Technical Guidance Note:

The Integration of Climate, Gender Equality and Health into Programming in Development and Humanitarian Contexts

July 2025

CanWaCH
Canadian Partnership for Women and Children's Health

ABOUT

The Canadian Partnership for Women and Children's Health (CanWaCH) is a proud membership of more than 100 non-governmental organizations, academic institutions, health professional associations and individuals partnering to improve health outcomes for women and children in more than 1,000 communities worldwide. Learn more at www.CanWaCH.ca.

Recommended citation: CanWaCH. (July 2025). *Technical Guidance Note: The Integration of Climate, Gender Equality, and Health into Programming in Development and Humanitarian Contexts.* Available at www.CanWaCH.ca.

ACKNOWLEDGEMENTS & DISCLAIMER

CanWaCH gratefully acknowledges the primary authorship and research of Liana Environmental Consulting (Dr. Ellen Woodley) in the development of this technical guidance note, as well as the contributions of the CanWaCH Secretariat, Global Affairs Canada, the CanWaCH Metrics Working Group, and other participating CanWaCH member organizations. In particular, we thank WaterAid and the International Federation of Red Cross and Red Crescent Societies for their case studies.

This note is under active review and consultation, and feedback is encouraged. Please contact Jessica Ferne, Director, Global Health Impact at info@CanWaCH.ca to participate more in this process.

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ACRONYMS

AgE	Agroecology
AF	Adaptation Fund
AgF	Agroforestry
CA	Conservation Agriculture
CanWaCH	Canadian Partnership for Women and Children's Health
CO2	Carbon Dioxide
CSA	Climate Smart Agriculture
CSO	Civil Society organizations
CVA	Climate Vulnerability Assessments
DRR	Disaster Risk Reduction
EMP	Environment Management Plan
FIAP	Feminist International Assistance Policy
FNS	Food and Nutrition Security
GAC	Global Affairs Canada
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoC	Government of Canada
NbS	Nature-based Solutions
NGO	Non-governmental Organization
SEA	Strategic Environmental Assessment
SEDH	Social and Environmental Determinants of Health
SGBV	Sexual and Gender-Based Violence
SRHR	Sexual and Reproductive Health and Rights
TGN	Technical Guidance Note
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VAA	Vulnerability and Adaptation Assessment
WaSH	Water, Sanitation and Hygiene
WHO	World Health Organization

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1.0 INTRODUCTION

1.1 ABOUT THIS NOTE

The relationship between climate and health is complex, with multiple interactions, synergies, and feedback loops (Romanello et al., 2022). The World Health Organization (WHO) states that the climate crisis is the greatest single threat to human health in the 21st century. When the gender dimension is added to climate and health linkages, the complexity increases. Therefore, understanding intersectionality of gender, health and climate change is critical to addressing the disproportionate health impacts of climate change on the most vulnerable populations.

While climate change impacts everyone's health, research from the United Nations Framework Convention on Climate Change (*Introduction to Gender and Climate Change | UNFCCC*, n.d.) highlight that women and girls face greater health risks from climate change and its devastating consequences. For example, women and girls are more vulnerable to climate-related disasters, with data indicating that they are up to 14 times more likely than men to die during such disasters (UNDP, 2022). Unless climate policy and action recognize and acknowledge these differences, climate change will continue to disproportionately affect women and girls, further amplifying existing gender inequalities (Fruttero et al., 2023).

This technical guidance note (TGN) focuses on disparities in climate change impacts and how the most vulnerable populations are disproportionately affected. High- and upper-middle income countries emit more than 80% of the world's CO2. Lower-middle and low-income countries, despite a much higher population, emit less than 20%, with the poorest countries emitting less than 1% (Ritchie, 2023). While these communities are not contributing in a large way to carbon emissions, they need to act to protect their health and livelihoods and the ecosystems they depend on. Vulnerable communities require the resources to adapt and to become resilient to the impacts of a changing climate.

Estimates suggest that women and girls account for 80% of the people displaced by climate changes (United Nations, 2021). Not surprisingly, one of the key messages emerging from the 2024 CanWaCH Healthy World Conference was that there is a need to *"articulate the sweet spot of gender/health/climate together"*, rather than in isolation. While the global health sector is generally knowledgeable on the obstacles, challenges and determinants of health related to climate change and potential adaptation and mitigation strategies, *"organizations [may] not necessarily know where to find and how to effectively apply the tools, indicators and frameworks to do this. Technical guidance, training and resources relevant to the health sector, and with a particular sensitivity to gender equity and human rights, are critical."*

Through this note, Canadian Partnership for Women and Children's Health (CanWaCH) seeks to support our sector to better understand the multiple, complex, integrated, and often reciprocal links between climate change, the environment and women and children's health. With over 100 member organizations, CanWaCH aims to increase the capacity of organizations to implement gender transformative health programming while considering climate change and environmental impacts. Considering the profound impact of the climate crisis on the health and well-being of vulnerable communities, disproportionately affecting women and girls, this TGN aims to provide the CanWaCH membership with some suggested tools and resources to ensure more effective integration of climate change and the environment considerations into global health and gender equality programming. The intended audience for this TGN includes practitioners, implementers and researchers, many of whom are working in partnership with the Government of Canada on global health and gender equality programming.

1.2 **APPROACH** AND METHODOLOGY

> ***The ultimate objective of integrating climate and environment into Gender and Health programming is to increase the resilience of women to the impacts of climate change to ensure optimal health outcomes, while considering and, where possible, reducing the impacts of programming on the natural environment.***

Specifically, the TGN is intended to provide some ideas and tools to help catalyze knowledge building and capacity of practitioners in this sector to:

i. Develop interventions to raise awareness and take action on the impacts of climate change, especially among women;
ii. Develop interventions to increase the resilience of women to the impacts of climate change to ensure optimal health outcomes while minimizing impacts on the environment and reducing the intervention's contribution to climate change;
iii. Find ways to reduce the climate impacts of existing interventions (i.e., test whether programming interventions are meeting the environmental requirements of Canada's climate finance initiative).

This note is grounded in the core functions of the health sector but linked to the wider social and environmental determinants of health (SEDH). It considers how climate change impacts each of the selected examples of determinants of health and how health and gender programming can then work to provide interventions that confer climate resilience while minimizing impacts on the environment.

The development of the TGN was consultative and collaborative. First, a series of interviews were held with some CanWaCH members who were invited to contribute their expertise and expectations. Next, a literature review was conducted to provide evidence for the linkages between gender, health and climate change and for best practices that illustrate these linkages. Finally, the draft TGN was reviewed by members of CanWaCH's Metrics Working Group and other technical specialists in climate, health and gender, who provided feedback for the final version. The process took place between October 2024 and January 2025.

1.3 **HOW TO USE** THE TECHNICAL GUIDANCE NOTE

The TGN aims to provide a conceptual framework to visualize the impact of climate change on health. It also outlines how adapting an action plan for climate change can inform health interventions while considering the potential environmental impacts. Section 2 includes a list of key terms and their definition for reference.

Since local ecosystems sustain human communities, it is important to recognize and mitigate potential impacts of health interventions. Additionally, identifying ways to enhance and restore these ecosystems can help ensure they provide essential services that human health depends on. Below, Figures 1 and 2 illustrate the conceptual framework to capture these relationships between impacts, interventions, action and mitigation of negative impacts.

Section 3 is designed to provide some examples of climate change impacts on health. Health has been deconstructed to include several social and environmental determinants of health. Within each sub-section, there is a non-exhaustive list of possible negative impacts that related health project interventions might have on the environment. As well, you will find suggestions for climate change adaptation responses that could confer greater climate resilience for women with greater environmental benefits.

Section 4 provides two examples of existing projects, with the purpose of providing a breakdown of what the climate change hazards impacts are for each project's geographic region, how those impacts affect one or more determinants of women's health, what a suitable adaptation response might be to improve climate resilience and how the project might consider negative impacts of the intervention with ways to mitigate those impacts. This breakdown generally follows the flow of concepts presented in Figures 1 and 2.

2.0 FRAMING GENDER AND HEALTH IN THE CONTEXT OF CLIMATE CHANGE

2.1 DEFINITIONS

Agroecology (AE): a holistic and integrated approach that applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems. It seeks to optimize the interactions between plants, animals, humans and the environment while also addressing the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced (Global Landscape Forum, 2023).

Agroforestry (AF): The interaction between agriculture and trees that tries to balance various needs: 1) to produce trees for timber and other commercial purposes; 2) to produce a diverse, adequate supply of nutritious foods to meet global demands and the needs of the producers; and 3) to ensure the protection of the natural environment so that it continues to provide resources and environmental services to meet the needs of the present generations and those to come (World Agroforestry, 2024).

