

Collaborating with national climate and weather agencies: a guide to getting started



NOAA's GOES-West satellite captured Tropical Storm Madeline as it moved past Hawaii and Hurricane Lester approaching the Hawaiian Islands in August 2016. (© NASA/NOAA)

Red Cross and Red Crescent National Societies can benefit from establishing direct collaboration with the national agencies responsible for providing meteorological and hydrological services – here is a description of how to proceed, and some do's and don'ts.

Introduction

Climate change is exacerbating risks and vulnerabilities – weather-related disasters are already becoming more extreme and frequent – which makes it ever more important that humanitarian organisations like the Red Cross Red Crescent make use of the early warnings that science can provide. It is urgent to increase investments in making the Movement programming activities ‘climate-smart’, i.e. ensuring that the regular activities within disaster management, risk reduction, health, WASH, livelihoods and broader resilience-building are planned with more variable and extreme weather events in mind. Collaboration with the science-based agencies like the national meteorological and hydrological departments can help access the best available early warning information – both short-term and medium-term warnings for impending disaster situations and extreme temperatures, but also longer-term projections to plan for likely climate change impacts over the coming decades.

Collaborations with other agencies enhance Red Cross and Red Crescent National Societies’ (National Societies) capacity to do climate-smart programming, strengthen levels of preparedness, support the most vulnerable people and communities, and inform awareness campaigning and dialogues. Specifically, partnering with National Meteorological and Hydrological Services (NMHS)¹ is necessary for climate-smart programming: whether we want to help people reach safety before extreme weather hits, or understand how to improve preparedness and resilience programming, good collaboration with climate service providers is important.

This guide only provides a background and initial support for developing fruitful collaborations between National Societies and their respective NHMSs. However, the Red Cross Red Crescent Climate Centre (the Climate Centre) team and International Federation of Red Cross Red Crescent National Societies (IFRC) ‘climate champions’ in different parts of the world are available to further support this process. Over the past decade some promising approaches to collaboration between NMHSs and National Societies have been piloted, from which we draw the recommendations and examples in this guide:²

- *Section 1* explains the humanitarian benefits of such collaboration.
- *Section 2* helps to understand the roles and responsibilities of National Meteorological and Hydrological Services, and how our Red Cross Red Crescent mandate relates to theirs.
- *Section 3* illuminates some complexities that can be anticipated in dialogue between National Societies and NMHS. It is not easy to establish common ground for collaboration. Communicating across

1 When referred to collectively, National Meteorological and Hydrological Services will be noted as ‘NMHS’. However, when considering only the ‘weather and climate information’ (meteorological services) the term ‘Met’ or ‘Met Service’ will be used. Similarly, when referring to the hydrological information (i.e. agencies projecting flood and drought risks etc.) the term ‘Hydro’ or ‘Hydro Service’ may be used. In some countries one single agency is responsible for both types of warning/information, but in others they are managed by separate entities.

2 Building on [earlier work](#) outlining initial steps to begin the dialogue with key stakeholders, and based on requests from national societies, we offered key questions for NSs to ask NMHS, which led to new discussions and partnerships being established.

sectors is often hampered by different mandates, visions, and jargon. This section will also help you to understand some do's and don'ts in dialogues between National Societies and NMHS.

- *Section 4* explores how to open initial dialogue with NHMS and, ideally, move towards a sustainable partnership

We include examples of successful collaborations which we hope will be inspiring and motivating for National Societies keen to strengthen climate-smart awareness, dialogue and programming.

1. What benefits can National Societies expect from collaboration with National Meteorological and Hydrological Services?

Weather agencies, nationally and globally, continue to develop new 'climate services' – i.e. to improve the production, translation, dissemination and use of climate and weather information. This spurs heightened interest in identifying potential users for their climate and weather information 'products' – and in developing decision-making processes with potential users. However, climate and weather information is complicated so identifying the most appropriate information needed can be confusing, for the NHMSs as well as the users.

Once relevant climate and weather information is identified, making practical use of it for 'early action' requires National Society expertise and resources. Thankfully, NMHSs can probably support the process and are even likely to have an official government mandate to do so. There are several key areas where National Societies' interests may overlap with those of the NMHS, such as:

- *Early warning* → *early action (EWEA)* is the overarching principle which brings National Societies and NHMSs together. IFRC characterises this as: '*Routinely taking humanitarian action before a disaster or health emergency happens, making full use of scientific information*'. Action planning requires using forecast information for insight into what may happen in the future. However, forecast information is not perfect. It is challenging to predict exactly where and when a disaster situation such as floods, tropical cyclones or heat waves may occur, and at what magnitude. Fortunately, the NMHS can support National Societies in understanding available forecasts and their limitations – in thinking through EWEA steps.
- *Impact-based forecasting (IBF)* is about action-based forecast messages. Short- and medium-term forecasts together with vulnerability and exposure spell out expected impacts and these are then further translated into what actions the target audiences need to take to avoid the impacts. IBF provides a basis for early action by helping to develop a trigger model; this can also support the roll out of Forecast based Financing (FbF), as explained in the next paragraph.

