Building Capacity Among Community Health Centers to Address Weather-Related Extreme Phenomena on Agricultural Communities and Workers in Puerto Rico and the U.S. Virgin Islands

Support Curriculum for Health Service Providers

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PROJECT INTRODUCTION

Building Capacity Among Community Health Centers to Address Weather-Related Extreme Phenomena on Agricultural Communities and Workers in Puerto Rico and the U.S. Virgin Islands is a project, funded by the National Institute of Food and Agriculture (NIFA), an agency of the U.S. Department of Agriculture (USDA). The three-year project focuses on strengthening the capacities of community health centers (CHCs) to support the dissemination of information, resources, and services related to adaptation to weather-related extreme phenomena and the identification of associated risks that affect the lives of Caribbean farming communities. The overall objective is to build the capacity of CHCs in Puerto Rico (PR) and the U.S. Virgin Islands (USVI) to employ a community mobilization framework in emergency preparedness, with the purpose of improving health outcomes in vulnerable populations before, during, and after a weather-related disaster.
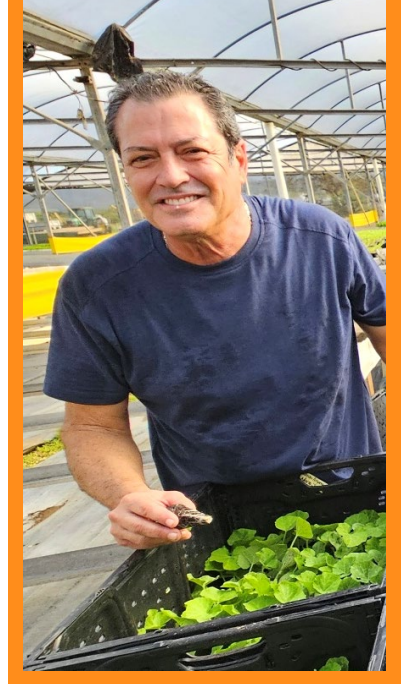
Farming communities are groups of individuals, families or populations whose ways of life, cultural practices and daily activities are deeply linked to agricultural production. These communities focus their economic and social activities on agriculture, planting crops, raising livestock and other related practices. They include farmers, ranchers, agricultural workers, and traders, but also those who reside near the fields where agricultural activities take place. Consumers of local agricultural products are also part of these communities. These communities face significant challenges due to extreme weather-related phenomena or events and weather-related disasters, as their inherent vulnerability and direct dependence on environmental conditions make them particularly prone to negative impacts. The effects of climate-related extreme events can be devastating, leading to crop and livestock losses, water scarcity and soil degradation. These disruptions not only threaten immediate agricultural productivity, but also the economic stability and long-term food security of these communities and their islands. Due to the limited availability of financial resources and the ability to adapt technologically, they often find it difficult to recover from environmental shocks.

Farming communities in PR and USVI are disproportionately affected by weather-related extreme events. However, existing programs often do not address their specific needs or are not culturally appropriate. Community health centers (CHCs) in these regions play a crucial role in providing health care and outreach services to vulnerable populations, including farmers and farmworkers. In the aftermath of hurricanes Irma and Maria in 2017, it became clear that CHCs must be prepared to deal with infrastructure collapse while continuing to meet community needs. Given their rural location and focus on farmworkers, CHCs are essential in helping these communities build resilience to weather-related impacts.

This project seeks to strengthen the capacity of CHCs to support farming communities through three years of training in weather-related extreme events and phenomena, agricultural adaptation, risk management, leadership, and environmental advocacy. CHCs will receive a curriculum with educational materials and tools for community impact activities. Each center will reach at least 300 farmworkers or farm community members and document their efforts. As part of the benefits of the project, it is expected to increase literacy about weather-related events and extreme phenomena among CHC staff, integrate educational tools into services, strengthen relationships between communities and community health centers, and develop environmental leadership. The participating centers will become key resources for farmworkers on adaptation and mitigation issues to weather-related extreme phenomena in the Caribbean.

ABOUT THIS CURRICULUM

To enhance CHCs' ability to support farming communities, this curriculum provides essential information to expand the knowledge of CHC outreach staff, community health promoters, clinicians, and other employees. It also describes the resources available in the resource packet and suggests activities that integrate the main project themes into existing activities at the CHC or into new activities created by the CHC. With the knowledge and tools provided here, CHCs will increase their capacity to create interventions that address weather-related extreme phenomena and events and strengthen resilience in Caribbean farming communities.

The proposed curriculum will provide comprehensive training across several modules:

1: Extreme Weather-Related Events and Phenomena

Provides an introduction to the science behind weather-related extreme events and phenomena considering their global and local impacts.

2: Agriculture in the Face of Weather-Related Events and Phenomena

It explores how climate-related extreme events and phenomena affect agriculture and livestock, offering adaptation strategies.

3: Community mobilization aimed at mitigating weather-related events

Offers guidance for outreach workers to assist community members in organizing and mobilizing resources to prepare for and respond to emergencies and disasters.

4: Community Health during weather-related events and phenomena

Addresses health risks in communities caused by weather-related extreme events or phenomena by considering physical, chemical, and biological risks.

5: Occupational health and safety during extreme weather-related events

Focuses on protecting the health and safety of farmworkers in extreme weather and changing environmental conditions.

6: Community Leadership and Advocacy to Build Resilient Communities

Provides information on how to assist in the development of leadership and advocacy skills to empower community members to advocate for weather adaptation and raise awareness within their communities.

7: Community Outreach

Offers resources and tools to understand and identify strategies to capture community processes while promoting the impact of community outreach; that is, developing and promoting activities, materials and strategies that are aligned with the community to be impacted.

Find resources in the provided package using keywords in the search bar such as:

- **Child**   Resources for children

- **Older**   Resources for older adults

- **Ag**   Resources related to agriculture or agricultural workers

- **CC**   Resources on weather-related extreme phenomena

- **Heat**   Resources related to heat-related illnesses

- **Emerg**   Emergency resources

- **Infec**   Resources related to infectious diseases

- **Cron**   Resources related to chronic diseases, in general

- **Cardio**   Resources related to cardiovascular disease

- **Diab**   Diabetes related resources

- **Kidney**   Resources related to kidney disease

- **Mental**   Mental health resources

- **Resp**   Respiratory health resources

- **Neuro**   Resources related to neurodegenerative conditions

- **Chem**   Chemical safety resources

- **Lead**   Resources related to community leadership

- **Adv**   Resources related to community advocacy

- **Com**   Related to community or with a community focus

MODULE 1: EXTREME WEATHER-RELATED PHENOMENA & EVENTS

WHAT DOES THIS MODULE CONTAIN?

Resources and tools to understand, identify, and apply data and information on weather-related extreme phenomena or events and their impacts.

WHO SHOULD READ THIS MODULE?

Anyone interested in understanding the definitions and application of the concepts "climate", "weather", "climate variability", "weather-related extreme phenomena" and "weather-related extreme events". Also, if you are interested in explaining the overall impacts associated to weather-related extreme events and phenomena that are being felt in PR and USVI, as well as indicators of those impacts and future projections.

CLIMATE AND WEATHER

Climate refers to the atmospheric and oceanic conditions that characterize a place. Those conditions can be measured by long-term (over the course of 30-years) average temperature and precipitation trends, for example. It should not be confused with **weather**, which refers to the atmospheric conditions at a determined time.

Example: *The U.S. Virgin Islands have a tropical climate. It is common to have sunny weather throughout the year.*

Thus, the type of climate in a place can tell us about expected temperature, rain, seasonal patterns, and other natural elements. Those factors can then be used to describe the potential weather of a place.

There can be natural climate variations in a particular climate, and within such climates there can be diverse **ecological life zones**, which refers to the flora (plants) and fauna (animals) characteristics in a specific area of a climate zone. In general, the term "ecological life zone" is used to describe areas in particular, in light of their precipitation, temperatures, and other ecological and environmental factors.

TEMPERATE ZONE
SUBTROPICAL ZONE
TROPICAL ZONE
EQUATORIAL ZONE

Example: The U.S. Virgin Islands are located in the tropical climate zone. Throughout the islands, you can identify two ecological life zones: dry subtropical forests and very humid subtropical forests.

Understanding the climatic characteristics and **ecological life zones** of a place is important for the establishment of agricultural and fishery' management. It also helps us to better understand the environment that surrounds us.

EXTREME WEATHER-RELATED PHENOMENA

There can be natural variations in the climate. **Climate variability** refers to deviations in the expected average conditions of a climate zone. It can happen that temperature or precipitation deviate from what is expected in a place because of natural reasons. For example, in the Caribbean, El Niño and La Niña (two types of complex patterns that cause deviations in the tropical climate of the region over the course of one or more years), can alter weather outcomes in the islands. Thus, **climate variability** can happen and that does not mean that there is an alteration in the climate zone—meaning, deviations in specific time periods do not necessarily mean that the climate of a place has been altered.
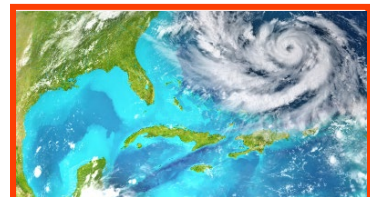

Example: It is likely to see a higher occurrence of stronger hurricanes in the Caribbean when La Niña goes into effect.

Though some **climate variabilities** can be linked to natural phenomena, others can be linked to human-related (anthropogenic) factors, such as greenhouse gas emissions, like carbon dioxide and methane.

Those emissions build up in the atmosphere and retain heat, which is what we know as the **greenhouse effect**. Human-caused variation in the climate over a long period of time (30 years or more) is what we know as **extreme weather-related phenomena**. Thus, extreme weather-related phenomena are measured by the long-term deviations of average conditions, such as changes in average temperature. The rise in average global temperatures through different climate zones is one phenomenon being observed that contributes to the occurrence of other weather-related phenomena and events.

On the other hand, extreme weather events are more specific and regional phenomena that occur over the short or medium term, such as storms, hurricanes, heat waves, or droughts. These events, which serve as indicators of extreme weather-related phenomena, are immediate or derived consequences of long-term and large-scale weather changes and can have direct and significant impacts on specific geographic areas.

Example: Though La Niña is linked to an increase in the occurrence of hurricanes, and other extreme weather events in the Caribbean. This is happening due to the effects of extreme weather-related phenomena on our oceans, such as higher surface temperatures, strengthen hurricane' intensity. Thus, the Caribbean is experiencing stronger hurricanes during La Niña that are further amplified by extreme weather-related phenomena.
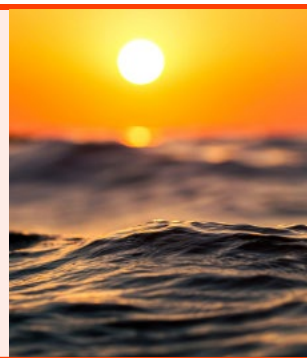
EXTREME WEATHER-RELATED PHENOMENA INDICATORS

The Caribbean has already been experiencing the impacts of extreme weather-related phenomena, especially through increased temperatures, increased periods of drought and increased extreme weather events such as hurricanes. These are examples of **extreme weather-related phenomena indicators**, which can be understood as conditions or elements that can be measured and for which we can assess their changes over the years.

One important indicator is temperature: already in the U.S. Virgin Islands and the other Caribbean islands we are experiencing continuous heat waves or days of extreme heat. And its gradual increase is already being observed. Between 2041-2060, maximum temperatures are projected to increase by 1 to 3 degrees Fahrenheit in the U.S. Virgin Islands, though St. Croix is expected to experience higher temperatures than St. Thomas and St. John. These expectations correspond, similarly, to minimum temperatures. Currently, it has been observed that nighttime temperatures in somewhat elevated areas have increased. It should be noted that the temperature experienced

during the day can be exacerbated by the "heat island" effect. This effect is due to the heat that permeates cities or fairly developed urban areas (more information on its effects on human health can be found in Module 4).

Another important indicator is **rain or precipitation**. Islands throughout the Caribbean are experiencing dryer periods that have contributed to significant droughts. This situation poses risks to St. Thomas, St. John, and St. Croix. Though it is important to note that rain pattern changes are still somewhat uncertain. Nonetheless, projections concur with a decrease in rain. It is expected that the U.S. Virgin Islands will experience a 12% decrease in annual rainfall. This scenario, alongside expected increases in temperature, will exacerbate dry periods. (More information on the impacts of these changeson agriculture can be found in Module 2).

In terms of **tropical cyclones** (e.g. storms, hurricanes), the Caribbean has observed above normal cyclone activity. It is known that the effects of extreme weather-related phenomena, particularly the increase in the temperature of the Atlantic Ocean, are associated with cyclonic intensity. Evaporation of water and warmer waters are driving forces in accelerating the formation of strong hurricanes. Likewise, sea level rise will make storm surge stronger. Although extreme weather-related phenomena are known to be associated with intense hurricanes, the certainty as to the frequency of hurricanes is not strong. However, we should expect stronger hurricane seasons. Furthermore, **sea level rise** will increase storm surge, which poses flooding risk to several coastline communities in our islands.

RESOURCES AND TOOLS

You can use all or part of the information provided in this module to design educational interventions for patients, in or outside the Health Center. You can complement other topics with what is presented here. For example, if you are giving a talk on chronic diseases, you can tie in the topic of extreme weather-related phenomena around having a contingency plan for stronger hurricane seasons. Below are some resources from the Caribbean Climate Center and collaborating organizations that help provide information about extreme weather-related phenomena and its effects on the U.S. Virgin Islands.
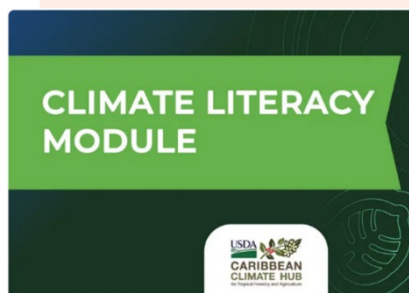
#1: Climate Literacy Module for a Climate-Smart Caribbean
This is an online educational tool to promote knowledge about extreme weather-related phenomena. It contains four online lessons. This electronic module can be used as an educational tool for clinical staff or in educational or outreach activities.

Keyword: CC
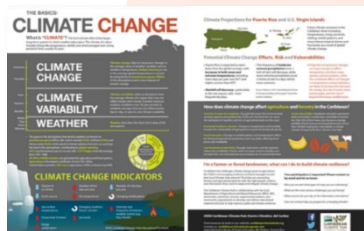
#2: This fact sheet summarizes the basic fundamentals related to the science of extreme weather-related phenomena. You can use this sheet in outreach activities or include it as part of the educational materials you provide to patients.

Keyword: CC

#3: Coloring book - Sr. Sapo's Garden
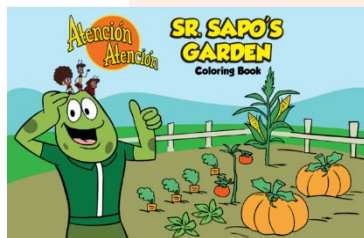
This coloring book highlights important information regarding extreme weather-related phenomena and agriculture. Kids using this coloring book will have the opportunity to grasp key topics that link food production and extreme weather-related phenomena.

Keyword: CC, Ag, Child

#4: Presentation - Climate Change in the U.S. Virgin Islands

This presentation prepared by Wanda I. Crespo Acevedo draws from multiple data sources and also from resources published by the USDA Caribbean Climate Hub. It was prepared for the One USDA Workshops carried out by the USDA Caribbean Climate Hub.

Keyword: CC
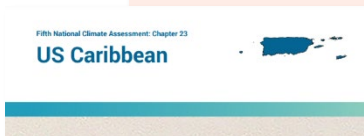
#5: US Caribbean, Fifth National Climate Assessment

This is the final report of the Fifth National Climate Assessment, concerning Puerto Rico and the Virgin Islands. It is suggested that you read this document for more specific and extensive details on climate change and its effects on our area. The previous documents use or summarize information detailed in this document.

Keyword: CC

#6: What Climate Change Means for the U.S. Virgin Islands - EPA

This fact sheet summarizes general data of climate change and its impacts in the context of the U.S. Virgin Islands. It had a particular focus on marine and coastal resources.

Keyword: CC

MODULE 2: AGRICULTURE IN THE FACE OF EXTREME WEATHER-RELATED PHENOMENA AND EVENTS

WHAT DOES THIS MODULE CONTAIN?

Resources and tools to understand agricultural practices in Puerto Rico and to identify and apply strategies for adaptation and mitigation of the impacts of extreme weather-related phenomena and events on such practices.

