



**A Nutrition Crisis
in a Warming World
2022**

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Acknowledgements

This document is the result of a collective effort of many individuals who are passionate about advancing nutrition and gender equality for women and girls across the globe.

Lead authors from World Vision Canada: Dayna McNeill, Christina Nguyen, and Melani O'Leary.

The document has benefited from contributions and editorial reviews from Marie Bettings (World Vision Canada), Miriam Chang (World Vision Canada), Merydth Holte-McKenzie (World Vision Canada), Elise Kendall (CARE USA), Loria Kulathungam (World Vision International), Maereg Tafere (World Vision Canada), Asrat Tolossa (World Vision Canada), and Julie Truelove (WaterAid Canada).

gendernutritionframework.org

First published 2022

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What is Climate Change?

Climate change is a long-term shift in the average weather conditions of a region, such as its typical temperature, rainfall, and windiness.¹ Since the 1800s, human activities have been the main driver of climate change, primarily through burning fossil fuels like coal, oil and gas. Carbon dioxide released into the atmosphere, one of the main drivers of climate change, creates a greenhouse effect that traps heat on earth, altering climate patterns and inducing extreme weather events.²

In a series of UN reports, thousands of scientists and government reviewers agreed that limiting global temperature rise to no more than 1.5°C would help us avoid the worst climate impacts and maintain a livable climate.³ Yet based on current national climate change plans, global warming is projected to reach around 3.2°C by the end of the century.

Current Trends

Climate change is accelerating at a rapid pace – greenhouse gas concentrations are at their highest levels in 2 million years and this last decade was the warmest on record.² **Extreme weather events and their accompanying natural disasters are increasing in frequency and intensity at an alarming rate, and combined with conflict and COVID-19, the impact is reversing decades of important progress towards gender equality (SDG 5), health for all (SDG 3), and zero hunger (SDG 2).** In 2021, the World Food Programme's HungerMap LIVE indicated that 828 million people across 92 countries did not have enough to eat.⁴ That represents an increase of about 81 million since 2020, when the COVID-19 pandemic plunged the world's economy into a downward spiral, and 185 million more since 2019.⁵ Rising levels of food insecurity will continue to affect millions of people globally, and all forms of malnutrition are predicted to worsen as a result of climate change.⁶

The climate crisis is a story of inequality – those with less power will face the most serious consequences. For women and girls, gendered roles often mean they feel the effects of climate shocks most acutely as

they are responsible for producing and preparing food, collecting water and wood for heating and cooking, and often travelling great distances to secure healthcare for themselves and their families – all tasks that rely heavily on natural resources and are vulnerable to shifting weather patterns. **Women and girls already eat last and least, so the combined impact of diminishing resources and limited decision-making power over allocation of increasingly scarce resources mean this crisis will deepen the systemic inequality that holds women and girls back from realizing their right to good nutrition.** This is compounded for women and girls with two or more marginalizing identities such as race, physical ability, ethnicity, socio-economic status, sexual orientation among others. When girls and women are not well-nourished, the impacts are devastating, including increased rates of anemia, increased school absences and dropout rates, and decreased economic activity. Should malnourished women choose to have children, the effects are equally catastrophic, including increased risks for complications for both mother and infant including maternal and infant mortality, preterm births, and low birthweight, thus perpetuating intergenerational cycles of malnutrition that are felt for generations to come.

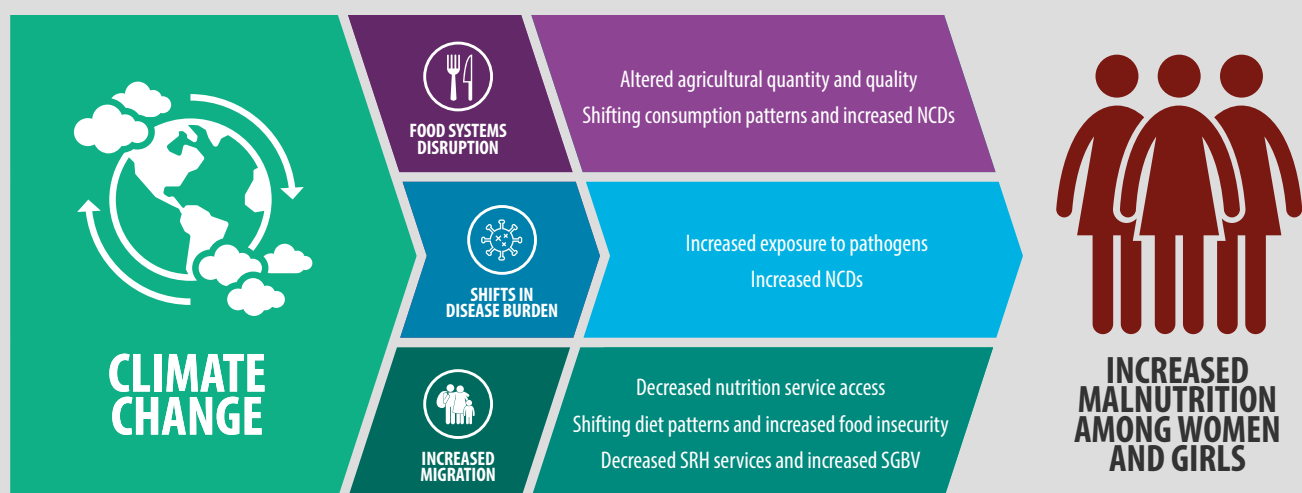
Understanding How Climate Change Impacts Nutrition

The role of climate change as a threat multiplier risks exacerbating inequalities and undoing decades of progress for women and girls, especially in the areas of food security, nutrition, and gender equality.

In this rapidly warming climate, hunger and malnutrition are predicted to rise 20% by 2050.⁷ Of those suffering from acute food insecurity, 60% are women and girls, highlighting the inequitable burden of malnutrition and food insecurity. This is also reflected in the gap between the number of hungry women and hungry men; between 2018 and 2021 this gap grew 8.3 times.⁸ Given the current trends of the global hunger and malnutrition crisis, climate change will have

multifaceted and severe effects on women and girls' nutritional status and therefore their survival, health, and development outcomes. At an individual level, systems of power worldwide create barriers for women and girls to act on their right to good nutrition. These barriers restrict women and girls from the resources necessary to be able to exercise their agency and to build resilience against climate change.