Climate Resilient Agricultural Practices: Farming techniques and strategies that help farmers adapt to, cope with, and recover from climate shocks and stressors, such as droughts, floods, and unpredictable rainfall patterns. These strategies could include crop diversification, incorporating native agrobiodiversity that is adapted to the local context, rainwater harvesting, etc. Many of these practices also have the potential to improve local food and nutrition security and dietary diversity. Additionally, some farming practices have the potential to mitigate carbon emissions; for example, using integrated pest management techniques can help farmers reduce their use of synthetic pesticides, which are greenhouse gas (GHG)-intensive.

Climate Resilient Water, Sanitation, and Hygiene (WaSH): Climate resilient WaSH refers to WaSH services and behaviours that continue to deliver benefits, or that are appropriately restored, within a changing climate context and despite climate induced hazards. Robust, sustainable WaSH systems can improve resilience to climate change.

Climate Smart Agriculture (CSA): An approach to agricultural practices that aims to transform farming systems towards green and climate resilient practices. CSA has three main objectives: sustainably increasing agricultural productivity and income; adapting and building resilience to climate change; and reducing and/or removing GHG emissions, where possible. CSA practices are context-specific, depending on local socio-economic, environmental and climate change factors (Food and Agriculture Organization of the United Nations, 2025).

Conservation Agriculture (CA): A farming system and form of CSA that promotes minimum soil disturbance (i.e., low or no tillage), maintenance of a permanent soil cover, and crop diversification. CA aims to enhance biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production (Food and Agriculture Organization of the United Nations, 2025).

Climate Change Adaptation: Actions to help reduce vulnerability to the current or expected impacts of climate change. Many adaptation measures need to happen at the local level, in rural communities and cities. Examples of adaptation measures include planting crop varieties that are more resistant to drought, practicing agroforestry or agroecology, improving water storage and use, managing land to reduce wildfire risks, and building stronger and sustainable responses to extreme weather like floods and heat waves. Adaptation also needs to be driven at the national and international levels through policies that guide adaptation, and large-scale measures such as strengthening or relocating infrastructure from coastal areas affected by sea-level rise, building infrastructure able to withstand more extreme weather conditions, enhancing early warning systems and access to disaster information, developing insurance mechanisms specific to climate-related threats, and creating new protections for wildlife and natural ecosystems (UNDP, 2023).

Climate Change Mitigation: Efforts to reduce GHG emissions (CO2) and enhance carbon sinks through carbon sequestration (e.g. trees store carbon so tree planting can be considered mitigation as well as an adaptation practice (UNFCCC, 2025).

One Health: An integrated, unifying approach to balance and optimize the health of people, animals and the environment. It is especially important to prevent, predict, detect, and respond to global health threats (such as the COVID-19 pandemic). The One Health approach is highly relevant for several of the SEDH identified in this guidance note, including food and water safety, nutrition, the control of zoonoses and pollution management (World Health Organization, 2017).

Resilience: the capacity of a social-ecological system to cope with a hazardous event or disturbance, responding or reorganizing in ways that maintain its essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.

- **Climate resilience:** Climate resilience is achieved through three interdependent outcomes: (1) ***Resilient people and livelihoods:*** a world where people most vulnerable to climate risks, especially those living in least developed countries and small island developing States, are resilient, prosper and thrive. It also depends on (2) ***resilient businesses and economies*** and (3) ***resilient environmental systems*** (Global Climate Action, 2021)
- **Health system resilience:** "the ability to prepare for, manage (absorb, adapt and transform) and learn from shocks"

Vulnerability: The degree to which individuals and systems are susceptible to and (un)able to cope with adverse effects of climate change, including climate variability and extremes. The vulnerability and adaptive capacity of particular populations to changing climatic conditions is influenced by a variety of factors, including biological factors (e.g., age, pre-existing health conditions, etc.), socioeconomic factors, infrastructure, and access to and control over resources.

Water Security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.

2.2 GLOBAL AFFAIRS CANADA: FIAP AND PARTNERING FOR CLIMATE

Global Affairs Canada's (GAC) Feminist International Assistance Policy (FIAP) and the $5.3 billion climate finance commitment require environmental integration into programming. There is a concomitant need to reduce the impacts of climate change on women's health and to reduce the impacts from health interventions on the environment.

An objective (Global Affairs Canada, 2022b) of the $5.3 billion climate finance commitment is to *Advance feminist climate action that supports the poorest and most vulnerable*. In this climate finance envelope, an amount of $315 million has been allocated for "Partnering for Climate" (Global Affairs Canada, 2022). This initiative funds projects from civil society, Indigenous Peoples, and other organizations in Canada to support climate change adaptation in Sub-Saharan Africa and other parts of the world.

To ensure that Canada's international assistance effectively achieves the goals of gender equality and the empowerment of women and girls, six action areas have been developed in the FIAP:

1. Gender Equality and the Empowerment of Women and Girls
2. Human Dignity (health and nutrition, education, humanitarian action)
3. Growth that Works for Everyone
4. Environment and Climate Action
5. Inclusive Governance
6. Peace and Security

For each of these interacting and overlapping areas, the FIAP has developed a Strategic Environmental Assessment (SEA), which asks key guiding questions on possible environmental impacts in these core action areas. As health crosscuts most of these action areas, the SEA are useful guides to test whether programming interventions are meeting the environmental requirements of Canada's climate finance initiative.

Canada has committed to allocate at least 20 per cent of its $5.3 billion climate finance pledge to projects that integrate nature-based solutions (NbS) that contribute to biodiversity co-benefits in developing countries (Tomlinson & AidWatch Canada, 2024). The Canadian Government has committed to "adopt a nature positive approach across all programming to ensure that its climate-related interventions do no harm to the environment, and strive to contribute to positive biodiversity outcomes," in all its climate thematic areas. Given that human health is inextricably intertwined with ecosystem health, it is imperative that health programming takes climate change and environmental considerations into account.

There is a need to strategically mobilize funds to enhance and expand the climate resilience of the health sector. Multilateral climate funds and climate-related assistance can jointly promote a range of health goals. These include climate change funding streams such as the Global Environment Facility (GEF), Adaptation Fund (AF) and Green Climate Fund (GCF). Financing mechanisms for health can incorporate or improve service provision across multiple sectors, including financing global health-responsive climate action. Commitment is also needed to ensure that adaptation programmes allocate resources to the health sector and to ensure adaptation and mitigation receive equal financing (World Health Organization, 2015).

2.3 **CONCEPTUAL FRAMEWORKS:** CLIMATE CHANGE IMPACTS ON DETERMINANTS OF HEALTH

> *"Climate change is moving both the environmental and social determinants of health in the wrong direction"* (Climate Centre, 2025).

For the purposes of this note, climate change impacts are considered in direct reference to the relevant SEDH. For example, if food security is a determinant of health, then the climate change impacts on food security were considered along with options for adaptation and resilience to these impacts. Finally, broad intervention areas for health programming were considered in terms of what environmental impacts those interventions might have and how those could potentially be mitigated.

2.3.1 CLIMATE CHANGE HAZARDS AND IMPACTS FRAMEWORK

Figure 1 illustrates a list of SEDH as impacted by climate change. The impacts on each of the SEDH overlaps and are interrelated. For example, drought, floods and high temperatures affect all of the SEDH but in different and frequently intersecting ways.

This framework illustrates the cascading effects of climate change on health. Climate hazards (pink) lead to primary impacts on the biophysical environment (blue), which then cause secondary effects on both built and natural environments (purple). These secondary impacts directly influence key social and environmental determinants of health, particularly for vulnerable women and children, and can further exacerbate local environmental challenges.