WHO SHOULD READ THIS MODULE?

Anyone interested in understanding the general characteristics of Puerto Rico's agriculture and the definitions and application of the following concepts: "climate adaptation" and "adaptive capacity." If you are interested in being able to describe a variety of resources that can help identify and provide information on extreme phenomena and events related to weather and adaptation, this module is for you!

AGRICULTURE IN THE U.S. VIRGIN ISLANDS

Rising temperatures and extreme weather events, among other factors related to extreme weather-related phenomena, are impacting the agricultural sector. In the past few years, we have seen storms and hurricanes generate major impacts on a large number of farms in the U.S. Virgin Islands. It does not take high winds or rainfall for crops, particularly vegetables, to suffer damage. The projected intensification of meteorological events (storms, hurricanes), which bring with them heavy rains and winds, will affect agricultural landscapes.

Another issue related to heavy and/or continuous rain is landslides. These not only cause damage to the farm, transforming the terrain, but can also hinder access to the farm, directly or indirectly, thus affecting food distribution. They also damage agricultural infrastructure, making it difficult to recover and return to production as soon as possible.

In addition, the increase in temperatures and the extension of drought periods will limit crop production (yield), but also the welfare and productivity of animals. The constant heat can affect the overall health and production capabilities of agricultural plants and animals. It is important to note that many farms in the U.S. Virgin Islands do not have access to water sources or irrigation infrastructure. This makes water management difficult and in turn affects farm productivity.

The welfare of farmers and farmworkers is important for maintaining **food security** (access by all people at all times to enough food for an active and healthy life, as defined by the USDA). Farmworkers, who depend on natural resources and work out of enclosed spaces, are subject to occupational hazards, meaning risks and actions in the workplace that could harm their physical and emotional health. In addition, since most farms in the U.S. Virgin Islands have little access to water, this can result in farmworkers having to work harder and face various physical and emotional health impacts. Similarly, landslide and erosion risks related to heavy rains can also pose occupational hazards for workers (See Module 5 for more on occupational health in agriculture in the context of extreme weather-related phenomena).

It should be noted that when we talk about agriculture and climate change, it is important to think in terms of a **food system**. This refers to all the elements and dynamics related to production, processing, distribution, consumption and disposal of food, taking into account the environment, climate and social and cultural elements. It is therefore important not to think of farm or agricultural production as an isolated management. For example, damage to the electrical system or drinking water distribution of a place (e.g. island) will have repercussions on the farm. Another example, linking social and economic elements, is that the importation of products can create unfair competition with local products, thus imposing pressures on local production. Therefore, when talking about climate change impacts on agriculture, other sectors and elements beyond the farm, must be considered.

CLIMATE ADAPTATION AND AGRICULTURE

Climate adaptation refers to the changes, such as actions and strategies, that people make to decrease or mitigate the impacts of extreme weather-related phenomena. In agricultural communities, climate adaptation includes changes to agricultural management or strategies to safeguard local production and the health of farmers and farmworkers. Therefore, **climate adaptation** refers to decreasing the vulnerability of people and their farms to the impacts of extreme weather-related phenomena. It should be noted that, within the context of extreme weather-related phenomena adaptation, one can also speak of **mitigation of impacts** (reduction of the effect, risks, or damages that may be generated by climate impacts). **Extreme weather-related phenomena mitigation**, which refers to the series of actions that reduce the emission of greenhouse gases to slow down extreme weather-related phenomena, should not be confused with climate adaptation or with mitigation of impacts. While this curriculum encourages climate mitigation, it mostly focuses on climate adaptation.

It will be challenging to adapt to or mitigate the impacts of extreme weather-related phenomena if farmers and agricultural workers have limited access to agricultural, economic, health and other resources to help them better prepare for, cope with, resist and recover from the impacts of extreme weather-related phenomena (that is what is known as **adaptive capacity**). These capacities are not only material, since human resources and people's state of well-being have an impact on this adaptive capacity. For example, elements of age, gender, physical health, level of formal education, among others, must be considered.

Farmers and farmworkers can implement agricultural strategies that help reduce extreme weather-related phenomena impacts on their farms (**adaptation**). There are agricultural and conservation practices that can be employed to reduce the impacts of extreme weather-related phenomena effects. These practices will depend on the farmer's production objectives, but also on the type of agricultural production on his or her farm. For example, a dairy herd may require different adaptation strategies than a diversified vegetable farm. So, it is important to know the characteristics of a farm or site to make informed decisions to promote adaptation to climate change. This, along with knowledge about available programs and services that support the adaptive capacity of agricultural communities, can help to reduce the risk of extreme weather-related phenomena.

RESOURCES AND TOOLS

This section contains a variety of printable resources and digital tools for service providers and people working in agriculture. These resources will allow you to access and provide information related to agriculture and extreme weather-related phenomena. Printable materials are located in the resources folder.

#7: US Virgin Islands USDA 2017 Census Highlights

This resource identifies and summarizes the role of the various USDA agencies, which may provide technical or economic assistance to farmers and farmworkers. It allows readers to become familiar with the USDA.

Keyword: Ag

#8: Fact sheets on the impact of drought on livestock and crops, Caribbean Climate Hub

You can use these sheets to understand general details about the impact of drought on these agricultural systems, to share with people in farming communities, and to use as resources for workshops and talks.

Keyword: CC, Ag

#9: Agricultural Conservation Practices Summary Sheet

The USDA Natural Resource Conservation Service (NRCS) provides technical support, grants and incentives for the adoption of agricultural or conservation practices on farms and private lands that support farmers to adapt to and mitigate extreme weather-related phenomena impacts. The following resource on NRCS-supported practices can help you learn about them and support the process of applying for services or support.

Keyword: CC, Ag
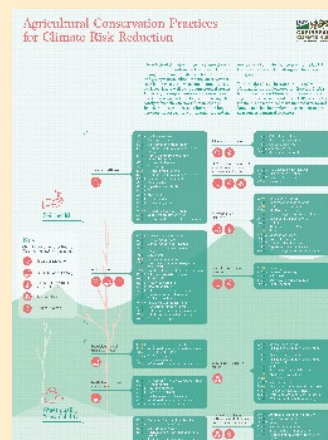
FARM PLANNING TOOL

#10: Farm Planning Tool

It is a digital tool developed by the USDA Caribbean Climate Hub that provides the characteristics of any area in PR and USVI. Included with the resources package for this Module is a fact sheet about the tool, which also provides instructions on how to use it.

The online tool generates information on the projected impacts of extreme weather-related phenomena (temperature and precipitation), landslide susceptibility, and other environmental and physical aspects relevant to agriculture. This data can help people to have a clearer idea of the characteristics of their farm and its surroundings.

Clinicians can use this tool in several ways. One way is to analyze an area or zone before visiting it. If, for example, an outreach event (e.g., health fair) is to be held in neighborhood X, the tool can be used to learn about the environmental, physical, and climatic aspects, among others, of that neighborhood. Similarly, clinicians can share the tool with farmers and show them how to use it. It can support them in getting more information about their farms. This tool is also used as part of the activities in the next resource.

Keyword: CC, Ag (Tool Instruction Sheet)

The following questions can help facilitate a discussion after creating the Farm Planning Tool report:

- What information shown here did you already know? What information shown here is new to you?

- Do you think the average monthly temperatures and precipitation data align with what you experience?

- What do you think of the expected change projections for temperature and temperature in the upcoming years?

#11: Climate Adaptation Guide for Agriculture and Forested Lands in the Caribbean

Two resources are included that were designed to guide conversations and activities related to agricultural planning around extreme weather-related phenomena. Two documents are included, the long version (Adaptation Guide) and the short version (Work Manual). Both allow for a guided individual conversation or process to be generated around developing an adaptation plan, summarized in five steps.

The Guide includes information related to extreme weather-related phenomena and its impacts, in addition to the Work Manual (five-step process). The documents contain specific instructions and activities to complete each of those steps. In addition, ten information brochures are included per agricultural sector, which complement both documents. They serve as an additional tool that is useful for agricultural communities in their decision-making processes. Above all, they are intended to summarize and provide technical and scientific information.

The Health Center's clinical staff can use these resources in a variety of ways, including the following: (1) Staff can be trained and familiarized with the Five-Step Process and the Work Manual and then offer a workshop or talk in which participants can identify possible adaptation measures according to their vulnerabilities to extreme weather-related phenomena. (2) The Center may distribute these resources to farming communities or to farmer service providers so that more people can access these resources and information. These resources can assist in community outreach and mobilization processes, around risk identification and possible solutions.

Keyword: CC, Ag

#12: Extreme Weather-Related Phenomena Adaptation Videos

Climate Smart Caribbean is a project with agricultural education and outreach aims from the USDA Caribbean Climate Hub. In general, it contextualizes climate science and adaptation strategies to different agricultural sectors of Puerto Rico and the Virgin Islands to promote resilience and support adaptive capacity. Here, resilience refers to the ability of a system, such as a farm, to recover from an impact and go back to functioning as it was. The videos listed here can be used as audiovisual support in outreach activities to present examples of ongoing climate adaptation and mitigation on Puerto Rican farms—the videos are available in Spanish, subtitled in English. Videos developed in the US Virgin Islands are forthcoming:

La Microfinca, Camuy, PR: Increasing Agricultural Resilience With Climate-Smart Practices: "The video shows the various practices that help you cope with the impacts of extreme weather such as planting to the surroundings, diversity of crops, water capturing, among others. In addition, he mentions how the Natural Resources Conservation Services (NRCS) agency supported him in the acquisition of a "high tunnel" to have greater control over his crops, as well as in the collection of rainwater, a vital resource in times of drought".

Finca Cruz, Maricao, PR: Integration of Practices and Available Resources: "José Cruz, farmer and owner of Finca Cruz, located in Maricao Puerto Rico, shows us what climate-smart practices he is working on his farm to mitigate and adapt to the effects of extreme weather-related phenomena. Finca Cruz's main crop is shade-grown coffee set in a secondary forest. Cruz decided to keep his land in a wooded state and design his planting in favor of the slopes and the contour to avoid erosion and that the workers have greater comfort. In addition, Cruz mentions how the Natural Resources Conservation Services (NRCS) agency supported him in acquiring native trees for his establishment as wind barriers".

Rancho AA, Sabana Grande, PR: "Andy and Myrna are the owners of Rancho AA, a project dedicated to beef cattle, located in the town of Sabana Grande, Puerto Rico. Rancho AA is a model farm where it has been proven that environmental protection and conservation can go hand in hand with food safety. These farmers aim to continue motivating the next generations to carry out environmentally responsible agricultural practices".

Finca Atabey, Santa Isabel, PR – Increasing agricultural resilience with climate-smart practices: "In this video, Josefina Arce talks about how the effects of extreme weather-related phenomena have impacted the project and details what climate-smart practices she has implemented to adapt. The video shows the various practices that help you cope with the impacts of extreme weather-related phenomena such as the use of windbreak barriers, crop diversity, habitat design for pollinators, among others. In addition to this, he mentions how the Natural Resources Conservation Services (NRCS) agency supported him in the installation of a drip irrigation system, a vital resource in times of drought".

MODULE 3: COMMUNITY MOBILIZATION AIMED AT MITIGATING WEATHER-RELATED EVENTS

WHAT DOES THIS MODULE CONTAIN?

Resources to understand and apply emergency management principles within the community mobilization framework. Tools to strengthen community members' capacity to prepare for, mitigate, and respond to extreme weather-related events.

WHO SHOULD READ THIS MODULE?

Anyone interested in understanding the phases of emergency management and the definitions and applications of the concepts of "threat," "emergency," "disaster," and "vulnerability." Also, those who wish to apply community preparedness tools with the understanding of the importance of community mobilization to mitigate the effects of extreme weather-related events and adapt to extreme weather-related phenomena.

Extreme phenomena and events related to the weather and my community

Nature, including natural hazards and those caused by humans, is constantly evolving, with different areas facing unique risks depending on local conditions. Hazards such as earthquakes, tsunamis, and floods become **emergencies** when *they can be managed with local resources*. Disasters, on the other hand, are *large-scale events that require extensive resources to manage*, and are influenced by the severity of the hazard and the vulnerabilities of the affected population. Vulnerability is the *set of characteristics or contexts that determine how susceptible a person, group of people, place, or community is to harmful hazard effects*. Vulnerability depends on factors such as location, construction quality, health, socioeconomic status, and community organization. In the face of extreme weather events that pose threats to individuals and communities, it is important to seek to reduce climate vulnerability by preparing them through education, establishment of warning systems, and voluntary support organization.

Extreme weather events exacerbate disaster risks by increasing the frequency and intensity of extreme weather events due to global warming and the burning of fossil fuels. This leads to more intense storms, floods, and heat waves, making community preparedness and resilience building essential. In summary, understanding and addressing both natural and man-made hazards, along with preparing for the impacts of extreme weather events, are crucial to reducing disaster risks and improving community resilience.

Many communities have managed **to recover after being affected by disasters,** demonstrating great **resilience**. What does a community need to be resilient?

ASSESS RISK

We know that **disaster** risk *depends on the threats to which we are exposed, our vulnerability and our ability to minimize those hazards and vulnerabilities*. All of this is usually expressed with a formula:

> **Disaster Risk = Threats x Vulnerability**

To build resilience, the first step is to be aware of the risks. Risks can vary significantly between communities and individuals, even among those who appear similar. Because of these variations, perceptions of risk may differ from person to person. It is essential to consider the risk perceptions of community members in order to reach consensus on the risks they face and mitigate the effects of these threats if they occur.

#13: Community Risk Analysis

It is a valuable tool for reflecting on emergency events or disasters that have occurred in the community. By assessing the frequency and impact of these events, we can create a prioritized list of risks to determine which events pose the greatest threat and focus our community preparedness efforts accordingly.

Keyword: Emerg

The prioritized list generated by the tool can then be used in conjunction with other tools to further develop the community's weather-related mitigation plan (short-term) and climate adaptation plan (long-term). A well-prepared community that is aware of its risks will be more resilient.

Being informed about extreme weather-related phenomena and events, and knowing how we can adapt, will be crucial to build resilience. While we can't eliminate all threats (it's impossible to prevent an earthquake), we can *take actions to prevent or reduce the causes, impact, and consequences* so that threats are less damaging. We call this process **mitigation**. For example, we can plant trees to reduce the risk of flooding.

One aspect we can often control is our vulnerability. By building safer homes in safer areas or helping those who are most at risk reduce their vulnerabilities, we can make a significant impact. Mitigation is a crucial part of the emergency management cycle, which comprises three main phases: preparedness, response, and recovery (Figure 2).

Figure 2. Emergency Management Cycle

The preparation phase involves planning, training, and education for events that cannot be fully mitigated. Key activities at this stage include:

- Develop disaster preparedness plans, including what to do, where to go, and who to contact for help.

- Conduct drills to practice emergency response.

- Create a list of essential items needed during a disaster.

- Assess the community to identify potential vulnerabilities.

Risk perception varies significantly among individuals, households, families, and communities due to several factors related to their unique vulnerability and lived experiences. Here's why this happens, with examples in the Caribbean:

💵 Socioeconomic Status and Physical Vulnerabilities

Income Levels: People with higher incomes in urban centers in the Caribbean may feel less vulnerable to hurricanes because they have concrete homes or access to resources for a quick recovery.

Poverty: Families living in informal settlements or coastal areas are more exposed to extreme weather, and their perception of risk may depend on the availability of resources to rebuild after disasters.

Location: Communities located in flood-prone areas or low-lying coastal areas have a high perception of risk due to recurrent flooding. Inland communities may underestimate the risk if they do not experience direct effects frequently.

📖 Access to Information and Education

Education: A person who is aware of climate models that predict stronger hurricanes is more likely to prepare properly. In contrast, someone with limited access to education might rely on local myths or informal networks to understand the risks.

Sources of information: The way information is shared in communities affects the perception of risk. For example, someone who trusts community leaders or social networks may have a different perception of someone who only listens to broadcasts in traditional media.

👥 Cultural Beliefs and Historical Experiences

Cultural Resilience: Some communities may be perceived as highly resilient due to generations of surviving hurricanes and floods, which can lead to complacency in preparing for future risks.

Disaster Fatigue: Repeated exposure to disaster alerts without severe consequences can reduce the perceived urgency to act. For example, a community with numerous hurricane warnings with minimal impact may begin to underestimate preparations.

