performing rapid reviews. *Systematic Reviews, 11*(1), 151. https://doi.org/10.1186/s13643-022-02011-5

Kuehn, L., & McCormick, S. (2017). Heat exposure and maternal health in the face of climate change. *International Journal of Environmental Research and Public Health, 14*(8), 853. https://doi.org/10.3390/ijerph14080853

Larson, A. M., Sarmiento Barletti, J. P., & Heise Vigil, N. (2022). A place at the table is not enough: Accountability for Indigenous Peoples and local communities in multi-stakeholder platforms. *World Development, 155,* 105907. https://doi.org/10.1016/j.worlddev.2022.105907

Lelieveld, J., Hadjinicolaou, P., Kostopoulou, E., Giannakopoulos, C., Pozzer, A., Tanarhte, M., & Tyrlis, E. (2013). Model projected heat extremes and air pollution in the eastern Mediterranean and Middle East in the twenty-first century. *Regional Environmental Change, 14*(5), 1937–1949. https://doi.org/10.1007/s10113-013-0444-4

Leyva, E. W. A., Beaman, A., & Davidson, P. M. (2017). Health impact of climate change in older people: An integrative review and implications for nursing. *Journal of Nursing Scholarship, 49*(6), 670–678. https://doi.org/10.1111/jnu.12346

Liu, Q., Wang, W., Gu, X., Deng, F., Wang, X., Lin, H., Guo, X., & Wu, S. (2021). Association between particulate matter air pollution and risk of depression and suicide: A systematic review and meta-analysis. *Environmental Science and Pollution Research, 28*(8), 9029–9049. https://doi.org/10.1007/s11356-021-12357-3

Ma, T., Moore, J., & Cleary, A. (2022). Climate change impacts on the mental health and wellbeing of young people: A scoping review of risk and protective factors. *Social Science & Medicine, 301*, 114888. https://doi.org/10.1016/j.socscimed.2022.114888

Maclean, J. C., Popovici, I., & French, M. T. (2016). Are natural disasters in early childhood associated with mental health and substance use disorders as an adult? *Social Science & Medicine, 151*, 78–91. https://doi.org/10.1016/j.socscimed.2016.01.006

Magnan, A. K., Pörtner, H.-O., Duvat, V. K. E., Garschagen, M., Guinder, V. A., Zommers, Z., Hoegh-Guldberg, O., & Gattuso, J.-P. (2021). Estimating the global risk of anthropogenic climate change. *Nature Climate Change, 11*(10), 879–885. https://doi.org/10.1038/s41558-021-01156-w

Mah, A. Y. J., Chapman, D. A., Markowitz, E. M., & Lickel, B. (2020). Coping with climate change: Three insights for research, intervention, and communication to promote adaptive coping to climate change. *Journal of Anxiety Disorders, 75*, 102282. https://doi.org/10.1016/j.janxdis.2020.102282

Martin, G., Reilly, K., Everitt, H., & Gilliland, J. A. (2021). Review: The impact of climate change awareness on children's mental well-being and negative emotions – a scoping review. *Child and Adolescent Mental Health, 27*(1), 59-72. https://doi.org/10.1111/camh.12525

Marzouk, H., Duman, Y., Meier, J., Khudhur, Q., & Alani, O. (2022). Assessment of perceptions of climate change and its causes and impacts on mental health and psychosocial wellbeing among a group of internally displaced persons in Iraq. *Intervention, 20*(1), 98-106. https://doi.org/10.4103/intv.intv_40_21

Masten, A. S. (2019). Resilience from a developmental systems perspective. *World Psychiatry, 18*(1), 101–102. https://doi.org/10.1002/wps.20591

MECCE. (n.d.). Sweden | Climate Change Communication and Education. *Education-Profiles.org.* https://education-profiles.org/europe-and-northern-america/sweden/~climate-change-communication-and-education

Ministry of Education - UAE. (2021, December 20). Greening Curriculum. *Greening Education Hub*. https://erthzayed.com/greening-curriculum/

Ministry of Energy and Minerals - Oman. (2022, October 24). Oman announces 2050 Net Zero commitment and unveils ambitious green hydrogen strategy. *MEM*. https://mem.gov.om/en-us/Media-Center/News/ArtMID/608/ArticleID/1281/Oman-announces-2050-Net-Zero-commitment-and-unveils-ambitious-green-hydrogen-strategy

Ministry of the Environment & United Nations Development Programme. (2022). National Climate Change Policy of the Hashemite Kingdom of Jordan 2022-2050.

