



USER GUIDE

HOW TO USE QUALITATIVE RESEARCH TO ASSESS TRIGGERS OF WEATHER-INDUCED DISASTERS & INFORM WEATHER RISK MANAGEMENT DESIGN

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Who is this guide designed for?

This guide is designed for those who would like to use qualitative methods (especially semi-structured interviews) when designing weather risk management tools.

The guide is designed either for

- a) Those who would like to conduct such qualitative research themselves, although we highly recommend working alongside professional social scientists; or
- b) As a checklist for those hiring a consultant or external partner to do such research.

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1. Introduction

Weather hazards are one of the leading direct causes of humanitarian disasters and are an indirect factor in many more, exasperating vulnerability caused by conflict, disease or other stressors. A focus on weather hazards alone is often insufficient for understanding the dynamics that contribute to a disaster situation, especially given that the same weather conditions will have a very different impact on those with different geographies, livelihoods or demographics.

Collecting actionable information about the complex interplay between the weather and disaster is difficult, leading to many weather risk product design processes focusing solely on meteorological analysis or on direct economic outcomes. While providing important information, such approaches can fail to consider the significance of hazard impacts, and their variance according to human livelihoods and other aspects of the socio-economic context. This can lead to missed opportunities, higher basis risk for insurance products and less of a good fit with the needs of the humanitarian sector.

Understanding the influence of livelihood on vulnerability, along with how seasonality and weather shocks sits alongside other stressors, require research methods that allow for a holistic understanding of the socio-environments in which communities exist and manage their livelihoods. It is also important to use methods that build on the existing rich context of the disaster risk management research community. We feel that qualitative and mixed methods research is important to address this gap, as it is especially prized for its capacity to illuminate the causal chain between weather hazards, impact, and disaster.

This document has a dual purpose:

1. To provide evidence on how qualitative research can enhance the development of weather risk management tools. These insights are important for the development of more nuanced products which are more suited to customer needs (for example, leading to lower basis risk and more effective risk transfer solutions in an insurance context).
2. To provide practical guidance on how to design an effective (and cost-effective) qualitative research campaign and integrate results into weather risk management solutions, with a focus on semi-structured interviews and literature analysis. Throughout this document, we illustrate the guide with examples from our AXA-XL funded project, “Measuring Hazard to Forecast Disaster”, which focuses on livelihood specific weather vulnerability analysis in Somalia.



1.1. Measuring Hazard to Forecast Disaster, project description

For resilience planning and disaster response, humanitarian agencies and NGOs often need very specific weather information at specific spatial scales that is closely tied to livelihood, disasters, and impact.

The aim of our project is to design tailored weather risk products for humanitarian agencies. We think of these agencies as the end-users of information in their own right, separate to their other important role of communicating weather data to the communities they serve.

Our work aims to assess whether a livelihood-centered approach can lead to more effective weather advisories for this sector, created without the need for extensive field-work campaigns. Specifically, we suggest that humanitarian programming or response might benefit from improved mapping of livelihood specific 'weather vulnerabilities', their corresponding historical baselines and the skill of free, remotely sensed products that are able to measure them.

Our initial pilot campaign is focused on Somalia, but we expect the methods to apply to other countries and humanitarian caseloads. The study is led by the Pennsylvania State University and is funded and supported by AXA-XL, with initial results expected in 2021. For more details, please contact project Principal Investigator and corresponding author, Dr Helen Greatrex.

2. Qualitative research and weather risk management

2.1. What is quantitative, qualitative and mixed methods research?

Understanding weather risk is complicated, especially if you are aiming to protect impacted communities. One must go beyond a physical understanding of the weather hazards to assessing the potential impact of the hazard on human livelihoods.

Quantitative Research: A large proportion of data used in the weather risk management design comes from quantitative research methods. For example, this might be a meteorological assessment of the area including quantitative measures of rainfall, temperature or other meteorological metrics or a fully structured economic questionnaire, where participants are asked a series of short "tick-box" style questions.

Qualitative research involves collecting and analyzing non-numerical data (for example from interviews, videos, focus groups or community observations), then systematically analyzing it to gather insights into a problem. **It is not simply a collection of anecdotes or stories;** instead, the information is gathered within an evidence-based framework to ensure that results are valid, reproducible, and representative of the population being studied. As described in Graneheim and Lundman¹:

"Qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them"



Mixed methods research combines both quantitative and qualitative methods in a single study to understand a research problem. Sometimes both parts are conducted in parallel, sometimes one part informs or complements the other.

2.2. Why use qualitative techniques to understand and manage weather risk?

a) The impacts of weather are context-specific and dependent on livelihood-related factors.