Religious and Spiritual Beliefs: Faith-based beliefs can influence the perception of risk. If people believe divine intervention will protect them, they may not prepare properly or avoid bowel movements during severe events.

Community Networks and Support Systems

Social Cohesion: Tight-knit communities might perceive risk as lower due to the belief that neighbors will support each other during and after a disaster. For example, a rural village where people know and rely on one another may prioritize collective preparation and feel confident in their mutual aid system.

Isolation: Conversely, communities with weak social networks may feel greater anxiety about potential disasters because they know they lack support in times of crisis.

Government and Policy Trust

Trust in Authorities: If there is a history of mismanagement or corruption related to disaster response, people may doubt official warnings or evacuation orders, altering their perception of risk.

Preparedness Initiatives: Regions that frequently conduct disaster drills or have visible emergency response infrastructure can reassure residents, shifting their perception of risk to something manageable. Without this, there may be a sense of abandonment and heightened fear.

Examples in the Caribbean

Hurricanes: Vulnerabilities could be compounded by poverty, political instability, and inadequate infrastructure. Families in more fortified homes can have a different risk perception compared to those in fragile housing or makeshift shelters.

Coastal Communities: Those relying on fishing and tourism perceive greater risk from rising sea levels and storms, which directly threaten their livelihoods. In contrast, urban populations working in less climate-dependent industries may not feel as directly affected.

Understanding these varying perceptions is essential for designing targeted emergency response and community mobilization strategies that consider each person, family and community's unique context and vulnerabilities.

These activities help ensure that individuals and communities are better equipped to handle disasters and reduce their overall risk.

In emergency management, the process includes three key phases: mitigation, response, and recovery. **Mitigation** focuses on reducing potential damage before a disaster, through actions such as planting vegetation to prevent flooding and securing properties to withstand weather events. **Response** begins immediately after a disaster, with the goal of addressing urgent needs by implementing emergency plans, search and rescue operations, and ensuring community safety and food security. **Recovery** occurs as normalcy is restored, which can be a lengthy process that includes addressing stress and financial issues, rebuilding based on lessons learned, and continuing mitigation efforts to prevent future disasters.

Some questions to ponder:

Preparation Phase

- How can communities leverage traditional knowledge and local networks to improve emergency preparedness plans for frequent hurricanes and floods?

- What strategies can be implemented to ensure that emergency information reaches the most vulnerable populations in a timely manner, including those in rural or hard-to-reach areas?

Response Phase

- What immediate steps should local governments and community leaders prioritize to coordinate an effective response when a major storm is predicted to impact in the next 48 hours?

- How can community-based organizations and local volunteers best mobilize to provide rapid assistance to neighbors and vulnerable groups in the immediate aftermath of a disaster?

Recovery Phase

- What long-term recovery programs can be developed to support affected families in rebuilding resilient homes and infrastructure after a major disaster?

- How can the economic impacts of disasters on local industries, such as tourism and agriculture, be mitigated to support faster community recovery?

Mitigation Between Phases

- What policies and infrastructure changes can be introduced to reduce future risks in coastal areas vulnerable to sea level rise and storm surges?

- How can education and training programs be designed to help community members adopt sustainable practices that mitigate the long-term effects of extreme weather events in their region?

A great tool for assessing your community's vulnerabilities and level of mitigation to climate change is a SWOT analysis.

#14: Community SWOT Analysis for Emergencies

A SWOT analysis is ideal for understanding the community's position on emergency and disaster management, assessing internal strengths and weaknesses, which can be modified by the community, as well as external opportunities and threats, which are not under the community's control but can be exploited or mitigated.

Keyword: Emerg

For example, a community's strengths might include the presence of an organized leadership structure, resources such as community centers, radios, stretchers, and generators, and organized volunteer groups. Weaknesses could include ineffective communication with all community members, lack of family support for the elderly or people with disabilities, accumulation of trash or debris in gutters and sewers, and lack of emergency and disaster planning. The analysis helps identify which strengths need to be reinforced and which weaknesses need to be addressed, as both are under the control of the community and can be improved.

On the other hand, while the community cannot change external opportunities and threats, it can seize opportunities and mitigate threats. Opportunities could include funds available for community emergency preparedness to enable the acquisition of Resources for emergency management and local government machinery and personnel for debris or trash removal. Threats could involve long delays in local government action to address threats to the community, difficulties in applying for community funds (due to lack of access to technology or challenges with the application process), and deforestation close to the community that reduces water absorption and increases flood risks. Analytics helps determine which opportunities to pursue and which threats to mitigate.

Questions to Conduct a Community SWOT Analysis with Community Members:

Strengths

- What resources or skills does our community have that help us during emergencies (e.g., strong volunteer groups, trusted community leaders)?
- Who in the community has helped in past emergencies, and what made their help effective?

Weaknesses

- What challenges do we face in preparing for or responding to emergencies (e.g., limited access to emergency shelters or slow communication)?
- What areas in the community are most at risk during disasters, and why?

Opportunities

- What new ideas or activities could make our community stronger and safer during emergencies (e.g., training workshops, partnerships with NGOs)?
- Are there local traditions or practices that could be used to better prepare for future emergencies?

Threats

- What external events or trends (such as stronger storms or economic problems) could put our community at greater risk?
- What worries you most about future emergencies, based on past experiences or changes you see occurring?

Reducing vulnerabilities or weaknesses requires community organization and analysis of community members to understand their needs and reduce the impact during an emergency or disaster. After conducting an in-depth analysis of the community in a specific emergency scenario, the next step is to identify all the resources available within and outside the community. This process is known as Community Resource Mapping.

#15: Community Resource Mapping

This tool makes it easy to identify all the resources available within and outside the community—both public and private—that could be useful in emergency and disaster management.

Keyword: Emerg

Within the community, resources can include community assets (such as members' skills, available equipment, and volunteer work), public resources (such as parks, gazebos, and courts), and private resources (including various businesses, nonprofits, hospitals, and health centers). In addition, resources that are not physically within the community but could still be useful (such as local government, businesses and organizations, and volunteers) should also be identified.

When identifying a resource, it is important to include as much information as possible: the name or organization, contact details, phone number, potential role in emergency management, and whether they agree to collaborate with the community during emergencies or disasters. This information applies to both community-based and external resources.

Tips for mapping community resources in emergency management:

1. It brings together community members, including elders and local leaders, to share knowledge and map important resources and risk areas.

2. Use large paper or whiteboards to draw a simple map of the community, marking key locations such as hospitals, schools, shelters, and water sources.

3. Label each resource clearly with easy-to-understand symbols and create a legend so everyone knows what each symbol means.

4. Identify and mark areas that are at risk, such as flood zones or areas with weak infrastructure.

5. Ask for input from different groups, such as youth, women's groups, and people with disabilities, to make sure all needs are included.

6. Review and update the map regularly, and practice using it during emergency drills to detect missing details or areas for improvement.

A tool that integrates the findings of the Risk Analysis, SWOT Analysis and Resource Mapping is the **Community Emergency Plan**.

#16: Community Emergency Plan

This tool helps to define, integrate and document the actions and resources of a community in the face of a given emergency in a detailed way.

Keyword: Emerg

In this tool, we use the identified resources to address community weaknesses and threats, reinforce strengths, and seize opportunities in the face of a high-risk threat. It also establishes when the emergency plan will be reviewed, since, as events occur, time passes and mitigation is carried out, we can identify new strengths, opportunities, weaknesses and threats that must be addressed or that must be eliminated from the plan as they have been previously addressed.

Incorporating the findings of a community SWOT Analysis and Resource Mapping into an emergency plan formatted as a table can streamline the planning process. Here are some tips for each column to ensure the plan is clear and actionable:

1. Problem Caused by the Emergency/Disaster

- **Use Specific Findings:** Reference the weaknesses and threats identified in the SWOT analysis to complete this column. For example, if "flood-prone areas" was a threat, list potential problems such as "flooded homes" or "blocked roads."
- **Categorize by Impact:** Group issues by type (e.g., infrastructure, public health, communication) to make the plan easier to navigate.

2. Actions, Tasks, Next Steps, or Necessary Activities

- **Detail Practical Steps:** Use strengths and opportunities from the SWOT analysis and Resources identified in the mapping exercise to create targeted actions. For example, if community centers were marked as safe havens, include tasks such as "preparing and stocking the community center with emergency supplies."
- **Include Clear Steps:** Break down larger actions into manageable tasks (e.g., "contact volunteers" or "take inventory of supplies").
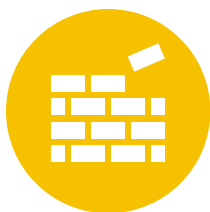
3. Emergency Phase

- **Assign the Phase:** Relate each action to the corresponding phase (Preparation, Response, Recovery). Use SWOT analysis to highlight what's needed for each phase. For example, preparing a "training workshop" would be part of the Preparation, while "distributing supplies" would be in the Response.
- **Consider Mitigation:** Includes activities that address long-term improvements between phases (e.g., "reinforcing building structures after recovery").
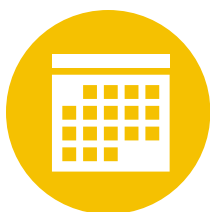
4. Date or Period

- **Set Realistic Schedules:** Assign dates based on urgency and feasibility, such as "monthly drills" for Readiness or "immediate action within 24 hours" for Response tasks.
- **Check Regularly:** Make sure dates are flexible enough to adjust as conditions change and align with community needs and seasonal disaster patterns.

5. Responsible People, Organizations and Resources

- **List Clearly:** Identifies who will lead and support each action, using the findings of Resources' mapping to ensure responsibilities are assigned to available organizations, community leaders, or volunteer groups.
- **Include Contacts:** Whenever possible, add names or contact roles (e.g., "local Red Cross chapter" or "community health worker") to facilitate coordination.
- **Resource Allocation:** Write down which Resources (e.g., vehicles, emergency kits, communication tools) will be needed and make sure they are accessible and ready.

- **Check Consistency:** Make sure that the issues, actions, and resources are aligned with what was found in the SWOT analysis and mapping.
- **Simplify Language:** Use clear and simple language so that all members of the community can understand their roles and responsibilities.
- **Highlight Priorities:** Use color-coding or symbols (e.g., stars) to indicate high-priority tasks or critical issues.
- **Create a Living Document:** Design the table so that it can be updated regularly as new findings emerge or Resources change.

OTHER EMERGENCY MANAGEMENT TOOLS AT THE COMMUNITY LEVEL

Keyword: Emerg

#17: Are you ready?

This comprehensive guide developed by FEMA will provide you with detailed information on how best to prepare for disasters, both at the family and community level. In this document, you'll find general tips for preparedness before, during, and after disasters, as well as best practices for informing the decisions you make to prepare for specific disasters, such as hurricanes, earthquakes, and active shooters.
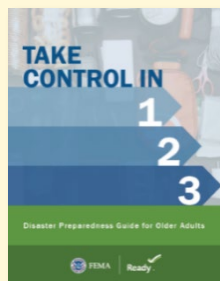
#18: FEMA Disaster Preparedness Guide for Older Adults

The Disaster Preparedness Guide for Older Adults from FEMA is intended to support older adults and their caregivers in preparing with three simple steps: assess their needs, plan and engage their network. The guide provides worksheets that are easy to read and use to guide individuals and caregivers through a self-assessment to identify specific needs and check sheets that create a personalized plan. Other resources for older adults available.
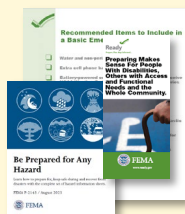
#19: Other Resources Available

Colorful brochures, fact sheets, and more, including resources aimed at diverse communities and groups, for a variety of emergencies from multiple organizations are available in the resource packet.

MATERIAL AIMED AT YOUNGE PEOPLE AND CHILDREN

Keyword: Emerg, Child
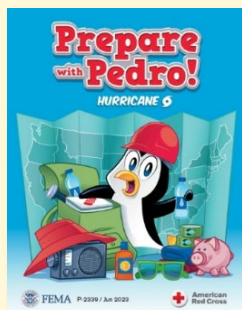
#20: Get Ready with Pedro

A 30- to 45-minute educational preparedness program for grades K-2 (7 years) that teaches young students how to be prepared and act in the face of a variety of home emergencies or local hazards.

#21: Ready 2 Help

With this card game, children ages 8 and up will be able to respond to examples of emergencies by working with their friends and using skills that will help them in a real emergency. Ready 2 Help teaches 5 easy steps to stay safe and make a difference until help arrives.

#22: Emergencies & Mental Health with Sesame Street

Resources includes Sesame Street characters and offers parents a family guide to educating children about emergencies, in addition to other emergency-related resources for children.
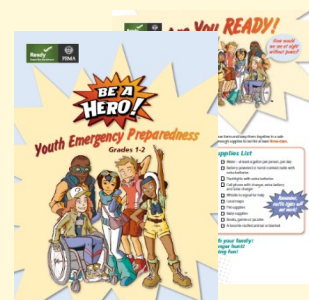
#23: Be a Hero!

An emergency preparedness curriculum for grades 1-12 that teaches children what to do before, during, and after an emergency, while fostering critical 21st century skills such as problem-solving, teamwork, creativity, leadership, and communication.

For activities and recommendations targeting specific vulnerable groups, such as children, young people and the elderly, please refer to Appendix B. For outdoor worker health information, see Module 5.

WHAT DOES THIS MODULE CONTAIN?

Information, resources, and tools to understand and identify common health hazards in farming communities, which become especially important risks during extreme weather events.

WHO SHOULD READ THIS MODULE?

Anyone interested in understanding how extreme weather events, often intensified by extreme weather-related phenomena, affect community health and in being able to identify chemical and biological risks. In this module mental health, chronic diseases, infectious diseases will be discussed in the context of extreme weather events. Tools and resources will be presented to educate about extreme weather events, emergency management, risk mitigation strategies, and protecting community health and safety.

COMMUNITY HEALTH

Extreme weather events have a profound impact on community health, with the potential to expose people to a variety of hazards. These hazards can affect every aspect of human health by disrupting environmental conditions and affecting the quality of air, water, and food supplies. In the face of such extreme weather events, communities must be prepared to respond to and mitigate these threats, as they often exacerbate existing health disparities and put vulnerable populations at greater risk. Understanding and addressing these risks is essential to ensure that public health systems can provide adequate protection and support during emergencies.

The hazards we may face during and after extreme weather events can be categorized into physical, chemical, and biological hazards. Physical hazards are related to our bodies and their functioning, and include shocks, falls, vibration, noise, injuries, and radiation. Musculoskeletal injuries are those that affect muscles, nerves, blood vessels, ligaments, tendons, and bones. Examples include muscle tears, carpal tunnel syndrome, tendonitis, and injuries to the shoulder, knee, or lower back.

CHEMICAL SAFETY

Chemicals are substances that, when found in sufficient amounts, can pose significant health risks. They can cause cancer, severe injury, acute illness, lead to birth defects, or even result in serious illness or death, depending on their toxicity. Routes of exposure include skin contact, ingestion, inhalation, and eye contact. Although many people think that laboratories or industrial environments are the main sources of chemical risk, everyday activities such as cleaning with household cleaning chemicals or using pesticides in the home can also be dangerous.

Several factors influence individual susceptibility to chemical exposure:

- **Type of Chemical**: Different chemicals have varying effects. For example, gases such as gasoline affect the respiratory system, while acids can cause skin irritation or corrosion.

- **Personal Characteristics**: A person's age, sex, weight, height, lifestyle, and health conditions affect how chemicals are absorbed, metabolized, and eliminated from the body.

- **Chemical Interactions**: Combining chemicals can result in toxic reactions or altered effects. Similarly, drug interactions can affect their effectiveness.

- **Duration of Exposure**: Chemicals can cause immediate harm or have delayed effects, with some requiring long-term exposure to manifest health problems.

- **Amount or dose of the chemical:** The amount or level of a chemical to which a person was exposed.

- **Frequency:** How many times a person was exposed.

Combining different cleaning chemicals is particularly risky. This practice can generate toxic fumes and reduce the effectiveness of products, leading to improper cleaning and potential damage. In addition, improper handling and failure to follow label directions can cause injury to the skin, eyes, or respiratory system. To ensure safety, it is crucial to use cleaning products as directed and follow all recommended safety measures.
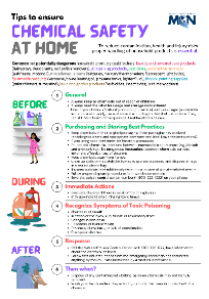
#24: Chemical Safety in the Home
A simple, one-page document that provides basic recommendations for ensuring household chemicals are handled properly.