Mücke, H. G., & Litvinovitch, J. M. (2020). Heat extremes, public health impacts, and adaptation policy in Germany. *International Journal of Environmental Research and Public Health, 17*(21), 7862. https://doi.org/10.3390/ijerph17217862

Munala, L., Allen, E. M., Frederick, A. J., & Ngũnjiri, A. (2023). Climate change, extreme weather, and intimate partner violence in East African agrarian-based economies. *International Journal of Environmental Research and Public Health, 20*(23), 7124–7124. https://doi.org/10.3390/ijerph20237124

Murtaugh, D. (2024, January 24). China's green economy drove 40% of GDP growth in 2023, CREA says. *Bloomberg*. https://www.bloomberg.com/news/articles/2024-01-25/china-s-green-economy-drove-40-of-gdp-growth-in-2023-crea-says

Netto, S. V., Sobral, M. F. F., Ribeiro, A. R. B., & Soares, G. R. da L. (2020). Concepts and forms of greenwashing: A systematic review. *Environmental Sciences Europe, 32*(1), 19. https://doi.org/10.1186/s12302-020-0300-3

Novikov, I., Kalter-Leibovici, O., Chetrit, A., Stav, N., & Epstein, Y. (2011). Weather conditions and visits to the medical wing of emergency rooms in a metropolitan area during the warm season in Israel: A predictive model. *International Journal of Biometeorology, 56*(1), 121–127. https://doi.org/10.1007/s00484-011-0403-z

NYC Mayor's Office of Climate and Environmental Justice. (2022). *Climate resiliency design guidelines*. https://climate.cityofnewyork.us/wp-content/uploads/2024/05/CRDG41May_2022_digital_print.pdf

O'Donnell, M. L., Lau, W., Fredrickson, J., Gibson, K., Bryant, R. A., Bisson, J., Burke, S., Busuttil, W., Coghlan, A., Creamer, M., Gray, D., Greenberg, N., McDermott, B., McFarlane, A. C., Monson, C. M., Phelps, A., Ruzek, J. I., Schnurr, P. P., Ugsang, J., & Watson, P. (2020). An open label pilot study of a brief psychosocial intervention for disaster and trauma survivors. *Frontiers in Psychiatry, 11*, 482. https://doi.org/10.3389/fpsyt.2020.00483

Palinkas, L. A., & Wong, M. (2020). Global climate change and mental health. *Current Opinion in Psychology, 32*, 12–16. https://doi.org/10.1016/j.copsyc.2019.06.023

Pearce, J. M., & Parncutt, R. (2023). Quantifying global greenhouse gas emissions in human deaths to guide energy policy. Energies, 16(16), 6074. https://doi.org/10.3390/en16166074

Pega, F., Shaw, C., Rasanathan, K., Yablonski, J., Kawachi, I., & Hales, S. (2015). Climate change, cash transfers and health. *Bulletin of the World Health Organization, 93*(8), 559–565. https://doi.org/10.2471/blt.14.150037

Pelling, M., & Garschagen, M. (2019). Put equity first in climate adaptation. *Nature, 569*(7756), 327–329. https://doi.org/10.1038/d41586-019-01497-9

Pope, D. H., McMullen, H., Baschieri, A., Philipose, A., Udeh, C., Diallo, J., & McCoy, D. (2022). What is the current evidence for the relationship between the climate and environmental crises and child marriage? A scoping review. *Global Public Health, 18*(1), 2095655. https://doi.org/10.1080/17441692.2022.2095655

Portier, C., Thigpen Tart, K., Carter, S., Dilworth, C., Grambsch, A., Gohlke, J., Hess, J., Howard, S., Luber, G., Lutz, J., Maslak, T., Radtke, M., Rosenthal, J., Rowles, T., Sandifer, P., Scheraga, J., Strickman, D., Trtanj, J., & Whung, P.-Y. (2010). A human health perspective on climate change: A report outlining research needs on the human health effects of climate change. *Environmental Health Perspectives*. https://doi.org/10.1289/ehp.1002272

Pujadas Botey, A., & Kulig, J. C. (2013). Family functioning following wildfires: Recovering from the 2011 Slave Lake fires. *Journal of Child and Family Studies, 23*(8), 1471–1483. https://doi.org/10.1007/s10826-013-9802-6

Qatar Foundation. (2007, March 14). Literacy challenges in the Arab region: Building partnerships and promoting innovative approaches. *UNESCO Regional Conferences in Support of Global Literacy, Doha, Qatar.*