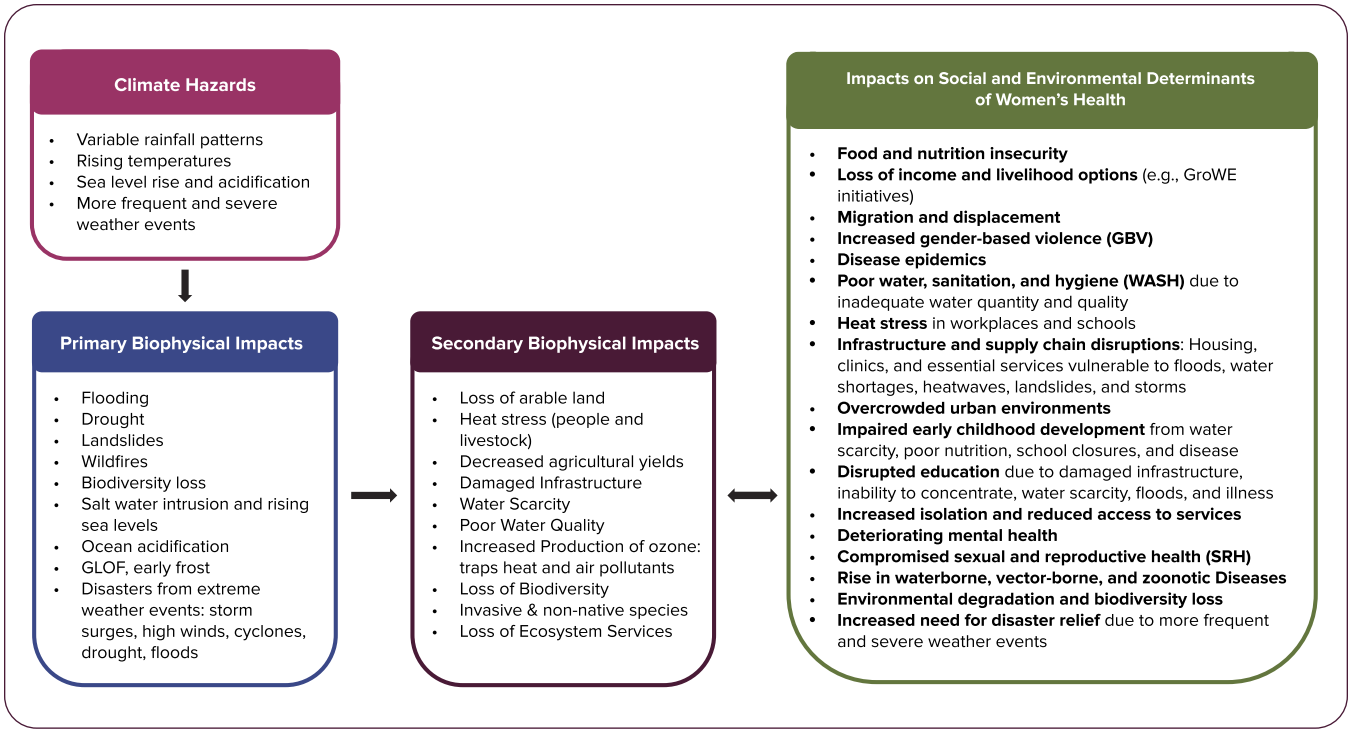

FIGURE 1: Social and environmental determinants of health impacted by climate change

2.3.2 FRAMEWORK FOR ACTION ON CLIMATE CHANGE AND THE ENVIRONMENT

The Framework for Action illustrated in Figure 2 is a continuation of the conceptual framework shown above. The determinants of health in the green box in Figure 1 are placed in the inner pink circle in Figure 2, to illustrate the importance of ecosystem health for the provision of its services. The action begins with a vulnerability assessment to assess exposure and sensitivity to climate change impacts. The programming response to the assessment determines the direction of the intervention: whether adaptation, mitigation, Disaster Risk Reduction (DRR) emergency response, or all three are required. Indicators and monitoring are a key part of the framework. As well, a key requirement of GAC-funded projects is satisfying environmental criteria in the form of an environmental assessment and environmental management plan. This ensures that no harm is done to the environment and any potential negative impacts have a mitigation plan. Two case studies in Section 4 briefly outline the steps shown in Figures 1 and 2.

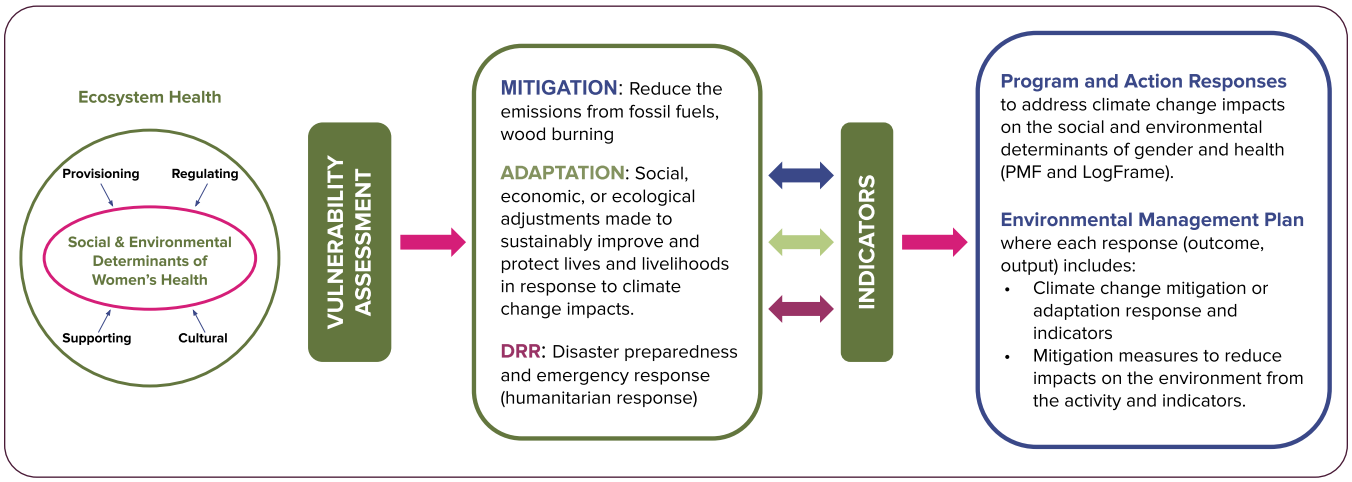

FIGURE 2: Framework for Action

2.3.3 THE IMPORTANCE OF BIODIVERSITY AND ECOSYSTEM HEALTH FOR HUMAN HEALTH

A separate section on biodiversity and ecosystem health is included due to the fundamental importance of healthy ecosystems for human health. According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, current trends in biodiversity loss and ecosystem degradation *undermine progress towards 80 per cent of the Sustainable Development Goals related to poverty, hunger, health, water, cities, climate, oceans and land (IPBES, 2019).*

> *"Biodiversity underpins ecosystem functioning and the provision of goods and services that are essential to human health and well-being… [it] is a key environmental determinant of human health; the conservation and the sustainable use of biodiversity can benefit human health by maintaining ecosystem services and by maintaining options for the future"*
>
> (World Health Organization & Secretariat of the Convention on Biological Diversity, 2015).

Human health ultimately depends upon ecosystem products and services (e.g., availability of freshwater, food and fuel sources), which are required for good health and productive livelihoods. For this reason, health programming cannot afford to ignore the importance of healthy ecosystems and must work to ensure that there are no adverse effects of project interventions on the environment, that efforts are made to enhance biodiversity and ecosystem health where possible and that carbon emissions that contribute to climate change are mitigated.

Figure 2 above shows the four ecosystem services that healthy ecosystems provide, serving as the drivers for the social and environmental determinants of health:

- **PROVISIONING** services such as water, food and timber;
- **REGULATING** services such as pest control, climate regulation and regulation of water quality;
- **CULTURAL** services including recreational and spiritual benefits; and
- **SUPPORTING** services such as photosynthesis, soil formation and nutrient cycling

Understanding how well local ecosystems function to provide essential ecosystem services is integral to understanding community and household vulnerability and resilience. Ecosystems, including our food production systems, depend on a whole host of organisms: primary producers, herbivores, carnivores, decomposers, pollinators, pathogens, natural enemies of pests. Services provided by ecosystems include food, clean air, the quantity and quality of fresh water, medicines, spiritual and cultural values, climate regulation, pest and disease regulation, and disaster risk reduction. Socio-economic development has occurred at great cost to the underlying natural resource base.

While climate change is a driver of change that affects both biodiversity and health and the interactions between them, another key interaction arises from the impacts of health sector interventions on biodiversity. For example, the use of pharmaceuticals by the health industry may lead to the release of active ingredients in the environment and damage species and ecosystems, which in turn may have negative effects on human health. Ecosystem degradation from the myriad of human activities that contribute to poor air and water quality results in heavy burdens on human health, with the most pronounced impacts on women, children and the poor. Conversely, the establishment of protected areas to conserve biodiversity maintains ecosystem services for the local population by, for example, protecting water supplies and air quality, which then has positive health benefits.