The World Meteorological Organisation (WMO) is urging NMHS to focus more on developing impact-based forecasts (IBF),³ and recognises that NMHS cannot develop these kinds of forecasts by themselves. Thus, an opportunity for National Societies to potentially help NMHS develop impact-based forecast messages. Instead of providing information on what the natural hazard (such as heavy rainfall) may be, information on the likely effects of the heavy rainfall (e.g. flash floods) enables us to plan for appropriate early actions. In order to define areas and populations that would be most impacted by forecasted climate hazards, NHMS partnerships are required with disaster managers – including National Societies – to bring in information on vulnerability, exposure and capacity. Understanding the places where impact may occur, and at what magnitude, enables a National Society to inform risk reduction measures, preparedness and response action planning. The fact that a National Society works closely with local authorities means that local government departments can be mobilised to incorporate impact-based forecast messages in their information dissemination mechanisms.

Cyclone Idai,
Mozambique, Red Cross
preparedness,
14 March 2019
(Denis Onyodi: IFRC/
DRK/Climate Centre)



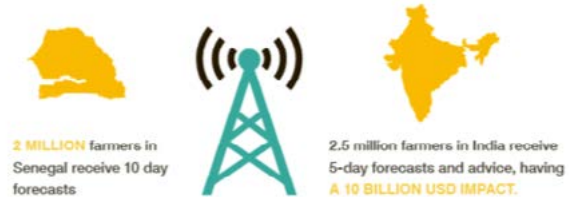
3 According to [WMO Guidelines on Multi-hazard Impact-based Forecast and Warning Services](#), WMO, 2015

Box 1. How Impact-based forecasting is being applied for farmers in India

The Indian Meteorological Department (IMD) has teamed up with the Indian Council of Agricultural Research (ICAR) to provide [Agro-meteorological Advisory Service \(AAS\)](#) to all farmers in local language through online and offline communication channels. Over half (55%) of India's farms are rainfed. Majority of the farmers do subsistence farming on small and marginal farms. Short, medium and seasonal forecasts are provided to help farmers decide when to sow, irrigate, use fertilisers or pesticides and harvest, as all these activities depend on rainfall, temperature, humidity and wind parameters. The AAS information comes with need-based local solutions for farmers and this is where the role of ICAR local universities and research organisations is necessary. AAS is available via SMS, online portal, radio, television, local newspapers, local agriculture extension workers and other sources. AAS results include protecting farmers from weather variabilities, increased resilience and productivity. This approach is replicated in Senegal.

WEATHER-BASED AGRICULTURAL ADVICE BOOSTING AGRICULTURAL PRODUCTION IN INDIA

Seasonal rainfall forecasts are helping farmers in India make decisions in a changing climate.



The Indian Red Cross Society has leveraged this climate service as part its livelihoods programme in rainfed, drought-prone areas of Maharashtra and Odisha. In the hilly, tribal areas of Odisha, for instance, Red Cross volunteers take the agro-advisory messages to farmers because there are no electronic means of communication there. Use of agro-advisories in this programme have helped the small farmers build resilience, raise farm productivity and improve their incomes. Results have also been seen in better health and nutritional levels - in a country that is home to the world's largest number of malnourished people. The agro-advisory service is also being used extensively as part of the Integrated Risk Management approach in the ongoing Partners for Resilience programme wherein farmers are being enabled to access this climate service.

- [Forecast-based Financing](#) builds on the principle of EWEA to include a reliable means of funding preparedness actions before a potential disaster, based on early action protocols (EAP) which have been defined in advance. A key element of the EAP is the development of a 'trigger' whereby a climate or weather forecast threshold is identified and used to indicate where and when to take action. The trigger development process needs to be supported by an NMHS, and they may even have done so for other sectors (for example, maybe the Hydro Service is working with the energy sector to anticipate river flows into a hydropower dam). It will likely take time to talk with NMHS to explain how triggers are defined from a humanitarian action planning perspective.⁴
- [The Regional Climate Outlook Forums \(RCOF\)](#) and National Climate Outlook Forums (NCOFs) offer another opportunity to collaborate with

4 Further detailed information, including a tailored [FbF Manual](#), is available for national societies which can be used to inform dialogue with NMHS in setting up a forecast-based financing system.

and take advantage of a relationship with NMHS. These seasonal conferences at regional, national and sub-national level take place at regular intervals, once, twice or three times a year. RCOFs and NCOFs enable providers of climate information and potential users of that information to convene and discuss the predictions for the upcoming months and seasons. Increasingly, RCOFs consist of a workshop with a training component to explore how to link available climate information to sector-specific use. In Ethiopia an [animation](#) has been developed to explain why it is useful for different sectoral stakeholders (including the National Society/ the humanitarian sector) to invest in this regular dialogue.

Box 2. Pacific National Societies engaging in their Regional Climate Outlook Forums (RCOF)

In the Pacific Region, the IFRC and Climate Centre, have become involved in shaping the content of the Pacific islands RCOF, promoting the potential for humanitarian use of the prediction information. Fruitful collaboration is helping to enhance action between the disaster management sector and NMHS at national level. In the Solomon Islands, Fiji, Vanuatu, Papua New Guinea, Tuvalu and Samoa, the Climate Centre and National Societies have worked together with their NMHS and regional technical partners to develop an ‘Early Action Rainfall Watch’ (EAR Watch) tailored to the climate information needs of the humanitarian sector. The EAR Watch presents seasonal rainfall predictions and drought advisory information in the form of simple colour coded alerts that sectors can use to develop protocols for early action to prepare for prolonged dry or wet conditions. Climate games training provided by the Climate Centre during [RCOFs](#) has assisted this process with NS and NMHSs themselves incorporating games into national stakeholder workshops as a means of communicating the value and limitations of using seasonal predictions for early warning early action.