Requia, W. J., Adams, M. D., Arain, A., Papatheodorou, S., Koutrakis, P., & Mahmoud, M. (2018). Global association of air pollution and cardiorespiratory diseases: A systematic review, meta-analysis, and investigation of modifier variables. *American Journal of Public Health, 108*(S2), S123–S130. https://doi.org/10.2105/ajph.2017.303839

Romanello, M., McGushin, A., Napoli, C. D., Drummond, P., Hughes, N., Jamart, L., Kennard, H., Lampard, P., Rodriguez, B. S., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Chu, L., Ciampi, L., Dalin, C., & Dasandi, N. (2021). The 2021 report of the Lancet Countdown on health and climate change: Code red for a healthy future. *The Lancet, 398*(10311), 1619-1662. https://doi.org/10.1016/S0140-6736(21)01787-6

Romanello, M., Napoli, C. D., Drummond, P., Green, C., Kennard, H., Lampard, P., Scamman, D., Arnell, N., Ayeb-Karlsson, S., Ford, L. B., Belesova, K., Bowen, K., Cai, W., Callaghan, M., Campbell-Lendrum, D., Chambers, J., Daalen, K. R. van, Dalin, C., Dasandi, N., & Dasgupta, S. (2022). The 2022 report of the Lancet Countdown on health and climate change: Health at the mercy of fossil fuels. *The Lancet, 400*(10363), 1619-1654. https://doi.org/10.1016/S0140-6736(22)01540-9

Salehyan, I., & Hendrix, C. S. (2014). Climate shocks and political violence. *Global Environmental Change, 28*, 239–250. https://doi.org/10.1016/j.gloenvcha.2014.07.007

Sanson, A. V., Malca, K. P., Hoorn, J. V., & Burke, S. (2022). Children and climate change. https://doi.org/10.1017/9781009118705

Sargren, M., Edgar, G., Beresford, N., & Julien Chevillard. (2019, June 6). Cambodia's schools are the new frontline in the battle against climate change. *World Economic Forum*. https://www.weforum.org/agenda/2019/06/cambodia-schools-climate-change-education/#:~:text=Cambodia%2C%20with%20support%20from%20the

Sarkar, B., Dutta, S., & Singh, P. K. (2022). Drought and temporary migration in rural India: A comparative study across different socio-economic groups with a cross-sectional nationally representative dataset. *PLOS ONE, 17*(10), e0275449. https://doi.org/10.1371/journal.pone.0275449

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: Climate change and the discourse of environmental justice. Wiley Interdisciplinary Reviews: *Climate Change, 5*(3), 359–374.

Segal, T. R., & Giudice, L. C. (2022). Systematic review of climate change effects on reproductive health. *Fertility and Sterility, 118*(2), 215–223. https://doi.org/10.1016/j.fertnstert.2022.06.005

Shah, A. S., Langrish, J. P., Nair, H., McAllister, D. A., Hunter, A. L., Donaldson, K., Newby, D. E., & Mills, N. L. (2013). Global association of air pollution and heart failure: A systematic review and meta-analysis. *The Lancet, 382*(9897), 1039–1048. https://doi.org/10.1016/s0140-6736(13)60898-3

Shao, S., Xu, L., & Fan, M. (2022). The effect of emission trading system on infant health: Evidence from China. *Environmental Geochemistry and Health, 44*(9), 3021–3033. https://doi.org/10.1007/s10653-021-01173-w

Sharifi, A., Pathak, M., Joshi, C., & He, B. J. (2021). A systematic review of the health co-benefits of urban climate change adaptation. *Sustainable Cities and Society, 74*, 103190. https://doi.org/10.1016/j.scs.2021.103190

Slater, H., & Michael, E. (2012). Predicting the current and future potential distributions of lymphatic filariasis in Africa using maximum entropy ecological niche modelling. *PLoS ONE, 7*(2), e32202. https://doi.org/10.1371/journal.pone.0032202

Smela, B., Toumi, M., Świerk, K., Francois, C., Biernikiewicz, M., Clay, E., & Boyer, L. (2023). Rapid literature review: definition and methodology. *Journal of Market Access & Health Policy, 11*(1), 2241234. https://doi.org/10.1080/20016689.2023.2241234

Somefun, O., Banougnin, B. H., & Smith-Greenaway, E. (2024). The relationships between drought exposure, fertility preferences, and contraceptive behaviors: A multicountry study. *Studies in Family Planning, 55*(1), 5–21. https://doi.org/10.1111/sifp.12258