> ***"It is increasingly important for people in the public health sector to recognize that human health and well-being are influenced by the health and integrity of local ecosystems, and frequently by the health of local plant and animal communities. The interactions between people and biodiversity can determine the baseline health status of a community, providing the basis for good health and secure livelihoods, or creating the conditions responsible for morbidity or mortality. In many cases, the long-term success and sustainability of public health interventions is determined by the degree to which ecological factors are taken into account"***
>
> (World Health Organization & Secretariat of the Convention on Biological Diversity, 2015).

Behavioral change is needed to improve human health and protect biodiversity. Human behaviour is at the core of the interlinkages between health and biodiversity, including challenges related to food, water, disease, medicine, physical and mental well-being, adaptation and mitigation of climate change. Different gender roles in relation to biodiversity management, conservation and use can also have an impact on human health, and more attention needs to be paid to gender dimensions.

2.4 RECOMMENDED STEPS FOR ACTION

1. CONDUCT A CLIMATE VULNERABILITY AND ADAPTATION ASSESSMENT WITH A FOCUS ON GENDER AND HEALTH:

Climate vulnerability and adaptation assessments (VAAs) are an essential tool for health policy and programmatic planning (World Health Organization, 2015). They identify populations susceptible to negative health outcomes, pinpoint system weaknesses, and propose specific interventions to address these issues. Assessments designed to measure the impact of climate change on health and their linkages can collect data on:

- **Vulnerability**: a robust understanding of the main health risks posed by climate change in a given context, and of the most at-risk population group(s) in the country or region;
- **Capacity:** baseline information on capacities, assets, and gaps within the health system to face the challenges posed by climate change;
- **Adaptation options:** information on the main adaptation options available, including their comparative advantages, potential costs and efficiency, available for selection by health system decision makers (World Health Organization, 2015).

VAAs can be conducted at the country level using national-level indicators but are more relevant at the local level. Some examples include the Climate Vulnerability and Capacity Analysis (CVCA) tool developed by CARE or the Enhanced Vulnerability Capacity Assessment (EVCA) that is used by the British Red Cross (see references to these in the table in Section 3.1 below). Often, organizations may have their own VAA frameworks used in baseline studies before a project intervention. These can be modified to identify actions at the community level or more broadly, that enhance community resilience and, if feasible, mitigate climate change.

2. INCLUDE MITIGATION, ADAPTATION AND DRR/EMERGENCY RESPONSE IN PROJECT INTERVENTIONS:

Project responses will be varied and require alignment with governments (local, regional, national) and other players and contribute to a coordinated action plan, where one exists. Close community consultation will be imperative, supporting strong women's rights organizations and movements; evidence-based policymaking for environmental sustainability; awareness raising, capacity building, establishing and cultivating partnerships that produce synergies. This includes information sharing and communications, government advocacy work for the role of women in natural resource management, and the importance of gender disaggregated data collection and monitoring, etc. Section 3 of this TGN outlines potential intervention areas for consideration.

3. DEVELOP OR INCLUDE INDICATORS OF THE IMPACTS OF CLIMATE CHANGE ON HEALTH.

Health indicators must be adapted to include the impact of climate change on women's and children's health, as well as the impact of health programming on the environment, in order to monitor these effects. Section 3.2 provides some examples of indicators which could be integrated.

4. DEVELOP AN ENVIRONMENT MANAGEMENT PLAN (EMP) TO ENSURE ENVIRONMENTAL SUSTAINABILITY AND COMMUNITY RESILIENCE.

A strong EMP for a project or program articulates the following:

- The impacts of climate change and environmental degradation on women's health interventions;
- how the interventions may impact the environment (negative and positive) and if any physical works will trigger.
- Mitigation measures for any potential negative impact of the project intervention;
- Intervention measures to enhance environmental sustainability, biodiversity, and ecosystem resilience;
- Indicators are developed to measure effectiveness of intervention and effect of mitigation measure;
- A monitoring plan listing roles and responsibilities, and timelines. Additional resources for developing a monitoring plan are available here.

3.0 EXAMPLES OF HEALTH INTERVENTION AREAS INTEGRATING GENDER AND CLIMATE CHANGE IMPACTS

In a project's Logical Framework and Performance Measurement Framework, it is essential to consider both risks and opportunities of the project in terms of climate change and the environment with a focus on gender. The following table provides examples of climate change impacts on SEDH. Based on some broad intervention areas in each of the SEDH, some examples of negative environmental impacts that the intervention may have are listed. Suggestions for ways the intervention area can confer greater climate resilience and have positive impacts on the environment are then listed, along with some tools and resources to further explore these areas and find more detail about potential impacts. Please note that the table is not exhaustive.

3.1 INTERVENTION AREAS, IMPACTS, AND OPPORTUNITIES IN CLIMATE CHANGE AND GENDER AND HEALTH

3.1.1 FOOD AND NUTRITION SECURITY

Impacts of Climate Change on Determinants of Health	• Increased crop losses/failure due to rainfall variability, floods, drought • Heightened food insecurity increasing risk of malnutrition • Reduced access to markets due to flooding, erosion, etc. • Lower micronutrient content of some foods due to high CO2 levels • Loss of pollinators and some key fruit crops that provide Vitamin C & A, folate, iron, etc. (World Vision, 2022) • Declining oxygen, and ocean and freshwater warming, altering suitable habitats for aquatic life and reducing ocean and inland fisheries • Increased risk of food-borne illnesses due to higher temperatures • Contaminated water and food from poor water quality due to higher temperatures and eutrophication
Broad Intervention Areas	• Introduce/Increase good agricultural practices • Increase market access • Introduce new and improved crops • Introduce/Increase aquaculture • Improve food storage
Potential Negative Environmental Impacts of Intervention	• Land conversion (deforestation) for more agricultural land may result in: » Change in the delivery of supporting & regulating services (i.e., water regulation, erosion control, pollination) from natural habitat important for agricultural production » Loss of habitat for wild species and increased interaction with disease hosts, vectors and reservoirs » Loss of medicinal plants » Loss of cultural ecosystem services and mental well-being associated with interactions with nature and landscapes • Increased carbon emissions from non-renewable energy sources and from the intensive use of fertilizer • High use of chemical fertilizers and pesticides may pollute ground and surface water

Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Conduct VAAs that incorporate FNS including climate awareness, climate smart agriculture and weather information • Promote good agricultural practices (CSA, CA, AgF, AgE) **Facilitate access to:** • Current and projected climate-related information for agriculture • Agricultural extension services (including training lead farmers) that support climate-smart practices • Affordable and inclusive climate-risk informed agricultural financial services (e.g., weather index-based microinsurance) • Climate resilient agricultural inputs: improved and adapted varieties of seeds and/or livestock and varieties • Support crop diversity to: » Increase the number and diversity of plant/crop pollinators » Decrease crop pests » Provide insurance if one crop fails • Sustainable sources of water supply for dry season farming. • Generate community awareness of: » The negative impacts of land conversion and deforestation » The importance of organic fertilizers and integrated pest management » Links between climate change and foodborne illnesses and nutrition content of foods • Establish home gardens for improved nutrition **Advocate for:** • The inclusion of at-risk communities and groups in existing and future climate-sensitive/shock responsive social protection programmes and interventions supporting food security and livelihoods • Inclusive and better access to information (markets, pricing, good practices and credit) • Sustainable fisheries • Increased agrobiodiversity • Productivity over production
Tools and Resources	• Standards for Supporting Agricultural Livelihoods in Emergencies | SEADS • Livestock Emergencies Guidelines and Standards (LEGS) • 'Y-Adapt' or 'Youth Adapt' • Participatory Integrated Climate Services for Agriculture (PICSA) • Climate-Smart Agriculture Sourcebook • Bringing Climate Change Adaptation into Farmer Field Schools (FFS) • Climate Resilient Farmer Field School Handbook • Climate Resilience Measurement for Communities (CRMC) • Climate Risk Planning & Managing Tool for Development Programmes in Agri-food Systems (CRISP)