When looking from a macro level, the gendered impact of climate change and the compounding impact it has on realizing the right to good nutrition can be seen through three distinct pathways:



- The impact on **food systems** highlights an acute vulnerability to a vast number of climate threats that influence women and girls' ability to obtain and consume nutritious foods.
- The impact on shifts in **disease burden**, points to shifting patterns in infectious and non-communicable diseases as climate change influences human relationships with the environment.
- Finally, as many environments around the world are rendered inhospitable, climate change-induced **migration** forces many people to leave in search of somewhere else to survive and thrive.

Altogether, the impacts of climate change on these three pathways overlap and intersect with one another in complex ways to exert strong forces on marginalized populations and consistently undermine women and girls' right to good nutrition.



Pathway 1:

Impact on Food Systems

Food systems are vulnerable to the impacts of climate change, negatively affecting the production, storage, distribution, processing, packaging, and retail of food.⁹ Increasing temperatures, rising atmospheric carbon dioxide (CO₂) and extreme weather affect agricultural production, impacting the yield and micronutrient concentrations of global food supplies.¹⁰ For example, both increasing CO₂ and rising temperature combined can decrease the yield of rice, wheat, barley, legumes, vegetables, fruits and nuts by altering agricultural production environments.¹¹ These changes are creating an enabling environment for malnutrition as these staple food sources are key in providing essential micronutrients such as magnesium, iron, zinc, and more.¹⁰ This is particularly concerning for landlocked countries that already face a deficit in food, where a single extreme weather event can reduce the average annual nutrient supply by up to 7.6%.¹² Alarming, research has demonstrated that crops grown under elevated CO₂ levels have lower concentrations of important nutrients (iron, zinc, and protein), with declines of 3–17% compared with those grown under

regular CO₂ levels.¹³ When there are losses in pollinators, there are also reduced yields of pollinator-dependent crops, such as fruits, vegetables and nuts. Animal-pollinated plants provide critical sources of vitamin C, vitamin A, folate, and iron in the global food supply.¹⁴

Combined, the impact of this loss of dietary nutrients in foods could translate to increased nutritional deficiency for hundreds of millions of people.

The impact of climate change on fisheries and aquaculture can be seen as rising sea levels and temperatures cause coral reef and mangrove losses, leading to losses in coastal rice production and coastal fisheries.¹⁰ Declining oxygen, and ocean and freshwater warming, alter suitable habitats for aquatic life and therefore reduce ocean and inland fisheries catch. A vulnerability assessment of Africa's freshwater fish showed that nearly 40% of fish species were vulnerable to climate change due to the highly specialized habitat and life-cycle requirements, especially in the African Rift Valley lakes, the Congo River drainage, and coastal rivers of West Africa.¹⁵ Should the current trends of sea-level

rising, and ocean and freshwater warming continue, devastating losses to fisheries catch and aquaculture will continue to have many negative, downstream effects within food production systems. For example, declines in marine fish supply could result in an estimated 845 million people or an additional 11% of the current global population to become deficient in micronutrients such as zinc, iron, and vitamin A.¹⁶

The impact of climate change on food systems workers will be significant. While feeding the world daily, food system workers regularly face high levels of working poverty and hunger, chronic food insecurity, poor health and safety conditions, and a lack of labour rights and protection.¹⁷ Approximately 2.7 billion rural people engage in small-scale food production and currently over 1.1 billion people in moderate to extreme poverty are working in agriculture.¹⁸ They are often from indigenous, caste-oppressed, racialized, and socially marginalized communities and are vulnerable to increasingly frequent climate shocks. Without diversified sources of incomes, increases in climate change will push them further into poverty and extreme risk of food insecurity and malnutrition.

These disruptions in food production systems will also have compounding effects on the global food environment, consumer behaviours and diets, and will disproportionately affect those living in the most fragile contexts.⁹ Of increasing concern related to the long-term effects of climate-induced shifts in the food system is the increased prevalence of non-communicable diseases (NCDs).¹ In this case, increasing urbanization resulting from climate change contributes to increased consumption of affordable and highly processed food options to cope with an expensive food environment.¹⁹ This is particularly concerning since poor air quality (from greenhouse gas emissions) also increases the risk of developing NCDs.²⁰

It is also worth noting that global food demands have led to over a third of all greenhouse gas emissions and

have consumed substantial amounts of environmental resources. In comparison to 2010, the current environmental impacts of food demands have increased by as much as 14% and animal-sourced foods contribute to a majority of greenhouse gas emissions and land use.²¹

What does this mean for women and girls' nutrition?

Considering the significant association between food security and gender equality, women, girls and people of diverse gender identities are most likely to be disproportionately affected by food system disruptions since they are unable to access the same resources and opportunities available to men and boys. Across the world, the impact of food security and gender inequality is more deeply felt by those who face two or more intersecting experiences of marginalization based on gender identity, race, religion, etc. As of 2021, there are 150 million more women who are food insecure than men in the world.⁸ This, combined with increased nutritional requirements, increases the disproportionate risk of malnutrition for women and girls. For example, it has been estimated that by 2050, elevated CO₂ concentrations could push an additional 138 million

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people into zinc deficiency and greatly increase iron deficiency as a result of changing crop nutrient density, with disproportionate burdens for children and pregnant or lactating women who are the highest risk groups for these deficiencies.²² With an estimated two billion people suffering from these deficiencies currently, causing a loss of 63 million life-years annually, the potential increase in these deficiencies among women and girls is catastrophic.

¹ NCDs are chronic conditions that require long term or lifelong care. Diet-related NCDs include cardiovascular disease and stroke, type 2 diabetes and some cancers.