	Alert Level	3-months January 2019 to March 2019	3-months April to June 2019
Stations with above normal favoured	Dark Blue	Nanumea	Nanumea, Funafuti
	Medium Blue	Nui, Funafuti	Nui, Niulakita
No Alert*	Light Blue	Niulakita	
Station with below normal favoured	Orange		
	Red		

2. What are the roles of National Meteorological and Hydrological Services?

Collectively referred to as National Meteorological and Hydrological Services (NMHS), national government meteorological (or ‘Met’) services and national level hydrological (or ‘Hydro’) services often have the best information on climate and weather for humanitarian use. Increasingly, some countries are establishing National Climate Services (NCS)⁵. An

5 For example, getting started in [Haiti](#)

Cyclone Idai, Mozambique,
Red Cross preparedness,
14 March 2019
(Denis Onyodi: IFRC/DRK/
Climate Centre)



NCS can be part of an NMHS or within the same Ministry that houses the NMHS, however an NCS could also be a more autonomous entity.

The roles and responsibilities of the NMHS can vary across different countries; there may yet be significant differences in how they work or what they can deliver. It is best not to assume the Met Service and Hydro Service are located within the same agency, ministry, or even located in the same city.⁶ Further differences can reflect different funding, internal capacity, and ability to support new initiatives.

It is important to be sensitive to the mandates of the NMHS. In many cases, NMHS are the sole and official disseminators of warnings. This mandate is likely to cover daily to seasonal forecasts (i.e. shifts in total rainfall from what is expected on average) to extreme weather events (e.g. the chance of tropical cyclone impact in a few days' time). In some cases, the mandate for issuing warnings falls within the national disaster management authority. If the government agencies have such a 'monopoly' on early warnings they cannot delegate early warning dissemination responsibility to, for instance, a National Society (however, the National Society might possibly still have a role in awareness raising of the public so people know of proper early actions to take when warnings are issued). It is worth noting though, that in some countries the National Society has [formal collaboration with government and NHMS](#), and mandated to deliver early warnings to at risk population, such as in the Bangladesh [Cyclone Preparedness Program](#).

⁶ Nevertheless, the Met and Hydro Services are often in the same agency, providing information on weather/climate as well as associated water-related risks; see example websites from [Philippines](#), [Ecuador](#), [Sweden](#), [Australia](#) and [Nepal](#).

It is important to understand differences in roles and responsibilities of Met and Hydro Services; for example, Met Services are generally responsible for weather and climate forecasts (such as rainfall and tropical cyclones) whereas Hydro Services are generally responsible for what happens once rainfall hits the ground (such as river flooding).

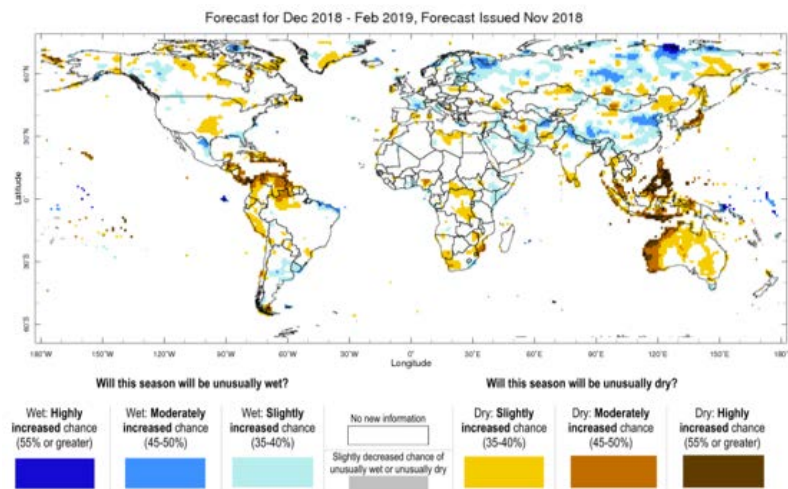
While most NMHS have a mandate to deliver early warning messages in advance of at least some types of extreme events, it may remain an “unfunded mandate”. In many instances the NMHS may focus on information provision for specific users, such as the aviation or shipping sectors, and it is not always easy for NMHS to divert resources from providing information to productive sectors in order to tailor products for humanitarian use. That said, a number of international initiatives are underway to help promote this type of service-oriented work. The World Bank has launched a portfolio of [HydroMet projects](#) to enhance interaction between Met and Hydro Services – and to collaborate in developing early warning systems – even if they might be operating under different ministries and mandates.