The effects of weather-influenced disasters depend critically on contextual factors specific to households, including exposure to weather hazards but also other factors related intrinsically to *livelihood*, understood generally as how people seek to maintain access to adequate food and other basic needs^{ii,iii}. For example, camel herders have very different sensitivities to the weather compared to maize farmers, even though both might be nominally affected by 'drought'. Similarly, two maize farmers living next door, but with different levels of social capital will also experience a different impact from the same weather hazard.

Disasters typically do not result from one individual shock, but rather they develop over time and seasons and through a combination of shocks and stressors. For instance, a drought followed by a locust invasion will have a disproportionately large impact on communities compared to the sum of each event happening separately. Additionally, a particular weather event can have differing significance, depending on the season^{iv}. Seasonality can also vary per location and geography, further highlighting the context-specificity of weather-influenced disasters.

b) Disasters develop through both weather and non-weather-related shocks.

Shocks might be driven or modified by the weather, but other shocks and stresses might be related to conflict, the regional economy, or other socio-economic developments^v. These varyingly influence livelihood outcomes and the context in which subsequent or coinciding stresses are experienced.

Qualitative output can complement weather risk management products already available to promote more effective anticipatory action and response to disasters. Many high-quality products currently exist, for example, FewsNet monitoring tools (including FewsNet Integrated Phase Classification maps for food insecurity), the IRI Map Rooms or other weather maps. Qualitative research can provide robust understanding on the complex interplay of risks, add nuance to the existing products, and help provide information at the targeted scale needed for humanitarian planning and disaster risk management.



2.3. How has qualitative research led to weather risk management outcomes?

Quantitative methods can provide representative information on exposure, sensitivity and adaptive capacity in the face of shocks, and can help establish causation between factors and outcomes of weather-influenced disasters. Qualitative methods can be particularly useful for illuminating underlying reasons for how weather and non-weather-related factors interact and influence outcomes. Consequently, they can help illustrate the causal chain between a weather shock and disaster situation.

Below, we include examples demonstrate the value of qualitative research in other projects. The examples show that qualitative research can be especially important for understanding how weather hazards play a role in socio-environmental dynamics, and how those dynamics vary per differing livelihood groups. Qualitative methods can also provide information on an individual's decision-making context, important for identifying the types of weather information products that can address user needs. Similarly, qualitative methods can be applied to assess the decision-making processes in which humanitarian organizations engage for planning of anticipatory actions, considering seasonality, potential future exposure and livelihood-specific contexts of the areas they serve.

- In the World Food Programme's R4 Rural Resilience Initiative, the use of focus groups and qualitative economic research games were shown to both lower basis risk and raise customer satisfaction during a basis risk event (where compensation did not match customer losses)^{vi,vii}. Farmers, who are the customer of the product, regularly take part in structured focus groups to talk about their definition of a 'bad year' and to describe historical events where they would have expected to receive compensation. Weather index insurance products are then calibrated to match those expectations, leading to more tailored products than ones based on an external perception of weather risk. The communication provided by the focus groups also allowed designers and customers to troubleshoot and redesign indices that caused a basis risk event (where compensation did not match customer losses), sustaining uptake the following year. A similar approach was taken in the Zambia for a research study^{viii}.
- During an agrometeorological advisory program in Mali, the Met Services reported initial results, associating increased yields of staple crops with the advisory program. However, an in-depth qualitative evaluation showed that the advisories were only useful to a small proportion of smallholder farmers. Men with limited asset ownership and most women did not use the advisories because the agro-advisories were not relevant to the crops they were responsible for. The evaluation was able to identify these findings through assessment of smallholder farmers' perceived stresses, weather-related and otherwise, and analysis of livelihoods decision-making, differentiating between key population sub-groups^{ix}.



- There have been several research studies showing a difference or change in opinion on weather risk management after qualitative research was taken into account. For example, there is a significant body of research on why different communities or groups respond differently to forecasts of extreme weather ^{x,xⁱ}.
- Equally, including quantitative information *in parallel* with qualitative methods has been shown to unearth new knowledge and an opinion. For example, Rao et al. ^{xⁱⁱ}, conducted mixed methods research to understand the differences between perceptions of drought (the land was getting meaningfully drier) with long-term rainfall records at the site (no change in rainfall). Putting these two research approaches together allowed a more nuanced understanding of the topic at hand – that the landscape was suffering from a combination of reduced fertilizer subsidy, declining soil fertility and less “effective” rainfall (e.g., rainfall was falling in more extreme events), which led to lower yields and increased vulnerability to rainfall shifts, even though broader rainfall patterns had not changed. It can be envisioned that this would lead to very different drought risk management products.
- New mixed methods research on flash floods in Kerala ^{xⁱⁱⁱ} used semi-structured interviews and satellite rainfall analysis in parallel to understand the causes and impact of urban flash floods. The interviews helped guide the development of rainfall statistics which were then able to independently hindcast “impactful” flash flood events.
- Mixed methods research on food security and flash flood resilience in Bangladesh helped to categorize rural households’ strategies for managing flash flood shocks according to their degree of short-term to long-term planning ; however, the research’s qualitative component was able to assess barriers to engaging in long-term, resilience-building strategies, for example: the poor’s limited access to common property fishery resources, necessary for disaster loss recovery ⁱⁱⁱ.