Gender norms related to food consumption determine what is considered safe, acceptable, affordable, and adequate for various gender and age groups. Women are responsible for 90% of food purchasing and preparation,⁸ but unfortunately, power dynamics that govern the social norms regarding who eats what and when, place restrictions on consumption (food taboos) for people with less power, who are most often women and girls. The gendered cultural practices in intra-household food allocation that penalize women and girls, combined with poor food availability at the household level, create a vicious cycle of nutritional deprivation for women and girls. This can be further challenged by intersectional experiences of marginalization, such as for adolescent girls who can experience discrimination based on gender and age. During times of food scarcity, women and girls are forced to adjust their food allocation practices to deal with food shortages when feeding their families; in those situations, gender bias and other forms of discrimination can be more pronounced.²³ A lack of support from men in completing household tasks and childcare is also associated with poor diets for women and children. Worldwide, women perform 75% of the unpaid work, such as care and domestic tasks, and women in rural areas spend around 14 hours a day on unpaid care work.⁸ As a result, women and girls may experience greater food insecurity than men and boys in the same household.

Whether driven by decreased agricultural production or increasing food prices and inequitable intrahousehold food distribution, the end result will be a catastrophic impact on the ability of women and girls to afford and/or consume nutritious meals. This means that women and girls are unable to meet their higher, specific needs for micronutrients, such as iron. This is particularly concerning since iron-deficiency anemia is the leading cause of lost Disability Adjusted Life Years (DALYs) globally among adolescent girls and young women aged 10 to 19 years, resulting in missed opportunities for physical growth and cognitive development.²⁴ At the same time, with limited financial freedom, women and girls may be forced to prioritize cheaper, lower quality, more affordable options of food and shift towards unfavorable consumer behaviours that could lead to issues of overweight and obesity.

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Pathway 2:

Impact on Disease Burden

Climate change is influencing shifting patterns in the global burden of disease. These shifts in disease burden stem from a variety of environmental and behavioural changes, that occur as a result of climate change, and include zoonotic transmission², food- and water-borne diseases, and non-communicable diseases. It has been estimated that environmental factors play a role in more than 80% of major diseases and injuries worldwide²⁵ and the WHO estimates that between 2030 and 2050, climate change will cause an additional 250,000 deaths each year resulting from malnutrition, malaria, heat stress, and diarrhea.²⁶ In fact, the WHO states that the climate crisis is the greatest single threat to human health in the 21st century.

With the consequences of the COVID-19 pandemic continuing to be felt globally, zoonotic diseases and our ability to mitigate them has gained increasing global health attention. Zoonotic diseases are currently responsible for 60% of emerging infectious diseases²⁷

and it is estimated that there are 10,000 virus species that have the ability to infect humans, with the majority of them silently living in wild mammals. Changes in ecosystems and increased contact with wildlife via human encroachment on natural habitats continues to increase the likelihood of zoonotic transmission, increasing the risk that new diseases will spread to human populations. Cross-species viral transmission is not a new finding, but it is expected to become more severe with the increasing rise in temperature and degradation of the environment. For example, zoonotic leishmaniasis, a vector-borne disease transmitted by sandflies with severe nutritional impacts, is an emerging zoonotic concern that is strongly associated with climate change.²⁸

The changing environmental conditions are also increasing the transmission of several water-, air-, food, and vector-borne pathogens. Changing planetary conditions are driving an increased epidemic potential for diseases of inequality including viruses like dengue, Zika, cholera, and chikungunya. The proliferation of malaria-carrying mosquitoes, one of the leading

² Infections that are caused by viruses, bacteria, parasites, fungi or prions, and that can be transmitted between humans and animals.

causes of death for children and a leading cause of maternal mortality (both directly and indirectly due to anemia leading to postpartum hemorrhage), is also increasing, particularly in previously non-endemic areas.²⁹ Food-borne disease, currently resulting in 600 million infections worldwide, is an increasing concern as leftover food is at increased risk of becoming toxic as temperatures rise.³⁰ Similarly, climate change is resulting in unpredictable impacts on water availability, increasing contamination of water sources and the risk for water-borne illnesses. In the first two decades of the 21st century, 74% of natural disasters were water-related, implicating serious concerns for the potential to alter the distribution of intestinal parasites and diarrheal diseases.³¹ For example, the geographic distribution of schistosomiasis, a water-borne parasitic infection, is expected to shift as the snails that carry the parasite are re-distributed to new areas through flooding or where climatic conditions now favour their growth and create new endemic areas.

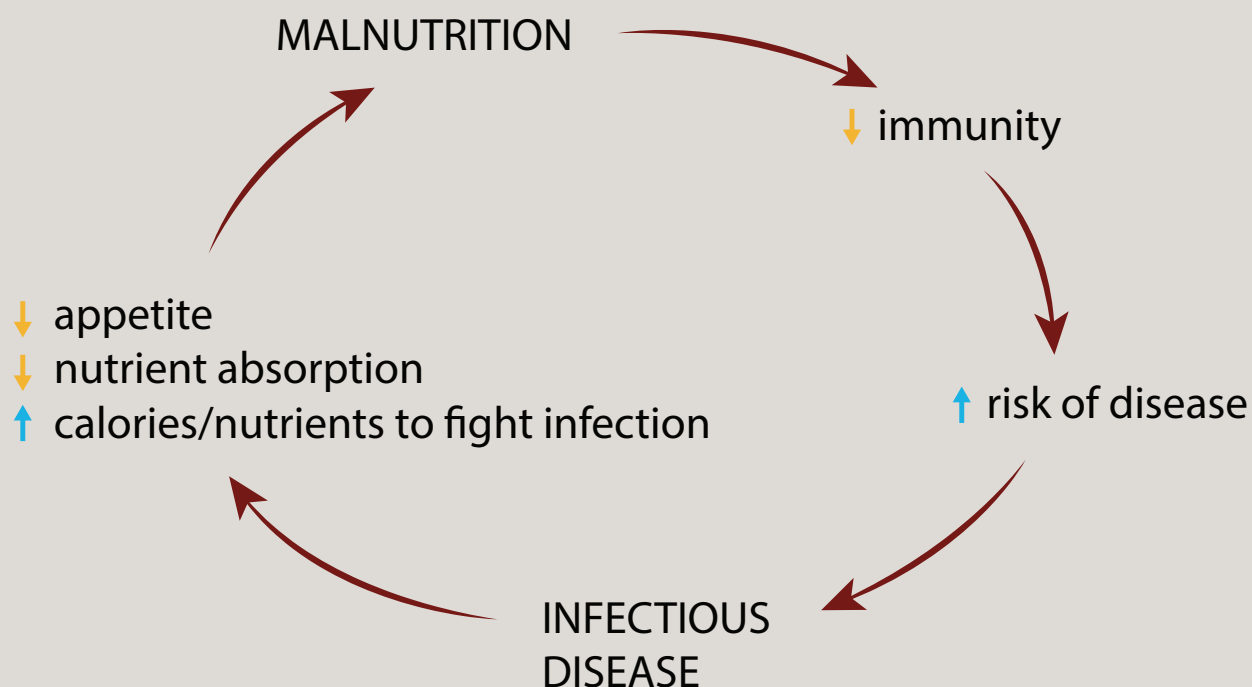
Pollution and changing environmental conditions are also directly increasing the risk for noncommunicable diseases. In fact, air pollution is the second leading

