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# Creating Flood Action Plans

Guidance for International Medical  
Corps Country Offices

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# Introduction

This guidance lays out the steps that International Medical Corps teams and their partners should take in developing a flood-preparedness plan. A flood-preparedness plan identifies:

- the actions that International Medical Corps and/or partners will take to prepare for and respond to large-scale flooding;
- when these actions will be taken—as part of ongoing International Medical Corps/partner activities, as specific preparedness activities conducted before the threat of flooding, on receipt of early warning information (where this is available) or once flooding has commenced;
- who is responsible for taking which actions;
- any expected challenges/constraints in taking these actions, and how these will be addressed;
- the expected cost of actions and potential sources of financing;
- arrangements for testing the plan; and
- arrangements for monitoring/evaluating the plan.

The guidance covers planning for the Health/Maternal and Newborn Health, Mental Health and Psychosocial Support (MHPSS), Nutrition, and Water, Sanitation and Hygiene (WASH) sectors, as these are the ones where International Medical Corps will most often be involved in flood preparedness.

This guidance can be used as a standalone document, but it should ideally be used as **part of the International Medical Corps Emergency Preparedness and Response Plan (EPRP) process** and the EPRP response tool. Green boxes in the guidance, titled “When Using the EPRP Tool,” will guide you through the use of the EPRP tool at each step.

## **Box – How to Use the Guidance**

This guidance outlines a step-by-step approach to developing a flood-preparedness plan, designed to be adaptable to various contexts.

This process is flexible. The total amount of time that is put into developing the plan will depend on local needs, resources available and the number of partner organizations involved in the process.

Each step of the process can be tailored by the country office to suit its specific circumstances. In some settings, most of the planning might be done in a single workshop. In other cases, an individual staff member, team of staff members or consultant may do much of the work, liaising with partners as required. Often, country offices will combine activities, with a staff member completing some of the initial steps (to get an understanding of risks and vulnerabilities), which then lead to a workshop to decide on activities.

In most cases, International Medical Corps teams will develop flood-preparedness plans in collaboration with partners (such as the ministry of health or national disaster management agency). In these cases, the partner agency may have their own processes and outlines for preparedness planning, and the guidance here should be adapted to support the process used in that country.

## Why Flood-Preparedness Planning?

Flood Preparedness is increasingly important because of rapid increases in the frequency, scale and impact of flooding across many of the areas where International Medical Corps works.

### **Floods are becoming increasingly common.**

- Floods are the most common form of natural disaster, accounting for between one-third and one-half of all natural disasters in the past 30 years. [1]. [2]. [3],
- The number of floods recorded globally has been steadily increasing since the 1990s. [1], [4], [2], [5]. There has been a 400% increase in recorded flooding in the tropics since 1985. [8].
- As a result of environmental stressors and extreme weather, increased urbanization, and changes to land use and land cover, the number of floods is expected to continue increasing. [1], [6], [7] [8] [9] [10]. While it is challenging to predict flooding trends for specific river systems, increases in flooding are expected to be particularly pronounced in Asia and Africa. [10]. Flooding is also likely to occur in areas that have not previously been flooded. [6]

### **Floods kill people and affect health and health systems.**

- A recent systematic review identified an average 26% increase in excess mortality during flood periods [41]. Some studies show increases in mortality rates of up to 50% during flood periods. [35]. Deaths from flooding occur because of drowning and trauma but also from a wide range of diseases (see section 4.4 *Health Actions — Key Issues*).
- Floods are associated with ill health in various ways. One study identified 121 pathogenic diseases that can be aggravated by flooding [18]. Flooding has been demonstrated to increase the incidence of several waterborne diseases [41], in addition to being associated with vector-borne diseases, mental health conditions and pre-term births [41] [35].
- Floods also damage health systems and public health infrastructure, resulting in negative impacts on health status and care for both flood-related and non-flood-related conditions [11], [12], [13], [14]. Floods may impact the functionality of health facilities and services when they are needed most.
- The negative health effects of flooding can be exacerbated by damage to WASH infrastructure and services.
- Floods can damage agricultural production, transportation systems and markets, decreasing food security. This, combined with increased ill health and changes in care practices, can lead to malnutrition.

### **Floods can be large-scale events, affecting hundreds of thousands of people.**

- Flooding in Pakistan in 2022 affected approximately 33 million people, while flooding in Yemen in 2024 affected more than half a million people.
- The humanitarian effects of flooding can persist for extended periods: people may be displaced for months and feel the impact on their livelihoods for years after a significant flood [15].

**Floods are particularly damaging in humanitarian contexts.**

- While flooding is a global phenomenon, these effects are particularly severe in humanitarian contexts.
- This is partly because many displaced and refugee settlements are located in areas that are likely to flood [30], [16], [17], [20], [21], [22].
- It is also because flooding tends to have more devastating effects on poorer countries and populations, resulting from higher levels of disease incidence, as well as malnutrition, the location and nature of shelter and water supplies, and more limited access to health facilities [9].
- Seniors, people with disabilities and pre-existing conditions, women, pregnant women, infants, children, and people who are socially isolated are disproportionately likely to be affected. [23], [15].

### **Box – What Is a Flood?**

A flood is an overflow of a large amount of water beyond its normal limits, or the accumulation of water over areas that are not normally submerged. In many parts of the world, flooding is a normal seasonal process. It becomes a disaster when the amount of water goes beyond normal seasonal limits or flows and submerges houses and critical infrastructure.

Floods can be caused in a number of different ways (although these different types of floods can sometimes occur at the same time)

- **River floods** — Situations where river levels rise beyond normal high-water limits and encroach onto productive land, settlements or infrastructure. This can be a result of heavy rainfall happening upstream—sometimes several hundred kilometers away. It can also be a result of rapid snowmelt or glacier melt in mountains upstream. River floods often have a lead time of several days [24] and can last for weeks or even months [25]. They can be extremely large in terms of the areas and number of people affected [15]. Recent examples include flooding on the Shebelle and Juba Rivers in Somalia in 2023 and 2024.
- **Rainfall (pluvial) flash floods** — Unusually large amounts of rainfall in a short time can lead to rainfall, or pluvial, flash floods, as the amount of water exceeds the ability of the ground to absorb it, and large amounts of water run across the ground or through small channels (such as valleys and culverts in cities or small streambeds in mountains) on their way to river drainage systems. Rainfall flooding is particularly common at times when heavy rain falls after a period of drought, and the land is too hard and dry to absorb it. This type of flooding is also common in cities, where concrete and tarmac prevent the water from being absorbed into the ground. These floods tend to have a very short lead time (less than six hours after rainfall) and a short duration [26] [3]. However, they can be extremely destructive, because of the strong flow of water and the large amounts of debris that are often caught up in the water. This form of flooding is also often associated with landslides [26] [27]. Recent examples include flooding in Baghlan, Badakhshan and Ghor in Afghanistan in 2024.
- **Sea floods** — Sea flooding occurs in coastal areas such as estuaries or coastal river mouths, often when high sea tides combine with river flooding. Sea flooding can also be a result of storm surges, where storms drive seawater inland. It can also—more rarely—be caused by tsunamis sending waves of sea water inland. Sea floods tend to have a high level of impact, because the areas where they occur can be heavily populated (coastal or estuarine cities) and because salt water can cause additional damage to agricultural land, WASH facilities and other infrastructure. The intensity of storm surges can often be similar to flash flooding, in the danger to life from fast moving water and waterborne debris. A recent example is the three-meter storm surge seen along the coast of Bangladesh during cyclone Mocha in 2023. [3].
- **Dam failures** — Flooding can also occur when a dam breaks or overflows—this sort of flooding is often particularly dangerous, as very large amounts of water can be released in a short period of time into areas that are not expecting flooding and have not experienced flooding before. Dams can be manmade or, in mountain areas, natural dams made of ice and rock that hold back glacial lakes. Where glacial lakes cause flooding, these floods are known as glacial lake outburst flooding (GLOFs). A recent example of a dam failure (caused by overflow) was in Maiduguri, Northern Nigeria, in 2024. Flooding caused by a dam break occurred in the city of Derna, Libya, in 2023.

## Fundamental Principles for Flood-Preparedness Planning

Before going through the steps for designing a flood plan, it is essential to recognize five central principles:

1. The plan should be developed in coordination with other stakeholders wherever possible. It should ideally be part of wider government-led disaster risk management activities.
2. Communities should be engaged in flood planning.
3. The plan should be designed to address the particular circumstances of population groups most vulnerable to the effects of flooding.
4. The plan should consider options for long-term engagement, both in the flood response itself and in post-flood actions to reduce risk and to support reconstruction.
5. The plan should consider seasonality.

**The plan should be developed in coordination with other stakeholders wherever possible. It should ideally be part of wider government-led disaster risk management activities.**

**The impacts of floods are multi-sectoral**, and addressing these impacts—reducing risk, preparing for floods and responding to floods—generally requires the involvement of actors in the areas of health/MNH/MHPSS/nutrition, shelter and settlements, WASH, disaster risk reduction, social service/welfare systems, food production, food security and livelihoods (FSL), and potentially other sectors such as transport, logistics and energy. Particular skills, such as flood forecasting (hydro-meteorological services) and mass communication (from public and private media organizations), are also necessary. **Substantial guidance and evaluations demonstrate the importance of multi-sectoral planning for floods** (see, for example, [27], [28], [29], [4], [30]). For more information on coordination in flood planning, see Step 2 – *The Multi-Stakeholder Platform*.

A central element of International Medical Corps' engagement in flood planning is to build the capacity of local actors, particularly those in the health sector.

**Communities should be engaged in flood planning.**

Multiple evaluations show that **where communities are involved in preparing for floods, the subsequent actions are more effective and sustainable** (see, for example, [15], [3], [31], [32]). Of course, communities are not passive and do not wait for outsiders to help them: there are many good examples of communities conducting their own flood-preparedness planning without external support (see for example [33], [26]). However, **organizations like International Medical Corps can often play an essential role in supporting communities in their efforts to prepare for flooding**. See 4.1 *Community-Based Preparedness Actions*.

**The plan should be designed to address the particular circumstances of population groups most vulnerable to the effects of flooding.**

**Flooding affects everyone differently**. Studies show that in the least developed countries, women are more likely to die in floods than men. [30], [26] [15]. There are many potential reasons for this (including the particular responsibilities of women in caring for children and older people; the fact that women often wear more restrictive clothing; and the fact that women may be expected not to leave the house, which affects their evacuation choices), but

one important reason is that women and their specific needs are often forgotten during preparedness planning and decision making more generally [26], [56]. Similarly, children and elderly people are at disproportionate risk of flooding [15], as are people with disabilities [26]. It is important that flood planning is not blind to the different vulnerabilities of different sectors of society, so ***it is important to take active steps to include all sections of society in planning***, to understand vulnerability and how vulnerability can be addressed.

**The plan should consider options for long-term engagement, both in the flood response itself and in post-flood actions to reduce risk and to support reconstruction.**

***Flooding—particularly riverine flooding—can be a long-term event:*** floods can last for weeks or even months [34], and the health impacts of flooding can continue for a year or more after the flood [35]. The destruction caused by flooding can also disrupt services such as health and WASH for a long period after the floods, until basic reconstruction activities have taken place: to give one example, flooding in Gonaives, Haiti, in 2008 deposited 3 million tons of mud in the city, which made services difficult to provide and took more than six months to remove [67]. Humanitarian ***planning for flood response should recognize the length of time for which a response will be required***, and the fact that response and reconstruction activities are likely to overlap [27].