3.1.2 INCOME AND OPTIONS FOR LIVELIHOODS AND SUPPLY CHAINS

Impacts of Climate Change on Determinants of Health	• Reduced productivity of agricultural livelihoods • Inability to work due to heat stress or other climate-related factors, resulting in reduced income and buying power which can affect nutrition, access to health care etc. • Roads and paths needed to transport produce and goods may be susceptible to flooding, erosion, etc. • Travel-related heat stress may disrupt input delivery, access to markets • Health care supply chain disruptions can reduce access to SRHR goods and services, leading to unintended pregnancies, unsafe abortions, increase in sexually transmitted infections, and long-term consequences such as infertility (see more below)
Broad Intervention Areas	• Promote diverse alternative income generating activities • Establish savings and loans groups, access to credit, or other financial support services for most vulnerable • Build physical flood control measures to maintain roads and pathways to ensure access and delivery of supplies • Provide accessible SRHR services and address disruptions in supply chains to ensure continued service provision
Potential Negative Environmental Impacts of Intervention	• Land conversion and natural resource exploitation for livelihoods can contribute to biodiversity loss, increased carbon emissions, and depleted soils, minerals, water, forests, fisheries, and wildlife • Water, soil and air contamination and increased energy demands and high GHG emissions from increased transportation measures • Physical works for flood and erosion control may take up arable land and resources such as wood, quarry stones, etc.
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Develop/scale up community-based early warning systems and early action protocols for the protection of basic needs and livelihoods against climate hazards and impacts (such as extreme temperatures) • Engage in community awareness to ensure sustainable use of natural resources and limit use of forest resources for livelihoods in times of stress • Use renewable energy sources and engage private sector to promote green energy • Promote eco-friendly income-generation activities • Hire to community members to serve as conservation stewards • Undertake community consultation for flood control measures and use of sustainable materials only for dams, gabions, terraces etc. • Undertake tree planting along roads for shade to ease transportation stress • Promote social protection systems to reduce vulnerability to climate change
Tools and Resources	• Climate Vulnerability and Capacity Analysis (CVCA) • Enhanced Vulnerability and Capacity Assessment (EVCA) • Practical Guide to Participatory Scenario Planning (PSP) • Study on the Use of Climate related Indigenous Knowledge Services to Support Anticipatory Action in Zimbabwe • Contraception and COVID-19: Disrupted supply and access • Climate change impacts on health and livelihoods: Mongolia Assessment (including Myanmar and Nepal) • Addressing Climate Risks through Social Protection • Life Skills for Success - Environmental Guidance Note

3.1.3 MIGRATION, DISPLACEMENT & STRUCTURAL CONFLICT

Impacts of Climate Change on Determinants of Health	• Increased migration due to unfavorable agricultural, living and livelihood conditions (i.e., drought, floods) and competition for scarce resources • Displacement or low-agency migration, resulting in poor health, well-being and socioeconomic outcomes • Displacement causing physical and psychological distress, and an increase in the unpaid workloads of women and girls • Increase in sexually transmitted infections, maternal mortality and mental health issues occurs resulting from forced displacement and migration
Broad Intervention Areas	• Increase social protection systems • Land remediation for flood control and mitigation • Promote good agricultural practices • Promote alternate income generating activities
Potential Negative Environmental Impacts of Intervention	• Widespread land conversion including deforestation for new settlements and livelihoods • Improper disposal of waste and increased contamination in crowded spaces • Excessive use of non-renewable energy sources (e.g., air conditioners, generators) to deal with increased heat
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Engage in climate resilience in urban areas – greening spaces, use of green technology • Ensure input and access to DRR plans • Encourage and build capacity on sustainable livelihoods and adaptation to climate change to avoid resettlement • Increase awareness of proper waste management and disposal • Promote green spaces in urban environments
Tools and Resources	• Climate Change 2022: Impacts, Adaptation and Vulnerability • Acting on Internal Migration Part II

3.1.4 SEXUAL AND GENDER-BASED VIOLENCE (SGBV)

Impacts of Climate Change on Determinants of Health	• Increased extreme-weather events may aggravate sexual violence, exploitation and abuse, trafficking and domestic violence faced by women and girls during and after disasters (International Federation of Red Cross, 2021) • Increased travel distance for women and girls to collect necessary resources due to scarcity may increase vulnerability • When livelihood options are limited due to climate change, female trafficking may increase • Extreme stress, property and communal loss, and scarcity of food and water may contribute to community conflict over resources and increased incidents of SGBV
Broad Intervention Areas	• Improve community-based early warning protocols • Improve access to clean water supply • Promote alternative fuels and fuel-efficient stoves • Undertake tree plantations for fuel supply
Potential Negative Environmental Impacts of Intervention	• Land conversion for water harvesting strategies • Water diversion to develop water sources may impact local ecosystems and create stagnant water sources • New plantations may take up farmland or cause deforestation of natural ecosystems
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Ensure water flow rates can sustain diversion • Ensure plantations are established on previously used land • Increase community awareness of SGBV risks to women and girls and provide relevant accessible services
Tools and Resources	• Gender-based violence and environment linkages: the violence of inequality • Global Girlhood Report 2023: Girls at the Centre of the Storm – Her planet, her future, her solutions

3.1.5 WATER, SANITATION AND HYGIENE (WASH)

Impacts of Climate Change on Determinants of Health	• Lack of access to WaSH is exacerbated by drought, floods and high temperatures is among the top five causes of women's deaths worldwide, associated with increased risks of urinary tract and other bacterial infections, diarrheal diseases, and menstrual hygiene challenges (WaterAid, 2017) • Flooding and high temperatures affecting water quantity and quality • Drought limits water availability for all domestic uses and contributes to disease • Increase in water and vector borne diseases exposure to water-borne pathogens • Increased ambient temperature extends the survival of pathogens that cause diarrhea and other illnesses (World Vision, 2022)
Broad Intervention Areas	• Improve access to clean and reliable water supply though water harvesting and storage • Promote WaSH in educational programs (training, sensitization, outreach, etc.) • Improve access to safe and private toilets with fecal waste disposal management (safe sanitation system) designed to be resilient to natural disasters and adapted to a changing climate • Promote good hygiene behaviours (hand, personal, menstrual, food and environmental) through community education/outreach programming • Advocate for strengthened water and sanitation systems that withstand weather events/climate shocks
Potential Negative Environmental Impacts of Intervention	• Water capture systems can use arable land and can divert water, thereby affecting watersheds and downstream users • Increase in disease vectors from water capture systems (i.e. open ponds) • Sanitation systems (collection, containment, treatment) can use arable land and increase transport emissions
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Build extra capacity and redundancy into service provision to manage shocks and long-term stresses • Improve ecosystem health (water is a provisioning service) with tree planting for water capture and retention • Increase awareness and action on: » Healthy and functioning watersheds to ensure good quantity and quality water supply; » Ending open defecation and using sanitation systems to reduce water and soil contamination • Use fecal waste to produce compost/fertilizer and biogas energy • Invest in climate-resilient infrastructure to reduce risk of water and soil contamination and water scarcity • Use green energy sources (such solar panels) to power water pumps, etc.
Tools and Resources	• Climate Change • Guidelines on sanitation and health • Hygiene Framework

3.1.6 EDUCATION

Impacts of Climate Change on Determinants of Health	• An estimated 12.5 million girls annually will not be able to complete their education due to climate change. Education is directly linked to multiple health outcomes. • Flood/storm impacts on infrastructure may close schools and access to schools • Water scarcity, heat stress, and disease affect school attendance and ability to concentrate • Women and children may be forced to travel further from home and to take more time in the early morning to carry out household duties, preventing them from attending schools or forcing them to arrive late and tired
Broad Intervention Areas	• Improve opportunities for cooling in schools • Install physical barriers for flood water control/diversion • Invest in climate-resilient infrastructure for school buildings to withstand disasters (such floods, storms) • Work with communities to ensure domestic tasks are fairly allocated
Potential Negative Environmental Impacts of Intervention	• School buildings may not be environmentally sustainable, causing environmental degradation through land clearing and size of footprint, improper sanitation, high use of non-renewable energy, etc. • Arable land may be taken up by related construction
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Increase trees for shaded areas around school area for better learning conditions • Install green roofs on school buildings • Encourage school gardens • Encourage recycling and implement education programs related to this • Promote: » Environmental literacy at all levels in school and through awareness campaigns » Technical and vocational training on green technologies, clean energy, environmental management and climate smart agriculture » The use of renewable energy such as solar panels » Awareness of women and children's domestic activities as a cause of non-attendance • Strengthen environmental governance to enhance women's participation in environmental decision-making • Use accredited engineers to design new buildings and reinforce old ones • Consultation meetings with communities on where to designate school lands • Update school curriculum to include the importance of ecosystem services and biodiversity for health and how this is impacted by climate change and ecosystem degradation • Advocate for strengthened environmental management capacities of education ministries and education faculty administrators to help create safe, clean learning environments
Tools and Resources	• Education and climate change: learning to act for people and planet • Malala Fund publishes report on climate change and girls' education