cause of NCDs, particularly respiratory diseases.³²

Air pollution is also causing millions of additional diabetes cases around the world³³ and is increasing the prevalence of cardiovascular disease, stroke, lung cancer and associated mortality. Research is also finding an association between prenatal exposure to environmental contaminants and epigenetic changes (changes that affect gene expression), increasing the risk for developing chronic diseases later in life. This indicates that climate change is eroding human health right down to the DNA level, with devastating impacts on health and nutrition for generations to come.

What does increased disease burden have to do with nutrition?

Disease can contribute to malnutrition through reduced food availability or quality through food contamination and/or through biological disruptions as a consequence of infection. **As demonstrated in the figure below,** the malnutrition-infection cycle demonstrates a negative two-way relationship between malnutrition and infection whereby they can both precede and exacerbate the experience and likelihood of the other.



On the one hand, malnutrition increases the likelihood of becoming infected with a pathogen by weakening the immune system. In this same way, malnutrition increases the severity of disease once infected, increasing the likelihood of more negative outcomes, including mortality. On the other hand, infectious diseases can increase the risk of malnutrition by changing the ability of the body to absorb and use the nutrients consumed. Infectious diseases can also contribute to malnutrition by increasing the body's need for more nutrients while infected (for example, higher nutrient requirements during a fever).³⁴

The climate-induced shifts in distribution and multiplication of disease vectors is particularly concerning when it comes to parasitic infection and the direct impacts on nutrition outcomes. Parasitic infections cause or exacerbate undernutrition through blood loss and impaired digestion, which impairs the absorption of nutrients in the body. For example, schistosomiasis causes loss of iron through intestinal or vaginal blood loss and contributes to and exacerbates iron-deficiency anemia. Similarly, malaria infection increases the risk of anemia – resulting in increased risk for poor pregnancy and birth outcomes, as well as poor cognitive and physical development among children.

There is also a clear link between diarrhea and climate variability. Increased ambient temperature extends the survival of pathogens that cause diarrhea. In addition, increasing frequency and intensity of climatic events, such as flooding, contribute to contamination of drinking water and exacerbate poor sanitation conditions with these conditions also limiting hygiene behaviour as a barrier to disease transmission. This is of particular concern since households with lower incomes are more severely affected by flooding and are also less likely to be able to take preventative action and receive assistance than more affluent households. Increased diarrheal diseases are also linked to droughts where water scarcity can result in allocation of limited water resources to priorities other than hygiene practices, further exacerbating transmission of diarrheal diseases. This is a concern as diarrhea is the leading cause of malnutrition among children under

five and the second leading cause of death among this age group.³⁵ Diarrhea is also a significant driver of micronutrient deficiencies, contributing to zinc loss, and poor maternal and birth outcomes. In countries in the global south where the annual hunger gap coincides with the rainy season, food insecurity that already puts vulnerable populations at risk of malnutrition, which could weaken the immune system, is compounded with seasonal spikes in water-borne diarrheal diseases through floods and contamination of water sources. As climate change intensifies challenges to food production and increases the frequency of floods, the combined effects of heightened food shortage and widespread diarrheal diseases greatly increase the risk of malnutrition, morbidity and mortality.

What does this mean for women and girls' nutrition?

Women and girls face a higher risk for some infectious diseases due to traditional discriminatory gender norms and persistent gender inequality. Gender norms often dictate the activities in which women and girls, men and boys participate and can thus influence differential exposure to pathogens. For instance, women may face increased exposure to malaria given that they are responsible for water collection. A study in Uganda revealed that gendered activities (late-evening outdoor meal preparation, early morning water collection, breastfeeding outside of bednet) increase women's vulnerability to malaria infection compared to men due to partaking in activities at peak mosquito hours.³⁶ Gender norms may also increase exposure to water-borne or soil-transmitted parasites such as schistosomiasis through laundering clothes and tending to crops, or increased risk of Ebola and COVID-19 virus disease due to their caring roles within the family.³⁷ Overlapping experiences of marginalization, including but not limited to gender identity, are important determinants for where and how people are permitted to live within countries and communities, and thus how much exposure they may have to particular diseases, as well as a key driver of systemic political bias in investing in appropriate treatments/response for them.

The link between malaria and anemia is concerning as anemia affects nearly one third (32.9%) of the world's population, with women suffering a higher prevalence of iron-deficiency anemia than men. Anemia in pregnant women is associated with increased risk of poor birth outcomes (low birth weight, preterm birth, small for gestational age, neonatal mortality, and more) and adverse maternal outcomes (postpartum hemorrhage, preeclampsia, and mortality). Evidence also points to adverse birth outcomes, including higher risk for small for gestational age, due to diarrheal illness during pregnancy.

Climate-driven shifts in the geographical distribution of disease vectors could pose additional strains on weak health systems that are not prepared to manage emerging infectious diseases. This, combined with factors negatively influencing health seeking behaviour, such as perceptions of unsafe or unhygienic conditions

at health facilities, further inhibits access to quality care and increases nutritional risks for women and girls. This poses additional challenges for women and girls who already face financial and cultural barriers to seek timely and appropriate treatment for infectious diseases that threaten their precarious nutritional status. As a secondary impact of shifting and increased disease prevalence, the increased unpaid care burden borne by women when children or elderly have an infection or NCDs, adds further challenges for women and girls to ensure their own nutritional wellbeing.