Communities near or near agricultural areas have the additional risk that pesticides applied to crops will also move with the wind, rain, runoff and other forms towards homes and community surroundings.

#25: A Little Bit of Poison... Will It Kill You?
A guide that can be used by community workers, educators, and community health workers during their educational activities in the community. It provides information on the risks of exposure to environmental pollutants and pesticides and ways to reduce those risks. It also includes helpful information and tips for working in the community. As for the comic book, community workers, educators, and health promoters can use it as an educational tool to inform their community about the risks of environmental pollutants and pesticides.

Keyword: Chem

#26: Pesticides Nearby... But Staying Healthy
Developed by MCN, it is aimed at farmworker families to educate parents about the risks children face due to pesticide exposure and ways to minimize these risks.

Keywords: Chem, Child, Ag

DIFFUSE OR NON-POINT SOURCE POLLUTION IN AGRICULTURAL COMMUNITIES DURING EXTREME WEATHER EVENTS

Nonpoint Source (NPS) pollution typically results from runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. It is usually caused by rain traveling through the soil, collecting and transporting natural and man-made pollutants, which are ultimately deposited in lakes, rivers, wetlands, coastal waters, and groundwater.

Pollution from non-point sources may include:

- Fertilizers, herbicides, and insecticides in excess of agricultural land and residential areas.
- Oil, grease, and toxic chemicals from urban runoff and energy production.
- Sediment from poorly managed construction sites, agricultural and forest lands, and eroded riverbanks.
- Salt from irrigation and acid drainage practices in abandoned mines.
- Bacteria and nutrients from livestock, pet waste, and faulty septic systems.
- Atmospheric hydrological deposition and modification.

#27: Be Prepared! Floods

Provides important recommendations for community members to stay safe during and after floods that are sources of NPS pollution.

Keyword: Chem
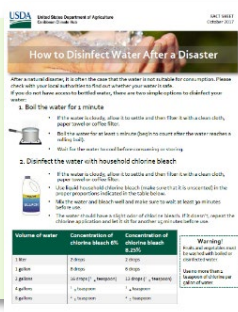
#28: How to Disinfect Water After a Disaster

This USDA resource offers recommendations on how to disinfect water after a disaster.

Keyword: Chem, Emerg

For occupational mitigation of NPS, see the next Module.

SAFE WATER AND CHEMICAL SAFETY IN THE U.S. VIRGIN ISLANDS

Water security in the U.S. Virgin Islands represents a critical and increasingly complex challenge that profoundly impacts residents' daily lives and long-term well-being. The territory faces problems with aging infrastructure, limited freshwater resources, and significant vulnerabilities exacerbated by extreme weather-related phenomena and events, leading to more frequent drought conditions, more intense hurricanes, and rising sea levels, which threatens groundwater and desalination systems. These environmental pressures create a great deal of mental and emotional strain on residents, who often experience increasing anxiety about water scarcity, potential pollution, and uncertainty in reliable access to water. The psychological impact is considerable, with community members experiencing stress related to water rationing, potential health risks, and the wider economic implications of water insecurity. Many Virgin Islanders have implemented rainwater harvesting systems to address these challenges and decentralize water harvesting. Investing in safe and climate-adaptive infrastructure must be the appropriate response by government authorities to address water security concerns, focusing on the health and safety of Virgin Islanders and increasing community resilience in the face of changing environmental conditions.

Education and Preparedness of Communities for Unsafe Water and Chemical Safety

Educating the community about the risks of unsafe water and chemical hazards during emergencies is crucial to minimizing health impacts and ensuring effective responses when such events occur. Preparedness activities may involve a variety of strategies tailored to different community groups. These activities not only increase awareness, but also empower individuals to take preventative measures before and during emergencies. Below are some general activities, along with specific activities tailored to children, adults, seniors, and outdoor workers.

Water Safety and Chemical Hazard Awareness Workshops:
Organize workshops to educate community members about the risks of unsafe water and chemical exposure during emergencies, and how to prevent contamination, such as boiling water or using water purification tablets.

Distribution of Educational Materials:
Create and distribute brochures, posters, and infographics that explain how to safely store, purify, and consume water during emergencies, as well as how to recognize and avoid chemical hazards.

Community Emergency Kits:
Help households prepare emergency kits that include water purification supplies (e.g., filters, purification tablets) and protective equipment for chemical exposure (e.g., gloves, masks).

Basic First Aid and Chemical Safety Training:
Offer first aid and chemical safety training, covering topics such as how to treat chemical burns, respiratory problems, and other exposures, along with guidelines for safe water handling.

Emergency Drills:
Conduct drills that simulate water contamination scenarios (e.g., chemical spillage into water systems) so that community members can practice what to do, how to purify water, and how to report chemical hazards.

For activities related to vulnerable groups, see Appendix C.

HEAT-RELATED ILLNESS

Extreme weather-related phenomena and events intensify heat-related illnesses, creating complex risks for vulnerable populations. Extreme heat aggravates chronic conditions such as cardiovascular disease, respiratory disorders, and diabetes by increasing physiological stress and metabolic disruption. Medications for mental health, hypertension, and neurological conditions can affect the body's thermal regulation, increasing individual vulnerability. Heat stress, characterized by slight physiological tension and a high core temperature, differs from heat stroke, which involves a more severe elevation of body temperature and possible organ deterioration. Heat stroke represents the most critical stage, with neurological alteration and possible multi-organ failure. During emergencies or disasters, these risks are amplified due to limited access to healthcare, the collapse of infrastructure, and compromised community support systems, making agricultural and rural populations particularly susceptible to rapid health deterioration under extreme thermal conditions.

Additional risks during extreme heat
(which is an extreme weather event consequence of extreme weather-related phenomena):

- Impaired drug effectiveness
- Accelerating the progress of chronic diseases
- Increased cardiovascular strain
- Impaired neurological function
- Commitment to metabolic regulation
- Increased vulnerability in mental health
- Possible failure in organic systems

#29: Colorful guides, fact sheets, and more resources
from multiple organizations are available in the resource packet addressing heat, climate change, mental health and emergencies.

Keyword: Heat

#30: OSHA-NIOSH Heat Safety Tool Application

It calculates the **heat index of the place** and shows the **level of danger**. With a "click," you can receive reminders about the appropriate **protective measures** for that level of risk and protect yourself from heat-related illnesses. The app includes reminders about hydration, rest, and offers valuable information on signs and symptoms of heat-related illnesses.

RESPIRATORY HEALTH

Extreme weather events dramatically impact respiratory health by deteriorating air quality, increasing particulate matter, pollen, wildfire smoke, and allergen concentrations. Respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), and respiratory infections are aggravated by these environmental changes. Vulnerable populations, including children, pregnant people, the elderly, and those with pre-existing conditions, face elevated risks. During emergencies or disasters, respiratory challenges are intensified due to infrastructure disruption, limited medical access, increased exposure to environmental hazards, and compromised community health infrastructure, making agricultural and rural communities particularly susceptible to acute and chronic respiratory complications.

Respiratory risks associated with extreme weather-related events and phenomena and deterioration of air quality:

- Increased asthma triggers
- COPD exacerbation
- Increased vulnerability to infection
- Reduced lung function
- Compromised immune responses
- Amplification of allergen sensitivity
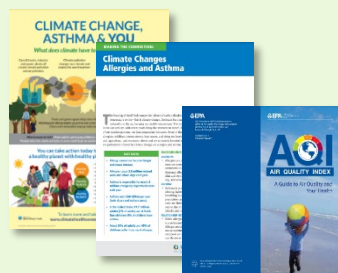
#31: Colorful guides, fact sheets, and more

Resources from multiple organizations are available in the resources package that address heat, weather, mental health, and emergencies.

Keyword: Resp

#32: EPA's AirNow Mobile App

It offers a simple interface to quickly view current and forecasted air quality information, allowing you to plan daily activities and protect your health. The app automatically displays the current air quality index (AQI) for your local area or any area you want to check and allows you to store multiple areas for quick reference.
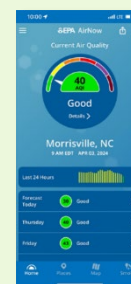
MENTAL HEALTH

Members of farming communities in the Caribbean, specifically in Puerto Rico and the U.S. Virgin Islands, face unique mental health challenges due to their distinctive geographic, cultural, and socioeconomic context within the climate crisis. The trauma of experiencing increasingly powerful hurricanes generates severe psychological impacts. These communities not only face the destruction of crops and infrastructure, but also isolation due to their archipelago's geography. The intensity of these storms, combined with prolonged recovery periods and limited access to mainland resources, can lead to acute stress disorder, post-traumatic stress disorder (PTSD), deep anxiety, and suicidal thoughts or thoughts about future hurricane seasons.

In short, farming communities are experiencing:

- Post-disaster psychological distress
- Complex grief from loss of livelihoods
- Increased vulnerability after extreme weather events
- Depression linked to economic uncertainty
- Increased interpersonal and family tensions
- Sleep disruptions
- Elevated cortisol levels
- Potential increased risk of substance abuse
- Collective trauma

- Erosion of social support networks
- Diminished sense of community resilience
- Feelings of helplessness
- Anticipated grief over environmental changes
- Persistent anxiety about crop failures
- Uncertainty about future agricultural productivity
- Precarious financial instability and economic precariousness

The loss of traditional Caribbean agricultural practices and crops due to changing weather patterns can trigger cultural grief. Many farmers on these islands maintain deep cultural connections to specific crops (such as coffee, bananas, and tubers) that are becoming increasingly difficult to grow. This threatens not only their economic survival, but also their cultural identity and generational knowledge, generating deep feelings of loss and displacement.

The combined effects of colonial history, economic challenges, and limited federal support create additional burdens on mental health. When disasters strike, limited resource awareness for emergency response and slower assistance compared to communities on the continent can lead to feelings of abandonment and hopelessness. This systemic stress is added to the already heavy psychological impact of extreme weather-related phenomena and associated events. For these island communities, the threat of losing their land due to rising sea levels or increased soil salinity creates a unique form of anticipatory mourning. Unlike mainland farmers who might have the option to relocate inland, island farmers face more limited adaptation options, which can intensify feelings of helplessness and anxiety about the future.

The interconnected nature of island communities means that individual mental health challenges often become collective concerns. When farming families struggle, this affects not only their immediate households, but also, frequently, local food systems and cultural practices. This can create a ripple effect of stress and anxiety throughout the community, particularly on smaller islands where alternative livelihoods may be limited. Social support networks, which are traditionally strong in Caribbean cultures, can become strained under repeated weather disasters. The potential disruption of these crucial support systems, combined with limited access to mental health services on the islands, can exacerbate feelings of isolation and depression among members of farming communities.

Given these complex mental health difficulties faced by farming communities in Puerto Rico and the U.S. Virgin Islands, it is crucial to understand the resources and support systems available. In the next section, we will explore several mental health resources designed to help community members cope with stress and trauma related to extreme weather-related events or phenomena. Understanding how to access these resources, along with identifying barriers to mental health care in these regions, is essential to building resilient and supportive systems that address the unique needs of Caribbean farming communities in the face of the impacts of extreme weather-related phenomena and events:
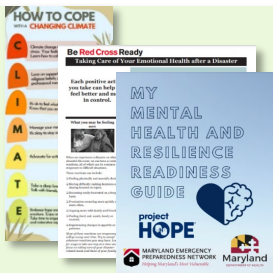
#33: Colorful guides, fact sheets, and more

Resources from multiple organizations are available in the resources package on mental health and extreme weather-related events.

Keyword: Mental

#34: Helping the Helpers

This comic dedicated to healthcare providers reminds them of the importance of taking care of themselves in order to meet the needs of their patients and families. It also offers simple self-care steps to improve overall well-being.

Keyword: Mental

#35: Colorful guides, fact sheets, and more focused on kids

This group of resources aims to provide strategies and activities for family members to help children cope with stress or difficult times while also managing their own emotions. They can be helpful after emergencies and disasters.

Keywords: Mental, Child

Mental health challenges in farming communities often intersect with chronic disease management, creating complex health vulnerabilities. Chronic stress stemming from climate uncertainty can aggravate conditions such as hypertension, diabetes, and cardiovascular disease, while limited access to health services and economic instability further compromise patients' ability to maintain consistent medical treatment and manage their lifestyle. The psychological impact of potential agricultural disruption can lead to an increase in health-affecting behaviors, which could accelerate the progression of chronic diseases and reduce overall community health resilience.

Chronic stress may, in turn, have the following effects in patients with comorbidity of chronic diseases:

- Elevated cortisol levels due to ongoing weather anxiety

- Increased blood pressure due to financial and environmental uncertainty

- Sleep disruption that affects heart health

- Dietary changes due to food insecurity that impact cardiovascular health

- Physical and emotional stress due to repeated disaster recovery

- Stress-induced blood sugar fluctuations

- Disrupted sleep patterns that affect glucose control

- Changes in eating habits due to food availability

- Mental health impacts affecting self-management

- Financial stress that impacts medication adherence

- Caregiver burnout due to additional responsibilities

In the next section of this module, you will find information about chronic diseases and weather-related extreme events or phenomena, including resources for patient preparedness before emergencies or disasters occur.

CHRONIC DISEASES

The relationship between chronic stress and the impacts of extreme weather-related phenomena or events on members of Caribbean farming communities in Puerto Rico and the U.S. Virgin Islands is particularly complex and intensifying.

The constant threat of extreme weather events creates a persistent state of hyper-alertness and anxiety. During hurricane season (June through November), farmers experience elevated levels of stress for extended periods, knowing that a single storm could devastate their entire operation. This prolonged state of alertness can lead to chronic stress conditions, affecting sleep patterns, blood pressure, and overall physical health.

The unpredictability of weather patterns disrupts traditional crop cycles, forcing farmers to constantly adapt to their farming practices. This ongoing process of adaptation creates sustained mental and physical strain as farmers struggle to maintain productivity while dealing with erratic rainfall, extreme heat, and changes in pest patterns. The physical demands of implementing new farming techniques, combined with the mental burden of uncertain outcomes, contribute to chronic fatigue and burnout.

Financial instability resulting from crop losses related to extreme weather-related phenomena or events generates persistent economic stress. Unlike mainland farmers, who may have more diverse access to markets or support systems, island farmers often face limited options for diversifying their incomes. This constant financial pressure can manifest itself in physical symptoms such as headaches, digestive problems, and muscle tension, while also aggravating pre-existing health conditions.

The cumulative effect of repeated disasters, particularly in recent years, has created a cycle of chronic stress that affects both physical and mental well-being. Each new weather event adds to the accumulated stress load, potentially worsening existing health conditions and creating new ones. Limited access to health care resources on the islands, combined with physical isolation during recovery periods, can make managing chronic conditions particularly challenging.

For older farmers and those with pre-existing health conditions, the physical demands of preparing for and recovering from climate disasters create additional health risks. The need to secure equipment, protect crops, and rebuild after storms places significant physical strain on bodies already dealing with chronic conditions, which could lead to additional health complications.

The intergenerational nature of agriculture in these communities means that chronic stress affects multiple generations simultaneously. Younger family members may experience the physical effects of chronic stress at a young age, as they take on more responsibilities to help their families adapt and recover from climate impacts, while also worrying about the long-term viability of their agricultural heritage.

Understanding these complex relationships between chronic stress, health conditions, and extreme weather-related phenomena or events is crucial to developing effective support systems and health care interventions. The following section examines specific strategies and resources available to help members of farming communities manage chronic stress and associated health conditions, while building resilience in the face of ongoing climate challenges.

Find available resources with the keyword: Chron

CARDIOVASCULAR CONDITIONS

Extreme weather-related phenomena or events significantly affect cardiovascular health among Caribbean inhabitants in Puerto Rico and the U.S. Virgin Islands through several mechanisms. Extreme heat increases the risk of heart attacks and strokes, while high humidity levels aggravate heat stress on the cardiovascular system. Sudden changes in temperature can act as triggers for cardiac events, and the degradation of air quality due to increased dust and pollutants places an additional burden on the heart. In addition, the physical exertion involved in disaster preparedness and recovery adds stress to the cardiovascular system, complicating the overall health risks faced by these populations.