Box 3. International Met and Hydro Services

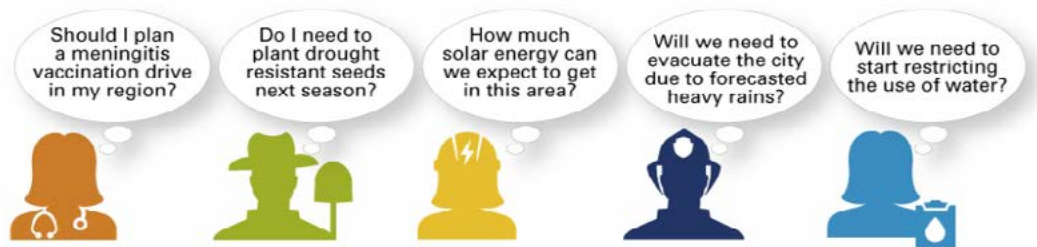
NHMS also engage in regional and wider collaboration to improve their capacities and provide better services and outreach. Examples are the [Pacific Meteorological Desk & Partnership](#), [IGAD Climate Prediction and Applications Centre \(ICPAC\)](#) for the Greater Horn of Africa, and the [Caribbean Institute for Meteorology & Hydrology](#).

Public and/or private agencies also offer regional or global services of use to humanitarian organisations. Notably, the International Research Institute for Climate and Society ([IRI](#)) has a partnership with IFRC and sends tailor-made bulletins to key contacts in the Red Cross Red Crescent Movement, develops IFRC-specific forecast products, and provides a helpdesk function to address questions on interpreting forecast information. The [IRI/IFRC MapRoom](#) is a portal to explore where unusual weather patterns are expected, for checking seasonal forecasts at a global scale, and to access information on the past 100 years rainfall and temperature trends for an area of your choice.

In addition, efforts coordinated by the World Meteorological Organisation (WMO) promote products under the ‘[Global Framework for Climate Services \(GFCS\)](#)’ to help in climate risk management. The NHMS in your country may already be part of GFCS, either directly or through a regional program, such as the [Regional Flood Information System](#) in the Himalaya region, and developing regional capacities for [Climate Services in Small Island States](#).



Met Services are also gearing up to disseminate information about 'new' climate-induced extreme events like heatwaves, coldwaves and flash floods⁷ for which the exposed vulnerable target audiences may not be identified, or the window for alert may be too short. These are learning curves for the NHMS, and an emerging area for collaboration with National Societies in using their volunteer network for innovative [community outreach](#); several good examples and case studies exist, especially from [India](#).



3. Complexities of working together

Many new relationships between NHMS and National Societies are being built and strengthened; however, in many cases the dialogue between information producers and users has been ad-hoc in nature. This has hampered 'gaining traction' to strengthen formal and long-term engagement.

While funding is often a common constraint, even adequately funded NMHS suffer from challenges in engaging with potential users of the information they produce. It is important to be aware of some of the potential challenges for engagement. Part of the picture may be that, until recently, scientists working at the NMHS had specific mandated users; the aviation sector is the most common client and in many countries the aviation meteorology (science, capacity, equipment) is most well developed compared to services for other sectors. So, some Met Services may have not been fully aware of the need from, or have the means to produce and communicate useful information to, the humanitarian sector and people at risk. It is important to keep this potential mandate gap, and associated funding gap, in mind when considering collaboration with NMHS.

When engaging with NHMSs, National Societies should be modest in demand and expectations and consider the collaboration may have three potential 'levels':

1. Aim to better *understand and interpret* the available forecast products they already disseminate, and understand the science language, the limitations and uncertainties of weather forecasts and climate projections.
2. Get and use NHMS products, including specialised ones; not all NHMS products may be disseminated in media or on their website. They may

⁷ Flash floods are often deadly, and also very difficult to forecast; however efforts are underway to assist NHMS around the world with [support from WMO](#) and other technical and financing partners

be able to share more advanced products earlier to trusted partners to take early action. This also applies to climate trends: for a community-based DRR project a National Society may need to understand the trends over past decades in local rainfall/flooding/drought patterns in order to help facilitate a 'climate-smart' community DRR plan; the NHMS may be able to provide a trends analysis for a certain weather station or part of the country.

3. Once the collaboration with NHMS is (hopefully) getting smooth, NHMS may also become interested in the experience National Societies have on early warning needs and dissemination. So opportunities may arise to help co-create better warning messages and improve the NHMS products.

However, do not enter into collaboration with the ambition of 'influencing their work' – you may never get to level 3. Do engage to 'make better use of their existing products', which is a win-win situation for both partners.



3.1 Challenges for communication between NMHS and NS

All of this underlines the necessity for a National Society to be clear about the objective of meeting and/or collaborating with NMHS before they are approached. Else it will be difficult to prepare what to ask from the NMHS and show how it will be useful to the National Society work and for alerting at-risk communities. A pre-defined objective could be, for instance, enhancing the understanding of staff/volunteers on weather and climate forecasting, setting up EWEA systems for local communities in a certain risk zone, helping facilitate a climate-smart DRR plan in a village or a city, etc. Clarifying the objective will guide the initial discussions with NHMS counterparts.

Box 4. Working together to simplify ENSO communication for end-users in the Pacific

In 2013, two short, humorous animations about ENSO were developed in the Pacific by Red Cross organisations in partnership with regional technical institutions and NMHS. One animation is Pacific wide – the “Climate Crab” - and one is specific to Vanuatu – the “Klaod Nasara”. Each has accompanying [toolkits](#), which provide an overview of ENSO, impacts and possible adaptation measures. These animations pictured explain the impact of La Niña and El Niño in a comprehensible and fun way and have been translated into at least two Pacific local languages.