Pathway 3:

Impact on Migration

As a result of a complex variety of factors, voluntary or forced migration is becoming increasingly common with over 200 million people expected to be displaced as a result of climate change factors by 2050.³⁸ Climate change can drive migration through both slow-onset climate events, such as desertification, sea-level rise and ocean warming, and acute-onset climate events such as natural disasters, including droughts and floods, resulting in the sudden loss or the risk of losing safe dwelling places, productive assets and/or livelihoods. Populations worldwide are experiencing climate migration at an alarming rate. While temporary or seasonal migration of certain populations is not new, the change in weather patterns, rising frequency and severity of natural disasters leaves populations in climate vulnerable regions at a significant risk of being exposed to multiple climate events, with little time to recover and build resilience in between. For example, in Mozambique, migration is occurring as a result of climate associated natural disasters with five tropical storms and cyclones in the first half of 2022 alone.³⁹

The impact of climate-induced migration movements is significant, both for migrant populations and host communities. Resource competition, for example, is a key factor contributing to conflict, as well as challenges associated with the inability to afford or access nutritious food due to inflation or limited food production and availability.⁴⁰ Exposure to conflict, violence, and food insecurity in this context is exacerbated for marginalized populations such as those with diverse gender identities, or marginalized ethnicities and religions. This is a particular concern given that the majority of the world's displaced populations are hosted in already resource-constrained communities.⁴¹ Migration has also been identified as having negative impacts on the health of the environment and host populations, contributing to further environmental degradation and the increased likelihood of future forced displacement. The negative environmental effects on the communities hosting displaced populations stem from increased depletion and pollution of natural resources and the erosion and destruction of the natural environment. For example, refugee population presence in Tanzania contributed

to soil erosion and land degradation, unsustainable water extraction, and deforestation, that impacted agricultural outputs and affected food security in the region.⁴²

What does migration have to do with nutrition?

Climate change-induced migration has a direct impact on nutrition through disrupted access to traditional food sources, loss of crops and livestock, and disrupted access to essential nutrition and health care services. Current estimates from UNHCR report that 80% of displaced individuals are located in areas that are challenged by food insecurity.⁴³ Displacement has also consistently been associated with malnutrition. For example, a study found that children in Nigeria affected by displacement had a 50% higher risk of malnutrition.⁴⁴ Of the various forms of malnutrition, iron-deficiency anemia and vitamin A deficiencies have been identified as particularly prevalent deficiencies in refugee populations, however, these are often just a portion of the multiple micronutrient deficiencies displaced individuals suffer from.⁴⁵

In many cases, migrants come from communities with an existing high burden of malnutrition (including overnutrition and undernutrition). Pre-existing nutritional vulnerability is exacerbated during often long journeys with inadequate food, water, and sanitation, which can increase the risk for infectious disease. Or in the case of NCDs (such as diabetes), disrupted services can mean lack of access to critical support to manage these chronic diseases. This can mean that the nutrition and health needs of migrant populations arriving in host communities are significant. Despite this, migrants face many barriers to accessing nutrition and health services, including xenophobia and discrimination, high user fees, language barriers and poor cultural competency among health providers. Migrant populations are also often excluded from national programs for growth monitoring and promotion, and disease prevention, treatment and care.

In some cases, migration in climate change contexts follows patterns of urbanization with people from rural areas frequently migrating to large urban centres,

oftentimes to slums. This has important impacts on nutrition and disease patterns as a result of increased risk for infectious disease, disrupted traditional food systems and affordability of poor nutrient quality foods, driving rising rates of chronic diseases and the double burden of malnutrition.⁴⁶

What does this mean for women and girls' nutrition?

Women and girls are subject to increased vulnerabilities in the context of climate-related disasters, with data indicating that women and children are up to 14 times more likely than men to be killed by such disasters.⁴⁷ Malnutrition is increasingly likely following disasters, with a disproportionate burden of suffering placed on women and children. **Vulnerability during climate shocks reflects the pre-existing gender inequalities which limit women and girls' access to resources and decision-making power.** Women and girls may experience additional barriers to accessing the resources, power, and structures necessary to exercise their right to nutrition when combined with other experiences of marginalization. For instance, elderly women may not be permitted to migrate as a result of gender norms or structural barriers preferentially creating opportunities for those "able" to contribute to the workforce. This may leave them in prolonged situations of exposure, with limited social supports to mitigate negative effects. Climate shocks exacerbate these inequalities, often inhibiting women's and girls' ability to withstand the impacts of climate change, access basic services and return to pre-climate shock levels of stability.

Migration is expected to increase in the coming years due to the impacts of climate change. However, the decision to migrate in the face of climate change disproportionately impacts women who may not have access to or control over the resources needed to migrate. Women's limited decision-making power and normative role as caregiver in households and communities make it difficult for them to leave home without their husbands in certain cultural contexts. When men migrate, women's and girls' workloads intensify, and family food security, childcare,

education, and work opportunities often suffer. This disproportionate workload to care for children and the elderly also makes it harder for women to leave home for the purposes of accessing nutritious foods, seeking health services for themselves and their dependents, and to pursue opportunities that could help build back resilience. Adopted coping strategies often put women and girls at high risk of sexual and gender-based violence (SGBV) and exploitation, including forced labour, child marriage, and transactional sex, which not only violate multiple rights of women and girls but also have a direct and indirect impact on their nutritional status and overall health. For example, in Bangladesh, climate change is exacerbating existing drivers of child marriage where floods and droughts are forcing farmers in rural communities to search for employment in urban cities. Income lost from traditional livelihoods is exacerbating practices of using dowry as a means of income, pointing to a concerning trend that climate change could drive up rates of child marriage around the world.⁴⁸

The impact on nutrition for women and girls along the migratory journey can be significant because of disruptions to essential nutrition services. **The combination of malnutrition and SGBV changes the trajectories of these women and girls' lives**

forever, often including unplanned pregnancies that wreak havoc on young bodies and perpetuate cycles of malnutrition, poverty and inequality. Lack of access to essential health services, including lack of access to sexual and reproductive health (SRH) services, results in high levels of unmet needs for contraception, unplanned pregnancies, poor maternal and child health outcomes, and unsafe abortion.⁴⁹ Absence of menstrual health and hygiene services and sanitary products during migration presents further risks to the dignity and health of adolescent girls and women. Disrupted access to routine nutrition services, such as growth monitoring, means girls may miss critical intervention points to detect and manage growth faltering, including appropriate treatment for moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). Similarly, disruptions to antenatal care services for pregnant women, mean women miss critical nutrition supports such as Iron and Folic Acid supplementation, increasing the risk of adverse maternal and infant outcomes. Migration also disrupts girls' education, a critical entry point for delivering nutrition interventions (e.g. school feeding or iron supplementation) and for a supportive environment to promote optimal health and nutrition behaviours.