> **When disaster strikes, other cardiovascular risks arise in addition to those mentioned above:**

- Disruption in access to heart medications during and after storms

- Limited access to medical facilities due to infrastructure damage

- Increased blood pressure from disaster-related stress

- Emergency evacuations that result in physical exertion

- Power outages affecting the operation of medical equipment and medication storage

- Potential exposure to contaminated water that affects overall health

#36: These resources include information on cardiovascular health and extreme weather-related phenomena or events.
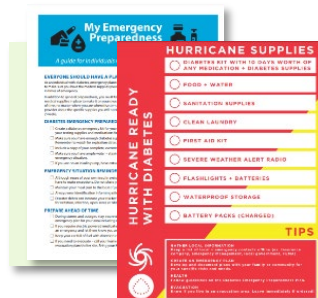
Keyword: Cardio

DIABETES

Extreme weather-related phenomena or events significantly affect diabetes management in Caribbean people in Puerto Rico and the U.S. Virgin Islands in a variety of ways. Extreme heat can compromise insulin storage and stability, while temperature fluctuations can affect the accuracy and functionality of blood glucose monitoring equipment. Heat stress can directly alter blood glucose levels, and the risk of dehydration further complicates the control of blood sugar levels. Changes in physical activity patterns due to extreme weather events disrupt routine diabetes management, and high humidity and heat can make wound healing difficult in diabetic patients, increasing the risk of complications. These challenges underscore the need for strategies in diabetes care in these scenarios.

> **When disaster strikes, other diabetes risks arise in addition to those listed above:**

- Disruption in insulin and drug supply chains

- Power outages affecting insulin cooling

- Limited access to blood glucose testing supplies

- Disruption of regular mealtimes and dietary patterns

- Difficulties in maintaining foot care during flooding

- Difficulty accessing medical care for routine checkups

- Emergency evacuations that disrupt diabetes management routines

- Food insecurity affecting dietary control

#37: These resources include information about diabetes and emergency and disaster preparedness.

Keyword: Diab

#38: My Health is My Treasure

This comic book explores the subject through the story of a farmworker named Goyo, who was recently diagnosed with diabetes.
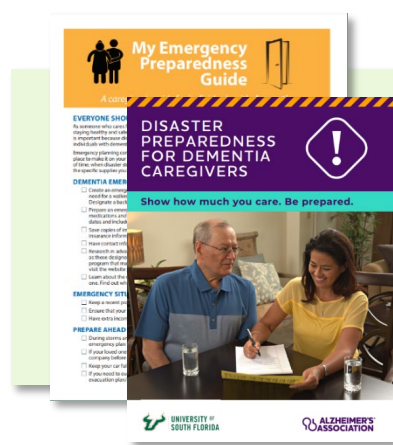
Keyword: Diab

NEURODEGENERATIVE CONDITIONS

Extreme weather-related phenomena or events significantly affect neurodegenerative conditions such as multiple sclerosis, Parkinson's, Alzheimer's, and other neurological disorders among Caribbean nationals in Puerto Rico and the U.S. Virgin Islands. Heat sensitivity can trigger symptom flare-ups, while temperature fluctuations worsen neurological symptoms. High humidity impacts mobility and comfort, increasing the challenges faced by people with these conditions. The physical exertion of adapting to extreme climates and the environmental stress associated with weather events can accelerate the progression of the disease, while heat-induced fatigue aggravates symptoms, compounding the burden on affected people. Caregivers are also at risk of burnout due to the responsibility of caring for themselves, their family, and the person with the neurodegenerative diagnosis during difficult times.

> **When disaster strikes, other risks related to neurodegenerative conditions arise in addition to those mentioned above:**

- Discontinuation in medication regimens

- Limited access to specialty care

- Interruption of therapy sessions

- Displacement from family environments that causes confusion

- Power outage affecting medical equipment

- Mobility difficulties during evacuations

- Disruption of daily routines essential to the management of the condition

- Limited access to assistive devices during emergencies

#39: These resources include information on neurodegenerative conditions, especially Alzheimer's and Dementia, and emergency and disaster preparedness.

Keyword: Neuro

KIDNEY DISEASES

Extreme weather-related phenomena or events pose significant risks to kidney disease patients, especially in vulnerable farming communities. Rising temperatures, water scarcity, and extreme weather events can cause cumulative damage to the kidneys (due to the development of urinary tract infections and/or stones), exacerbate the risks of dehydration, and disrupt access to critical medical infrastructure and treatment. Heat stress can trigger acute kidney injury, while limited water resources compromise patients' ability to maintain hydration and follow necessary medication regimens.

> **When disaster strikes, there are other risks for kidney disease in addition to those mentioned above:**

- Discontinuation of dialysis treatments

- Disruptions in drug supply

- Limits on medical evacuation capabilities

- Compromised refrigeration for temperature-sensitive drugs

- Increased vulnerability to infections

- Accelerated dehydration

- Loss of medical records

- Restricted access to specialized medical care
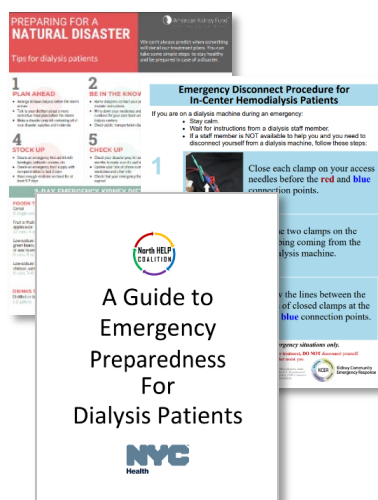
#40: These resources include information on kidney disease and emergency and disaster preparedness.

Keyword: Kidney

COMMUNITY OUTREACH ACTIVITIES

1. **Community Training Programs:**
   - Conduct hands-on training sessions for local farmers on sustainable farming practices, such as soil conservation, water-efficient irrigation, and agroforestry.
   - Organize weather strength workshops for families on disaster preparedness, including stormproof housing construction and emergency supply maintenance.

6. **Collaborative Partnerships:**
   - Partner with agricultural extension services and environmental NGOs to organize joint programs focused on sustainable practices and resource sharing.
   - Connect with local schools and organizations to bring weather-related education into classrooms and community centers, engaging younger generations in environmental action.

5. **Community Engagement and Advocacy:**
   - Facilitate community dialogues to share personal experiences related to weather impacts and co-create adaptive strategies, fostering trust and inclusion.
   - Empower local leaders by training them to advocate for policies that support weather adaptation, such as improving infrastructure or financing sustainable projects.

4. **Mobile Outreach Units:**
   - Deploy mobile health and education units to reach remote agricultural areas, providing on-site health services and weather adaptation resources.
   - Distribute weather-event action kits that include items such as reusable water bottles, first aid supplies, and illustrated guides on sustainable living practices.

3. **Health and Weather Monitoring Programs:**
   - Implement community-based health surveillance programs that monitor weather-sensitive diseases and use the data for public health interventions.
   - Conduct a community-based weather monitoring program that involves residents in monitoring and reporting local weather changes, improving early warning systems for extreme events.

2. **Promoting Traditional Knowledge:**
   - Incorporate indigenous and local practices for natural resource management and resilience into broader educational efforts to validate and preserve traditional wisdom.
   - Host storytelling events where older community members share how past generations adapted to environmental changes, fostering an intergenerational approach to resilience.

These activities not only strengthen community health and resilience, but also foster proactive adaptation and collaboration, empowering communities to collectively address extreme weather-related phenomena or events.

ARBOVIRAL AND INFECTIOUS DISEASES

Another danger to which we can be exposed are diseases that can be transmitted directly or indirectly by weather events. For example, the risk of spreading the Dengue virus through the *Aedes aegypti* mosquito increases with the presence of standing water and high temperatures. Flooding events that promote long-term water accumulation, as well as heat waves, could put farmworkers at risk of mosquito bites and, consequently, infection with the virus. The *Aedes aegypti* mosquito also transmits the Zika and Chikungunya viruses. Like mosquito-borne viruses, standing water and high temperatures increase the risk of exposure to *Leptospira* bacteria, which causes the disease known as Leptospirosis. In addition, extreme weather-related phenomena can increase the frequency of weather events, such as floods, disrupting and contaminating the supply of fresh (or drinking) water and contributing to poor sanitation and hygiene. This increases the risk of food- and water-borne infectious diseases. Specifically, a lack of basic hygiene can promote the spread of these diseases. Similarly, heat waves and the use of air conditioners as a response mechanism can increase the risk of contagion if adequate ventilation is not used. It should not be started with extreme events, since the populations targeted by the nature of their work exhibit a high risk of contagion of these diseases.

In the table below, you can see different diseases and how our population of interest may be exposed:

Illness	Exposition	How do I protect myself?
Dengue, Zika, Chikungunya	Mosquito bite.	Elimination of breeding sites. Use of repellent and appropriate clothing. Fumigation of high-risk areas.
Leptospirosis	Urine from an infected animal on soil or in standing water.	Personal protective equipment such as gloves and work boots can protect people and workers from exposure.
Infectious Respiratory Diseases (COVID-19, influenza, mycoplasma)	Contact with an exposed person, and with contaminated air or surface.	Personal protective equipment, disinfection and adequate ventilation. View resources.

RESULTS

#41: COVID-19 and Our Community

An educational material to support the work of community health workers on COVID-19 and its prevention. It is complemented by a guide with concrete suggestions on how to use the flipchart and links to resources for those who want to delve deeper into the subject and investigate if there are any changes in the information. The flipchart includes basic concepts of COVID-19, prevention and vaccination in the form of clear and simple messages that are supported by culturally appropriate illustrations to facilitate the process of communicating and transmitting information to community members.

Keyword: Infec
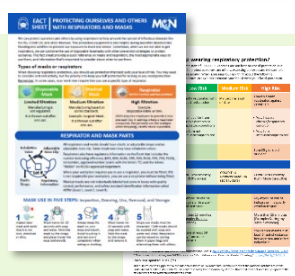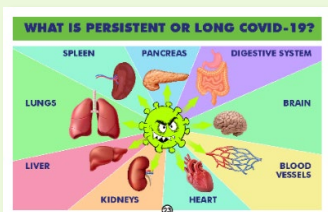
#42: Protecting ourselves and others with respirators and masks

Keyword: Infec
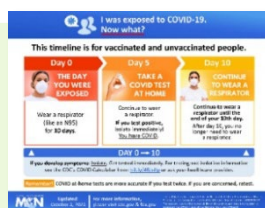
#43: I was exposed to COVID-19. Now what?

Keyword: Infec

#44: Ventilation as an essential control strategy to avoid contagion

Keyword: Infec
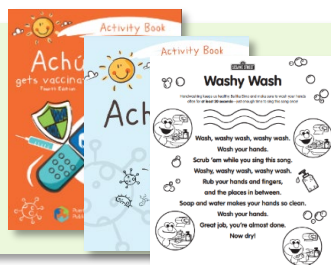
#45: Colorful guides, fact sheets, and more resources for kids

They are available in the infectious disease before and during emergencies resource packet.

Keyword: Infec, Child

48

Activities and ideas that can be done within the Community Health Center

1. **Educational Workshops**
   - Organize workshops on extreme events or phenomena related to climate and health that explain the connections between extreme events or phenomena related to climate, public health, and agriculture, emphasizing preventive measures.
   - Offer training sessions for health providers on how to identify and manage climate-related health conditions (e.g., heat-related illnesses, respiratory problems from air pollution).

2. **Sustainable Practices**
   - Incorporate eco-friendly practices, such as energy-efficient lighting, solar panels, and waste reduction strategies, to model sustainability.
   - Implement a green prescribing program where clinicians encourage patients to participate in activities that improve health and reduce carbon footprint (e.g., walking or cycling).

3. **Climate Resilience Resource Center**
   - Create an information corner with brochures, posters and digital resources on the impacts of climate-related extreme events or phenomena and ways to adapt (e.g. water conservation, crop rotation techniques).
   - Offer consultation for farmers and farmworkers on how to manage heat stress and the use of climate-resilient crops.

General Best Practices for All Groups

Inclusive Communication: Ensure weather-related warnings and emergency instructions are accessible to all groups, using multiple formats (e.g., oral, written, visual) and channels appropriate to each demographic.

Community Engagement: Engage vulnerable groups in the development and updating of emergency plans, ensuring that their voices and needs are

Intergenerational Support: Encourage intergenerational programs in which children and youth help older community members prepare for climate emergencies, promoting solidarity and knowledge sharing.

Adaptation and Resilience in All Plans: Ensure that all emergency plans take into account the specific vulnerabilities of each group, with tailored actions to protect them during weather events.

MODULE 5: OCCUPATIONAL HEALTH AND SAFETY DURING EXTREME WEATHER-RELATED PHENOMENA AND EVENTS

WHAT DOES THIS MODULE CONTAIN?

This module addresses the health and safety risks of outdoor workers, especially those who face extreme conditions due to extreme weather events, such as heat waves and others. It includes information about specific occupational hazards, such as heat stress and heat-related illnesses, as well as how to prevent them. It also covers safety in agricultural environments where workers are exposed to chemicals such as pesticides, and how extreme weather conditions can increase these risks. The module offers practical resources on how to manage these hazards and protect the health and well-being of workers during disasters and extreme heat conditions.

WHO SHOULD READ THIS MODULE?

This module is aimed at anyone who provides services or works in outdoor environments, especially in sectors such as agriculture, construction or emergency services, where workers face extreme weather conditions. It is particularly relevant for those who respond to disasters or work in the sun in areas with high temperatures. In addition, it should be read by occupational safety managers, occupational health workers, worksite supervisors, and community educators seeking to promote occupational safety and health, specifically in the face of risks associated with extreme heat and chemical exposure.

Health and safety concerns for outdoor workers during weather-related events have become increasingly critical as extreme weather patterns intensify. These frontline workers face elevated risks of both acute injury and chronic health impacts while performing essential tasks during disasters. The physical demands of disaster response and recovery work, combined with challenging environmental conditions, create multiple injury risks, including falls on slippery surfaces, stresses from debris removal, cuts from damaged materials, and accidents due to fatigue or reduced visibility. Farm work requires repetitive motions such as twisting, bending, weightlifting, static postures, and physical exertion under high temperatures and humidity. These conditions increase the risk of musculoskeletal disorders in workers. Serious injuries can also occur, such as falls from dizziness or accidents with machinery. Among these occupational hazards, heat exposure has emerged as a particularly significant threat. As global temperatures rise and extreme heat events become more frequent and intense, workers face increasing risks of heat-related illness. The combination of strenuous physical activity, protective gear requirements, and exposure to high temperatures and humidity creates dangerous conditions that can rapidly progress from mild heat stress to severe heat illness if proper precautions and monitoring are not maintained. Let's look at what heat illness is, why it occurs, what its symptoms are, and how to prevent it.

HEAT AND HEAT-RELATED ILLNESS

Heat-related illnesses occur when the body has difficulty regulating its temperature due to prolonged exposure to high temperatures and humidity. Just like a car's oil light indicates when maintenance is needed, our bodies have signals like thirst, dark urine, and cramps that indicate dehydration or an electrolyte imbalance. Thirst indicates that the body lacks essential water to cool itself through sweat, while dark urine and cramping often signal the need for hydration and electrolytes.

Hydrated:
If your urine looks like the colors 1 to 3, the person is most likely hydrated.

Dehydrated:
If the urine looks like the colors 4 to 6, the person is most likely dehydrated and in need to consume hydrating liquids.

Severely dehydrated:
If the urine looks like the colors 7 to 8, the person is most likely severely dehydrated, need to consume hydrating liquids immediately and contact your doctor.

Figure 3. Urine can be helpful in measuring hydration levels.
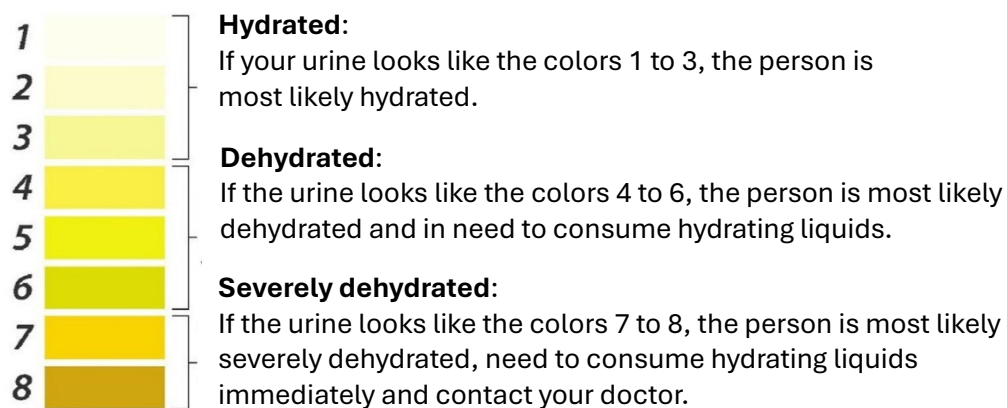
Heat exhaustion arises from the loss of fluids and electrolytes through excessive sweating, which leads to symptoms such as headache, nausea, dizziness, and weakness. If left untreated, it can progress to heat stroke, a serious condition in which the body's temperature regulation fails, which can cause symptoms such as fever, altered mental status, and even seizures.