Technical Language

The majority of NMHS staff are trained physical scientists and experts in their fields, but many might not be trained in *communicating* science information and tailoring the communication methods to specific types of users. While the fields of applied climate science and climate services are growing, leading to improvements in science communication globally, it is still likely difficult for most National Societies to have discussions on an equal footing with NMHS staff used to using highly technical and sophisticated terminology with their scientist peers. Likewise, the language we use in the humanitarian/development sector is also full of jargon and abbreviations (such as DRR) which may very likely be confusing to NMHS staff.

Warnings are available in general, but are they available for the type of event you are interested in? Some NMHS can support functional, appropriate Early Warning Systems (EWS), but it should not be assumed that just because an NMHS operates an EWS for a certain type of extreme weather and climate event that it has an operational EWS for all types of extreme events. EWS operated by NMHS tend to be focused on the monitoring and warning part of the system, and do not necessarily engage in how to ensure the information is disseminated and understood by people at risk (a ‘last mile’ or ‘end-to-end EWS’). However, increasingly NHMS are stepping up to this challenge; see efforts of the [Severe Weather Forecasting Demonstration Project](#).

The NHMS observations and forecasts are not the only sources of information for taking early action; local and traditional knowledge often provide other types of information on emerging weather events, in particular in relation to wind, droughts and floods, and are often the type of information that people trust and act upon. While traditional knowledge is being challenged with climate change causing more unpredictable ‘funny weather’ there is a lot to be gained in combining local observations with the scientific forecasts. National Societies can help broker the ‘two types of knowledge’. In some cases, communities may even organise their own community early warning systems, for example upstream-downstream river flood monitoring in [Togo](#), and supplementing HNMS-led warnings and government-led preparedness efforts as demonstrated in [Ethiopia](#). A community-based, upstream-to-downstream early warning early action system has also formed the basis for [Forecast-based Financing projects in Togo and Uganda](#). Community experiences may even help [shape the climate services](#) as fully recognized by the World Meteorological Organization, WMO.

Warnings are available, but are they usable in the humanitarian sector? A warning which is accessible and perhaps useful for some users may not be actionable for disaster managers. For example, a tornado warning issued at 3 hours lead time (length of time between a forecast issuance and the timing of potential impact) may be very useful for the aviation industry to make decisions on whether airport operations should cease. However, it may be too short notice for the humanitarian sector to take appropriate early action, although the potentially affected communities could still take precautionary actions – if warnings reach them and they are prepared on how to react.



FbF cash distributions,
Bogra district,
Bangladesh,
July 2017 monsoon

Available information, but is the format useful? The format for one EWS may be different from another and may be more or less useful depending on the potential user and associated early actions. In some cases, the standard information issued may be hard for a National Society to interpret or act on – at least without proper training with NHMS. There are efforts underway to address these complexities and the types of formats that are most useful for the humanitarian sector.

Long-term climate projections may also be hard for a National Society to translate into meaningful early actions and climate-smart community projects; however, this is an area where NHMS may be able to explain in more layman’s terms the climate projection uncertainties and likely variability and extreme events, so your National Society can make realistic ‘worst case scenarios’ for contingency planning etc.

Difficulties communicating needs to NMHS

NMHS engagement with users of their data is usually framed as a ‘two-way street’. This means that it is equally important for both sides to build a functional relationship, which should include mutual understanding of the other’s perspective, motivations, constraints and activities. Sometimes, NMHS may not understand a question that is phrased by a National Society. For example, asking ‘how do you provide rainfall forecasts?’ is difficult to answer and will likely require further discussions to explore which formats are available, and for NMHS to explain some of the pros and cons of each. It is also useful to describe the types of disaster management decisions that are sensitive to interpreting weather and climate information, and work with the NMHS to find out how well their available information and formats match the National Society decision-making needs.



4. Moving towards a partnership between a National Society and the NMHS

How to initiate the dialogue

Establishing a relationship with your NHMS well before a high-risk period (such as the rainy season) is important. Building the foundation for a flow of relevant information takes time, so don't start it in busy times of emergencies. One way to get the conversation going is to invite key decision makers from the NHMS to your office and show them some of the activities your team is involved in, and how climate and weather information is critical. In this meeting it would be wise to think broadly about what it means to be climate and weather sensitive and to identify if there are past collaborations between NMHS and the National Society. If there were, it is important to understand any potential sensitivities around moving forward with building a new relationship. This would include probing why a previous relationship ceased to exist and highlighting opportunities going forward based on ongoing and upcoming work within both the NS and the NMHS. Working together can be positioned as a way to implement national commitments under major policy frameworks – which the government may have mandated the NHMS to contribute to. A desk study may be needed to understand how developing EWEA capacity together can help implement the Paris Agreement, the Sendai Framework on DRR, and many of the SDGs (Sustainable Development Goals). For example, developing EWEA systems to support DRR are highlighted in many countries' National Adaptation Plan processes, and are also included in many NDCs (Nationally Determined Contributions under the Paris Agreement). As a specific example, close collaboration on heatwave EWEA (like the [India](#) case mentioned above) can bring down mortality and contribute to the Sendai Framework targets of the country as well as contribute to the adaptation goals under the Paris Agreement. Together, this will contribute towards the SDGs.