Flood plans should also recognize that ***preparing for flood response is most effective where measures have been taken to decrease the impact of floods in the first place***. Making structural interventions to decrease the likelihood of flooding (such as tree planting or creating dikes or flood defenses); designing and building settlements, WASH and health infrastructure in such a way that they are less likely to flood; and investing in capacity building for communities, health staff and WASH committees are all ways of decreasing the impact of flooding on the communities that International Medical Corps serves, and so decreasing the scale and cost of humanitarian responses when a flood happens. While many of these activities are outside the scope of International Medical Corps' work, some (such as flood-proofing clinics and training health staff) are included in this guidance. Where International Medical Corps is involved in multi-stakeholder flood planning, country offices should also work with partners to undertake this sort of upstream disaster risk reduction work wherever possible.

**The plan should consider seasonality.**

***Both the occurrence and the impact of floods will be affected by the time of year.*** Flooding is likely to coincide with high (total) levels of rainfall, with high intensity of rainfall over a short period, or with melting of snow or glaciers, all of which are often seasonal. For example, flooding on the Niger River in Mali tends to coincide with the rainy season between July and September, as does monsoon-related flooding on the Indus in Pakistan. Flooding in Somalia tends to occur during one of the two rainy seasons, April–June or October–December. However, major flooding has occurred outside the rainy season in all three countries in the last 10 years. Flood plans should be prepared for flooding outside the rainy season.

The impacts of flooding will also differ depending on when flooding occurs. Health impacts such as malaria or hypothermia will differ depending on the time of year, as will impacts on sectors such as agriculture. [30] Preparedness plans should take these seasonal impacts into account, and their implementation should be informed by rapid assessments that consider the season-specific impacts.

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# Steps to Creating a Flood-Preparedness Plan

International Medical Corps teams developing a flood-preparedness plan can follow these nine steps:

- 1. Initial review/deciding on flood-preparedness planning** — determining the degree to which flooding is a risk in the areas where International Medical Corps operates (including areas where there may not be current activities) and whether International Medical Corps needs to make a programmatic response
- 2. The multi-stakeholder platform** — identifying whether management and coordination groups for disaster risk management of flooding already exist, and whether and how International Medical Corps can play a role in these groups. Where platforms do not exist, supporting their development
- 3. Conducting a (multi stakeholder) vulnerability and capacity assessment** — collecting information on the vulnerability of the population, and of health, WASH and other systems, to flooding, on current levels of preparedness for flooding, and on gaps that need to be addressed
- 4. Identifying preparedness and response activities for flooding**
  - a. activities that can be embedded in everyday programming to increase resilience to flooding
  - b. additional activities that are necessary for International Medical Corps and partners to be ready to respond when a flood occurs
- 5. Risk analysis of preparedness and response activities**
- 6. Planning and budgeting for preparedness and response activities**
- 7. Linking the preparedness plan to early warning systems** — identifying early warning systems that can be used to trigger the plan
- 8. Testing the preparedness plan**
- 9. Monitoring, evaluation and assessment of the flood-preparedness plan**

The sections below lay out how to complete each of these steps. They also relate these steps to the EPRP tool, where International Medical Corps offices are using this tool.

The steps provide an outline structure that individual country offices may adapt based on their specific circumstances (see Box: *How to Use This Guidance*).

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# Step 1 – Initial Review/Deciding on Flood-Preparedness Planning

**In this step, you will determine whether the area where you are working is at risk of flood and whether you need to create a flood-preparedness plan. This is a rapid review—a more detailed assessment will come later, as you develop the plan.**

The first step for country teams is a rapid review to understand the risks posed by flooding. This will help the team to decide:

- whether to plan for flooding;
- what sort of flooding to plan for; and
- the geographical area to be covered by the flood plan.

**Questions to ask at this stage include:**

- Are any areas where International Medical Corps works—or where International Medical Corps could provide support—vulnerable to river flooding?
- Are any areas where International Medical Corps works—or where International Medical Corps could provide support—vulnerable to flash flooding/landslides?
- Are any areas where International Medical Corps works—or where International Medical Corps could provide support—vulnerable to coastal flooding?
- What is the possible scale of flooding? How large is the area that could be affected, and how many people might be affected?
- How (broadly speaking) might flooding affect the sectors that we engage in, and which sectors should we make plans for?

This step should be light and quick—you are just deciding the outlines of whether you need a plan, which area the plan is for and the sectors of interest. It can be completed through desktop review and (possibly) discussions with key stakeholders such as the ministry of health (MoH) or clusters or communities, in which case this step might overlap with Steps 2 and 3.

The main **sources of information** for this step are likely to be:

1. **Global (online) flood-risk maps**—in particular, the maps available on [GRI Risk Viewer](#). To use these maps:
  - a. Go to the [Risk Viewer](#) and click on “Hazard.”
  - b. **For River flood risk:** Click on the eye symbol next to “River Flooding Aqueduct” and “River Flooding JRC” (note these two data sets use different models and information and so will give different results).
  - c. Set the return period to 100 (this means that you are looking at the areas that have a 1% chance of flooding in any given year—known as a 100-year return period. For the aqueduct map, set the “Epoch” to 2030 and the “RCP” to 4.5.
  - d. You will now have a map of areas that one or the other model says is likely to flood (1% chance in any given year) and the depth of the floodwater when it does flood.
  - e. **For Coastal flood risk:** Click on the eye symbol next to “Coastal Flooding Aqueduct.” Set the return period to 100 (this means that you are looking at the areas that have a 1% chance of flooding in any given year—known as a 100-year return period) Set the “Epoch” to 2030 and the “RCP” to 4.5.

- f. You will now have a map of areas that the model says are likely to flood, as well as the depth of the floodwater. *Note that this model looks only at storm surges and does not take into account the way in which storm surges can be increased by high levels of rainfall and high river levels, and thus is likely to **underrepresent** the risks of flooding in many places. Unfortunately, maps that combine sea and river risk are not freely available but require commercial subscriptions*

Free, global online flood risk maps are not available for **flash floods** (paid versions are available from JBA Global Flood Maps, for example), although a flash flood risk map is available for Burkina Faso, Burundi, Central African Republic, Chad, the Democratic Republic of the Congo, Djibouti, Honduras, Madagascar, Micronesia, Federated States of Micronesia, Mozambique, Pakistan, Papua New Guinea, Somalia, South Sudan, Timor-Leste and Yemen. [This map](#) needs to be downloaded and viewed with GIS software.

For **landslide** risk, you can also use the [GRI risk viewer tool](#) using Hazard “Landslide.” Note that the tool is based on historical data, and so does not include the (increased) risk of landslides resulting from intense precipitation.

The original landslide maps are also available from the [GFDRR Global Risk Data Library here](#). These also need to be downloaded to a GIS viewer to read, as do the related maps for areas at risk of dam failure.

- 2. Discussions with residents** (particularly older people and longer-term residents) in areas that might be at risk to identify whether the area has ever flooded, what sort of flood was involved, which areas were flooded and how long the flooding lasted.
- 3. Observation** — Areas that are liable to flash flooding may have dry streambeds that fill quickly after heavy rainfall, and signs of erosion or sediment deposits from previous floods. Areas with steep slopes or narrow V-shaped valleys that experience intense rainfall are often at higher risk of flash floods. Flood plains—large, low and generally flat areas near rivers—are likely to experience river flooding.
- 4. Flood risk maps held by government agencies** — In some cases, the government hydromet agencies and/or disaster management agency might have maps showing areas at risk of flood, and possibly landslides.

Note that predicting flood risk is very difficult. The resources above can give a broad idea of risk but will never be completely accurate. Predictions based on historical information (including memories of previous flooding) are becoming less accurate because of unpredictable long-term weather patterns and changes in urbanization and land use, all of which are making flooding more common and more destructive. A simple rule is that if an area has flooded in the past, it is more likely to flood in the future, and that areas that have not flooded but are in areas of high risk are also likely to flood in the future.

#### **When Using the EPRP Tool**

This is the stage where you will fill out the first columns of the HVI page of the EPRP. You can use the data sources above to complete the “probability,” “human impact,” “property impact” and “business impact” sections of the HVI tool.

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## Step 2 – The Multi-Stakeholder Platform

**In this step, you will identify who is involved in flood-preparedness planning and how International Medical Corps will fit into the planning and response process.**

International Medical Corps' flood-preparedness plan should be developed in coordination with other stakeholders, wherever possible, and ideally should be part of wider government-led disaster risk management activities.

### Who Is Involved

**Who is involved in planning and response, and the process for planning and response, will differ from one country to another.**

- In some cases, planning will be conducted at a national level, while in others plans may be more bottom up—developed at the district, province or regional level.
- The government may make specific flood plans, or it may develop more complex, “multi-hazard” emergency-preparedness plans that cover flooding, droughts, tropical storms, earthquakes and a variety of other hazards.
- Planning may be led by the national disaster management agency or by another government agency.
- Flood plans may already exist (in which case, International Medical Corps will wish to identify how to support these existing plans) or may need to be developed.

The International Medical Corps office should identify how planning is done and how International Medical Corps can contribute to planning and response. A good first step is to approach contacts in the MoH, national disaster management authority (NDMA), UN Clusters or Red Cross/Crescent Society.

Where the government has not engaged in flood planning and does not show a strong interest in planning for floods despite evident risks, planning may be undertaken through multi-agency platforms, such as the humanitarian country team or the NGO forum.

**In general, key stakeholders in an effective flood-preparedness plan will include:**

- NDMA;
- national meteorological authority;
- local/municipal authorities;
- water and power authorities or utilities;
- ministries of health;
- national Red Cross/Red Crescent Society (national RCRC societies are often engaged in and have skills in early warning and preparedness planning);
- national public health emergency management centers or emergency coordination;
- humanitarian country team/clusters/OCHA;
- donors;
- NGO forum;
- media organizations; and
- representatives of community/civil society organizations.

International Medical Corps will tend to focus on specific areas of expertise, such as health/MNH (including MHPSS), nutrition and WASH. However, flood-preparedness plans will generally require input from other sectors, particularly shelter and settlements, food security and livelihoods, education and logistics (including energy). Key elements of flood-preparedness plans that International Medical Corps will probably **not** be involved in designing but will need to take into consideration include:

- flood defenses for priority assets (which should include health facilities and storage);
- early warning systems;
- evacuation routes and evacuation procedures;
- alternative accommodation for people who lose homes during flooding; and
- reconstruction plans.

## Developing an effective multi-stakeholder platform

Whatever platform is used and organizations are involved, experience and evaluations suggest the following elements are important for effective multi-stakeholder flood-preparedness planning and should be put in place as the plan is being created.

### 1. Clear roles and responsibilities

- a. What organization has overall authority for flood preparedness and response?
- b. Who/what organizations are involved in making which decisions?
- c. How are decisions made?
- d. Who/what organizations take the lead/have delegated authority to make specific (often sectoral) decisions without reference to the group or to the lead organization?

A RACI Matrix, which outlines different levels of responsibility, or a similar tool can be useful in clarifying the organization of flood preparedness and response.

### 2. Common communication channels for use during flood response. Different organizations may use different communication technologies—mobile phones, landlines or handheld radios—and may find that they are unable to communicate with one another during an emergency response. Organizations should clarify how they will communicate with one another during the response:

- a. aligning communication technologies to the degree possible;
- b. clarifying contact people and contact information for each organization;
- c. developing a communication tree to cascade information;
- d. agreeing on whether there is need for an emergency operations center (EOC) or other coordinating location, as well as its function, location and staffing; and
- e. agreeing on any schedule of regular coordination meetings.

### 3. Clarity and agreement around early warning systems and triggers, and more broadly, the situations under which coordination and flood-response activities will be initiated. (see *Step 7 — Linking the Preparedness Plan to Flood Early Warning Systems*).

### 4. Clarity and agreement around public messaging. It is important that key messages are aligned, so as not to cause confusion among the public (See *Section 4.2 Communication Actions*).