Heat stroke is a medical emergency with core temperatures reaching 105°F or higher and requires immediate intervention.

Workers in high-temperature environments, such as farmworkers, are most at risk. Dehydration and loss of electrolytes are common, especially in hot and humid conditions, where sweat alone is not enough to cool the body. Proper hydration involves drinking water regularly and replenishing electrolytes with drinks or foods that contain salts, although sports drinks that are high in sugar are less ideal.

Farmworker in St. Croix, U.S. Virgin Islands

To prevent heat-related illness, it's crucial to recognize the early signs and stay hydrated. The Occupational Safety and Health Administration (OSHA) recommends drinking one cup of water every 20 minutes during heat exposure. With temperatures rising due to extreme weather phenomena in our planet, recognizing and managing heat stress has become increasingly important for safety and productivity. The temperature of the Earth has been increasing over time, and that favors the heat point of the environment. Even if you've been working in the fields for 10 years, you're more vulnerable to heat illness today than you were 10 years ago because the temperature is warmer. Extreme weather-relate phenomena and events have made humans more vulnerable. Everyone is at risk of heat stress, especially those exposed to high temperatures.
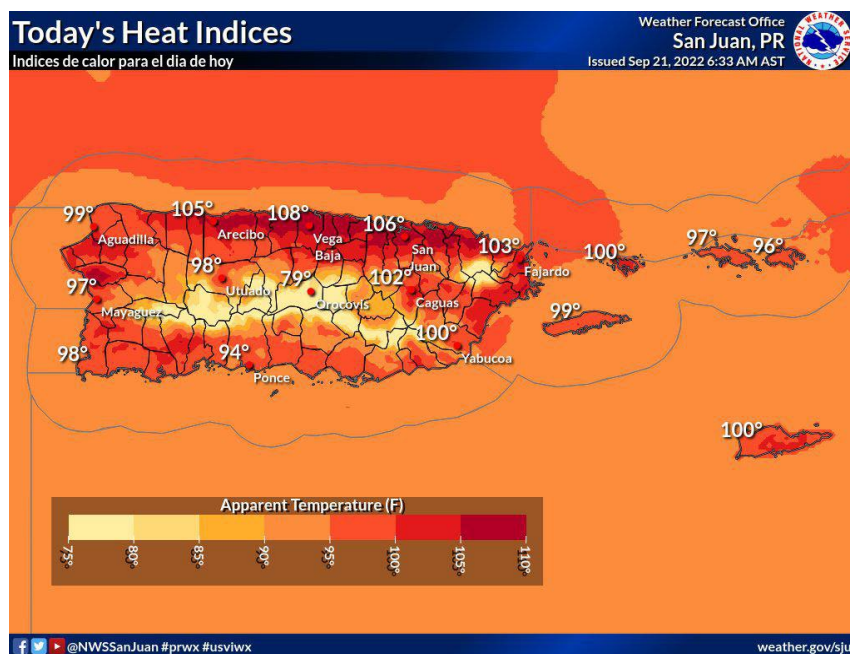

Figure 4. Heat Indices in PR and USVI

We've already covered the main idea that heat-related illnesses cause dehydration because farmworkers sweat a lot, and that the main reason farmworkers sweat so much is because of environmental conditions and the arduous nature of farm work. But there are other physical and health conditions that will increase our risk in the heat, such as: age, weight, sex, pregnancy, previous health-related diseases, heart disease, diabetes, smoking, among others. There are also medications that increase the risk of heat, such as: allergy medications (antihistamines), cough and cold medications, blood thinners and heart medications, bladder or irritable bowel medications, laxatives, mental health medications, thyroid pills, among others. In addition, outdoor work with prolonged exposure to ultraviolet radiation and heat may increase the risk of skin cancer among farmworkers.

To control the risks to which outdoor workers, especially agricultural workers, are exposed, it is recommended:

| **Sun protection:** Use of wide-brimmed hats, protective clothing and sunscreen. | **Hydration and rest:** Drink water frequently, seek shade, and take breaks to recover. | **Musculoskeletal injury prevention:** Bending knees when bending, carrying weight close to the body, and breaking heavy loads into smaller parts for easier handling. |

The following resources may be helpful in learning and discussing individual heat risk, how to prevent heat-related illness, and its symptoms:
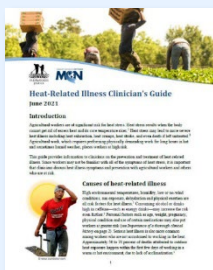
#46: Heat-Related Illness Clinicians Guide

Provides clinical information on the prevention and treatment of heat-related illness. Since workers may not be familiar with the signs of heat stress, it is important for clinicians to discuss symptoms and prevention with farmworkers and others at risk for heat-related illness.

Keyword: Heat, Ag
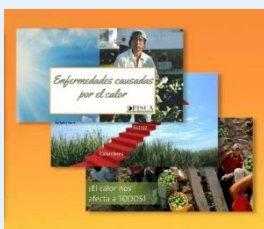
#47: Heat-Related Illness Curriculum

A package containing an illustrated poster, presentation, and detailed facilitator guide with engaging visuals and plain language, useful for educating farmworkers and members of agricultural communities about heat-related illness.

Keywords: Heat, Ag

#48: OSHA-NIOSH Heat Safety Tool Application

It calculates the **heat index of the place** and shows the **level of danger**. With a "click," you can receive reminders about the appropriate **protective measures** for that level of risk and protect yourself from heat-related illnesses. The app includes reminders about hydration, rest, and offers valuable information on signs and symptoms of heat-related illnesses.

The relationship between heat exposure and respiratory health among outdoor workers has become increasingly complex and concerning in the age of extreme weather-related events. Rising temperatures not only generate direct heat stress, but also exacerbate air quality problems, creating a dangerous synergy that affects respiratory function. During extreme heat events, increased ground-level ozone formation, increased particulate matter from wildfire smoke, and higher pollen levels combine with the physiological stress of breathing hot air, making respiratory protection even more crucial and challenging to maintain.

Workers who must wear respiratory protective equipment face additional challenges, as masks and respirators can increase body temperature and breathing resistance, which could lead to less adherence to wearing them during extreme heat. In addition, the combination of intense physical exertion, heat stress, and poor air quality can trigger or worsen existing respiratory conditions, such as asthma and chronic obstructive pulmonary disease (COPD), creating a cyclical pattern where respiratory distress can affect the body's ability to effectively regulate temperature. This interconnected relationship between heat exposure and respiratory health requires comprehensive workplace policies that consider both thermal safety and respiratory protection in an integrated approach. Check out the following resources related to respiratory health at work:

#49: Clear the Air! Protect Your Health from Bad Air

This comic serves as a support for health promoters by conveying basic information about respiratory health and air pollution. It includes basics about the respiratory system, particulate matter, the Air Quality Index, sources of air pollution, and the personal protective equipment that outdoor workers should wear to protect themselves from respiratory illnesses.

Keywords: Resp, Ag
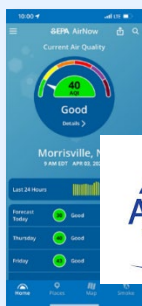
#50: EPA's *AirNow* Mobile App

It offers a simple interface to quickly view current and forecasted air quality information, allowing you to plan daily activities and protect your health. The app automatically displays the current air quality index (AQI) for your local area or any area you want to check and allows you to store multiple areas for quick reference.

Outdoor workers are often at increased risk for heat stress, dehydration, and other weather-related hazards due to prolonged exposure to extreme weather conditions. Here are some activities and ideas that focus on your specific needs in the context of the mitigation and management of extreme weather-related events:

Risk Assessments
Conduct specific weather risk analyses for outdoor workers, identifying hazards such as heat waves, flooding, and pollution, and how they impact workers' health and safety.

Cooling Spaces and Rest Areas
Map and establish cooling stations, shaded areas, and water supply points in workplaces to reduce heat-related risks.
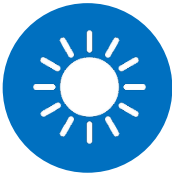
Weather Safety Training
Offer workshops for employers and workers on how to recognize heat stress, stay hydrated, and wear protective gear (e.g., hats, sunscreen).

Workplace Accommodations
Advocate for the creation of work schedules that reduce exposure to extreme heat, such as starting earlier or taking more frequent breaks during periods of peak heat.

Hydration and Protection Kit
Distribute hydration kits that include water, electrolyte packs, and cooling towels for workers.

Weather Alerts
Establish a system to send weather alerts about extreme heat or storms to outdoor workers, allowing them to prepare for or adjust their work schedules.

CHEMICAL SAFETY IN AGRICULTURAL ENVIRONMENTS

Pesticide exposure is another major occupational hazard due to the increase in pests and disease-carrying insects such as ticks and mosquitoes due to climate change. Changes in the number and distribution of pests are expected to lead to increased pesticide use in agriculture, which will also increase the exposure of agricultural workers. Residues in plants, soil, and clothing pose additional risks to workers, who can also carry pesticide residues home on their skin, tools, and clothing. When we talk about pesticides, we are referring to chemicals used to control pests of biological agents, such as insecticides, herbicides, fungicides and rodenticides. These can be inhaled, ingested or absorbed through the skin and have health consequences. The intersection of chemical safety and extreme weather-related phenomena and events in agricultural environments presents increasing risks that demand greater attention to occupational safety protocols. Rising temperatures accelerate the volatilization of pesticides and other agricultural chemicals, potentially increasing workers' inhalation exposure. Extreme weather events, especially heavy rainfall and flooding, can mobilize stored chemicals and create unexpected exposure scenarios during cleanup and recovery efforts.

Common exposure routes include:

- **Airborne:** Pesticides can drift from application sites to areas where people are present.

- **Direct Contact:** Handling treated plants or soil, washing pesticide-contaminated clothes, or accidental ingestion of residues.

- **Other Practices:** Exposure can occur through touching the face, smoking, or eating after pesticide use.

Changes in crop pest and disease patterns driven by extreme weather-related phenomena and events can lead to an increase in chemical application frequencies or the use of stronger formulations, increasing exposure risks for agricultural workers. In addition, heat stress can affect workers' cognitive function and decision-making skills, potentially leading to errors in the handling, mixing, or application of chemicals. The combination of personal protective equipment (PPE) required for chemical safety and high temperatures creates additional challenges, as workers may be tempted to compromise on protection for comfort during extreme heat events. This complex interplay between chemical hazards and climate impacts requires adaptive safety protocols that balance essential crop protection measures with worker safety, while considering the amplified risks presented by changing environmental conditions.

Both employees and employers can take steps to reduce the effects of climate change related to pesticide use. Employers may offer training, protective gear, and other strategies to minimize exposure. Farmers can also reduce pesticide use through Integrated Pest Management (IPM), an effective and eco-friendly approach that combines safe practices based on knowledge of the life cycle of pests and their relationship to the environment.

#51: Pesticide Safety Curriculum

A package containing an illustrated poster, presentation, and detailed facilitator guide with engaging visuals and plain language, useful for educating farmworkers and members of agricultural communities about pesticide safety practices.

Keywords: Ag, Chem

There are practices that farmworkers can follow to reduce the risk of exposure to their families:

- Remove shoes before entering the house.
- Bathe and change clothes immediately after you get home.
- Wash work clothes with detergent and hot water before using them again.
- Wash work clothes separately from the clothes of the rest of the family.
- Do not use a dryer, dry clothes in the sun so that the sun's rays degrade particles that can be harmful.
- Never carry pesticides inside the house.
- Avoid transferring or mixing pesticide containers with those that could be mistaken for food or beverages (e.g., soda bottles).
- Covering the car seat with a rag when driving in pesticide-contaminated clothing

Other available resources:

#52: A Little Bit of Poison... Will It Kill You?

A guide that can be used by community workers, educators, and community health workers during their educational activities in the community. It provides information on the risks of exposure to environmental pollutants and pesticides and ways to reduce those risks. It also includes helpful information and tips for working in the community. As for the comic book, community workers, educators, and health promoters can use it as an educational tool to inform their community about the risks of environmental pollutants and pesticides.

Keyword: Chem

#53: Although Nearby... Healthy

Developed by MCN, it is aimed at farmworker families to educate parents about the risks children face due to pesticide exposure and ways to minimize these risks.

Keyword: Chem, Child, Ag

MODULE 6: COMMUNITY LEADERSHIP AND ADVOCACY TO BUILD STRONG COMMUNITIES

WHAT DOES THIS MODULE CONTAIN?

This module is designed for community outreach facilitators or community leaders to develop skills to connect with their communities. Through practical exercises focused on observation, questioning, and empathetic listening, it will provide the reader with tools that facilitate a deep understanding of community dynamics.

WHO SHOULD READ THIS MODULE?

This module is intended for community outreach facilitators, community leaders, and individuals involved in community advocacy. It is especially beneficial for those looking to improve their ability to engage with and understand their communities, as well as strengthen their leadership skills in diverse and culturally sensitive environments.

THE COMMUNITY

A community is defined as a group of people who share similar characteristics and/or develop cooperative bonds among the individuals that make up the community. Living in community allows us to know the common needs that each one of us faces individually. There are different communities such as geographical ones, or those where we live with people we know as neighbors; university students, who are students and professors; the agricultural communities that are those that make up farmers, ranchers, peasants, agricultural traders; among other communities.

How to use this tool?

The module sequence begins with the definition of community leadership and its particular characteristics. This helps the outreach facilitator identify how organized the community is and what the ways to access it are. The tools offered are focused on developing leadership within the community, putting participants in the position of reflection individually and collectively within the community context.

Subsequently, when the community identifies a challenge that is affecting everyone in the community, they proceed to move with the leader to (1) identify the problem, (2) identify possible solutions, and (3) manage the solution. These three steps are called community advocacy processes. These processes allow the community to empower themselves by identifying the challenges that afflict them, how they can solve them and where they will go to advocate for the solution of these.

This module focuses on community leadership development for farming communities in Puerto Rico and the U.S. Virgin Islands.

LEADERSHIP

The main characteristic that you will see in the communities is that they have a person who is aware of everyone in the community, and people identify them as a community leader. A community leader is the person who works for the **collective well-being**, is actively involved in community affairs, and works collaboratively with community members to bring solutions to the challenges they face.

In the first part of the guide, we will be focusing on the topic of community leadership.

What are community leadership skills or abilities?

- *Community Connection:* They know all the members of the community, which allows them to understand their needs and be empathetic to their challenges, so they can support them in finding solutions.

- *Active Listening:* They are able to listen and understand the concerns of each of the members of the community in order to represent them effectively.

- *Effective communication:* They have clear communication with a specific purpose, making the information clearly understood.

- *Mobilization:* They have the ability to activate and move the community to work together in the identification for the solution of the problem.

- *Collaboration:* They encourage teamwork, seeking the participation of all sectors of the community.

After knowing the leadership skills and abilities, it is necessary to identify the different community leadership styles that exist, to recognize who can help in what capacity. The diversity of community leadership styles is important since community leaders must have the adaptability to address the specific challenges of each community.

Some of the leadership styles found in the communities are:

Participatory: Encourages all members of the community to be integrated in decision-making and the identification of solutions.

Servant: Focuses on serving and providing support individually and collectively to community members to meet the needs of the community.

Transformational: Seeks to change the reality of the community through personal and collective development; focuses on the growth and improvement of all.

Collaborative: Interested in identifying allies and provoking communication between leaders and community members, as well as between local organizations for solutions.

Asset-based: Focuses on identifying existing resources and strengths in the community, using local assets to drive development and further strength.

Resources to Strengthen Community Leadership

#54: Leadership Exercise #1

To work on strengthening our leadership, we can carry out a self-analysis where we contemplate who we are as a person and what are the values that define us individually. This tool includes a practical exercise that will help determine the identity of the member/leader and their trajectory in the community.

Keyword: Leader

#55: Leadership Exercise #2

After carrying out the self-analysis where we contemplate who we are as a person and what are the values that define us individually, we move to identify what we can contribute to the community. This tool includes a practical exercise that will help to determine this possible community contribution.