Forecast-based financing,
cash distribution in
Noakhali district for
Cyclone Mora,
29 May 2017
(Photo/ Canton Pious
Rozario/DRK)

4.1 What questions to ask yourself before approaching NMHS

<i>What is your added value, as a National Society, to the overarching discussion on building resilience to climate change, climate variability and extreme events?⁸</i>	Consider the National Society role and mandate, as auxiliary to government, and also in relation to other civil society and international organisations and government agencies; and what is your comparative advantage in specific areas of expertise and practical experience?
<i>How are the existing and available NMHS products useful to us?</i>	What sources are available, and which do the National Society already use/act upon? ⁹ Have you reviewed them sufficiently? To prepare for this discussion, you may need to browse their website and other products to review the span of services publicly available.
<i>What are our expectations from engagement with the NMHS?</i>	Is the National Society interested in working with the NMHS on a long-term strategy to communicate risk of floods? Or perhaps heat waves are becoming more common and a NMHS focal point could be a useful connection to support understanding where heat waves are more likely. Would you be able to get trainings to better understand the forecast/warning science? Could you get access to warnings information earlier (longer lead times) than is currently the case?
<i>What is the “win-win”: what can we provide to the NMHS? Are we sure that what we can offer is useful for their needs?</i>	<p>Can the National Society help disseminate the official NHMS forecasts/warnings to reach ‘the last mile’, and prepare people to take appropriate action? Will this help NHMS (government) meet some of their commitments to international agreements (Sendai etc.). Can a chart of preparedness actions with lead times necessary to act on them be developed for the principal natural hazards facing vulnerable people in your country?</p> <p>A National Society may even help disseminate the formal NHMS information for a wider disaster management audience and the public; see for example the American Red Cross Weather & Hazard Center.</p>
<i>What is the potential timeline of engagement?</i>	Project based? Seasonal? This is important to think about as there will likely be different people at the NMHS you will need to engage with depending on the timeline.
<i>Do mechanisms exist within the NS to sustain engagement?</i>	This question is related to the time and resources it takes to manage the relationship with the NMHS. Does the National Society have a long-term staff who can serve as ‘dedicated focal point’ to lead the engagement? Is this noted in their job duties?
<i>Is there an existing framework for NMHS engagement?</i>	Is there protocol for engagement with other government agencies that should be followed?
<i>Do the government departments that we work with already have an NMHS partnership?</i>	If yes, it may be worthwhile to ask them who to connect with at the NMHS or ask them to facilitate a first meeting.

8 see examples listed in section 1

9 can include website-based, email-based, radio-based or other

<i>What are others in the region doing in regard to NMHS engagement that we can learn from?</i>	Who can you reach out to in your region who may already work with their NMHS to discuss and learn from their experiences?
<i>Does the NMHS have a long-term strategy for this kind of engagement?</i>	There are international efforts under WMO to promote better climate services to end-users, including a User Interface Platform to link 'providers' and 'users' to develop more useful climate information. You may check if the NHMS in your country is already engaged in the ' Global Framework for Climate Services '

4.2 What questions you should not ask your NMHS

It is important to understand what questions should be avoided during initial meetings with NMHS. It is also possible that there will be an opportunity to discuss some of these if the time is right. Some questions are not helpful for enhancing Red Cross and Red Crescent work. Some can be framed differently, which we will explain in the next section.

<i>Can we have the data?</i>	Don't ask for raw data, such as the daily rainfall measurements taken at a particular weather station. ¹⁰ It is difficult for them to provide data; in some cases, it may be politically sensitive. Generally speaking, all the information you ask for should come in the form of interpreted products such as a flood risk map, a rainfall forecast tool, or a chart with trends in rainfall/flood levels in a certain areas.
<i>Why do you give wrong forecasts?</i>	There is significant uncertainty in the processes that make forecasts and therefore sometimes forecasts will be wrong. ¹¹ It may be productive to talk about a positive experience with a NMHS forecast that was correct and the National Society used for taking early action. If there is interest in why a disaster occurred and no timely forecast was issued, it is a good idea to frame it in a way so the NMHS understands how a timely communicated forecast could have helped in disaster preparedness and maybe saved lives and assets.
<i>What is the skill of the forecast?</i>	This could be a good question to ask but only if the person asking it has a grasp on what forecast skill means. ¹²
<i>Can you help provide climate projections for town X?</i>	Do not ask for 'downscaling' climate projection modelling to local levels – the uncertainty increases so much it becomes meaningless, and the NHMS scientists should refuse the exercise (see below for a better question).

10 Unless you really need specific data for a very specific purpose and have the mathematical and statistical skills and software to do proper analysis, which is often cumbersome. Forecast-based Financing is one such purpose when asking for their data would be acceptable, but only after the process of FbF is explained (and you're certain you have the capacity to handle it).

11 Meteorology, hydrology and climate science are complicated areas of physical science that involve chaos theory and complex atmospheric modelling.

12 This is important because of the complexities in evaluating what a 'good' forecast means. For example, a 60% skill could actually be good in some contexts (such as seasonal climate forecasts), but not others (such as some metrics of riverine flood prediction).