Stevens, B., Adami, S., Ali, T., Anzt, H., Aslan, Z., Attinger, S., Bäck, J., Baehr, J., Bauer, P., Bernier, N., Bishop, B., Bockelmann, H., Bony, S., Brasseur, G., Bresch, D. N., Breyer, S., Brunet, G., Buttigieg, P. L., Cao, J., & Castet, C. (2024). Earth virtualization engines (EVE). *Earth System Science Data, 16*(4), 2113–2122. https://doi.org/10.5194/essd-16-2113-2024

Telecommunications and Digital Government Regulatory Authority. (2024). National Climate Change Plan of the UAE 2017–2050. UAE. https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/national-climate-change-plan-of-the-uae

Terranova, A. M., Morris, A. S., Myers, S., Kithakye, M., & Morris, M. D. S. (2015). Preschool children's adjustment following a hurricane: Risk and resilience in the face of adversity. *Early Education and Development, 26*(4), 534–548. https://doi.org/10.1080/10409289.2015.994463

Thiery, B. W., Lange, S., Rogelj, J., Schleussner, C.-F., Gudmundsson, L., Seneviratne, S. I., Andrijevic, M., Frieler, K., Emanuel, K., Geiger, T., Bresch, D. N., Zhao, F., Willner, S. N., Büchner, M., Volkholz, J., Bauer, N., Chang, J., Ciais, P., Dury, M., & François, L. (2021). *Intergenerational inequities in exposure to climate extremes. Science, 374*(6564), 158-160. https://doi.org/10.1126/science.abi7339

Thompson, R., Hornigold, R., Page, L., & Waite, T. (2018). Associations between high ambient temperatures and heat waves with mental health outcomes: A systematic review. *Public Health, 161*, 171–191. https://doi.org/10.1016/j.puhe.2018.06.008

Toumi, A., Chlif, S., Bettaieb, J., Alaya, N. B., Boukthir, A., Ahmadi, Z. E., & Salah, A. B. (2012). Temporal dynamics and impact of climate factors on the incidence of zoonotic cutaneous leishmaniasis in central Tunisia. *PLoS Neglected Tropical Diseases, 6*(5), e1633. https://doi.org/10.1371/journal.pntd.0001633

Trask, B. (2020). Mega trends and families: The impact of demographic shifts, international migration and urbanization, climate change, and technological transformations. https://www.un.org/development/desa/family/wp-content/uploads/sites/23/2020/06/UN.MegaTrends.Final_.Trask_.2020.pdf

Trudell, J. P., Burnet, M. L., Ziegler, B. R., & Luginaah, I. (2021). The impact of food insecurity on mental health in Africa: A systematic review. *Social Science & Medicine, 278*, 113953. https://doi.org/10.1016/j.socscimed.2021.113953

UAE Government. (2022, November 24). UAE Energy Strategy 2050 - The Official Portal of the UAE Government. https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/uae-energy-strategy-2050

UAE Government. (2024, March). 13. Climate action. https://u.ae/en/about-the-uae/leaving-no-one-behind/13climateaction

United Nations Framework Convention on Climate Change. (2015). Paris Agreement. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

UN. (n.d.). Drought - The Drought Initiative. UN Convention to Combat Desertification. https://www.unccd.int/land-and-life/drought/drought-initiative

UN Committee for Development Policy. (2024). Report on the twenty-fifth session.

UN Women. (2022, February 28). Explainer: How gender inequality and climate change are interconnected. *UN Women*. https://www.unwomen.org/en/news-stories/explainer/2022/02/explainer-how-gender-inequality-and-climate-change-are-interconnected

UNCHR. (n.d.). Climate change and disaster displacement. *UNHCR UK*. https://www.unhcr.org/uk/what-we-do/build-better-futures/environment-disasters-and-climate-change/climate-change-and#:~:text=In%202022%2C%2084%20per%20cent

UNCTAD. (n.d.). The costs of achieving the SDGs: About | UNCTAD. *Unctad.org*. https://unctad.org/sdg-costing/about#:~:text=Cost%20of%20achieving%20the%20pathways&text=The%20resulting%20cost%20estimates%20for

UNICEF. (2021a, August). The climate crisis is a child rights crisis. *UNICEF*. https://www.unicef.org/reports/climate-crisis-child-rights-crisis

UNICEF. (2021b, August 19). The Climate Crisis is a Child Rights Crisis: Introducing the Children's Climate Risk Index. *UNICEF DATA*. https://data.unicef.org/resources/childrens-climate-risk-index-report/

UNICEF. (2023a). Climate Change: Impact on Adolescent Girls. *UNICEF*.

UNICEF. (2023b). Growing up in a changing climate. *UNICEF*.