3.1.7 INFRASTRUCTURE AND ACCESS TO HEALTH SERVICES

Impacts of Climate Change on Determinants of Health	• Housing, clinics and access to services are susceptible to floods, water shortages, heat, landslides, and storms • Essential environmental services to health facilities, such as water and sanitation services, may be compromised by flood or drought, and electricity supply may be cut off during extreme weather events • Women face significant challenges in accessing maternal and reproductive health care services especially after climate-related disasters, due to displacement, limited access to health care facilities, and interruptions in medical supply chains (Sunderji et al., 2023)
Broad Intervention Areas	• Construct/update buildings to be resilient to natural disasters and adapted to a changing climate • Install physical barriers for flood water diversion
Potential Negative Environmental Impacts of Intervention	• Biomedical waste contamination • Construction-generated waste • Land clearing for infrastructure • High energy consumption and carbon emissions (e.g., use of generators in emergency situations)
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Review health facilities and the building codes to account for current and projected climate risks in the area • Enhance climate resilience of essential environmental services to health facilities (such as WaSH services and electricity supply) • Generate awareness of and implement proper waste disposal procedures • Promote the use of minimizing resources, recycling, and other climate-smart practices • Undertake tree planting around infrastructure for shade • Ensure roofs on clinics that reflect heat • Use sustainable and renewable energy sources for clinics • Establish demonstration gardens for nutritious foods • Select medical technologies and products with lower environmental footprint and use technologies with lower energy demand • Review zoning and building regulations for health infrastructure, taking into account environmental risks • Enhance ventilation standards and improve housing and building design • Undertake capacity-building to ensure adequate numbers of skilled health workers with good working conditions, who are empowered and informed to respond to climate change challenges
Tools and Resources	• Operational framework for building climate resilient health systems

3.1.8 HEALTH-SUPPORTIVE URBAN AREAS AND BUILT ENVIRONMENTS

Impacts of Climate Change on Determinants of Health	• Increased heat stress and flood risk in urban areas • Overcrowding leading to increased disease prevalence and demands on WaSH resources • Intensive energy usage for cooling • Unplanned urban development due to migration may lead to biodiversity loss
Broad Intervention Areas	• Improve urban environment with tree planting, cooling centres, flood control • Build capacity for urban planning
Potential Negative Envr. Impacts of Intervention	• Waste generated by green energy (construction, used solar panels, batteries) • Overcrowding and need for land may lead to deforestation, land conversion and reduce opportunities for FNS and mental health support
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Promote green energy solutions • Improve awareness and engagement of local government on mechanisms for proper disposal of renewable energy waste • Rehabilitate urban waterways • Create urban eco-parks with educational component • Promote urban community or home gardens
Tools and Resources	• Urban Climate Resilience • GIZ Urban Climate Resilience Toolbox • Developing Resilient Cities through Risk Reduction in the context of Disaster and Climate Change

3.1.9 MENTAL HEALTH

Impacts of Climate Change on Determinants of Health	• Extreme weather events can lead to trauma, anxiety etc. • Isolation and lack of access to resources, most commonly felt by women, are compounded by heat, drought, floods etc. • Psychological distress can lead to migration which may increase of women's and girls' unpaid workloads due to the absence of men) • Women and girls face amplified physical and mental stress as primary caregivers during adverse events. Stress can contribute to physical health problems (lower immune system responses, increasing vulnerability to air pollution and water-borne diseases) • Biodiversity loss can have both direct and indirect impacts on physical and mental health (Pretty et al., 2011)
Broad Intervention Areas	• Establish women-led support groups to understand causes of stress • Establish community watch for people with mental illness during extreme weather conditions • Provide protection services
Potential Negative Envr. Impacts of Intervention	• Psychological stress may lead to lack of motivation to deal with environmental issues or to care for the local environment and reduce waste, emissions etc.

Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Increase awareness (radio, workshops) of climate change-related stress • Advocate for mental health considerations in climate change policy/action • Engage support groups to become involved in environmental stewardship – oversee waste management, plant trees etc.
Tools and Resources	• Mental Health and Climate Change: Policy Brief

3.1.10 MATERNAL, NEWBORN AND CHILD HEALTH AND DEVELOPMENT

Impacts of Climate Change on Determinants of Health	• Climate hazards, including extreme heat, increase risks of maternal and neonatal morbidity and mortality such as gestational diabetes, hypertensive disorders of pregnancy, preterm birth, low birth weight and stillbirth • Poor water quality and quantity lead to lead to increased disease and malnutrition i.e. diarrhea is the leading cause of malnutrition among children under five years • In addition to the health risks of poor WASH, exposure to climate hazards during and after pregnancy can affect mental health: cause stress, anxiety and depression - risk factors for adverse perinatal outcomes (World Health Organization, 2023) • Maternal health is directly affected by water scarcity & quality, heat stress, food and nutrition insecurity, disease • Maternal malaria increases the risk of spontaneous abortion, premature delivery, stillbirth and low birth weight • Exposure to extreme heat and air pollution may lead to increased mortality and morbidity from stunting, respiratory diseases and adverse neurodevelopmental outcomes • High exposure to indoor air pollution from cooking stove fuel is linked to a 35% increased risk of low birthweight
Broad Intervention Areas	• Increase awareness of the links between maternal health and early childhood development and climate change • Access to high-quality MNCH care that is available, accessible and acceptable • Understand data gaps and need for high quality data on impacts on MNCH
Potential Negative Envr. Impacts of Intervention	• Linked to intervention areas that address FNS, disease, WASH • Physical health care facilities can increase land degradation, carbon emissions • Malaria controlling chemicals may be hazardous to health and environment
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• The needs of women, newborns and children integrated into climate mitigation, adaptation and disaster risk reduction strategies • Incorporate climate change impact data on MNCH for policy development • Develop climate-resilient, low-carbon and environmentally sustainable, structurally safe health-care facilities for pregnant women and young children
Tools and Resources	• Climate change worsens global inequity in maternal nutrition • Protecting maternal, newborn and child health from the impacts of climate change: A call to action

3.1.11 SEXUAL AND REPRODUCTIVE HEALTH AND RIGHTS (SRHR)

Impacts of Climate Change on Determinants of Health	• Increased extreme-weather events may aggravate SGBV, sexual exploitation and abuse, trafficking and domestic violence faced by women and girls during and after disasters • Increase of sexually transmitted infections and maternal mortality rates due to displacement • Disruption to SRHR services, including education and counselling, which may be further compromised by increased labour loads for women, heat stress affecting attendance at counselling etc.
Broad Intervention Areas	• Construct Climate resilient health clinic buildings • Ensure functioning supply chains for health care • Increase SRHR issues awareness among communities and implement risk reduction measures concerning SGBV • Establish community support initiative for vulnerable groups along with services
Potential Negative Envr. Impacts of Intervention	• Construction of physical works may impact local environment through pollution, use of materials • Increased wastage from supplies packaging • Increased demand on energy sources (heating and cooling clinics, maintaining cold chains, etc).
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Implement proper waste material disposal programs with awareness and oversight • Ensure there are options for shade in clinic waiting areas • Identify impacts of climate change on supply chains and leverage eco-friendly energy solutions where possible
Tools and Resources	• World Disasters Report 2020 • Human Health: Impacts, Adaptation, and Co-Benefits • YLabs content on climate health

3.1.12 INCIDENCE OF INFECTIOUS DISEASE: ZOONOTIC, VECTOR AND WATER-BORNE

Impacts of Climate Change on Determinants of Health	• 58% of all infectious diseases known to have impacted humanity in recorded history can be aggravated by climate change. Anthropogenic disturbance and biodiversity loss are strongly linked to increased prevalence and elevated risk of zoonotic disease for a variety of pathogens (World Health Organization & Secretariat of the Convention on Biological Diversity, 2015): Increased household and resource-gathering responsibilities of women expose them to additional health risks such as vector-borne diseases, dehydration, heat strokes or indoor air pollution (Sorensen et al., 2018) • Accelerated parasite replication with higher temperatures • Prolonged transmission seasons • Climate-induced shifts in distribution and multiplication of disease vectors • Interactions of malnutrition and infection by pathogens and severity of disease • Incentives to adapt to climate change and install ponds or dams may increase water-borne vectors (such as mosquitos that carry malaria)