4.3. What questions you could ask NMHS

<i>Do you forecast extreme events – for which events?</i>	It is useful to specify the timeline of actions for the National Society to help NHMS understand what type of forecast may interest you.
<i>What timescales do you provide forecasts on (monthly, weekly, daily, hourly etc)?</i>	Also inquire as to the seasonality of such forecasts; some forecasts on some timescales may only be available in certain seasons. Be opportunistic; you may also ask if the NMHS has the capacity to offer forecasts on other timescales, and what might be needed to do so.
<i>What geographical scale do you provide forecasts on – national, province level etc.?</i>	It is worth checking the spatial resolution ('how localized') the weather forecasts are made, and then how well these forecasts match what has been observed. You may also ask for climate summaries for localized areas – these are often available and are useful to understanding things like 'below normal' rainfall as presented in seasonal forecasts. In addition, long term trends in temperature, rainfall and flood levels may be available for regions or specific watersheds, and be helpful disaster preparedness planning for the National Society and its branches as well as and for at-risk communities.
<i>Do you have strategic development plans you could share?</i>	First try to find out whether the NMHS has publicly available information (check website); it may be useful to explore for overlaps with National Society strategic priorities.
<i>Do you offer impact-based forecasts,¹³ and in relation to which risks?</i>	Are there plans to transition towards Impact-based forecasting? Follow up to this can be how the National Society can potentially fit into and/or support NHMS plans to develop IBF, noting that NMHS may need partnership with disaster managers in order to develop IBF (owing to the need for vulnerability and capacity information that National Societies may have but NMHS may not)
<i>Are you aware of the National Society's efforts in climate risk management?</i>	If NHMS has plans to move towards or enhance IBF, it may be of interest – and even helpful – for them to know about current or anticipated National Society capacity for early action.
<i>Is there a list of accessible climate services?¹⁴</i>	Of course, you check in advance what is already publicly available (probably through NHMS websites), but they will likely have more info.
<i>Do you provide any training to the public or specific user groups on how to understand and use forecast information?</i>	National Society staff and key volunteers (including youth) may be potential candidates for future trainings.
<i>Can you show me your forecasts leading up ... [a specific flood event, for example]?</i>	This may stimulate a dialogue on how disaster managers used information, how the NHMS information was disseminated to organisations and the public, etc.

13 As noted above, Impact-based Forecasting involves a shift from providing information about what the weather and climate may be to what impact the weather and climate may cause.

14 The term Climate Services pertains to maps, tools and other systems that are available to inform for decision making.

<i>Do you know how many of these events you were able to forecast, and how far in advance?</i>	This question, and the one below, are good discussion starters on uncertainty and disaster management decision making, but beware that in some contexts there is a risk the questions may be considered 'a criticism' – so phrase it carefully.
<i>Do you know how many times you issued a similar forecast and then it was a false alarm (no flood event)?</i>	See above. It can be helpful to explain that the National Society needs to understand this in order to help raise awareness that forecasts offer the best available information which can be used by disaster managers planning early action and can be trusted by the volunteers and communities that need to take action on the ground.
<i>Do you have specific forecasts for urban areas?</i>	Certain hazards can be exacerbated in urban areas, e.g. heat wave impacts and flash floods, and can affect a huge number of people; the specific opportunities for taking early action in crowded urban environments call for timely warnings.
<i>Can you help interpret the climate projections for this country; what it would mean for disaster patterns and, hence, for our National Society work on disaster management and community resilience?</i>	Have the NHMS scientists help explain how the large-scale climate projections (for the region or nation) may translate into likely changes in disaster patterns and extreme events the coming decades. Use their knowledge to help National Society contingency planning for new 'worst case scenarios' and to support climate-smart community resilience planning; be sure to also let them know when your National Society is making good use of NHMS information.
<i>What are your long terms goals?</i>	This can be a useful question to open up a discussion in which the long-term goals of the NS could be shared and compared. It may be the case that both the NMHS and NS are interested in supporting efforts to build community level resilience (to heat waves in urban areas, for example).

How to move towards a more formal, sustainable relationship

There is no practical guidance as to how long the initial phase of engagement with the NMHS needs to be; what is important is to cultivate an organic relationship-building process. This likely means that multiple in-person meetings are necessary in addition to a systematic, coordinated follow-up process. When the time is right (which will vary considerably based on the situation), you may consider establishing a more formal, sustainable relationship, maybe based on a Memorandum of Understanding (see Annex 1).

4.4 What questions to ask yourself, before proposing more formal agreements

<i>Does the National Society have the resources to contribute to this relationship to the degree that is needed to make an impact?</i>	Managing this two-way relationship will take effort from National Society staff and flexibility to change some ways of working.
<i>Do we have the capacity to manage a potential relationship?</i>	Are mechanisms in place to hire the human resources needed? For example, you may consider if the human resources for engaging with your NMHS may be included in the National Society programming (maybe with external donors), such as Disaster Risk Reduction (DRR) and resilience (to ensure the programming is 'climate-smart').
<i>What are the monitoring and evaluation mechanisms that need to be in place internally in order to assess the value of this relationship?</i>	For example, can a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis be conducted?
<i>Should you aim to establish an MoU with the NMHS?</i>	What are the pros and cons (if any) in establishing a MoU with the NMHS? In some cases, an MoU may be the only way forward towards a sustainable relationship; check if there is a precedent for doing so with government entities.