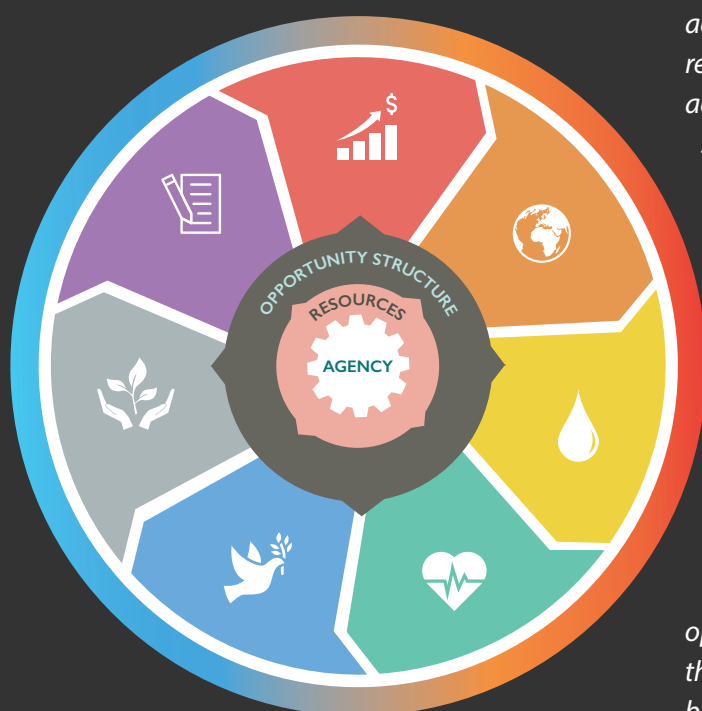


A Gender-Transformative Approach

Altogether, the complex challenges presented within each of these pathways overlap and intersect with one another to consistently undermine the rights of women and girls to safety, good health and nutrition. The disproportionate burden that the climate crisis exerts on women and girls emphasizes the importance of nutrition-and gender-transformative solutions that build resilience against the impact of climate change.

The Gender Transformative Framework for Nutrition (GTFN)⁵⁰ provides a critical tool for navigating the interplay between gender and nutrition and its effects on women and girls within a complex ecosystem of global challenges. **The GTFN has at its core an understanding that agency, resources, and opportunity structure are fundamentally linked and**

interact to influence the degree to which women and girls are empowered. The GTFN also uses systems thinking to highlight that actions and interventions within one system, or domain, of the GTFN will have ripple effects across the other domains. As women and girls increase their agency, have greater access to and control over resources, and experience opportunity structures that enable the enjoyment of their rights within one area of their life, they will experience gains in other domains in different ways. Ultimately, the GTFN emphasizes that the complex and intersecting challenges outlined in the previous three pathways require an intersectoral and gender-transformative approach.



Agency is the capacity to define one's own goals and act on them; where women are not seen as passive recipients of "welfare-enhancing help," but rather active agents within their own lives and influencing the systems within which they interact. Agency is most often conceptualized as decision-making power but also the ability to negotiate, influence or exert control over one's life or others.

To be able to act, women and girls must also have the necessary **resources** to do so. This can include everything from financial assets and material wealth to essential infrastructure, information, time and labour, mobility, bodily integrity, and access to social support.

Opportunity structure refers to the presence and operation of formal and informal institutions, including the laws, regulatory frameworks, and norms governing behaviour that affect women and girls' agency and access to resources.

Applying The Gender-Transformative Framework for Nutrition

The transformative approach that the GTFN describes requires an understanding of how power dynamics limit or enhance the participation of women and girls and their ability to claim their rights. Gender transformative actions actively seek to build equitable social norms, structures, and policies, in addition to individual gender-equitable behaviors, while also transforming harmful root causes of inequality. Women's empowerment occurs when each of these elements: agency, resources and opportunity structures, are activated and mutually reinforcing so that women and girls are able to achieve their goals or aspirations. A key element of applying women's empowerment theory to climate change adaptation and mitigation through the lens of nutrition is to understand that power imbalances and resulting gender inequalities have a direct impact on the

nutritional status of women and girls, and that poor nutrition is fundamentally disempowering.

In the face of enormous challenges, women and girls can be powerful change agents and play a crucial role in climate change adaptation and mitigation. Across the globe, women and girls are blazing a path for a better future with gender-transformative climate resilient measures – ensuring that they, their families, their communities, and generations to come will have access to nutritious food. Several case studies can be found following the conclusion that demonstrate women and girls as powerful change agents and outline opportunities for a gender-transformative approach to nutrition in each of the three pathways.





Conclusion

Intersecting experiences of marginalization, alongside complex gender dynamics have a direct impact on individual and collective agency, resource control, and one's ability to operate within an environment that champions their rights – all critical ingredients for resiliency in the face of climate change. In short, gender equality is fundamental to climate resilience, which is ultimately critical to the fulfillment of nutrition-related rights and to the achievement of the Sustainable Development Goals. Achieving gender equality and ensuring women and girls can act on their right to good nutrition in a warming world hinge on everyone's ability to respond to climate change.

Yet, women and girls have a unique capacity to lead the fight against climate change due to their proven local knowledge of, and leadership in, biodiversity and sustainable resource management. Women are often managers of domestic water resources and promoters of home and community-based sanitation activities. As such, they often have accumulated knowledge

about WASH resources, including location, water quality and storage methods. Similarly, women are primarily responsible for fuel collection across the Global South and when equipped with the necessary resources, they are more likely to choose sustainable fuel options. Time and again, experience demonstrates that meaningful participation of women and girls in all levels of decision-making and implementation is a critical factor in the success of sustainable resource management initiatives.