### 5. Clarity and agreement around any common services available to responding organizations, for example, warehousing or transport services.

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## Step 3 — Vulnerability and Capacity Assessment

**In this step, you will collect and analyze more detailed information on flood risks, the capacity of local actors to respond to these risks and any important gaps in capacity that need to be addressed in the plan. This information forms the basis of the flood-preparedness plan.**

International Medical Corps teams should, to the degree possible, conduct this step with other stakeholders (see *Step 2 – The Multi-Stakeholder Platform*), as these stakeholders will have much of the relevant knowledge and will be important (and often leading) partners in the creation and implementation of plans. Partners might also conduct complementary assessments in sectors such as shelter, FSL and education.

This step might be conducted through a review of available literature and data, interviews and meetings with key stakeholders, workshops, or a combination of these approaches. For more information on techniques, see the *Annex – Tools for VCA*.

Some of the information for the VCA (on incidence of disease and malnutrition, for example) will often already be available to International Medical Corps, as it will have been **collected during multi-sectoral needs assessments (MSNA)**.

Where existing flood-preparedness planning has been conducted by the government, UN or other NGOs, **much of this information will already be available**.

A list of specific questions to ask is included as *Annex – VCA Questions*

At the end of this step, you should have developed a shared understanding of:

- Which **organizations** are active or potentially active in health/MNH, nutrition and WASH aspects of a flood response.
- **Risks** of flooding — the likelihood and type of flooding, when, where and how long flooding might occur.
- **Vulnerability** to flooding, with particular reference to health, WASH and nutrition sectors.
- **Capacities:** What actions have been taken with respect to
  - early warning systems and anticipatory action frameworks;
  - community risk awareness;
  - health system preparedness (including Nutrition, MNH and MHPSS); and
  - WASH facilities and services preparedness.
- What are the **gaps**?

### **When Using the EPRP Tool**

This is the stage where you will fill out the remaining columns of the HVI page of the EPRP.

In conversation with national stakeholders, you can fill out the sections on “Preparedness” and “Response capacity.”

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## Step 4 — Identifying Priority Actions for the Flood-Preparedness Plan

*At this step you decide on the key actions to include in the plan. The key impacts of flooding, and suggestions for action, are provided by theme/sector below.*

### 4.1 Community-Based Preparedness Actions

#### Challenges Related to Community Preparedness and Flooding

Community-based preparedness is a key element of effective disaster risk management (see *Fundamental Principles for Flood-Preparedness Planning*). In many cases, communities will self-organize to prepare for flooding and will need little, if any, external support. Many communities develop their own early warning systems, identify evacuation routes and safe areas to evacuate to, provide first aid, maintain emergency stockpiles and manage distribution of essential goods to affected community members without any external assistance.

However, communities:

- may not be aware of flood risk, particularly where risk has changed significantly or where they have not lived in the area for decades or more (which may be the case for displaced people, refugees or people who have migrated to informal settlements) [29], [36], [28];
- may not be aware and informed of newer risks resulting from extreme weather and environmental stresses (such as flash floods);
- may not be included or engaged in official preparedness planning activities and are unable to influence these activities and/or are unaware of early warning systems and flood-preparedness actions that are developed by government agencies or international agencies [37], [28];
- may not include marginalized groups in flood-preparedness planning, putting these groups at a disadvantage [26];
- may not have included the need for services that are often not publicly discussed or hold a level of stigma depending on the context, such as services for MNH and violence against women and girls;
- may not have the organizational structures within the community to conduct flood preparedness and response activities [37]; and
- may not have the knowledge and skills required to prepare for and respond to floods [31].

#### Activities to Support Community Preparedness

External actors—NGOs, the UN or local government—can support communities that are likely to be affected by flooding through activities such as:

- support to development of community flood-preparedness plans;
- capacity building of community disaster committees; and
- risk communication and training of community members in flood-related skills.

In most cases, International Medical Corps' role in supporting community preparedness will relate to risk communication, and to training of health and nutrition workers and WASH committees (see sections below). However, if International Medical Corps or partners wish to support the development of flood-preparedness plans or facilitate capacity building for local

disaster management committees, the resources included in *Annex — Resources to Support Community-Based Disaster Risk Management (CBDRM)* may be helpful.

## 4.2 Communications Actions

### Challenges Related to Risk Communication and Flooding

Risk communication is a key part of flood-preparedness planning [31], [4], [27], because:

- As noted above, people may not be aware of the increased risk of flooding caused by unpredictable long-term weather patterns and changes in land-use patterns. This is particularly the case in areas where flooding is high impact/low frequency and so has occurred relatively seldom in the past [29].
- People may also not be aware of the risk of flooding when they have not lived in the area for long periods of time—as is often the case with internally displaced persons, refugees and people who have moved to informal settlements [36], [28].
- Even when people have some idea that they are at risk of flooding, they may not act on this knowledge, as a result of information bombardment [27]; a perception that extreme weather and environmental stress-related changes will occur far in the future [38], [38]; or because of a lack of trust in authorities or in messages related to extreme weather and environmental stress [38], [28].
- Even where people are aware of the risks of flooding, they may not be aware of the most important actions to take to maintain health, hygiene and nutrition.

### Activities Around Communication

International Medical Corps has expertise in RCCE and in health/MNH/MHPSS/nutrition and hygiene promotion and can make a significant contribution to multi-agency communication strategies.

General points to bear in mind when communicating with communities about flood risk and response:

- There should be several levels of communication, with different types of communication occurring at different times. Some general messages (such as information on the risk of floods, for example) should be communicated year-round. Other, more focused messages can be communicated at the beginning of the flood season. A different set of messages should be communicated alongside early warning, when a flood is forecasted to occur in the next few days.
- Messages should be sustained (over years) and repeated.
- Messages should be based on what people know and build from there. It can be very useful to undertake a Knowledge, Attitude and Practices (KAP) survey to understand what people know and where there are gaps in knowledge, as well as to understand information sources that people trust.
- Messages should not focus exclusively on risks but should also provide people with practical actions that they can take to reduce the risks.
- The different organizations involved in flood preparedness should agree on key common messages and common vocabulary. Messages should be coordinated between actors.
- Wherever possible, communication should be two way and active, with people able to discuss the messages and take part in a process. Participatory flood mapping, for example, is a very effective way of helping people to understand and internalize the risks of flooding, as are drills, where people practice what they would do in the event of a flood.

- Specific messaging will be needed for particular sub-sections of the population; it is important to understand how women, elderly people, children, people without political power and people with disabilities access and use information, and to tailor communication for these groups, including where and how they can access services that are related to their needs.
- It is important to engage local opinion-formers in the messaging process.
- It is important to monitor the results of community communication, to identify which methods and messages are effective and which are not, and continually adjust the plan on this basis.
- It is important to consider the most effective channels or media through which the messages can be delivered (i.e., community dialog sessions, radio, social media, etc.) and who is best positioned as a trusted source to communicate the information (i.e., health workers, community or religious leaders, etc.)

International Medical Corps has developed key messages around flooding. For more information on this guidance note, contact [research@internationalmedicalcorps.org](mailto:research@internationalmedicalcorps.org).

In addition, Oxfam UK, with International Medical Corps support, has developed general guidance on risk communication relevant to flooding , which can be found [here](#) (Guidance note #6).

Guidance on ensuring that messages can be received by people with disabilities is available in this [Humanity & Inclusion guidance](#) (in Part 3, Tool 2).

## 4.3 WASH Actions

### Challenges Related to WASH and Flooding

Floods are a water hazard, and WASH interventions play a central role in effective flood response [15]. Key, often interrelated, WASH issues arising from floods are:

- **Contamination of drinking water (ground and surface water)** — Contaminants in the environment are washed into surface water. Pollutants can also enter groundwater through damaged infrastructure (such as borehole casings and seals) [29], [39], or in some cases directly through rock fractures or porous rock [39]. Where pipes or other elements of water distribution systems are damaged, contaminants can also enter the water distribution system. Pollutants include:
  - pathogens from fecal matter, resulting from damaged sanitation facilities (below), open defecation and runoff from fields [6], [15], [38];
  - vector-borne pathogens, such as schistosomiasis and leptospirosis [6];
  - chemicals (including pesticides) from flooded domestic, agricultural or industrial facilities [29], [39]; and
  - heavy metals from industrial processes [29].
- **Lack of access to water** — Water supply infrastructure may be damaged by flooding, or people may be unable to access water supplies because they are prevented from reaching wells by floodwater or have relocated away from their wells/boreholes. Flooding may make access difficult for water bowsers.
- **Damage to WASH infrastructure [27], [38], [29]** — Infrastructure can be destroyed by the force of water, particularly in flash floods [6]; by sediment [29]; by salt (in the case of coastal flooding); and by submersion [6]. Electrical components are particularly vulnerable. Where latrines, septic tanks or treatment plants are damaged or submerged, fecal matter can enter the environment (see above) [29], [38].

- **Failure of the sanitation chain** — Damage to toilets or failure of sanitation facilities, or inability to access toilets (as a result of floodwater or relocation), can lead to the release of fecal matter into the environment and to increases in open defecation. Flooding may also affect the ability of sludge trucks to access facilities [38].
- **Impacts on solid waste management** — Flooding can disrupt the collection of solid waste [38] and damage waste containment structures, allowing waste to enter the environment [42].
- **Difficulties maintaining hygiene** — Lack of clean water, as well as a lack of materials such as soap that might be lost in the flooding, can make it difficult for people to maintain adequate personal or food hygiene [29], [38].
- **Proximity to disease vectors** — Proximity to standing water and to stored water can increase exposure to disease vectors, particularly mosquitoes. Lack of shelter can make people more susceptible to being bitten [15].

### **WASH Activities — For Inclusion in Ongoing Programs**

In flood-prone areas, the following activities should be integrated into ongoing WASH programming wherever possible. These activities decrease the impact of flooding on affected communities and/or provide a basis for effective response.

#### **Inclusion of WASH messages in community risk communication**

Flood risk communications (see section above) should include priority WASH messages around storage and purification of water, hygiene, preventing open defecation, etc. A full list of WASH messages for community RCCE is available in the International Medical Corps guidance note.

#### **Capacity development for water committees**

Water committees should be trained in skills related to flooding and flood response, including damage assessment and repair of WASH facilities and systems and water-quality monitoring. International Medical Corps developed a [training package for water committee members](#). For more information, contact [research@internationalmedicalcorps.org](mailto:research@internationalmedicalcorps.org).

#### **Regular maintenance of WASH infrastructure**

Where infrastructure such as boreholes and water distribution mechanisms is regularly maintained, it is less likely to be damaged during floods and more resistant to the entry of floodwater.

#### **Regular cleaning of drainage infrastructure**

In situations where drainage exists, communities should be encouraged to ensure that drainage systems are maintained and kept free from blockages to speed the movement of floodwater out of settled areas.

#### **“Flood proofing” WASH infrastructure**

Wherever possible, new infrastructure being built in areas vulnerable to flooding should be sited where it is less likely to flood and where people can maintain access during flooding. It should also be built to resist flood damage and intrusion of floodwater.

It is also possible to retrofit infrastructure to make it more flood proof.

Guidance on floodproofing sanitation systems from [SaniHub](#) suggests:

- raising toilets and pits above the highest level of floodwater, if possible;
- reinforcing the walls of latrine pits (lining them with erosion-resistant materials);
- waterproofing sludge and wastewater containment facilities where they cannot be raised above the maximum flood level;

- limiting the risk of effluent infiltrating the soil by separating urine from feces (urine-diverting dry toilets); and
- installing non-return valves on septic tanks.