4.5 What questions you should Not ask the NMHS

<i>How much funding do you have to put towards our collaboration?</i>	You should strive for establishing a win-win collaboration (exchanging knowledge and services) that falls within the NHMS and National Society's overlapping strategic priorities. Hence, it would be part of – and funded through – the NHMS regular work.
<i>Can we have the data?</i>	This is still not a good question to ask. If you have the capacity to request, process and evaluate data it is advisable to request the data in a formal process and best if this process is linked to a co-developed project or initiative.

4.6 What questions you should ask the NMHS

<i>After learning about how the National Society works, do you see any opportunities to work together?</i>	Be opportunistic: look for the easy gains where you can start to build a relationship. Do not force the collaboration into areas the NHMS may appear reluctant to engage in. A long-term agreement on even a very limited set of priorities can probably be expanded as the relationship grows.
<i>How can we best provide information about our decision processes, actions and needs so that you can consider which existing or new climate and weather service products may be useful?</i>	You need to find a common exchange platform between the climate service producers (NHMS) and users (National Society and, by extension, vulnerable communities). A User Interface Platform may already be under development or in place?

Annex 1: Potential elements of a Memorandum of Understanding with NHMS

If the initial collaboration between NHMS and the National Society moves forward towards a more long-term relationship, you may need a formal written agreement in which you jointly specify the type of things you collectively commit to collaborate on to advance shared objectives, and relating to respective mandates. Here are some suggestions on items to consider and elaborate on as appropriate to your situation¹⁵:

1. The [xxx] Red Cross [Crescent] Society is committed to strengthening community resilience, disaster risk reduction and disaster management. [xxx] NMHS provides observation forecasts and warning services on weather-related disasters in different spatial and time scales including xxx (e.g. 3 hour forecast), short/medium range (up to 7 days), extended range (up to 2 weeks), seasonal forecast for temperature and monsoon (4 months for rain, 3 months for temperature). XXX NMHS will provide this forecast to XXX Red Cross on a regular basis through [xxx]
2. For collaboration and proper exchange of information there will be cooperation at the national, district/ provincial/ sub-national level.
3. For capacity building to strengthen community preparedness Red Cross will organize TOTs at the National, State and District levels and XXXNMHS will provide resource persons and knowledge support for understanding and interpretation of weather monitoring and forecast information.
4. XXX [NHMS] at present issues impact forecast for cyclones. A joint effort will be made by the Red Cross [Crescent] and XXX [NHMS] by taking on a pilot study in x districts to develop impact-based forecast with respect to [heat wave, cold wave, heavy/deficient rain leading to floods, etc.]
5. XXX Red Cross [Crescent] and XXX [NHMS] will work jointly to improve communication of weather forecasts and warnings to at-risk communities, building on the current digital/media tools, supplemented by Red Cross [Crescent] outreach through its staff and volunteers.
6. XXX [NHMS] will collaborate with XXX Red Cross [Crescent] to raise awareness on weather monitoring and forecasting, including extreme weather forecasting, as part of the community-based preparedness programme of the Red Cross [Crescent] starting with xx Districts.

¹⁵ please note that some of the draft points may possibly be considered 'changing the way NHMS works' and beyond what NHMS can commit to, depending on mandate and funding etc.

7. XXX Red Cross [Crescent] and XXX [NHMS] will work together to make weather and forecast data and products more user-friendly, easy to understand and actionable.
8. XXX [NHMS] shall provide historical weather data, if possible, for areas of interest of the XXX Red Cross [Crescent] as per the existing procedures for data sharing/supply.
9. XXX [NHMS] carries out a technical [post-cyclone, flood etc.] survey to find out the characteristics and impacts. It will work with Red Cross [Crescent] to also get an impact assessment from the ground wherever possible for improving impact-based forecast and warning.
10. Both XXX [NHMS] and Red Cross [Crescent] will evaluate annually the benefits achieved from their collaborative work and share it in appropriate forums.
11. Both parties shall identify the region-wise/state-wise nodal officers for coordination at region/state level.
12. Information on past climate trends and future projections will be shared with XXX Red Cross [Crescent] and NHMS may assist Red Cross [Crescent] in interpreting the projections' likely implications for disaster preparedness at all levels as well as for community resilience programming.
13. XXX [NHMS] and XXX Red Cross [Crescent] will jointly work for multi-hazard early warning and weather and climate risk mapping to build community awareness and resilience.
14. XXX [NHMS] and XXX Red Cross [Crescent] shall jointly publish papers for the purpose of knowledge sharing, awareness and information.
15. XXX [NHMS] and XXX Red Cross [Crescent] will jointly identify, on a pilot basis, one riverine flood rural area and one flood-prone urban city to prepare a plan with local authorities for forecast-based preventive action based on agreed Standard Operating Procedures.
16. XXX [NHMS] and XXX Red Cross [Crescent] will work jointly to fine-tune existing early warning systems as per the requirement of communities, especially with respect to preparedness, DRR, health and agriculture-related livelihoods.
17. XXX [NHMS] will assist XXX Red Cross [Crescent] in the formulation of EAPs (Early Action Protocols) to support EWEA and FBF.