United Nations. (2024). What Is Climate Change? *United Nations*. https://www.un.org/en/climatechange/what-is-climate-change

Ursano, R., Morganstein, J., & Cooper, R. (2017). Resource Document on Mental Health and Climate Change. https://www.psychiatry.org/getattachment/b7fb9e58-86f7-4b54-bd32-59fb50f32d9c/Resource-Document-2017-Mental-Health-Climate-Change.pdf

US EPA. (2022, March 21). Climate Change and the Health of People with Disabilities. *Www.epa.gov*. https://www.epa.gov/climateimpacts/climate-change-and-health-people-disabilities

van Daalen, K. R., Kallesøe, S. S., Davey, F., Dada, S., Jung, L., Singh, L., Issa, R., Emilian, C. A., Kuhn, I., Keygnaert, I., & Nilsson, M. (2022). Extreme events and gender-based violence: A mixed-methods systematic review. *The Lancet Planetary Health, 6*(6), e504–e523. https://doi.org/10.1016/s2542-5196(22)00088-2

van de Wetering, J., Leijten, P., Spitzer, J., & Thomaes, S. (2022). Does environmental education benefit environmental outcomes in children and adolescents? A meta-analysis. *Journal of Environmental Psychology, 81*, 101782. https://doi.org/10.1016/j.jenvp.2022.101782

van den Bosch, M. (2023, November 3). Five climate challenges the Gulf states might not have time to solve. *Arab Gulf States Institute in Washington*. https://agsiw.org/five-climate-challenges-the-gulf-states-might-not-have-time-to-solve/

Vergunst, F., & Berry, H. L. (2021). Climate change and children's mental health: A developmental perspective. *Clinical Psychological Science, 10*(4), 767-785. https://doi.org/10.1177/21677026211040787

Vermeulen, S. J., Aggarwal, P. K., Ainslie, A., Angelone, C., Campbell, B. M., Challinor, A. J., Hansen, J. W., Ingram, J. S. I., Jarvis, A., Kristjanson, P., Lau, C., Nelson, G. C., Thornton, P. K., & Wollenberg, E. (2012). Options for support to agriculture and food security under climate change. *Environmental Science & Policy, 15*(1), 136–144. https://doi.org/10.1016/j.envsci.2011.09.003

Wang, W., Foutz, N. Z., & Gao, G. (2022). Huddling with families after disaster: Human resilience and social disparity. *PLOS ONE, 17*(9), e0273307. https://doi.org/10.1371/journal.pone.0273307

Weeda, L. J. Z., Bradshaw, C. J. A., Judge, M. A., Saraswati, C. M., & Le, P. N. (2024). How climate change degrades child health: A systematic review and meta-analysis. *Science of the Total Environment, 920*, 170944. https://doi.org/10.1016/j.scitotenv.2024.170944

White, E., & Ding, W. (2024, July 8). Gridlock in China: Huge spending on network in shift to green energy. *Www.ft.com*. https://www.ft.com/content/2c0fa0d1-2902-440e-8677-d9f087c2e943

WHO and EMRO. (2009). The work of WHO in the Eastern Mediterranean Region: Annual report of the Regional Director. *Institutional Repository for Information Sharing*.

Williamson, H. C., Bradbury, T. N., & Karney, B. R. (2021). Experiencing a natural disaster temporarily boosts relationship satisfaction in newlywed couples. *Psychological Science, 32*(11), 1709–1719. https://doi.org/10.1177/09567976211015677

Wood, R. G. (2011). Is there a role for cash transfers in climate change adaptation? *IDS Bulletin, 42*(6), 79–85. https://doi.org/10.1111/j.1759-5436.2011.00277.x

World Food Programme. (n.d.). The R4 Rural Resilience Initiative | World Food Programme. *Www.wfp.org*. https://www.wfp.org/r4-rural-resilience-initiative

Youssouf, H., Liousse, C., Roblou, L., Assamoi, E.-M., Salonen, R. O., Maesano, C., Banerjee, S., & Annesi-Maesano, I. (2014). Non-accidental health impacts of wildfire smoke. International Journal of Environmental Research and *Public Health, 11*(11), 11772–11804. https://doi.org/10.3390/ijerph111111772

Yu, E., & Liu, J. (2007). Environmental impacts of divorce. *Proceedings of the National Academies of Sciences of the United States of America, 104*(51), 20629-20634. https://doi.org/10.1073/pnas.0707267104

DIFI
معهد الدوحة الدولي للأسرة
Doha International Family Institute

مؤسسة قطر
Qatar Foundation

difi.org.qa