Oxfam is currently developing further information on flood proofing sanitation infrastructure, which is available [here](#). (Guidance note 11)

## **WASH Activities – Additional Preparedness and Response Activities**

In developing the flood-preparedness plan, International Medical Corps teams and partners should also consider the following activities. Where the vulnerability and capacity assessment (VCA) (see *Step 3 – Vulnerability and Capacity Assessment*) has demonstrated that WASH providers and services are not prepared to conduct these activities, this will require International Medical Corps teams and partners to take action to fill the gaps (for example, by preparing contingency stocks, developing risk communication materials, and deciding how clean water will be supplied and ensuring that everything is in place to ensure this supply).

### **Rapid assessment**

WASH elements should be included in any post-flood rapid assessment to identify specific needs and the location of these needs.

### **Enhanced community risk education**

When early warning systems predict floods, the communications plan (see 4.2 *Communications Actions*) should include mechanisms for increased community risk communications, with more frequent messages across multiple media and additional messages related to water safety and hygiene. This is likely to include health and hygiene sessions (below) and the preparation/printing of materials.

### **Health and hygiene sessions/visits**

The health and hygiene promotion team, along with community health volunteers, should be prepared to conduct health and hygiene promotion and awareness sessions for people affected by flooding. Additionally, they should conduct door-to-door visits for outreach in the targeted catchments of the health facilities. Key messages will include safe water chains, washing hands with soap and safe excreta disposal. According to local conditions, sessions should be conducted separately for women, men and children in the proposed areas.

### **Protection of WASH infrastructure**

In some cases, vulnerable infrastructure (such as pumps or other elements on or above the ground) can be temporarily protected from floodwater by sandbags or other temporary defenses. Where suitable soil is available, stocks of sandbags and plastic sheets should be prepared, and community members trained in their use. Other temporary defenses may be stockpiled, particularly in areas of high risk. Again, community members should be trained in deploying these temporary flood defenses.

### **Chlorination of water sources**

International Medical Corps or partners should be ready to chlorinate water sources, the piped network and private water trucks. Avoid chlorinating unprotected wells; instead, consider bucket chlorination (if appropriate). As a last resort, International Medical Corps/partners should provide chlorinated water through water trucking where necessary.

### **Augmented monitoring and testing of drinking water**

Given the increased risk of water contamination, WASH actors/water committees should have the skills, materials and authority to monitor and test drinking water at source and point of use and identify pathogens that may be present as a result of flooding. They should also

be able to close off sources of contaminated water. Messages on safe water should also be included in post-flood communications. Where water supply is distributed through networks, maps of these networks should be available as part of preparedness activities, to facilitate mapping of potential contamination.

### **Provision of safe drinking water**

Flood-preparedness planning should include plans to provide safe drinking water to people affected by flooding. These plans should take into account:

- Potentially limited access for bowsers, if floods close roads or bridges.
- Planned relocation sites—if contingency plans call for communities to relocate, it is important to ensure that sufficient amounts of clean water can be available at these sites.
- The potential for domestic treatment and storage. If the plan calls for domestic water treatment and storage, households should receive water purification tablets (chlorine), water storage vessels designed to reduce the risk of microbial infection, and communication messages that clearly explain how to use purification and storage items. Households may also need fuel and cooking utensils to boil water.
- Skills and materials required to rehabilitate water sources as soon as possible after flooding. This will involve disinfection and may require the removal of large quantities of sand and silt, and the replacement of parts.

### **Provision of sanitation services**

As with drinking water, preparedness plans should include measures to ensure that people have access to sanitation services and that there are adequate facilities for managing fecal sludge. This is particularly important because the contamination of water by fecal pathogens is a major cause of illness during and after floods. Preparedness activities for sanitation should take into account:

- Planned relocation sites—if contingency plans require communities to relocate, it is essential to ensure that adequate sanitation facilities are available at these sites. Failure to address the sanitation needs of people who have relocated after floods is a common theme in evaluations.
- The potential vulnerability of systems to treat or remove excreta. If these are likely to be damaged or become inoperable due to flooding, the plan should include alternatives.
- Skills and materials required to rehabilitate sanitation systems as soon as possible after flooding.

### **Provision of hygiene materials**

People affected by flooding may lose essential materials for personal, domestic and food hygiene purposes. They may have additional hygiene needs associated with flooding (such as cleaning cooking utensils, clothes and bedding that have been submerged in floodwater). International Medical Corps and partners should be prepared to meet these needs, including specific hygiene needs for women, the elderly, babies and people with disabilities. When distributing items, consider a two-phase distribution, allowing general items to be distributed immediately, while others that require consultation with affected populations are distributed later.

### **Supporting community-based vector control**

In coordination with health activities, International Medical Corps should be prepared to support enhanced activities to control rats (which spread leptospirosis and attract snakes) and mosquitoes, in particular.

## 4.4 Health Actions

### Challenges Related to Health and Flooding

Health, like WASH, is a priority for flood-preparedness planning [15], [40], [27].

Flooding generally has significant impacts on health and is associated with increases in both mortality and morbidity. Some studies show a 50% increase in all-cause mortality in the year after a flood [35]. A recent systematic review identified an average 26% increase in excess mortality during flood periods [41]. Flooding has been associated with increased incidence of 121 diseases, through increased waterborne, vector-borne and direct-contact transmission [40].

Flooding affects health through a broad variety of mechanisms. This means that even a relatively minor flood can result in a dangerous increase in morbidity and mortality [27]. It also means that the impacts of flooding on health vary significantly, depending on the nature of the flood, the location, time of year, services available and underlying health status of the population [35], [25], [43].

Despite the clear associations between health conditions and flooding, clear evidence of causality is generally weak [6], [27], [34], [43].

Health conditions that are frequently associated with flooding in the literature include:

- **Drowning**, which in some situations is the leading direct cause of death from floods [29], [27]. Drowning seems to be particularly associated with flash flooding [15], although it has also occurred during or after riverine floods [27].
- **Acute trauma**, which again is associated particularly with flash floods, where people are injured by debris [35], [29]. However, trauma also occurs in other forms of flooding, particularly through electrocution and during post-flood clean-up activities [6]. In conflict situations, trauma related to landmines and unexploded ordnance associated with flooding can be a particular challenge [44].
- **Infection associated with acute trauma** is particularly likely when wounds come into contact with floodwater, and can be extremely dangerous [29], [40].
- **Snake and other animal bites** are frequently mentioned as being associated with flooding. [45], [27], [35]. These may be particularly associated with longer-term flooding, where people and animals are forced by floodwater to inhabit smaller areas.
- **Hypothermia** has been associated with flooding where people have lost shelter during colder periods of the year [29].
- **Waterborne gastroenteric diseases** are very frequently associated with flooding [29], [46], [13], [12], [35], [40], [43], [27], [14], [44], [30], [6] and can be the main cause of illness post flooding [47]. A wide range of diseases are mentioned in the literature, including cholera, [6], [43]; hepatitis E [6], [35]; *Cryptosporidium* [27], [15]; typhoid, amoebic dysentery and polio [6]. However, outbreaks of gastroenteric disease are *not* inevitable following flooding—they tend to occur where people are displaced and/or where WASH facilities are damaged [29], [34]. They also seem to be associated with longer-term flooding (rather than flash floods) [6]. For example, following flooding in Cameroon in 2024, the International Medical Corps office reported that there had been no observed increase in gastroenteric diseases, and this has been the case elsewhere [43].
- **Leptospirosis** is very frequently associated with flooding [6], [40], [43], [27], [29], [35], [47]. Other zoonotic pathogens may also enter floodwater [29].

- **Respiratory infections** are in some cases the most common type of disease associated with flooding and a major cause of mortality [47], [25]. Higher rates of respiratory infection post flood can be associated with crowding and lack of shelter for people who have been displaced [35].
- **Skin and eye diseases** related with lack of clean water for hygiene and with crowded conditions are frequently mentioned as being associated with flooding [29], [40], [47], [35].
- **Arboviruses**, particularly malaria (also Dengue and Zika), are frequently associated with flooding [13], [40], [35], [6], [48]. Floods can decrease incidence of arboviruses by washing breeding sites away—this is particularly likely to occur in flash flooding [14], [6], [49], [29]. However, they can also create new breeding sites, while flood-related disruption to control campaigns, damage to homes and displacement can make people more exposed to disease vectors [29], [35]. Increased malaria appears to be particularly associated with longer-term flooding [6].
- **Non-communicable diseases**, particularly cardiovascular diseases, show increased prevalence and mortality in association with flooding [29], [43], particularly in low-income countries when compared to high-income countries [25]. This may relate to breaks in the continuity of care [11].
- **Maternal and newborn health (MNH)** — During and after flooding, MNH services are often de-prioritized or unavailable [54, 55, 56, 57]. Inaccessible facilities, interruption of MNH supply chains, absence of healthcare workers with MNH training, communication and transport problems, and lack of access to referrals can lead to poor outcomes like stillbirth [55], prenatal stress, low birth weight/preterm birth, lack of medical care for survivors of rape and other forms of violence, and increased maternal and neonatal morbidity and mortality [58, 59, 60]. For people living with HIV—including pregnant women—the lack of access to care and treatment may make them more susceptible to opportunistic infection, treatment resistance and increased risk of transmission [61]. With a lack of adequate sanitation, women and girls may also face more painful menstrual cycles and higher rates of urinary and reproductive tract infections during floods [62, 63].
- **Mental health conditions** — High levels of mental ill health, including PTSD and depression, have been demonstrated during and after many flood events [29], [12], [45], [50], [27], [6]. Most studies in this area have focused on high-income countries [15], [6]. Some studies show very high prevalence—up to 50%—among some flood-affected populations immediately post flood, with high levels of prevalence still apparent two years after flooding [35].
- **Violence against women and girls** — Evidence highlights increases in rape [59], greater odds of intimate partner violence, specifically physical and sexual violence [64] and early marriage after extreme weather events, including floods [65].

The acute and chronic impacts of flooding on health can be long term. While some studies show that the incidence of disease peaks fairly quickly after flooding (in one study, cholera cases peaked 8.5 days after flooding, and malaria between two and three months after flooding [43]; another study shows a decrease in all-cause mortality after 60 days [25]), others show increased all-cause mortality and increased morbidity for certain diseases continuing for a year or longer [35]. The causes of flood-related ill health also tend to change over time [29].

Flooding can also decrease the ability of populations to **access health facilities** [27], [11] **damage health facilities** and disrupt care [11], [12], [13], [14].

## Health Activities — For Inclusion in Ongoing Programs

In flood-prone areas, the following activities should be integrated into ongoing health programming wherever possible. These activities decrease the impact of flooding on affected communities and/or provide a basis for effective response.

### **Inclusion of health messages in community-risk communication**

Flood-risk communications (see section above) should include priority health messages around avoidance of harm and what to do in the event of common flood-related injuries and diseases. A full list of health and MHPSS messages is available in the International Medical Corps guidance note.

### **Capacity development of community health workers**

International Medical Corps works with community health workers (CHW) and community health volunteers (CHV) in many contexts. In areas at risk of flooding, CHW/CHV training should include material on flooding and health. International Medical Corps developed training modules on flooding and health; for more information, contact [research@internationalmedicalcorps.org](mailto:research@internationalmedicalcorps.org).

### **Capacity development for MHPSS**

Potential frontline responders, irrespective of their role or technical capacity, should receive training on how to provide basic psychosocial support in the wake of flooding and other hazard events. Training in psychological first aid prepares responders to offer humane and appropriate support, as well as to identify needs and facilitate referrals for affected individuals. This can inform the provision of the response package, to ensure stressors are addressed and help people to access relevant MHPSS services if experiencing psychological distress and/or an exacerbation of existing mental health conditions or disruption in their care.

### **Capacity development of health professionals**

Building the knowledge and skills of health professionals around flooding and health is an important element of many flood-preparedness plans.

Ideally, information on flooding and health should be embedded in the basic pre-service and in-service curriculum for health providers, with refresher training occurring regularly.