3. Designing a qualitative study on weather risk

The following provides an overview of how one might design a qualitative study as part of the weather risk management design process. We recommend that this guidance should be a supporting tool, and wish to highlight that ideally, weather risk management design should involve the expertise of a professional social scientist to create a study tailored to the problem at hand. We envision this guide might prove useful for those using this document to engage with external consultants or partners who are conducting the work. As a quick reference tool, we provide a 'quick checklist' for carrying out qualitative research in weather risk management at the end of this document.

Re-emphasizing that a qualitative study does not consist in simply collecting a series of anecdotes, in the remainder of the guide we detail the process for conducting research. It is important to note that this process is rarely linear; for example, input from questionnaire trials or local partners might allow for reflection and revision of study objectives along with updated questionnaires. We illustrate the guide with our experience designing a study for humanitarian weather risk management products in Somalia, which focused strongly on semi-structured interviews and literature review.

Overall, the follow steps should be taken in the research process:

1. Identify strong local collaborators and subject experts
2. Articulate the study objectives
3. Determine the target population and sampling strategy
4. Design a flexible interview instrument
5. Collect the qualitative data
6. Analyze results

3.1. Build connections with strong local collaborators

Given that the target audience for this document is those designing weather risk management tools, such as index insurance or early-warning-early-action programs, it is likely there are already strong local partners in place. Nevertheless, it is important to highlight that local collaborators are key for effective design of your research study. These partners can provide valuable advice about the nature of the study objectives, who to include in the study, and any relevant local context. They can also act as gatekeepers, providing access to interview subjects who would otherwise be hard to reach. Bringing local partners on board as soon as possible often leads to the strongest research outcomes. In the case of our study, a meaningful amount of time was spent working with collaborators at Concern Worldwide- and USAID-Somalia.

Equally it is often necessary and always beneficial to reach out to subject experts who work in the region or on the study topic. These might include other qualitative social scientists for example anthropologists or sociologists who can provide valuable advice on context, alongside more practical advice on: i) local ethics



board requirements (see Section 3.8), or ii) social science PhD students trained in qualitative methods who could act as interviewers/enumerators for the study.

Subject experts might also include physical scientists such as meteorologists or hydrologists, who can in parallel obtain and assess complementary physical datasets for weather risk management design. They can also help ensure that the study asks relevant questions within the study design process. This type of collaboration allows your study to make use of meteorological data throughout the process. For example, allowing questions to be tailored about certain hazards, or allowing interviewees to refer to relevant weather data.

Building these interdisciplinary networks often moves a study into the mixed methods realm allowing for a rich interplay between the different sources of information. It is also the approach that we took in our case. Out of the two Penn State Principal Investigators in this work, Dr Gumucio is trained as a cultural anthropologist with a focus on climate services, Dr Greatrex is trained as a meteorologist with a focus on historical weather impact and we also sought the help, support and opinions of local collaborators as described above.

3.2. Articulate study objectives

As with all research, it is important to have clearly defined study objectives which fit into the wider project design. These can be framed within a general vision for the work, but the objectives themselves should be answerable questions. For example, “to learn more about weather risk” is a general aim or vision, but not an objective. To develop robust and useful study objectives, we recommend seeking feedback from local partners and/or end-users of the weather risk management product. In our case, our local collaborator Concern Worldwide was also one of the target users of our research; in other cases, your specific target users might include meteorologists, farmers, customers or other weather data providers.

In our study, the general vision of our work was to inform the design of more tailored weather risk management products for the humanitarian sector in Somalia. We identified two specific objectives for our qualitative study, in response to the knowledge gaps and challenges mentioned above and through discussions with our humanitarian partners.

- [Objective 1](#): Analyze the context-specific triggers of weather-induced disasters in key areas of humanitarian action. This includes identifying and understanding key combinations of shocks and stressors, weather-related and otherwise, and the causal chain linking these to impacts.
- [Objective 2](#): Assess the actual and potential uses of weather-related information in early warning-early action, in the context of differing types of humanitarian decision-making processes.