Around the world, women also play a unique and powerful role in conservation efforts through their roles as healers and traditional caretakers of the water and land. There are approximately 370 million indigenous peoples in the world, and they own, occupy, or use up to 22% of the global land area.⁵¹ Currently, more than 80% of the world's biodiversity resides within these lands that Indigenous people have been the traditional custodians of for generations. With many of these communities upholding matriarchal structures, Indigenous women possess unique ecological

knowledge and a powerful spiritual and philosophical approach to caring for and healing the Earth, making the role of these women crucial to conserve critical ecosystems and threatened species. Their traditional knowledge provides natural solutions to energy, waste management, and agriculture, offering a tremendous opportunity to scale on a global level. Women are also the keepers of native seed banks and nurseries, proving to be fierce protectors of local biodiversity. For example, as hurricanes increased in severity and frequency in Nicaragua, Indigenous women came together to create seed banks to protect local biodiversity and to create sustainable livelihoods that were not dependent upon industrialized agriculture.⁵²

Numerous examples support the fact that women have better leadership capabilities, think more sustainably and tend to make more decisions that support human and environmental welfare compared to men.⁵² Women are more likely to think for the collective, rather than themselves, making more decisions that support public good and ethical behaviors. Studies have documented that women are more likely to adopt preventative and innovative solutions faster than men. Women are also powerful organizers and have demonstrated their strength and capacity to lead powerful social and environmental movements. In fact, the environmental movement can be attributed to the leadership of women. Leaders like Jane Goodall have spent decades researching and building awareness around the complex relationship between humans, animals, and the environment. It was also the vision and leadership of a powerful group of women called the “lionesses” of international climate diplomacy, who met in the countryside of Scotland and ultimately solidified the concept of net zero emission targets that resulted in the Paris Climate Agreement that we now know.⁵²

Research shows that countries where women have higher social and political status have a 12% lower CO2 emission. Clearly the way forward hinges on changing conditions so that women and girls can recognize and act on their own power to take the lead as transformational change agents, in partnership with male allies, duty bearers, and other power holders.

Without transforming these power dynamics, response and mitigation efforts will continue to exacerbate inequalities and uphold systems of oppression. The global community must transform the way we think about and act on the role of nutrition in achieving gender equality, and ultimately climate resilience.



Case Study Annexes

Pathway 1 Case Study:

FORTIFYING EQUALITY AND ECONOMIC AND DIVERSIFICATION (FEED) – MOVING TOWARDS GENDER-TRANSFORMATIVE APPROACHES

FEED was a three-year project implemented by World Vision, Oxfam and CARE, funded by Global Affairs Canada.

In South Sudan, worsening food insecurity and diet quality is driven by a mix of climate shocks, protracted conflict, and displacements, contributing to insufficient crop production and ongoing disruptions to livelihoods. The situation remains volatile, and it is women and girls who are most affected. Discriminatory gendered norms, such as practices where women and girls eat last and least increase their vulnerability. Women also face limited decision-making power, access to and control over productive resources, information, and services and significant mobility restrictions. The labour burden of women and girls significantly exceeds that of men and boys, undermining their productive capacity and exacerbating challenges in meeting their nutrition needs. Widespread early marriages, violence against children, and SGBV are fueled, in part, by reduced access to food.

FEED was one of the first food security projects in South Sudan to intentionally adopt a gender-sensitive approach, specifically targeting female farmers and explicitly seeking to transform traditional power imbalances towards more equal opportunities for women and greater gender equality (GE). As one of the main interventions, Farmer Field Schools (FFS) were established to promote new farming systems, climate smart agronomical practices, and sustainable management of natural resources through training on Farmer Managed Natural Regeneration. FFS were also a key intervention in supporting women to access and control resources they needed to increase agricultural production and income. FFS also supported women to take leadership roles, giving them decision-making power and responsibility to determine the direction of their group. Women-led FFS were able to address needs

that were specific to women in their communities and increased opportunities for female farmers through collective bargaining power.

FEED's interventions also addressed deeply rooted discriminatory gender norms. Male allies and traditional power holders were engaged to identify and address barriers in the underlying socio-cultural, economic and political environments that limited the decision-making power and resource control of women. A situational analysis was conducted to understand how different actors in society had differing incentives to enable or block progress towards women's participation and empowerment. Civil society members and government representatives were trained on women's legal entitlements and were engaged to improve their enforcement. To further address discriminatory gender norms impacting women and girls' ability to fulfil their right to good nutrition, in collaboration with the Ministry of Health, FEED trained volunteers to improve equitable food utilization practices through community dialogues, cooking demonstrations, and home visits, covering dietary diversification, food preparation, and hygiene.

The project demonstrated success in improving diet quality as 71% of households achieved minimum diet diversity at endline, compared to 31.3% at baseline. The most transformational change was observed in gender power dynamics demonstrating impact on agency, resource control, and shifts in the informal/formal environment. Women experienced equal access to agricultural services (75.8% female, 75.1% male), significant increases in control of livelihood assets (73% endline, 43% baseline), and increases in profitable/

viable income generating activities (from 4.1% to 64.3%), surpassing that of men (35.7%). The perception of women's ability to contribute to decision-making, including regarding farming activities, improved from 54.5% to 79%.

The success of the project was credited to the integration of GE activities with agricultural activities – gaining community trust through food security interventions first, alongside targeted engagement of male/female leaders as champions for GE. Transparent targeting and strategic inclusion of men in dialogues and activities designed to reduce inequalities between women and men's access to/control over resources was critical to mitigate the risk of backlash to female participants. By putting the needs of women and girls at the centre, FEED demonstrated a successful multi-pronged approach to integrate activities related to climate adaptation, increasing agricultural production, promoting diet diversity, disaster management, peaceful conflict resolution and GE, ultimately supporting women and girls to claim their nutrition-related rights and act as agents of change in their families and communities.



Pathway 2 Case Study:

STRENGTHENING GENDER EQUALITY AND SOCIAL INCLUSION IN WASH IN BANGLADESH (SHOMOTA)

SHOMOTA was a five year project implemented by World Vision, with funding from the Australian Department of Foreign Affairs and Trade.