International Medical Corps is developing a training course for clinicians on flooding and health. For more information, contact [research@internationalmedicalcorps.org](mailto:research@internationalmedicalcorps.org).

### **Supporting community-based surveillance activities, including case definitions for diseases associated with flooding**

Community-based surveillance is an important element in identifying and controlling post-flood disease outbreaks. International Medical Corps should ensure that informants and CHWs are trained on case definitions that relate to the main flood-related illnesses.

### **Flood proofing clinics and health infrastructure**

Ensuring that International Medical Corps-supported facilities are safe and that flood damage is kept to a minimum. This may require taking flooding into consideration when constructing new buildings or retrofitting existing buildings to address flood risks.

Flood-proofing measures can attempt to prevent water from accessing the building (dry floodproofing) or to prevent damage when water enters the building (wet floodproofing). In addition to protecting the building structure itself, specific measures should be taken to protect:

- water supply;

- electricity supply and electrical appliances;
- sanitation infrastructure;
- storage areas, particularly medicine storage;
- medical waste; and
- infection prevention and control measures.

The WHO checklist for ensuring that health facilities (including water and electricity supplies) are resilient to extreme weather events includes a section on resilience to floods and [is available here](#).

Further technical information on flood proofing buildings [is available here](#) (see the section on Adaptation of buildings and other assets) and [here](#) (although note that this guidance was developed for high income contexts).

### Health Activities – Additional Preparedness and Response Activities

In developing the flood-preparedness plan, International Medical Corps teams and partners should also consider the following activities. Where the VCA (see *Step 3 – Vulnerability and Capacity Assessment*) has demonstrated that health/MNH/MHPSS providers and services are not ready to conduct these activities, this will require International Medical Corps teams and partners to take action to fill the gaps (for example, by preparing contingency stocks, developing risk communication materials and preparing rosters of surge staff).

#### Rapid assessment

Health elements should be included in any post-flood rapid assessment to identify specific needs and the location of these needs, and to adjust the health system response accordingly. Note, however, that health activities, particularly those that focus on essential lifesaving health services during floods (e.g., services as defined under SPHERE standards) do not need to wait for the assessment and should continue or start immediately if not already being provided.

#### Enhanced community risk education

When early warning systems predict floods, the communications plan (see 4.2 *Communications Actions*) should include mechanisms to increase the frequency of community risk education messages, with more frequent messages across multiple media and additional health messages related to the health conditions expected from the type of flooding predicted and locations where health services are available.

Once the flood has receded, messaging should move to address post-flood/cleanup health threats (only returning to homes once it is safe to do so, being aware of the dangers of carbon monoxide poisoning, etc.)

#### Protection of health infrastructure

In some cases, vulnerable infrastructure (such as PHCs or parts of PHCs) can be temporarily protected from floodwater by sandbags or other temporary defenses. Where suitable soil is available, stocks of sandbags and plastic sheeting should be prepared, and staff and community members trained in their use. Other temporary defenses may be stockpiled, particularly in areas of high risk. Again, staff and community members should be trained in deploying these temporary flood defenses. Information on temporary flood defense options [is available here](#) (although as this guidance is from the UK, note that not all options may be relevant).

### **Continuing community-based surveillance activities**

Floods are likely to disrupt community-based surveillance at a time when it is particularly important for epidemic control. Preparedness plans should include measures to maintain surveillance activities.

### **Maintaining existing health services during flooding**

Flooding is likely to disrupt International Medical Corps or the MoH's ability to provide primary healthcare services. To minimize this disruption, the preparedness plan should address the following issues:

- Location of health services — Will existing clinics be accessible? Will communities have relocated? If communities have evacuation/relocation plans, how will care be provided in areas of relocation?
- Types of services to be provided — Assess and ensure capacity to provide a full package of essential PHC services that should be maintained such as:
  - health education and health promotion;
  - child health, including vaccination;
  - disease surveillance and response;
  - maternal and newborn health services (with a focus on minimum initial service package (MISP) priority activities);
  - communicable disease case management;
  - noncommunicable disease (NCD) treatment;
  - injury and trauma care;
  - malnutrition case management; and
  - MHPSS services.
- Monitoring groups that need medication (such as women readying for home deliveries or people who have NCDs) and preparing patients with a backup supply of medication and instructions on where to access emergency care if a crisis occurs. An example of this has been the advance distribution of medication for prevention of post-partum hemorrhage in home deliveries.
- Flooding is likely to impact CHWs/CHVs, who may not be able to work or may have to relocate. What steps can be taken to keep the CHW network operational during and after floods?
- Safety of patients and staff — Is there any likelihood that patients or staff members will need to be evacuated from health facilities? If so, how, under what circumstances and to where? How can people on chronic disease medication be reached or provided with needed medication at the community level?
- Availability of equipment, materials and records to maintain essential services outlined above — How will these be protected from flood damage? Are existing stocks sufficient to deal with any disruption in supply?
- Impact of flooding on WASH in health facilities — How will safe drinking water, sanitation and waste management be protected from flooding, and what alternative arrangements need to be made?
- Electricity supply — Is there a risk of electricity being compromised? What alternative sources are available?
- Availability of testing and lab facilities — How will these be protected from flood damage? Can testing be carried out elsewhere if normal locations are flooded?
- Referral routes — Are routes likely to flood? Are alternative routes available?

### **Expanding health services to address the health impacts of flooding**

As outlined above in the *Challenges Related to Health and Flooding* section, flooding is likely to lead to additional demands on the health system. The preparedness plan should include actions that International Medical Corps and partners will take to be ready for the most likely and potentially most significant health risks. As such, it should address the following issues:

- Advance identification of likely health risks and caseload (for planning purposes) — based on the VCA, particularly the current health status of the population, diseases that are endemic in the area and previous experiences of flooding (which diseases and health conditions should International Medical Corps/partners be prepared for, what is the likely size of the caseload and what is the likely timing of increased incidence/epidemics?).
- Ensuring that any additional MNH needs are included in this planning.
- Monitoring of the health situation (to update and revise assumptions made in the plan during and after the flood period). Is information relevant to identifying and responding to key health risks included in the rapid assessment and in community surveillance activities? How can community surveillance be maintained during and after the flood?
- Availability of surge staff — Will additional staff be required to meet additional needs (including those related to specific protocols for epidemic control, malaria control, etc.)? How many of which types of staff members, and where will they come from? (This may require preparation of a roster.)
- Availability of equipment and materials — Will specific medications, equipment or other materials be required to meet additional needs (including those laid out in specific protocols for epidemic control, malaria control, etc., and including assistance equipment that may be lost in flooding) Will these be pre-positioned? If not pre-positioned, where will they be sourced, and how will they be transported and safely stored?
- Availability of bed space — Will additional bed space (including isolation/quarantine) be required? Where will it be required? How will this be made available?
- Availability of transport and fuel — Will additional transport and fuel be needed for mobile units, for example? Epidemic response? Increased numbers of referrals? How will this be made available?
- Arrangements for management of dead bodies — Are arrangements in place to address an increased number of dead bodies?

As noted above, plans should take into consideration the fact that the health impacts of floods can be long term and are likely to change over time. The plan may, for example, need to address waterborne gastrointestinal diseases immediately after flooding, malaria some weeks later, and impacts on mental health for several months or longer.

The plan should also take into consideration the health risks that might occur as people clean up after the flood.

## **4.5 Nutrition Actions**

### **Challenges Related to Health and Nutrition**

Flooding is associated with malnutrition, and international authorities say that flooding has already led to increased malnutrition in Africa [9]. The IPCC also predicts that as floods become more frequent, malnutrition will become worse [9].

Flooding seems to have particularly negative effects on nutrition where baseline levels of malnutrition are already high [35].

Flooding is more frequently associated with stunting than with acute malnutrition [51], [43], [19], [19], although some studies show an association with acute malnutrition [52].

The pathways linking flooding to malnutrition are unclear but may be related to:

- Limited food access—both as a direct result of flooding on stored food and food production and longer-term impacts of flooding on food security, economic activities and wage labor opportunities [29].
- Increased levels of illness (see *Health – Key Issues* section above).
- Changes to care practices resulting from need to respond to flooding and disruption to lives and livelihoods resulting from flooding [19].

### **Nutrition actions – For Inclusion in Ongoing Programs**

In flood prone areas, the following activities should be integrated into ongoing nutrition programming wherever possible. These activities decrease the impact of flooding on affected communities, and/or provide a basis for effective response.

#### **Inclusion of nutrition messages in community flood-risk communication**

Flood-risk communications (see section 4.2 *Communications actions*) should include priority nutrition messages around nutrition and care practices during and after floods. A full list of nutrition messages is available in the International Medical Corps guidance note.

#### **Capacity development of community nutrition workers**

International Medical Corps works with community nutrition workers/volunteers in many contexts. In areas at risk of flooding, International Medical Corps should include material on flooding and nutrition in their training. Modules on flooding and nutrition that can be adapted to the specific local context are available through the International Medical Corps training modules. In addition, they should be trained to monitor key nutrition indicators, including acute malnutrition, through mid-upper arm circumference (MUAC) and weight-for-height Z-score, exclusive breastfeeding status and dietary diversity.

### **Nutrition Actions – Additional Preparedness and Response Activities**

In developing the flood-preparedness plan, International Medical Corps teams and partners should also consider the following activities. Where the VCA (see *Step 3 – Vulnerability and Capacity Assessment*) has demonstrated that nutrition providers and services are not ready to conduct these activities, this will require International Medical Corps teams and partners to take action to fill the gaps (for example, by preparing contingency stocks, developing risk communication materials and ensuring staff are available to include nutrition responses in mobile clinics).

#### **Rapid assessment**

Nutrition elements should be included in any post-flood rapid assessment to identify specific needs and the location of these needs. This includes indicators such as acute malnutrition, measured by MUAC or weight for height and dietary diversity. Comparison of these indicators with pre-disaster nutritional baseline is key to design an appropriate response based on the expected impact of the flooding.

#### **Enhanced community risk education**

When early warning systems predict floods, preparedness plans should include mechanisms for community risk education activities to increase, with more frequent messages across multiple media.

### **Nutritional surveillance**

Floods disrupt food systems, reduce access to clean water and healthcare, and increase the risk of disease, all of which may contribute to wasting (acute malnutrition). The preparedness plan may include provision for nutritional surveillance to help detect early signs of malnutrition, to support the design and implementation of targeted interventions and to monitor the effectiveness of nutrition interventions where these have been put in place.

### **Maintaining existing nutrition services during flooding**

Flooding is likely to disrupt International Medical Corps' or the MoH's ability to provide nutrition services. To minimize this disruption, the preparedness plan should address the following issues:

- Location of nutrition services — Will existing locations be accessible? Will communities have relocated? If communities have evacuation/relocation plans, how will services be provided in areas of relocation?
- Impact of flooding on work of nutrition staff/volunteers — Nutrition staff/volunteers are likely to be impacted by flooding and may not be able to work or may have to relocate. What steps can be taken to keep the network operational during and after floods?
- Availability of equipment, food commodities, materials and records — How will these be protected from flood damage? Are existing stocks sufficient to deal with any disruption in supply? Is food safety at risk and how can this be addressed?
- Water supply — An adequate supply of clean water is particularly important for breastfeeding women and for infants. Is there a risk of clean water supplies being compromised? What alternative sources are available?
- Referral routes — Are routes likely to flood? Are alternative routes available?

### **Availability of and access to food of sufficient quality**

A key issue to maintain the nutritional status of the population is the degree to which people can access enough food of sufficient nutritional quality. Where International Medical Corps may not provide food aid, it should work with partners to consider the following questions:

- What are the potential impacts of flooding on food stocks, agriculture, wage labor and markets?
- On the basis of the above, are there any nutritional needs, particularly for pregnant and breastfeeding women and young children, that are unlikely to be met?
- How can these needs be met—ideally as part of existing FSL preparedness planning?