Broad Intervention Areas	• Ensure adequate livestock and human vaccination coverage • Enhance disease surveillance systems during high-risk seasons/events • Implement vector control programs (such as insecticides, gutter drainage/cleaning, providing rainwater barrels with covers, etc.) • Implement campaigns to educate communities on vector control and zoonotic illnesses • Provide targeted education programs to farmers, veterinarians, and others living in close proximity to animals/livestock
Potential Negative Envr. Impacts of Intervention	• Harms resulting from the use of unregulated toxic chemicals to get rid of disease vectors • Adverse actions towards some animal disease vectors (ex; bats and other wild animals)
Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Increase awareness on how to limit human-wild animal interactions • Increase awareness of human infectious and non-infectious diseases and their transmission • More surveillance of stagnant water and reducing incidence where possible • Engage research institutions to conduct research on disease vector distribution shifts due to climate change
Tools and Resources	• Connecting global priorities: biodiversity and human health: a state of knowledge review • Over half of known human pathogenic diseases can be aggravated by climate change

3.1.13 ENVIRONMENTAL CONDITIONS, ECOSYSTEM HEALTH AND BIODIVERSITY

Impacts of Climate Change on Determinants of Health	• Increased heat, water scarcity, floods, and extreme weather events contributing to: » Biodiversity loss and loss of ecosystem services » Harmful effects on plant and crop growth » Depletion of soil health » Erosion and landslides » Exacerbating existing poverty and inequalities • Environmental degradation leading to an increase in SGBV, exploitation, and child and early forced marriage, (such as women and girls facing sexual threats as they walk further, more frequently, to collect necessities) (International Federation of Red Cross, 2021)
Broad Intervention Areas	• Provide protection and strengthening of natural systems and ecosystem services, on which communities depend for their health and livelihoods • Support women's participation and leadership in natural resource management and environmental steward groups (including payment for their services)
Potential Negative Environmental Impacts of Intervention	• Environmental protection may cause displacement, take up arable land for restoration and be a cause for conflict

Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Conduct community sensitization on protection/sustainable use of ecosystems such as forests (including mangroves), grasslands, etc., used for ecosystem services including food, water abundance and quality and income generation • Protect rights to land, water, and other resources, especially for women • Facilitate community access to and use of public/private services that protect, restore and/or strengthen ecosystems • Promote tree planting and care (as part of ecosystem resilience) for longer-term environmental, food, fodder, water and income benefits • Promote good agricultural practices that include AE, AF, CA and CSA
Tools and Resources	• A SPHERE Unpacked Guide: Nature-based solutions for climate resilience in humanitarian action • What is planetary health? • Nature-based solutions

3.1.14 DISASTER RELIEF, DISASTER RISK REDUCTION (DRR) AND EMERGENCY RESPONSE

Impacts of Climate Change on Determinants of Health	• Increased floods, dought and extreme weather events driven by climate change, leading to disasters and undermining recovery efforts
Broad Intervention Areas	• Promote and support community-based disaster and emergency management systems • Deliver timely, regular, and predictable cash-based safety net transfers supported by EAPs prior to and during high-risk periods for floods, drought, and high temperatures • Support government social protection services during response and DRR efforts, targeting households most vulnerable to climate change impacts • Ensure access to early warning information through local governments or through national dissemination mechanisms (see Sendai Framework for DRR) • Ensure response facilities and service routes are appropriately located, maintained and remain safe and functional during extreme weather events
Potential Negative Environmental Impacts of Intervention	• Increased amounts of solid waste and sewage causing soil and water pollution • Supply management issues leading to an overabundance of unused or wasted food or (unrecyclable) supplies • Increased use of energy/fossil fuel as intensive energy sources • Air pollution from transportation of non-locally available items • Deforestation, soil erosion, and biodiversity loss with the establishment of temporary settlements, which can also exacerbate vulnerabilities and create resource-use conflicts • Unsustainable environmental coping strategies where food or cash provided is not sufficient to meet household needs

Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Support emergency relief that improves ecosystem resilience • Provide cash-for-work/assets for the climate-smart restoration and protection of natural ecosystems to maintain ecosystem services used for livelihoods, food, water, etc. • Develop "anticipatory actions", prior to emergencies which includes distribution of resilient seeds, organic fertilizers, credit schemes tied to natural resource conservation • Ensure cash programs link to awareness-raising on impacts and to longer term resilience strategies that enhance health outcomes • Use energy efficient technology • Make available a diversity of appropriate seeds and organic fertilizers • Cash for work programs can include waste containment and natural resource protection • Couple regular cash-based social safety net interventions with longer-term promotion of and support to climate and other risk-informed diversification of community and household livelihood assets and strategies • Link cash-based safety net interventions to weather index-based microinsurance where relevant and feasible • Provide or facilitate access to cash-for-work/assets for the climate-smart protection and improvement of community livelihood infrastructure such as market feeder roads and multi-usage water points for domestic use, crop production, livestock, etc
Tools and Resources	• Environment and Emergencies • Food Assistance for Assets (FFA) • What is the Sendai Framework for Disaster Risk Reduction?

3.1.15 POLLUTION (AIR AND WATER) AND EXPOSURE TO TOXIC SUBSTANCES

Impacts of Climate Change on Determinants of Health	• Increased indoor and outdoor air pollution: exposure to smoke from indoor wood stoves and high traffic corridors and industry may increase maternal mortality and mortality from non-communicable diseases and further contribute to climate change • Fine particulate matter contributes to global warming and non-communicable diseases (i.e. excess respiratory disorders, allergy, asthma, ischemic heart disease, stroke, lung cancer and chronic obstructive pulmonary disease) • Contaminated water due to pollution from mining and industrial contaminants, pesticides and chemical fertilizers from agriculture; etc. • Increased temperatures from climate change can trap ozone; air pollution from carbon emissions causes climate change
Broad Intervention Areas	• Establish or link with existing programs that aim to reduce pollution • Promote alternative fuel and fuel-efficient stoves for cooking • Promote use of good agricultural practices (e.g., AE, AF, CA, CSA, etc.) • Promote good WaSH management practices (see above)
Potential Negative Environmental Impacts of Intervention	• Sanitation systems (collection, containment, treatment) can use arable land and increase transport emissions. • Increased carbon emissions from non-renewable energy sources and from the intensive use of fertilizer • High use of chemical fertilizers and pesticides may pollute ground and surface water

Opportunities to Increase Resilience and Enhance Environment & Ecosystem Health	• Increase awareness on the potential links between daily human activities and climate change and the reciprocal relationship between climate change and air pollution • Promote organic fertilizers or micro-dosing with chemical fertilizers to limit amount used • Protect water bodies from contamination by diverting run-off from pastures, agricultural fields fields and by using practices such as riparian buffers • Practice integrated pest management and reduce chemical pesticide runoff that pollutes water sources
Tools and Resources	• Understanding the compound risk of heat, humidity and air pollution on human health: A scoping review

3.1.16 ENABLING POLICY ENVIRONMENTS

Impacts of Climate Change on Determinants of Health	• Limited or ineffective government policy • Limited or no government budget for disaggregated data collection, monitoring of impacts of climate change on health • Outdated or non-existent nationally Determined Contributions and National Adaptation Plans under the Paris Agreement that refer to climate change impacts on health and gender • Little to no intersectoral information sharing on climate change and health • Non-signatories to multilateral environmental agreements (e.g., convention on biodiversity)
Broad Intervention Areas	• Increased advocacy concerning the need for government action on climate change and health with a focus on women's health • Improved health and climate governance education and awareness programs • Support for women and girl-led environmental and climate organizations
Potential Negative Envr. Impacts of Intervention	• Budget reallocations may ignore importance of ecosystem health and biodiversity conservation
Opportunities to increase resilience and enhance environment & ecosystem health	• Capacity development at all levels of government to understand and integrate climate change, environment and health, with an emphasis on understanding that the services that healthy ecosystems provide are vital to human health
Tools and Resources	• Create an enabling environment

3.2 **EXAMPLE** INDICATORS

In general, climate data allows both organizations and governments to prepare in advance for potential climate-related humanitarian crises, as well as to develop effective adaptation strategies to prepare for the longer term climate change impacts. These lead to interventions that build greater overall resilience when it comes to climate-related health risks. Climate-related data generated from baseline studies, including participatory climate VAAs, can be used to inform project interventions by giving direction, identifying what does and does not work, and tailoring programming to specific vulnerabilities. This also applies specifically to resource allocation activities. Where possible and available, consult any existing data including measures of socio-economic status, chronic disease, and mortality or morbidity which could be directly associated with climate impacts.

Indicators that integrate climate change and environmental impact considerations into health programming should generate appropriately disaggregated data that takes into account intersectionality, which is vital to understand health and rights challenges, especially for women. This will better identify existing inequities in outcomes, and can help policymakers and communities to identify strengths that can contribute to adaptation and resilience.