Keyword: Leader

#56: Leadership Exercise #3

After reflecting on community contribution, we move on to identify our level of integration in the community. This tool includes a practical exercise that will help evaluate whether leadership needs to be strengthened in order to generate projects that respond to their needs as a collective, according to the level of recognition of the community.

Keyword: Leader

ADVOCACY

What is advocacy?

When we hear the word advocacy, it is normal to associate it with the profession of the lawyer, that is, a person with a degree in law who offers professional advice on legal matters and who defends people in judicial or administrative processes. When we talk about advocacy from the broadest concept, we refer to the exercise of *defending ourselves* or others not only in court but also outside of it: on the street, in the municipality, before government agencies, before corporations or any entity that is affecting us or other people.

Advocacy is then the process or act of supporting a cause or proposal, in order to give *visibility* to the situation or *problem*, *provoke actions and influence decisions* that achieve a *solution* to it. This exercise can be done for the benefit of ourselves or other people. Likewise, the exercise of advocacy can be done individually, as a family or in a group, representing collectives and geographical communities, among other groups.

Ways to advocate

Every time we see an injustice and point it out, we are doing advocacy. This ranges from confronting a person when they do something that affects someone else, or when we call our mayor to fix a road. We advocate when we take small actions to be better ourselves, but also when we champion a cause that goes beyond our family or community. Making this reflection we would be surprised at the number of times we have contributed to the improvement of someone's life or to the collective well-being through our advocacy.

Among the most common ways we advocate are:

- Research: Searching for information and digging for data to increase what we know about a given subject.

- Education: Learning and transferring the knowledge we have to carry our message through all possible spaces.

- Coalition: To bring people, social or community groups together to achieve an end together.

- Litigation: It is the process where two people or groups face and discuss a dispute in a trial.

- Activism: To exercise direct actions that cause the social change we are seeking.

- Lobbying: Through this process, we make agreed-upon efforts to win the will of a collegiate body that has decision-making power over the matter that matters to us.

How do I advocate for my community?

Identify the Problem

When we find ourselves in an uncomfortable or difficult situation, it is important to recognize that this is happening and that it is having an impact on our lives. There are times when we feel that we do not know how to solve what is happening to us, we feel alone, or we feel that the problem is too big to be solved. One exercise we can do to begin to properly identify that problem is to ask ourselves:

1. What's going on?

2. Why is it happening?

3. When did the situation begin?

4. Who is involved?

5. Is this situation affecting only me or is it affecting my neighbors as well?

6. Is it something I can solve on my own or do I need someone else to solve it?

Identify Possible Solutions

After defining the problem, we can identify several ways to deal with it. The possible solutions will vary depending on whether the problem is on a personal level, at my work, or a problem that the neighbors also share, at the community level. When the problem is affecting us on a personal level, we can look for tools, professionals or even people in the community who can guide us to address it. If, on the other hand, it is a problem that my colleagues in agriculture also face, or it is a collective problem of the community, we must start by recognizing and reflecting on ourselves and the role we can assume to address it and then how that contributes to the collective solution.

To be effective in working collectively on a solution, we must consider the following:

> ### Personal Reflection
>
> Individually, let's identify the strengths you have to address the problem and what your contribution can be within the community space.
>
> - What are my characteristics and virtues?
> - What tools do I need to work towards the solution?
> - What can I contribute?
> - Am I the right person to lead the effort or take action?
> - What other people can contribute to address the solution?

Community Mobilization

After determining what you can contribute as an individual to the solution, we move on to working collectively. To do this, a first step is to convene a meeting space, or gathering, between your co-workers or neighbors in the community.

Before the meeting:

- Find people to help you
- Invite community members
    - Examples of invitations: flyers, loudspeakers, word of mouth, among others
- Identify a recognized and accessible space
- Developing an Agenda
- Identify internal and/or external resources necessary to serve the purpose of the meeting

During the meeting:

Start the community dialogue space with:

- Introduction and recognition of the people who are present
- Presentation of the problem in a clear and precise manner
- Gathering other opinions on the problem, listening to understand the other people in the community.
    - How do we collect information? Let's ask the following questions to the collective:
    - What situation is happening that affects us?
    - Are they all going through the same thing?
    - Does it affect us all equally?
    - How are you dealing with the situation?
    - How difficult has it been to be able to attend to him?
    - What have been the stumbling blocks in addressing or mitigating the issue?
- Collect all the possible solutions that arise from the discussion and then prioritize them according to those that have the greatest chances of success.

Closing the meeting:

- Gathering consensus and next steps

Working on the solution

This is the part that comes after the community meeting. Here, we can focus on the collective solution we have already identified in the meeting, take concrete actions to make our request known, and move towards solutions. The steps for this are:

A. Develop the work plan: This will become the action plan that will guide the strategies. It should contain:

- What are you going to do?
- Why are you going to do it?
- How are you going to do it?
- When will it be done?

B. Delegate tasks: With this, we will establish a proper timeline and, at the same time, protect ourselves as a resource so as not to be overwhelmed with everything that must be done.

- Make a list of people in the community who are available to work on the advocacy plan.
- Identify where they can contribute to the plan.
- Divide up the tasks and explain the work plan.

C. Develop a strategic plan to communicate solutions: This plan will serve to take the fight beyond the community, reach people who can support us, and reach those people who can address the problem.

- Identify potential partner organizations.
- Identify which government entities can help work on the solution.
- Identify which communication channels will support the distribution of the message.
  - TV-News programs
  - Radio
  - Social networks
  - Informative letters
  - Regional Newspapers

Tool for developing the advocacy plan

#57: Advocacy Exercise #1

An exercise that allows for the proper identification of problems and their impact on the life of the community, their background, people, or entities involved, affected individuals or groups and a narrative from the perspective of the community.

#58: Advocacy Exercise #2

An exercise that allows you to make a list of the measures or actions that have been taken to address the problems identified, evaluate if they have worked, identify the people who have been involved, list possible solutions and specific actions to reach the solutions.

MODULE 7: COMMUNITY OUTREACH

WHAT DOES THIS MODULE CONTAIN?

This module includes resources and tools to understand and identify strategies for grasping community processes while promoting the impact of community outreach; that is, developing and promoting activities, materials, and strategies that align with the community to be impacted.

WHO SHOULD READ THIS MODULE?

Anyone who wishes to create and implement activities focused on community participation and presents strategies to adapt Community Outreach efforts to maximize their impact.

In other words, if you work at the Health Center and are interested in improving your relationship with a specific community that, for example, has faced issues accessing health services, this module can help you acquire the necessary skills to effectively engage that community.

It is important to emphasize that we promote a participatory approach, which can be understood as working **with**, **from**, and **for** the community. This module is intended for health center staff.

DEFINING COMMUNITY OUTREACH – CONTEXT ACCORDING TO SOCIAL DETERMINANTS OF HEALTH

When we say that "the zip code is more important for a person's health than the genetic code," it prompts us to reflect on everything related to the health and well-being of a population. Social, economic, political, environmental, cultural, educational, geographical, and health conditions in a community all affect the health and well-being of its residents. Together, these factors make up the context of the Social Determinants of Health. The unequal distribution of some of these aspects can lead to health disparities and inequities.

For this reason, to maintain and improve well-being in a community, it's important to recognize that the Community Health Center and the hospital are not the only resources for community health. Municipal administrations, schools, and community organizations may have a greater capacity to promote the well-being of our communities. This is precisely where **Community Outreach** and **Community Participation** can play a role, considering the level of community cohesion, the availability of certain resources, how those resources are utilized, and how they are interconnected. These are also factors that influence overall well-being.

The potential impact of Community Outreach and Community Participation determines factors for health and well-being. Populations with more participative communities are healthier populations.

WORKING TOGETHER

The World Health Organization (WHO) defines Community Outreach as an active connection process with the community to promote health, prevent diseases, and facilitate access to essential health services. This process involves the mobilization and direct participation of communities in the planning, implementation, and evaluation of health initiatives, ensuring that services and information reach all community members, especially the most underserved populations.

In other words, Community Outreach seeks to empower communities to make informed decisions about their health, promoting equity and improving quality of life. Meanwhile, the Community Participation Model reinforces a participatory process that actively offers opportunities for communities to be part of the conversation, learn, and collaborate with agency staff beyond simply providing feedback. However, when we talk about communities, each one possesses unique characteristics. This leads us to ask: What elements are essential for planning from a participatory approach? When referring to Community Outreach, there are non-negotiable elements, and in this section, we aim to help identify them.

We propose moving from the approach of "being the experts who know everything" to being individuals who facilitate or promote conditions for well-being and true community empowerment. Here, we are reminded of the diversity and dynamism of communities. Therefore, it is important to emphasize that there are no "one-size-fits-all" solutions for addressing social issues, and this uniqueness is what makes it particularly interesting and different.

As a supportive tool for understanding these processes, we share the model developed by the University of Colorado, known as the "Community Readiness Model." This model helps us identify characteristics that can indicate when a community is ready for change. It allows us to consider the community's preparedness, identifying the extent to which a community is willing and ready to address its issues.

Below are the different stages of communities, a brief description of each, and a phrase that relates to each stage. You will also find examples per stage that provide an opportunity to promote effective and relevant interventions. The activities and strategies listed can help offer communities appropriate tools that make sense for them:

Stages of Community Readiness

Stage 1: No Awareness
- Community has no knowledge about local efforts addressing the issue.
- Leadership believes that the issue is not much of a concern.
- The community believes that the issue is not a concern.
- Community members have no knowledge about the issue.
- There are no resources available for dealing with the issue.

  "Kids drink and get drunk."

Examples:

- One-on-one visits with community leaders and members. Pay particular attention to the details of these visits (message, communicator, etc.)

- Visit existing and established unrelated small groups to inform them of the issue.

- Get individuals in your social network excited and solicit their support – be creative! Give them ideas and information that they can post on their Facebook page or other outlets.

- Collect stories of local people who have been affected by this issue in this community and find creative ways to disseminate these.

- Conduct an environmental scan to identify the community's strengths, weaknesses, opportunities, and threats.

Stage 2: Denial / Resistance

- Leadership and community members believe that this issue is not a concern in their community, or they think it can't or shouldn't be addressed.
- Community members have misconceptions or incorrect knowledge about current efforts.
- Only a few community members have knowledge about the issue, and there may be many misconceptions among community members about the issue.
- Community members and/or leaders do not support using available resources to address this issue.

"We can't (or shouldn't) do anything about it!"

Examples:

- Continue actions from previous stage.
- Put information in church bulletins, club newsletters, respected publications, Facebook, etc.
- Distribute media articles that highlight issues in the community.
- Communicate strategically with influencers and opinion leaders.

Stage 3: Vague Awareness

- A few community members have at least heard about local efforts but know little about them.
- Leadership and community members believe that this issue may be a concern in the community. They show no immediate motivation to act.
- Community members have only vague knowledge about the issue (e.g. they have some awareness that the issue can be a problem and why it may occur).
- There are limited resources (such as a community room) identified that could be used for further efforts to address the issue.

"Something should probably be done, but what?
Maybe someone else will work on this."

Examples:

- Continue actions from previous stages.
- Present information on local community events and unrelated community groups. Don't rely on just facts. Use visuals and stories. Make your message —sticky‖.
- Post flyers, posters, and billboards.
- Begin to initiate your own events (e.g., potlucks) to present information on this issue. But they must be fun or have other benefits for potential attendees.
- Publish editorials and articles in newspapers and in other media with general information but always relate the information to the local situation.

Stage 4: Preplanning

- Some community members have at least heard about local efforts but know little about them.
- Leadership and community members acknowledge that this issue is a concern in the community and that something must be done to address it.
- Community members have limited knowledge about the issue.
- There are limited resources that could be used for further efforts to address the issue.

"This is important. What can we do?"

Examples:

- Continue actions from previous stages.
- Introduce information about issues through presentations/media.
- Review the existing efforts in community (e.g., curriculum, programs, activities) to determine who benefits and the degree of success.
- Conduct local focus groups to discuss issues and develop strategies.

Stage 5: Preparation

- Most community members have at least heard about local efforts.
- Leadership is actively supportive of continuing or improving current efforts or in developing new efforts
- The attitude in the community is —We are concerned about this, and we want to do something about it.
- Community members have basic knowledge about causes, consequences, signs and symptoms.
- There are some resources identified that could be used for further efforts to address the issue; community members or leaders are actively working to secure these resources.

"I will meet with our funder tomorrow."

Examples:
- Continue actions from previous stages.
- Conduct public forums to develop strategies.
- Get key leaders to speak out.
- Sponsor a community picnic or event to kick off new efforts or revitalize existing efforts.

Stage 6: Initiation

- Most community members have at least basic knowledge of local efforts.
- Leadership plays a key role in planning, developing and/or implementing new, modified, or increased efforts.
- The attitude in the community is —This is our responsibility‖, and some community members are involved in addressing the issue.
- Community members have basic knowledge about the issue and are aware that the issue occurs locally.
- Resources have been obtained and/or allocated to support further efforts to address this issue.

   "This is our responsibility; we are now beginning to do something to address this issue."

Examples:

- Continue actions from previous stages.
- Conduct in-service training on Community Readiness for professionals and paraprofessionals.
- Plan publicity efforts associated with start-up of activity or efforts.
- Attending meetings to provide updates on progress of the effort.
- Conduct consumer interviews to identify service gaps, improve existing services and identify key places to post information.
- Begin library or Internet search for additional resources and potential funding.
- Begin some basic evaluation efforts.

Stage 7: Stabilization

- Most community members have more than basic knowledge of local efforts, including names and purposes of specific efforts, target audiences, and other specific information.
- Leadership is actively involved in ensuring or improving the long-term viability of the efforts to address this issue.
- The attitude in the community is —We have taken responsibility‖. There is ongoing community involvement in addressing the issue.
- Community members have more than basic knowledge about the issue.
- A considerable part of allocated resources for efforts are from sources that are expected to provide continuous support.

   "We have taken responsibility"

Stage 8: Confirmation / Expansion

- **Most** community members have **considerable** knowledge of local efforts, including the level of program effectiveness.
- Leadership **plays a key role in expanding and improving efforts.**
- Most of the community **strongly** supports efforts or the need for efforts. Participation level is high.
- Community members have **more than basic** knowledge about the issue and have **significant** knowledge about **local prevalence** and local consequences.
- A considerable part of allocated resources is expected to provide **continuous** support. Community members are looking for **additional** support to implement new efforts.

"How well are our current programs working and how can we make them better?"

Examples:

- Continue actions from previous stages.
- Formalize the networking with qualified service agreements.
- Prepare a community risk assessment profile.
- Publish a localized program services directory.
- Maintain a comprehensive database available to the public.
- Develop a local speaker's bureau.
- Increase media exposure through radio and TV public service announcements and other forms of social media.
- Initiate policy change through support of local city officials.
- Conduct media outreach on specific data trends related to the issue.
- Utilize evaluation data to modify efforts.

Stage 9: High Level of Community Ownership

- **Most** community members have **considerable and detailed** knowledge of local efforts,
- Leadership is **continually reviewing evaluation** results of the efforts and is modifying financial support accordingly.
- **Most** major segments of the community are highly supportive and actively involved.
- Community members have **detailed** knowledge about the issue and have **significant** knowledge about **local prevalence** and local consequences.
- Diversified resources and funds are secured, and efforts are expected to be ongoing.

"These efforts are an important part of the fabric of our community."

Examples:

- Continue actions from previous stages.

- Maintain local business community support and solicit financial support from them.

- Diversify funding resources.

- Continue more advanced training of professionals and paraprofessionals.

- Continue reassessment of issue and progress made.

- Utilize external evaluation and use feedback for program modification.

- Track outcome data for use with future grant requests.

- Continued progress reports for benefit of community leaders and local sponsorship. At this level the community has ownership of the efforts and will invest themselves in maintaining the efforts.

Connecting with the community to understand their needs

To connect with community members, it is important to know their stories, understand their needs and be empathetic to the challenges they face. To do this, three components must be considered: observe, ask, and listen.

1. **First step**

   Observe and understand the community movements without intervening. Take time to be present in the community processes and spaces for dialogue. You will be able to perceive how they relate to each other, which spaces are most used, and what are the common behaviors. It's important to pay attention to the details, the interactions between people, and the dynamics of the community.

2. **Second Step**

   Ask community residents questions to understand their perspectives on life and how they are involved at the community level. It's important to develop questions that provoke individual and collective reflections. Therefore, it is recommended to develop open-ended questions that allow community members to share their experiences, concerns and goals.