### **Expanding nutrition services to address increased needs**

Flooding may lead to increased malnutrition and so to increased requirements for nutrition support. The preparedness plan should include actions that International Medical Corps and partners will take to be ready for the most likely and potentially most significant nutrition risks. As such, it should address the following issues:

- How to scale up community-based management of acute malnutrition? Solutions include:
  - Deploying mobile health and nutrition teams to reach displaced and isolated populations.
  - Training local health workers to screen for malnutrition using MUAC and refer cases for treatment to the nearest nutrition site.
  - Establishing temporary treatment sites in flood-affected areas for moderate and severe acute malnutrition, and establishing referral channels for children with severe acute malnutrition and medical conditions.

- How to protect and promote infant and young-child feeding? Solutions include:
  - Setting up safe spaces for breastfeeding and providing counseling to mothers under stress.
  - Distributing breastmilk substitutes only when breastfeeding is not possible, ensuring safe preparation in compliance with the UNICEF guideline on the procurement and use of breastmilk substitute. (See [UNICEF Programming Guidance Procurement and Use of Breastmilk Substitutes in Humanitarian Settings](#).)
  - Promoting continued breastfeeding and age-appropriate complementary feeding through mass communication and community outreach.
- How to provide micronutrient supplementation and fortified foods? Solutions include:
  - Distributing vitamin A, iron and folic acid supplements to children and pregnant/lactating women (PLW).
  - Ensuring access to fortified blended foods and lipid-based nutrient supplements to prevent malnutrition including micronutrient deficiencies. These food commodities should be provided through a blanket supplementary feeding program targeting the most vulnerable such as children 6–23 months and PLW.
- How to integrate nutrition with WASH, health and food security? Solutions include:
  - Combining nutrition services with WASH interventions to reduce disease-related malnutrition.
  - Linking with cash transfer programs to improve household food access and dietary diversity, thereby increasing household food security.
  - Coordinating with agriculture and food security sectors to restore local food production and markets.

#### **When Using the EPRP Tool**

This is the stage where you will fill out the first part of the Scenario Planning and Activities page of the EPRP.

Add “flooding” as the **scenario**.

Give an overview of the plan in the **Intervention** section.

Put each element of the plan (for example, “enhanced community risk education”) under the **Preparedness/Planning/Response/Close out** sections as relevant.

Split each element of the plan into its key activities, and put these under **Activity Description**.

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## Step 5 – Risk Analysis of Preparedness and Response Activities

*In this step, you will consider potential challenges or constraints that may prevent you from activating your flood-preparedness plan.*

Note that flooding commonly causes challenges in the following areas:

- Disruption to transport systems—flooding of roads/railways/airstrips, destruction of bridges and potential lack of fuel. Flood hazard maps can be used to identify elements of the transport system that may be in high-risk areas.
- This disruption of supply chains may lead to pipeline breaks in food commodities or medicines.
- Damage to storage facilities and loss of stocks.
- Disruptions to markets, related to transport systems and storage facilities. This can increase prices.
- Difficulties for staff in accessing facilities, possibly unsafe working conditions for staff.
- Lack of clean water supplies.
- Lack of electricity (where substations flood or transmission infrastructure is damaged) and related disruptions.
- Disruption to communications infrastructure, particularly for landlines and mobile phones.

If the country has previously been affected by flooding, it is worth reflecting on the impact that this flooding had.

### **When Using the EPRP Tool**

This is the stage where you will fill out the Risk Analysis and Context/Risk Mitigation page.

Add the key activities you identified at the last step in the **Potential Interventions** box.

Then consider risks to these activities and complete the **context/challenge/risk** columns.

Finally, consider what you will need to do to mitigate the risks (e.g., solar power or generators as backups to mains electricity services). Put these elements in the **mitigation** column.

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## Step 6 – Planning and Budgeting for Preparedness and Response Activities

***In this step, you will decide who will lead and undertake the activities, and the materials and budget you will need to implement the plans.***

For each activity in the plan, consider:

- Who will be responsible for these activities in the country office?
- Who will be involved in delivering these activities? Will they be internal or external to International Medical Corps? Will the country office need to hire additional staff?
- What other materials will be required, and what will they cost?
- Will any technical support or technical materials be required? Where will you get this support?
- What is the level of budget required for additional activities (materials, staff, support)?
- Where will funding come from?
- Is the budget likely to be affected by inflation in this period?

Note that you may be able to include the budget for the flood response under a “crisis modifier” in a regular donor proposal (a crisis modifier is a contingency fund that the donor agrees to make available if a crisis—such as flooding—occurs). When preparing annual proposals for ECHO or other donors, check whether there is the possibility to add a crisis modifier, which would cover these costs if flooding occurs, to the proposal. Information on ECHO’s crisis modifiers [is available here](#).

You may also be able to access anticipatory action funding to pay for the cost of flood response (see Box: *Anticipatory Action*). Anticipatory action funding is available from some donors to pay for early responses to emergencies. It is agreed in advance so that it can be released as soon as an early warning is given, rather than requiring a proposal to be made and agreed after the flooding has happened.

Finally, you may be able to access funding to pay for the response from country-based pooled funds.

### **When Using the EPRP Tool**

This is the stage where you will fill out the second part of the Scenario Planning and Activities page of the EPRP and the Resources page of the EPRP.

On the Scenario Planning and Activities page, for each activity, say who is **responsible**, who is **accountable**, who needs to be **consulted** and who needs to be **informed** in the relevant column.

On the Resources page, add **medical supplies** needed, **non-medical supplies** and **other needs**, the **number needed** and the **unit cost**. Under **staff roster**, add human resource needs.

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## Step 7 – Linking the Preparedness Plan to Flood Early Warning Systems (EWS)

***In this step, you will link your preparedness plan to an early warning system to ensure that actions are taken as early as possible and to allow the preparedness plan to be eligible for anticipatory action funding.***

Response plans for flooding are most effective when they are related to a flood early warning system. This allows the plan to be launched before the flood occurs (and before health facilities have flooded, for example), and thus gives more time for activities such as risk communication, creating temporary flood defenses and bringing in surge staff and materials.

Linking the preparedness plan to an early warning system is also attractive to donors who wish to support anticipatory action frameworks (see box: *Anticipatory Action*).

International Medical Corps teams should use flood early warning systems developed by national authorities wherever these exist.

These will generally be developed by the authority with responsibility for hydrometeorological (hydromet) issues. International Medical Corps teams should engage with the hydromet authority and NDMA in your country to find out about existing flood early warning systems (this will generally be part of Step 3 – *Vulnerability and Capacity Assessment*). Other useful contacts include the UN's World Meteorological Organisation (if present in country) and the National Red Cross/Crescent Society, as the RCRC does a lot of work on early warning and anticipatory action.

If no national early warning system exists, International Medical Corps teams may also consider using early warning systems developed at a regional or global level that cover the country of operation. You should still discuss their use with the MoH and other government counterparts (as the MoH may not regularly use—or even be aware—of these systems).

Note that, whichever EWS and system you use, it is important to be clear on:

- who in the office is responsible for monitoring EWS forecasts;
- when they should be monitored (Daily? Weekly? All year? Only in the rainy season?); and
- how many days in advance you should start actions on the basis of the forecast.

### **Early warning information for flooding**

One useful resource—although on a global scale, without much local detail—is the [UNHCR/WMO Global hydromet weekly scan](#). This gives high-level warnings of river flooding and flash flooding for the week ahead.

### **Early warning information for river flooding (global and regional levels)**

The most commonly used Global EWS for **river flooding** is the Global Flood Awareness System (GloFAS). This will give you up to 15 days warning of river flooding, and show the likely maximum extent of flooding, wherever you are in the world.

The GloFAS system relies on weather forecasts (precipitation, temperature, evaporation), combined with a model (LISFLOOD) of how water will move through each part (map grid cell) of a river system, to provide flood forecasts. See Annex *Using GloFAS/Google for River Flood Early Warning* for more information on using GloFAS.

Another global system for **river flooding** is the Google Flood Hub. This provides early warning of flooding up to seven days in advance. It is from GloFAS in that it uses AI, but it appears to be as reliable and, in some cases, more reliable than GloFAS. See *Annex Using GloFAS/Google for River Flood Early Warning* for more information on using the Google Flood Hub

In addition to these global early warning systems, a number of regional systems for early warning of **river flooding** also exist, including:

- a [weekly flood forecast](#) for East/Horn of Africa from ICPAC
- a [10-day forecast](#) for West Africa from Fanfar

### **Early warning information for coastal and flash flooding (global level)**

There do not seem to be any good, publicly available viewers for early warning of **coastal flooding** from storm surges, or that combine storm surge data with rain/river data, although the information is available for specialists to use in their modeling (for example at <https://oss.deltares.nl/web/delft-fews/>).

Providing early warning of **flash floods** is more difficult than providing warning of river floods, and there are no global EWS that provide flash flood early warning for all countries. Early warning is likely to be community based and rely on local flood watchers who give warning of impending floods.

### **Box – Anticipatory Action**

Anticipatory action (sometimes called forecast-based action) is a type of disaster risk management that is designed to launch a humanitarian response immediately before a hazard—such as a heatwave or flood—or in the very earliest stages of the disaster.

By acting early, anticipatory action programs aim to decrease the impact of the event on people affected by giving time for people to evacuate themselves and their belongings from an area about to be flooded, for example. This, in turn, means that the impacts of the disaster are lessened (fewer people die or lose their belongings), and that the response activity is smaller (and so potentially cheaper) than it would otherwise be, and generally more efficient.

In a typical anticipatory action program, activities to respond to a disaster are decided in advance in a preparedness plan. These activities are costed, and the budget required to pay for them is set aside in a contingency fund, which will only be spent if the plan needs to be implemented. The preparedness plan and budget are linked to an EWS.

Stakeholders agree in advance on a threshold at which the EWS will trigger payments from the fund and the activation of the preparedness plan. For a flood plan, the threshold is likely to be when an EWS says that flooding is likely to occur. When this happens, the money is disbursed and the actions in the preparedness plan are carried out.

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## Step 8 – Testing the Preparedness Plan

In this step, you will test the preparedness and response actions for flooding to ensure that they will work when required.

To do this, choose a testing method—either a tabletop test or a simulated response—and ensure that all key stakeholders are involved. A tabletop test is a discussion-based exercise where stakeholders walk through the plan step by step, trying to identify gaps and ensuring that everyone understands their roles. In a simulated event, you would assume the flood had happened, clarifying the extent and areas affected, and then carry out the actions in the plan—mobilizing surge staff and mobile units, and carrying out evacuations, for example. Simulations require significantly more planning and a budget to carry out and will only generally be undertaken for larger and more complex plans.

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## Step 9 – Monitoring, Evaluation and Assessment of the Flood-Preparedness Plan

***In this step, you will decide how you are going to monitor the implementation of the plan and how you are going to evaluate the plan. These decisions are made as part of the design of the plan.***

### Monitoring

Monitoring is the systematic, routine tracking of how the flood-preparedness plan is being adopted, implemented and integrated into broader preparedness efforts. It allows International Medical Corps teams and partners to assess whether planned actions are being delivered on time, in the right way and by the appropriate actors.

In many cases, the flood-preparedness plan will form part of a broader project or program and should therefore be linked to the logframe or results framework of that program. If the plan is a standalone activity, it will need its own results framework. In either case, indicators relevant to the flood plan should be clearly integrated into the project logframe to enable routine monitoring through established reporting mechanisms.