A non-exhaustive sample of indicators and areas for measurement to track the health impacts of climate change, and efforts to adapt and build resilience, are suggested below. All indicators must be additionally modified to include disaggregation by age, gender, and other characteristics for the given intervention.[1]

3.2.1 VULNERABILITY, RISK AND EXPOSURE

1. # of health services facilities / individuals (m/f) / communities exposed to:
   a. temperature change
   b. heat waves
   c. floods
   d. droughts
   e. other extreme weather events
2. Level of awareness of local/regional/national support systems by relevant stakeholders
3. %/Level of implementation of Nationally Determined Contributions that address SEDH and are gender-inclusive
4. % of national health budget that addresses risks posed by climate variability and change
5. #/type of resources (public, private sector, CSO) available to increase climate resilience or responses to climate change for:
   a. health workforce
   b. community leadership
   c. local government
   d. health information systems
   e. medical technologies
   f. service delivery (i.e., disease control programs, healthcare facilities, early detection and research efforts, community-awareness)

[1] Based on the 2018 paper Monitoring and Evaluation Indicators for Climate Change-Related Health Impacts, Risks, Adaptation, and Resilience. International Journal of Environmental Research and Public Health

3.2.2 ADAPTATION AND RESILIENCE IN POPULATIONS AND HEALTH SYSTEMS

6. # of early warning systems in place at the local/regional/national level
7. # of government commitments to maintain sufficient human and financial resources in health care services
8. #/Level of effectiveness of collaborative across relevant government departments regarding sharing data and coordinating efforts
9. Level of frequency with which vulnerability and adaptation assessments are updated
10. #/Level of integration of adaptation strategies into government plans/budgets
11. #/type of policies/ strategies reflecting climate change and health integrated considerations
12. % coverage / level of health surveillance systems
13. Level of effectiveness of local/national/regions plans incorporating climate resilience measures in:
    a. water resource plans
    b. infectious disease control programs
    c. food security
    d. health and health care programs
    e. other SEDH

3.2.3 HEALTH SERVICES & SYSTEMS

14. # of professional development strategies enabling health services staff to integrate new data streams and models into planning
15. % of healthcare personnel aware of interrelated climate change and health links, appropriate to their role and function
16. Level of awareness of the health risks of climate change
17. # of health practitioners and personnel trained in climate change and health links
18. % of healthcare facilities incorporating climate variability and change in siting, construction, technology and procedures to ensure provision of basic services
19. # people trained / Level of effectiveness of measures to manage climate-sensitive health outcomes (e.g., climate adaptive management)
20. % of medium- and long-term plans for control programmes for climate-related diseases that include consideration of climate change risks
21. #/Prevalence of climate sensitive diseases
22. Level of anxiety related to climate vulnerability or disaster
23. % changes in labor productivity
24. % changes in the incidence and geographic range of climate-sensitive infectious diseases
25. % of food insecurity and under-nutrition
26. # of children / pregnant women with chronic diseases increasing susceptibility to adverse climate-sensitive health outcomes
27. #/% of adverse health outcomes (i.e., injuries, illnesses, and deaths) attributed to high ambient temperatures, drought, floods, fire, pollution, or other extreme weather events
28. #/% episodes/mortality relating to exposure to pollutants
29. % changes in the incidence and geographic range of climate-sensitive infectious diseases

3.2.4 COMMUNITY ENGAGEMENT

30. Level of awareness of/actions taken to address the health risks of climate variability and change
31. # of people (m/f) /# of communities reached with relevant and timely information/services/ resources that protect/strengthen their livelihood assets against climate change impacts
32. # of people (m/f) /# of communities reached with training/ awareness-raising in climate-smart agricultural practices
33. # of people (m/f) /# of communities actively applying CSA to protect or strengthen their livelihoods against climate change impacts
34. # of people (m/f) /# of communities reached with information / services / resources that protect or strengthen ecosystems
35. # of people (m/f) /# of communities sustainably benefiting from protected and strengthened ecosystems for their livelihood needs
36. # of people (m/f) /# of communities reached with climate-responsive health safety net transfers in cash or in-kind
37. # of people (m/f) /# of communities that have met their essential health / food / other livelihood needs met during a climate-related crisis
38. # of people (m/f) /# of communities engaged in preparedness and capacity-building processes (such as forecast-based financing, early action, preparedness for effective response)
39. # of at-risk communities / households who receive relevant and timely products /inputs/ services to protect or strengthen their livelihood assets
40. # of at-risk communities / households who receive trainings and/or awareness-raising sessions in climate change impacts on health and associated adaptation practices

4.0 CASE STUDIES

4.1 WATER, SANITATION AND HYGIENE: THE FOUNDATION FOR BUILDING RESILIENCE IN CLIMATE-VULNERABLE COMMUNITIES

The above project report, which involved input from across WaterAid (in particular from the Programme Support Unit of WaterAid UK), includes case studies from a variety of countries, including Bangladesh, Burkina Faso, Eswatini, Ethiopia, Ghana, India and Nepal. Each case study demonstrates what must be done to improve WASH services and address current challenges, in order to increase community resilience to climate change, particularly for women and girls. An associated podcast and transcript about the report is available here.

KEY POINTS FROM THIS PROGRAM:

- **Climate Hazards:** Some of the worst impacts of climate change are being felt in the countries where WaterAid works (higher temperatures, variable rainfall) and the need for adaptation is critical.
- **Secondary Impacts:** Water scarcity and poor water quality that disproportionately impact women and children in vulnerable communities. The provisioning service (in this case water) provided by local ecosystems is affected.
- **Focus:** Water, Sanitation and Hygiene (WASH) (a key determinant of women and children's health) becomes compromised.
- **VAA:** Reveals that women and children are more prone to sickness from water-borne diseases, longer distances to fetch water, reduction in household hygiene.
- **Interventions and Adaptation Response:** Inclusive climate-resilient WaSH ensures that women serve as leaders in water safety planning; well-built household latrines and animal water troughs are constructed, and tree planting is undertaken to increase ground water. Project advocates for accessible, safe drinking water.
- **Monitoring Indicators:** Developed to track specific impacts of climate change on WaSH access.
- **EMP:** Ensures that the climate-resilient household latrines do not pollute the groundwater.

4.2 CLIMATE CHANGE IMPACTS ON HEALTH AND LIVELIHOODS: NEPAL ASSESSMENT

International Federation of Red Cross and Red Crescent Societies

Nepalese society has 125 different castes/ethnic groups and it is necessary to be inclusive when assessing and addressing vulnerabilities on livelihoods and health parameters. Many groups are economically marginalized and particularly vulnerable to the impacts of climate change. Some people live next to forests and rely heavily on forest resources to meet their basic needs. Accordingly, they risk loss of livelihoods linked to deforestation caused by droughts, landslides, soil erosion, or forest fires.

This increased vulnerability is compounded by existing deficiencies in food availability, the ownership of smaller-sized land, the scarcity of water, a higher dependency on natural resources (especially rainfed agriculture) for reduced livelihoods and a reduced economic capacity to deal with the adverse impacts of climate change. Over 80% of the farmers rely on subsistence rainfed farming on less than 1 hectare of land and with only 2–3 livestock units. Women in particular face higher climate change risks due to discrimination in access to education and healthcare, exclusion from employment opportunities and their high burden of both household and agricultural responsibilities (similar papers available for Myanmar and Mongolia). The report is available here.

KEY POINTS FROM THIS PROGRAM:

- **Climate Hazards:** Higher temperatures, decreased rainfall, extreme weather events.
- **Primary Impacts:** Glacial outburst floods, drought, floods, landslides.
- **Secondary Impacts:** Crop losses, water scarcity, and loss of arable land. The provisioning service (water), supporting services of nutrient cycling, and the regulating services provided by forests and wetlands are no longer provided by local ecosystems.
- **Focus:** Food security and livelihoods and migration, which are key determinants of women and children's health, are adversely affected.
- **VAA:** Reveals that women and children are more prone to food insecurity, increased work burdens due to distress migration of men, longer distances to fetch water.
- **Interventions and Adaptation Response:** Raise awareness of climate change stressors and shocks, implement weather alerts, forecasts and climate projections to reach the 'last mile', so that people remain aware and prepared, improve forecasting to know whether to plant late and/or harvest early; protect crops from flooding using natural barriers, and practice climate-smart agriculture.
- **Monitoring Indicators:** Developed to track specific impacts of climate change on agricultural productivity and the economics of livelihoods.
- **EMP:** Ensures that flood barriers do not disturb natural ecosystems, uses agricultural land for CSA and ensures no deforestation takes place.

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