The Jamalpur, Gaibandha and Satkhira districts of Bangladesh are extremely vulnerable to flooding, climate influences, cyclones and saline intrusion. With poor levels of sanitation among communities, these districts are subject to recurrent and intensifying impacts of disasters, exacerbating poor Water, Sanitation and Hygiene (WASH) facilities and practices. In addition to being living in hard-to-reach locations, these communities have some of the highest rates of poverty in Bangladesh. Women and people with disabilities face multiple constraints which limit their equal participation and decision making related to WASH, including family expectations, social constraints such as expectations of limited mobility/seclusion and social roles, and limited access to and control over income and assets. In addition to shouldering all of the care burden for household chores and care giving, World Vision's gender assessment found discriminatory perceptions held by male community members regarding what women and those with disabilities can and should do, further limiting their active participation in community structures and processes.

In response, World Vision implemented SHOMOTA, an integrated project that took an empowerment approach to improve WASH coverage and practices. The project's activities were guided by a Gender Equality and Social Inclusion (GESI) framework and power analysis that sought to equip change agents and traditional power holders to shift negative gender norms, while increasing the leadership and participation of women and those with disabilities in WASH structures and processes. The project partnered with women's organisations to advocate for increased equality and inclusion in WASH policies and governance and to strengthen

demand for access to WASH services by excluded groups. Women were also supported to meaningfully participate in formal WASH governance structures and the government-led WATSAN committees. This provided opportunities for systemic and structural change to WASH services, with the inclusive perspective of women and people with disability shaping decisions.

To empower communities to hold duty bearers accountable for service provision, the project employed World Vision's Citizen Voice and Action (CVA) model. The CVA approach supported community members with knowledge of their rights and the ability to rate the performance of government service providers against the government's obligations. Women were encouraged and equipped to take on leadership roles within the CVA groups. Communities also participated in sessions where they noted WASH issues or services that were most important to them and provided a quantitative and qualitative assessment of these issues to better inform the government and service providers.

World Vision's MenCare approach was also implemented to tackle discriminatory gender norms that are key barriers to accessing WASH services for women and girls. It used a group education model, working with men and women, empowering them to critically reflect on gender norms, workloads, and decision-making at individual and household relationship level, ensuring that men were engaged as allies.

As a result, SHOMOTA transformed social norms, strengthened system structures and enabled the active participation of women, people with disabilities and Sexual and Gender Minorities (SGM) in all aspects of

WASH programming. The project equipped strong advocates and leaders for equality and inclusion across all the target communities. Leaders like Rabyea Basri Rayna, who mobilized her community to install low-cost, inclusive handwashing devices and toilets in their homes. As a result, four wards and 28 communities were declared and certified by the Department of Public Health Engineering as open defecation free (ODF) and having 100% handwashing device coverage.

The holistic approach contributed to gender-transformative change, as evidenced by increased agency of women and people living with a disability, especially to participate and engage in decision-making in WASH governance. The project also demonstrated progress towards equitable power dynamics, which

was visible in gendered relations in households, at the community level, and through changed relations between government officials and women and people living with a disability in formal governance structures. Importantly, women and people living with disability were able to advocate for their unique needs, which resulted in new allocations of government funding for more inclusive WASH infrastructure.



Pathway 3 Case Study:

WHERE THE RAIN FALLS (WtRF) - IMPROVING LIVELIHOODS TO REDUCE MIGRATION PRESSURES IN INDIA

Where the Rain Falls (WtRF) is an on-going, 9-year research and adaptation program undertaken in partnership between CARE International and the United Nations University Institute for Environment and Human Security (UNU-EHS), and financially supported by the AXA Group and the John D. and Catherine T. MacArthur Foundation

In the Jashpur district of Chhattisgarh and Buldhana district of Maharashtra, women are highly dependent on rainfed agriculture and face many challenges due to climate change, including water stress, erratic rainfalls, deterioration of soil quality and fertility, and declining agro-biodiversity. With changing weather patterns and low expertise on how to adapt to these changes, the productivity of their paddy fields is worsening. As a result, women need to migrate every year with their families to other areas to find work and food. These communities also have limited representation of women in local organizations and persisting gender inequalities affecting women's access to natural resources, markets, financial services, and public services.

In response, CARE launched the WtRF project with an initial focus of building capacities of tribal (Adivasi) women to address climatic shocks and stresses around water. The WtRF project initially focused on building capacities of tribal (Adivasi) women to address climatic shocks and stresses around water. This was deepened and expanded to address chronic risks like water and food insecurity (agriculture related livelihoods) arising out of climate and impacting tribal (Adivasi) women's access, control, and management of natural resources.

Women are now better able to plan their agricultural activities because they are engaged in participatory scenario planning. Before the rainy season starts, and as

soon as a seasonal climate forecast is made available by the meteorological department, the women, and their communities, including the traditional forecaster, meet with local authorities to create an action plan for the rainy season. Then, twice a week, weather information that is received from the local agriculture university is shared through village information boards and messaged to cell phones. With this climate information at hand, women can properly plan their agricultural activities. In selected villages, mini-weather stations were set-up and are being monitored by women, to provide farmers with locally accurate weather data on a daily basis.

While the provision of weather information increased women's access to information, opportunity structures, restricted access to resources, and limited agency afforded to women still had to be addressed so that women could act upon the information they received. Therefore, women were trained on agricultural techniques through FFSs and on functional literacy and leadership, empowering women to increase participation in local governance organizations and access inputs, markets, and services. WtRF addressed deeply rooted systems of gender inequality through gender dialogues and the promotion of male champions to advocate on gender issues, resulting in improved equitable decision-making and supportive relationships within communities and households.

Women smallholder farmers improved their skills on sustainable, productive, equitable and resilient (SuPER) agricultural practices such as planting diversified crop varieties, ensuring spacing between seedlings, using organic fertilizers, and managing irrigation water carefully. The water harvesting, storage, and management techniques and the construction of

dams and farm ponds expanded the scope and annual timespan for cropping. Final evaluations showed that the perception of women's role in the communities had positively changed. Women's independent decision making and mobility, confidence in raising issues in public and their participation in community decision-making increased. Alongside this, the project demonstrated increases in agricultural production, resulting in a 33% increase in income, a decrease in food insecurity (only a fourth of the households are now food insecure), and a decrease in the number of days of seasonal migration (almost down to a third, from 31 days to 12 days per year).



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