Monitoring should typically include two complementary types of indicators:

1. Adoption indicators: *Are key actors using and aligning with the plan?*
2. Implementation indicators: *Are the planned activities being effectively carried out?*

If possible, a third type of indicator can be included:

3. Quality indicators: *Are activities being delivered to an appropriate standard?*

However, measuring quality may require more detailed monitoring approaches such as direct observation, structured checklists, post-drill reviews or feedback from communities and staff. It is often more practical to assess quality as part of an **impact** evaluation (see below).

## Examples of Monitoring Indicators

Type of Indicator	Examples
<b>Adoption</b>	<ul style="list-style-type: none"> <li>- Number of stakeholders (e.g., MoH, local authorities, partners) who have formally signed off on the flood-preparedness plan</li> <li>- Percentage of target facilities or administrative units where the plan has been disseminated and endorsed</li> <li>- Number of sectoral or partner contingency plans that align with or explicitly reference the International Medical Corps flood-preparedness plan</li> <li>- Number of community-based flood-preparedness plans developed and tested</li> </ul>
<b>Implementation</b>	<ul style="list-style-type: none"> <li>- Number of training events held for CHWs</li> <li>- Number of WASH facilities where resilience to flooding has been assessed</li> <li>- Number of WASH facilities where action has been taken to improve resilience</li> <li>- Number of simulation exercises or flood drills conducted</li> <li>- Participation rate in drills and simulations (disaggregated by sector, location and role)</li> <li>- Percentage of planned preparedness activities completed by start of flood season</li> <li>- (If flooding occurs) number or percentage of action plans triggered in response to flood alerts or early warnings</li> <li>- (If flooding occurs) timeliness of response activities following flood alerts (e.g., time from alert to activation of contingency measures)</li> <li>- (If flooding occurs) number of consultations by mobile teams</li> </ul>
<b>Quality</b>	<ul style="list-style-type: none"> <li>- Degree to which clinicians say that they have learned useful content during training sessions</li> <li>- Percentage of health facilities in flood-prone areas with functional and tested flood contingency plans</li> <li>- Proportion of flood preparedness actions implemented that meet minimum quality standards (e.g. International Medical Corps internal standards, Cluster standards)</li> <li>- Percentage of risk communication messages tested and rated as clear and actionable by community members</li> </ul>

## Evaluation and Assessment

Evaluation helps determine how well the flood-preparedness plan worked in practice and what can be improved for future iterations. Evaluations can explore a wide range of questions, from how effectively activities were implemented to what outcomes were achieved.

Wherever possible, evaluations should be planned *before* an activity to ensure that the information needed for the evaluation is conducted *during* the activity (see *Planning Evaluations*, below). Before implementing the flood-preparedness plan, it is important to think about a future evaluation and define what the evaluation should achieve. Common objectives include:

- identifying which activities are most effective or should be revised;
- improving how activities are implemented;
- assessing whether activation triggers were timely and appropriate;
- evaluating coordination with local authorities and partners; and
- determining whether the plan contributed to reduced mortality, morbidity or service disruption.

Evaluations typically focus on one or both of the following:

### 1. Process evaluation

Process evaluation assesses *how the plan was implemented*. Key questions include:

- Were planned activities completed as expected and on schedule?
- What supported or hindered successful implementation?
- Were coordination and communication effective?

Often, process evaluation looks at the implementation of activities and their direct output (Was this training conducted? How good was it? What worked and didn't?). These are normally easier to conduct than impact evaluations and rely on qualitative methods such as interviews, focus group discussions and document reviews. A common format is the *after-action review*, where stakeholders reflect on what worked, what didn't and why.

### 2. Impact evaluation

Impact evaluation assesses what changed *as a result of the plan*. This may include:

- health outcomes (e.g., reduced mortality or morbidity during floods);
- functional outcomes (e.g., PHCs remaining open during floods); and
- behavioral outcomes (e.g., increased community knowledge or action taken based on early warnings).

Impact evaluations are generally more complex to conduct than process evaluations. They often require extensive data such as mortality or morbidity figures, which may be difficult to access or unreliable. Moreover, attributing observed outcomes directly to the preparedness plan can be challenging, especially without a clear counterfactual (i.e., knowing what would have happened if there hadn't been a plan).

Because of this, impact evaluations often focus on intermediate outcomes—measurable changes that are plausibly linked to the plan, which will contribute to higher-level outcomes (such as decreased mortality), but which are easier to track than the higher-level outcomes. Examples include:

- increased community knowledge and preparedness behaviors following risk communication activities; and
- improved health facility readiness (e.g., increased availability of emergency stocks or functioning backup power systems).

These intermediate outcomes are more feasible to measure and can serve as meaningful proxies for longer-term impact. Since impact evaluations aim to assess change over time, they typically require baseline and endline data collection to compare conditions before and after the plan's implementation.

### **Key evaluation design questions**

Whether examining process, impact or both, any evaluation should consider these questions:

- Which elements or activities should be evaluated?
- What are the key questions and indicators?
- What data is needed, and how will it be collected?
- Who will use the results, and how will they inform future planning?

### **Using evaluation results**

Similarly, regardless of the evaluation's focus, it is important to define how the evaluation results will be used. When considering your evaluation, you should define:

- how findings will be shared with stakeholders;
- who is responsible for acting on the results; and
- when and how the preparedness plan will be revised.

### **Planning evaluations**

Evaluations should be planned well in advance, ideally during the design phase of the flood-preparedness plan. Early planning allows appropriate and feasible selection of research questions, identification of suitable indicators, the collection of baseline data and the integration of evaluation activities into the overall implementation timeline. It is strongly recommended to consult your Monitoring and Evaluation (M&E) Advisor for support in drafting the evaluation scope of work and selecting suitable methodologies.

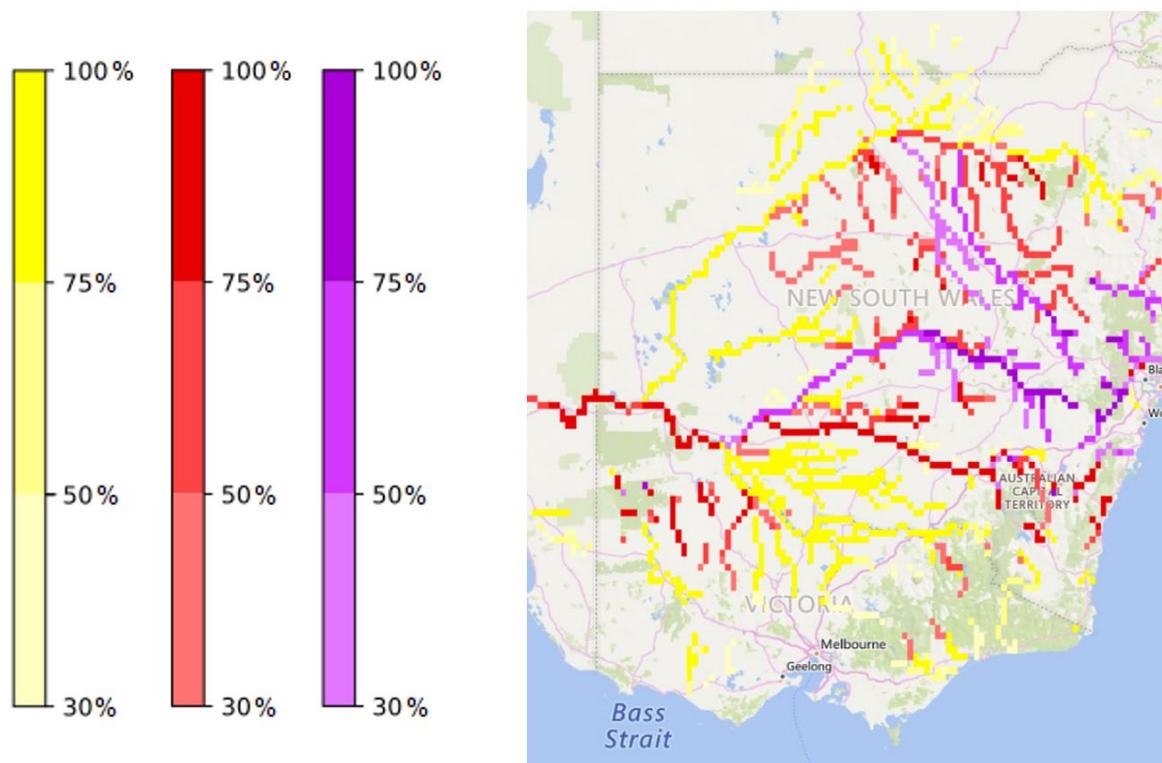
For more detailed guidance on evaluation design, methods and tools, refer to the International Medical Corps M&E Evaluation Guidance Document.

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## Annex – Using GloFAS/Google for River Flood Early Warning

To use GloFAS:

1. Go to <https://global-flood.emergency.copernicus.eu/>
2. Sign up with your email.
3. Go to Services/Map viewer. At present, this is halfway down the homepage.
4. Click and drag to move the map, and use the scaling buttons on the top left of the map (or your mouse) to zoom in and out.
5. Go to the “Hydrological” tab at the top of the map.
6. Under the tab, turn on “Flood summary for days 1-15.”



This will show any rivers that are likely to flood, the size of the flood and the degree of certainty that a flood will happen.

The size of the flood is shown by the color: Purple is a “20-year flood” (larger), red is a “five-year flood” (less large). Yellow is a “two-year flood” (probably not important for International Medical Corps’ purposes).

The degree of certainty/uncertainty is shown by how solid the color is. For example, solid purple suggests that there is a 75%+ likelihood of a 20-year flood in the next 15 days. Light red suggests a 30%+ likelihood of a five-year flood happening. The scale is shown below.

7. To see the maximum area likely to be covered by floodwater, go to the “Flood Risk” tab at the top of the map and turn on “Rapid Flood Mapping.”

To use Google Floodhub:

1. Go to <https://sites.research.google/floods/>
2. In the right-hand panel, select "River Gauges."
3. Move to the country you are interested in. If there are colored hexagons on that country, go to step 5.
4. If there are no colored hexagons in the area of interest, select "Extended Coverage."  
This gives information, at a lower level of reliability, for areas where river heights are not regularly or reliably recorded.
5. Zoom in on the area you are interested in, until you see the pins for individual gauges. Click on the gauges nearest to the area. This will show you (in a new panel on the left-hand side of the screen) river heights for the last nine days and predicted heights for the next seven days. Red or dark red projections suggest that river levels are abnormally high: red suggests that they are at heights reached on average every five years, and dark red suggests that they are higher than that.

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## Annex – VCA Questions

Specific areas to consider as part of the VCA:

- **Flood risk** — Do stakeholders have any additional information (beyond that collected at step 1) on:
  - the likelihood of flooding;
  - the nature of potential flooding (river, rainfall, etc.);
  - the geographical scope of potential flooding—the area that could potentially be affected;
  - seasonal considerations for potential flooding—when flooding is likely or possible;
  - the potential duration of flooding;
  - the number of people who might be affected; and
  - any groups at particularly high risk.
  
- **Flood early warning systems:**
  - Does an early warning system for flooding exist?
  - Does the EWS cover all the types of flooding that may occur?
  - What are the triggers for the EWS (the point at which a flood is likely and response actions start)?
  - How, and how effectively, are EWS messages communicated to response organizations?
  - How, and how effectively, are EWS messages communicated to communities/the public?
  - How, and how effectively, are EWS messages communicated to vulnerable groups within communities?
  - Who is responsible for information communication at these various levels?
  - Are there any existing anticipatory action plans (see box: Anticipatory Action) for flooding in the country? If so:
    - Which organizations are involved?
    - Which actions are planned? Can International Medical Corps activities articulate with these activities?
    - How will anticipatory actions be funded? Can International Medical Corps also access these funds?
  