   Open-ended questions: These are questions that are asked to encourage reflection, where the person will answer in the way that is most comfortable for him/her within his/her vision of life. For example:

   - How would you describe yourself in the community?

   - What aspects of the community make you most proud?

   - What do you understand are the strengths that your community has?

3. **Third Step**

   Listen to connect with the community; after asking community members questions, it is important to be able to listen and understand what they are communicating. Therefore, while conversing with community members, try not to interrupt and make eye contact, to affirm that you value what they are saying. Then reflect on what you have heard and

Practical Exercise: Connecting with the Community

To begin this exercise, you will need to choose a place where you can interact with various members of the community, such as a park, a community center, or a community event.

A. *Observe*: Spend at least 25-30 minutes observing the environment and people, without intervening

Observe	Description	Objective
Leadership	Identify who people report to when they arrive on site.	Understand the dynamics and identify who the community leaders are.
Culture	Perceive how they behave in space. If you're in a community activity you can identify what kind of music they have, the food they eat, what recreational activities they have, among others.	Respect the cultural practices of the community.
Necessities	Identify possible needs that may arise.	Prioritize areas of assistance according to the needs of the community.
Resources	Make a list of all the resources that the community has.	Determine the resources available to the community.
Interactions between them	Note how they interact with each other, e.g., how do they greet each other, how much personal space do they have between them, do they have prolonged conversations, do they feel comfortable in the space?	Understand the dynamics of community coexistence.
Interactions with external parties	Note how they interact with people who are not local. For example: identify how they received you, if they greeted you, how they looked at you, among others.	Adapt community outreach strategies to be accepted by community members.
Meeting spaces	Identify if there are community centers in the community, if there are sports fields or parks, among other community spaces.	Establish meeting points and community participation.
Participation	Perceive how many people attend community activities.	Assess the level of community engagement.

B. *Designing questions for informal conversations with the community:* After observing, approach a few people and ask open-ended questions about their experience in the community.
NOTE: It is not necessary to ask them all the questions, just identify which ones you can ask them in the informal conversation.

Suggested questions	Answers	Individual analysis
The questions presented are only a guide, you can ask other questions that you think are important	You should write down the answers as they are expressed; it is also recommended to write down the way in which the answers were given.	After asking the questions, you should analyze the results to understand and connect with the community in a way that is more aware of their perspectives on life.
How would you describe yourself in the community?		
What aspects of the community make you most proud?		
What are the strengths you have as a community?		
What changes do you want to see in the community?		
What support would you like to have from the community?		
What do you want to see in the community?		
What community activities do you consider important?		
How do you think we can encourage greater participation in the community?		
How do you think we can encourage greater participation in the community?		

What personal experiences have impacted on you?		
What do you expect community leaders to prioritize?		

Additional notes:

_____

_____

_____

_____

_____

_____

_____

C. Listening to empathize with the community

Process	Description	Objectives
Emotional preparations	It is important to be free of distractions, prejudices and judgments to be fully present.	To be able to transcribe the information properly as the questions were answered.
Visual contact	It's important to have eye contact with the person speaking, so that they feel that their opinion is being valued.	Develop trust and mutual respect among community members.
Active listening	It's important to allow the other person to finish speaking without interrupting. This avoids pre-empting their thoughts before they have finished.	Ensure that the person can fully express his or her ideas.
Repeat what has been discussed	After the person has finished speaking, repeat what you have heard in your own words to make sure you have understood correctly. Example: "What am I understanding is that you are concerned about the lack of recreational activities for young people in the community - is that correct?"	Confirm the narrative and demonstrate that you have been paying attention.
Empathize	Expressing understanding of the situations the person shares. Example: a) Verbal expression: "I understand this must be very difficult for you." b) Nonverbal expression: affirming with the head.	Show that you care about the person's experience.

Having clarity about the potential of Community Outreach is essential, as it is not just a set of actions but an **integral** and **dynamic process** that empowers communities to make informed and sustainable decisions regarding their health. It is crucial to be very mindful when developing interventions with the community, as written plans can cover everything, but social processes have their own timelines and rhythms. By taking these into consideration, we can achieve a significant and lasting impact on the health and well-being of the communities we serve.

APPENDICES

APPENDIX A

Concept	Definition
Hazard	A dangerous phenomenon or human activity that can cause death or impairment of health, or cause damage or disruption to, or loss of, property, livelihoods or social or economic services. Hazards have multiple origins and sometimes act in combination.
Extreme heat	Very hot and humid period with high temperatures. In extreme heat, the body works harder to maintain a normal temperature, which can lead to death.
Climate change	In the United Nations Framework Convention on Climate Change (UNFCCC) it is defined as a "change in climate attributed directly or indirectly to human activities that alter the composition of the world's atmosphere, and that adds to the natural variability of the climate. observed over comparable periods of time."
Capacity	The combination of all the strengths, attributes and resources available within a community, a society or an organization that can be used to achieve the agreed objectives. Comment: Capacity can include the physical infrastructure and means, institutions and coping skills of society, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management.
Landslides / debris flows	Masses of rocks, dirt, or debris move down a slope. Debris and mudflows are rivers of rock, dirt, and other water-saturated debris. They develop during heavy rains, runoff, or rapid thaw, transforming the land into a flowing river of mud or "mudflow." They can flow quickly, hitting with little or no warning at avalanche speeds (faster than a person can run).
Hurricanes	A tropical cyclone, formed in the atmosphere over warm ocean areas, in which the wind speed reaches 74 miles per hour or more and blows in a large spiral around a relatively quiet center or "eye."
Forest fires	Unplanned fires burning in natural areas such as forests, grasslands, or prairies. These dangerous fires spread rapidly and can devastate not only wildfires and natural areas, but also communities.

Floods	A temporary overflow of water on normally dry terrain. Floods are one of the most common natural disasters. Failure to evacuate flooded areas or enter floodwaters can result in injury or death.
Preparation	The knowledge and capacities that governments, communities and individuals acquire to effectively anticipate, respond to and recover from the consequences of events or conditions—probable, imminent or current—related to a hazard.
Disaster risk reduction	The practice of reducing disaster risk through systematic efforts aimed at analyzing and managing the causal factors of disasters, including reducing the degree of exposure to hazards, reducing the vulnerability of the population and assets, sound management of soils and the environment; and improvement of disaster preparedness. In the area of education, it involves a systematic analysis of disaster-related risks and an attempt to reduce them in order to allow the education system to provide quality education for all (and students can continue their learning and children out of school, access to education) before, during and after emergencies.
Resilience	Resilience is the ability of an education system (at its various levels) to minimize the risks of a disaster or conflict, maintain its functions during an emergency, and recover from shocks. On a personal level, resilience is the ability to apply knowledge to minimize risks, adapt to emergencies, withstand shocks, and quickly resume learning and other activities necessary for survival. Resilience can be strengthened by addressing the factors underlying vulnerability. Resilience is the opposite of vulnerability.
Risk	In common parlance, the use of this term emphasizes the concept of probability or possibility ("the risk of an accident"). In a technical context, consequences are often emphasized, in terms of "possible losses". The relationship between vulnerability, on the one hand, and the probability and intensity of hazards, on the other, can be represented by the following equation: RISK = HAZARD x VULNERABILITY The worse the hazard, the greater the risk. Similarly, the risk also increases when a community, a system or even a school is more vulnerable.
Drought	Period of low rainfall.

Earthquake	A sudden and rapid shaking of the ground caused by the movement of rocks far below the earth's surface. Earthquakes can cause fires, tsunamis, landslides, or avalanches.
Winter storms	They bring extreme cold, freezing rain, snow, ice, and strong winds. Winter storms create an increased risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion.
Thunderstorms and lightning	Dangerous storms that include lightning and can include high winds over 50 MPH, create hail, and cause flash floods and tornadoes. Lightning is a leading cause of injury and death from weather-related hazards. Although most lightning victims survive, people struck by lightning often report a variety of long-term debilitating symptoms.
Tornadoes	Columns of violently rotating air that extend from a storm to the ground. Tornadoes can destroy buildings, flip cars, and create deadly flying debris.
Tsunamis	A series of huge ocean waves caused by earthquakes, underwater landslides, volcanic eruptions, or asteroids. A tsunami can kill or injure people and damage or destroy buildings and infrastructure when waves arrive and then subsequently recede.
Volcanos	An opening in the earth's crust that allows molten rock, gases, and debris to escape to the surface.
Vulnerability	The characteristics and circumstances of a community, a system, or an asset that make it susceptible to the damaging effects of a threat. There are many aspects related to vulnerability, derived from various physical, social, economic and environmental factors. In the sphere of the educational system, vulnerability is the combination of exposure to hazards—whether of natural or human origin or conflict-related—and the degree to which the different levels of the educational system are susceptible to a collapse or its functions are disturbed. For students, vulnerability is the combination of exposure to hazards and the degree to which students are susceptible to the interruption of access to good quality educational opportunities or the total loss of those opportunities.

Example: the vulnerability that a student from the southern area of the island suffers interruptions in receiving virtual classes versus the vulnerability of a student from the metro area due to a tremor / earthquake. |

APPENDIX B

Climate Change Adaptation, Mitigation, and Emergency Management for Vulnerable Groups

Here are activities and ideas for children, Youth, and elderly community members that focus on their specific needs in the context of climate change adaptation, mitigation, and emergency management:

1. **Children**
   Children are particularly vulnerable to climate change impacts such as extreme temperatures, poor air quality, and the disruption of daily routines due to natural disasters.

Activities and Ideas:

- **Climate Health Education:** Integrate climate change education into school curriculums, helping children understand how extreme weather events can affect their health and safety.

- **Child-Friendly Emergency Spaces:** Identify schools, community centers, and playgrounds that can serve as safe spaces during climate emergencies, with cooling or heating facilities.

- **Emergency Preparedness Drills:** Run school-based climate emergency drills, teaching children how to respond to heatwaves, floods, or storms, and ensuring they understand the importance of hydration and protective clothing.

- **Health Monitoring:** Set up child-focused health monitoring systems that track issues like dehydration, asthma attacks (due to poor air quality), and injuries from extreme weather events.

- **Caregiver Support:** Encourage teachers and caregivers to learn about child-specific emergency planning, including evacuation plans, safe gathering areas, and communication methods for children during emergencies.

- **School Climate Resilience Programs:** Develop programs where children engage in activities like creating disaster kits, planting trees, or learning about sustainable practices that contribute to community resilience.

2. **Youth**
    Youth, especially those in vulnerable communities, can be key actors in climate adaptation efforts, but they also face specific challenges in terms of mobility and mental health.

Activities and Ideas:

- **Youth Climate Leadership Programs:** Train Youth to be climate resilience ambassadors who can help educate peers and younger children about the effects of climate change and how to prepare for emergencies.

- **Peer-Led Emergency Drills:** Engage Youth in designing and leading emergency preparedness drills, empowering them to teach their peers how to stay safe during extreme events.

- **Mental Health Support:** Offer workshops on the mental health impacts of climate change, including anxiety related to natural disasters, and provide resources for stress management and coping strategies.

- **Social Media & Communication:** Use social media platforms popular among Youth to share climate-related emergency updates and engage them in community resilience campaigns.

- **Building Youth-Centered Safe Spaces:** Designate youth-friendly community centers as emergency shelter locations where Youth can receive care, participate in activities, and feel secure.

- **Training in Sustainable Practices:** Offer hands-on opportunities for Youth to learn sustainable agriculture, renewable energy, and other climate-resilient practices that they can apply both at home and in their communities.

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3. **Elderly Community Members**
    Elderly individuals are particularly vulnerable to climate impacts like extreme heat, cold, and other weather-related disasters, as they may have limited mobility or pre-existing health conditions.

Activities and Ideas:

- **Health and Mobility Support:** Ensure that elderly residents have access to mobility aids, transportation during evacuations, and special health care needs (e.g., medications, oxygen, etc.).

- **Community Watch Programs:** Establish neighborhood teams that check on elderly individuals during extreme weather events, ensuring they are safe and have necessary supplies like water, food, and medications.

- **Cooling/Heating Centers:** Map and establish dedicated cooling or warming centers during extreme heat or cold events, where elderly people can go for respite.

- **Heat/Cold Awareness Campaigns:** Launch targeted campaigns for elderly individuals, caregivers, and family members about the risks of heat stroke, dehydration, and frostbite, including signs and prevention.

- **Resilience Kits:** Provide elderly community members with resilience kits containing items such as fans, thermal blankets, a list of emergency contacts, and medications.

- **Training for Caregivers:** Offer training for caregivers of elderly people on how to handle climate-related health issues, including the importance of hydration, recognizing early signs of distress, and emergency evacuation procedures.

- **Mental Health Support:** Provide services or support groups to address isolation and mental health concerns, especially after major climate events that disrupt routines or displace people.

APPENDIX C

Health and climate related events: Chemical safety

Children

1. **Interactive Lessons on Water and Chemical Safety:** Create fun, age-appropriate educational games or activities, such as quizzes or role-play scenarios, that teach children about the importance of clean water and staying away from chemical hazards.

2. **Drawing and Storytelling:** Have children draw pictures or create stories about how to stay safe during emergencies, focusing on activities like boiling water, using clean containers, or avoiding areas with chemical spills.

3. **School Emergency Plans:** Involve schools in developing water and chemical safety emergency plans, ensuring that children understand where the safe water stations are located and how to act if they encounter hazardous chemicals.

4. **Hand-Washing and Hygiene Campaigns:** Promote hand-washing as a simple but effective way to avoid the spread of illness during emergencies. Provide demonstrations and teach children how to keep water sources clean and safe.

Adults

1. **Water Purification Demonstrations:** Host practical demonstrations on how to purify water using methods like boiling, chlorination, or filtration. Distribute DIY water purification kits and explain how to use them.

2. **Chemical Safety for Homeowners:** Teach adults how to safely store household chemicals, such as cleaning supplies and pesticides, to prevent accidental exposure. Offer tips on identifying chemical hazards during storms or flooding.

3. **Community Resource Mapping:** Engage adults in creating a community resource map that includes emergency water sources, safe collection points, and known chemical storage sites, as well as evacuation routes in case of hazardous spills.

4. **Chemical Spill Response Plans:** Provide workshops on how to respond to chemical spills at home or in the community, including how to safely contain or neutralize substances and what protective equipment is needed.

5. **Emergency Water Storage Practices:** Teach adults how to store water for long-term emergencies, including methods to prevent contamination in stored water (e.g., using clean, sealed containers).

Elderly

1. **Water Purification Demonstrations:** Host practical demonstrations on how to purify water using methods like boiling, chlorination, or filtration. Distribute DIY water purification kits and explain how to use them.

2. **Chemical Safety for Homeowners:** Teach adults how to safely store household chemicals, such as cleaning supplies and pesticides, to prevent accidental exposure. Offer tips on identifying chemical hazards during storms or flooding.

3. **Community Resource Mapping:** Engage adults in creating a community resource map that includes emergency water sources, safe collection points, and known chemical storage sites, as well as evacuation routes in case of hazardous spills.

4. **Chemical Spill Response Plans:** Provide workshops on how to respond to chemical spills at home or in the community, including how to safely contain or neutralize substances and what protective equipment is needed.

5. **Emergency Water Storage Practices:** Teach adults how to store water for long-term emergencies, including methods to prevent contamination in stored water (e.g., using clean, sealed containers).

Outdoor Workers

1. **Chemical Hazard Awareness Training:** Provide training on how to identify and avoid chemical hazards in outdoor environments, including agricultural fields, construction sites, and industrial zones. Emphasize the importance of protective gear like gloves and masks.

2. **Emergency Water Access for Workers:** Set up designated areas on worksites where outdoor workers can access safe drinking water, especially during heatwaves or emergencies when water supplies may be contaminated.

3. **Portable Water Purification:** Teach workers how to use portable water purification methods, such as filters or purification tablets, that can be carried with them in case they need to drink from questionable water sources during emergencies.

4. **PPE (Personal Protective Equipment) Use:** Promote the use of PPE (e.g., goggles, gloves, masks) to protect workers from chemical exposure in the field, particularly during natural disasters like floods or wildfires that may release hazardous materials.

5. **Heat Stress and Chemical Exposure Education:** Train workers on recognizing heat stress symptoms and the importance of hydration, as well as the risks of chemical exposure during extreme weather events like heatwaves, which can cause chemicals to evaporate or become more potent.