- **Evacuation and emergency shelter:**
  - Do evacuation plans exist?
  - Do evacuation plans take account of the specific vulnerabilities of groups such as the elderly, pregnant women and infants, and people with disabilities or medical conditions?
  - Have plans been made for emergency shelter?
  - Where are people supposed to shelter/relocate?
  
- **Health-related vulnerabilities and capacities:**
  - What is the underlying health status of the population?
    - Existing data on the demographics of the population, mapping of high-risk community members whose conditions might be exacerbated by the floods or treatment might be affected by floods (including people with NCDs, mental health

- conditions, HIV or disabilities; people taking regular medication; pregnant women; infants and children; adolescents; and the elderly).
  - Incidence of diseases and malnutrition
  - Presence of endemic diseases and other health conditions that might be exacerbated by flooding
- What were the health/MNH, MHPSS and/or nutrition impacts of previous flooding events—nature, scale and any gaps identified in health response?

**Health facilities:**

- Are there health facilities located in flood-prone areas?
- Are health facilities and services designed and prepared to be resilient and respond to flooding? Consider:
  - building design;
  - staff surge capacity;
  - mass casualty triage protocols;
  - logistics arrangements to ensure supply chain;
  - emergency communication equipment;
  - emergency power/water backup; and
  - prepositioning of essential supplies, equipment and pharmaceuticals.
- Status of WASH services in health facilities and likely impact on them in case of flooding
- Status of existing MNH services at facility level and understanding of the community’s care-seeking habits—has a preparedness assessment for the MISP been completed for the country or sub-national area?
- Are there plans at the health facilities to ensure the occupational safety of staff members during and after floods?
- Are there plans at the health facilities to ensure patient safety during and after floods?
- Are health professionals aware of the likely health, MNH and MHPSS impacts of flooding?
- Do standard curricula for health professionals include content on flooding and health?
- Do arrangements exist to provide medical services at facilities in alternative locations if facilities are damaged/destroyed, or in the event that communities are displaced to new locations/emergency shelter?
- How do health facilities communicate and coordinate with the community during health emergencies?

**Community health preparedness:**

- Are there active/functional and trained CHWs/CHVs?
- Are community health/nutrition workers aware of the likely health/MNH and MHPSS impacts of flooding?
- Do standard CHW/CHV training curricula include content on flooding and health/MNH, WASH, MHPSS and nutrition?
- Are there any community sensitization activities around the risk and prevention of the impact of flooding?
- Have communities prepositioned items such as first aid kits?
- What informal community support networks exist (such as religious associations or traditional solidarity systems) that provide emotional or practical help during crises?

- **Nutrition-related vulnerabilities and capacities** (Some questions will also be addressed as part of any FSL assessment):
  - What is the underlying nutrition status of the population? What are the underlying causes of malnutrition?
  - What are likely impacts of flooding on food production? How might the flood affect food production (both of staple foods and of animal products and horticultural products)?
  - How might flooding affect markets? Will enough food of sufficient quality be available in local markets?
  - How might flooding affect warehouses where food is stored? Will food stocks be impacted by the flooding?
  - How might flooding affect the ability to purchase? Will food prices increase or income-earning opportunities decline?
  - How might flooding impact food safety? Are communities aware of what to do with food that has been left after the flood and when to discard it?
  - How might flooding affect caregiving behavior? Is the impact of flooding likely to affect caregiving practices, in particular breastfeeding and the ability to cook food?
  - Are community nutrition workers aware of the likely nutrition impacts of flooding?
  - Do standard curricula include content on flooding and nutrition?
  - Are nutrition facilities and services designed and prepared to be resilient and respond to flooding?
  - Do stocks of necessary materials and food commodities exist to address nutrition-related needs during/after a flood?
  
- **WASH-related vulnerabilities and capacities:**
  - Where are the main water and sanitation facilities for the population? Are they in areas that put them at risk of damage from floodwaters/flooding?
  - What were the impacts of previous flood events on water, sanitation and waste management facilities?
  - Are water and sanitation facilities adequate and operational?
  - Are water and sanitation facilities regularly maintained?
  - Are water and sanitation facilities designed to be resilient to flooding (including electricity supply, where relevant)?
  - If flooding compromises the supply of clean water, are alternative sources of supply available?
  - If flooding compromises the sanitation system or prevents access to sanitation facilities, are alternative facilities available?
  - If people are forced to relocate due to flooding, are alternative safe water and sanitation facilities available in areas of relocation and/or emergency shelters?
  - Do drainage facilities exist, and are they regularly maintained?
  
- **Community-based preparedness:**
  - Have communities prepared for flooding?
  - Do effective community-level structures exist to coordinate community-level preparedness and response?
  - Are these structures involved in and linked to government or other official preparedness planning?
  - Are community members trained in flood response?

- Do community preparedness activities take account of the unique needs of women, pregnant women and infants, elderly people, and people with disabilities and existing health conditions?
- **Community awareness and engagement:**
  - Have any KAP surveys been conducted regarding:
    - how citizens understand the risk of flooding;
    - their use of early warning systems;
    - the actions they should take before, during and after a flood; and
    - the health impacts of flooding.
  - Have common/official messages on flood risk, actions to take before, during and after a flood, and the health impacts of flooding been developed?
  - Is there a communication plan? Do stakeholders agree on which messages should be released when, and which media will be used?
- **Logistics:**
  - Are main transport routes (roads, bridges, railways lines) in the area likely to be affected by flooding? Are alternative routes available?
  - Are contingency stocks of the main supplies required for the flood response available in the area?
  - Are warehousing and storage facilities designed to be resilient to flooding and accessible in case of floods?
  - Are there any emergency communication, power and water backups?

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## Annex – Tools for VCA

Vulnerability and capacity assessments can take different forms, and a mix of methods is often used. Some methods that can be helpful include:

### Using Secondary Data (Using Information That Has Already Been Collected and Analyzed)

Identifying existing research, reports and analysis and then synthesizing them to produce key information for the VCA. These might be government risk maps or reports, government health data, previous humanitarian risk assessments, or even previous International Medical Corps multi-sectoral needs assessments.

Secondary data review is particularly useful as a way to understand elements of the VCA such as flood risk, the baseline health and nutrition status of the population, and the location of health centers or WASH infrastructure.

Secondary data review is often cheap and relatively quick to conduct.

### Collecting and Using Primary Data

There are a number of different ways to collect new information—each method has strengths and weaknesses and is generally good for getting a specific type of information.

**Key informant interviews** (KIIs) with stakeholders, such as local authorities, health workers, disaster management officials and community leaders, are useful for getting expert insight, and for reality-checking information from secondary data review.

KIIs can be used to get a better idea of whether EWS or evacuation plans are available and how they work, or of the degree to which the health system has taken action to build skills and resilience to flooding, for example.

KIIs are a good way to get this sort of information quickly and easily (as long as you can access the experts)

**Focus group discussions** with community members or groups, such as CHWs, are a good way to explore knowledge and opinions—what people think about a topic, what they know and don't know, and what they think should be done.

In a flooding VCA, focus groups can be used to understand how much clinicians, CHWs, nutrition workers and community members know about the impacts of flooding and what they think priority actions should be. They can also be used to get the perspectives of particular groups, such as women or people living with disabilities.

Focus group discussions can provide a lot of useful information in a short time when they are well organized and facilitated. They are generally more complicated to arrange than KIIs but less complicated than surveys.

**Representative surveys** aim to provide a statistically accurate (valid and reliable) statement of a situation across a large group of people. Surveys can tell you, for example, the rate of malnutrition or other health conditions in a population. They can also tell you what a population as a whole thinks about a certain topic.

In a flood VCA, surveys could be used to understand baseline health and nutritional status (although normally you will be using surveys that have already been conducted as

secondary data, rather than conducting new surveys). You may also use KAP surveys along with or as an alternative to focus groups to develop communications materials and strategies. Surveys may also be an important element of the evaluation of any plan.

Representative surveys require careful design by people with skills in this area and are one of the most costly techniques for collecting and analyzing information.

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## Annex – Resources to Support Community-Based Disaster Risk Management (CBDRM)

There are a large number of manuals and guidelines that describe **how to facilitate a community level preparedness plan**. Most are not flood specific (you can use the same method to create preparedness plans for multiple hazards, including floods, tropical storms, earthquakes, etc.) They generally follow a similar set of steps.

For example, Section 3, “Resilience Planning and Tools,” of the [Community-Based Disaster Preparedness Toolkit](#) lays out a process for community based planning.

Guidance and a package for **training community health workers/volunteers in community-based disaster preparedness**, along with a process that can be used with communities to facilitate the design of community plans, is available in WHO’s [Managing Disaster Risks in Communities: A Community-Based Approach to Disaster Risk Reduction: Training Manual for the Trainers of Cluster Representatives and Volunteers](#). The manual was designed for the Eastern Mediterranean region but can be used in any location.

Another WHO training package for **community health workers**, [A Training Tool Kit for Community Health Workers on Community-Based Disaster Risk Management](#), **focuses on facilitating a health-specific (rather than multi-sector) preparedness plan**.

Guidance also exists [here](#) on **including women in development of disaster preparedness planning**. This is a guide to including women in community-based preparedness planning; even if you don’t use the whole process, some of the tools will be useful.

Guidance on **including people with disabilities** in the development of disaster-preparedness planning (not flood specific) is available [here](#) in the toolkit from Humanity & Inclusion.

For **capacity building of disaster-management committees**, some information is available in the section on Community Disaster Risk Management Organization in this [CADRI document](#) (pages 3–6).

Chapter 2 of the [Resource Manual on Flash Flood Risk Management](#) is also helpful.

International Medical Corps has also produced tools for the capacity building of local NGOs, some of which are also relevant to community-level organizations.

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# Annex – Suggested Flood-Preparedness Plan Format

***This is a suggested format for a multi-agency flood-preparedness plan, which can be used as a common document by all participating organizations. The format includes information on the early warning system for flooding that will be used (if an early warning system is in use) and on the triggers that would be used to launch the plan’s activities. As such, it can be used as an anticipatory action protocol—a document agreed by donors and response organizations that forms the basis of anticipatory action planning and funding.***

***This format does NOT replace International Medical Corps’ own internal EPRP document, and International Medical Corps teams should complete the EPRP for their own planning purposes. Instructions on how to complete the EPRP are given in the green boxes in the sections above.***

1. Country and location (district/region) of flood-preparedness plan
2. Brief assessment of risks and vulnerabilities related to flooding
  - Include nature of flooding (riverine, coastal, etc.)
  - Likelihood of flooding, to the degree known
  - Area to be covered by the plan, number of people to be covered by plan and number of people in vulnerable groups
  - Particular health, WASH, nutrition, MHPSS risks associated with flooding (overview only)
3. Participating organizations
  - X [Lead organization]
  - A, B, C [Participating organizations, including those responsible for particular areas/sectors]
4. Arrangements for coordinating participating organizations
5. Adaptations to existing services to improve resilience to flooding (from “Ongoing Activity” sections)
  - Activity 1 (e.g., community risk education)
    - Brief description of activity and number/nature of people to be reached
    - Monitoring information to be collected for activity, if any
    - Organization responsible for activity
    - Budget required and funding source for activity
  - Activity 2, etc.
6. Early warning system and triggers for flooding
  - Early warning system that will be used
  - Arrangements for monitoring the EWS
  - Arrangements for sharing EWS information
    - With participating organizations
    - With public
7. Preparedness and response activities for flooding
  - Activity 1 (e.g., community risk education)
  - Brief description of activity and number/nature of people to be reached
  - Monitoring information to be collected for activity, if any
  - Organization responsible for activity
  - Budget required and funding source for activity
  - Activity 2, etc.
8. Arrangements for testing preparedness and response activities
9. Arrangements for evaluation of flood-preparedness plan