3.3. Identify the study population and sampling strategy

The study [population](#) is the overall group of people who might become interviewed as part of the study. It is important to clearly delineate who the study participants should be, according to your research objectives and correspondingly, the data you seek to collect and analyze. Your [sample](#) is the subset of your population that you actually interview and should be representative of the study population. Clearly defining a study population in advance often leads to clearer outputs.

In the case of our study, aligned with our study aim and objectives, it was important that study participants be part of the humanitarian sector in Somalia, to assess their needs for weather information products. As an additional criterion for the study population, we determined that study participants should have knowledge in one or more of the following areas. These broad themes corresponded to key datasets we sought to collect through the qualitative research.

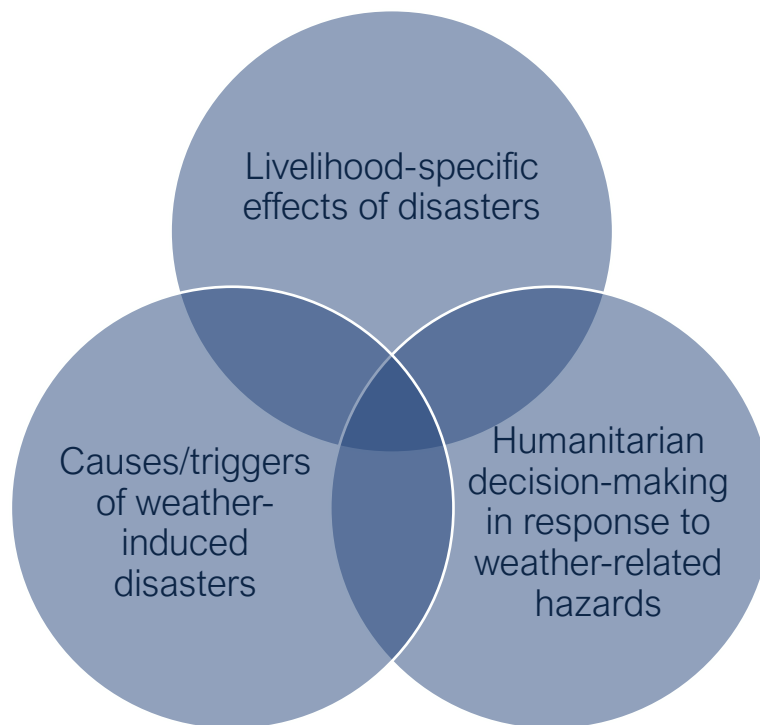


FIGURE 1 KEY KNOWLEDGE AREAS FOR SELECTION OF STUDY PARTICIPANTS



Consequently, to select our study sample, it was important that sampling be [purposeful](#) and [representative](#).

[Purposeful](#) sampling “involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest”^{xiv}. Purposeful sampling is particularly useful for the identification and selection of information-rich cases. We categorized potential study participants according to their expertise and sought to ensure that the knowledge areas of interest were represented in the sample of study participants chosen.

[Representative](#) means that the sample represents the full study population rather than being biased towards a subset. For example, if your population was stated as all farmers in Somalia but your sample only included men, it wouldn't be fully representative of your stated goals.

We recommend a combination of literature review and stakeholder group discussion to understand the institutional landscape in the country or region of interest and identify the study participants to be selected. Although stakeholder group discussion was not possible in our case, due to complications of COVID-19 restrictions during the research period, we conducted extensive remote discussions with our local expert partners. In this way, we developed an initial shortlist of 10-15 individuals to include in the study sample. As an additional sampling strategy, we used [snowball sampling](#), wherein each participant recommends other individuals who meet the sampling criteria, to promote that sampling continued until no new substantial information was learned from study participants. Other forms of sampling are also available and are described in relevant social science textbooks.

It is worth highlighting once more the importance of determining the study population according to the research questions and objectives. For Objective 1 of our study, household-level research with people affected by weather-influenced disasters would be relevant for understanding how weather hazards affect a specific group of people and the causal chain of loss experienced; however, achieving an extensive enough sample, representative of differing geographies, livelihoods, weather hazards, etc. requires significant time and resources.

Field research might also be unfeasible in sites of humanitarian action, due to security and other concerns. Additionally, if there is either planned or unplanned migration (either seasonal or due to a factor such as conflict), it might not be possible to capture household views without multiple instances of data collection. Given these challenges and recognizing our study's aim to identify the weather risk management needs of the humanitarian sector – and the unique spatiotemporal scale of the decisions that humanitarian sector actors make -- we defined the study population as humanitarian sector representatives, according to the criteria discussed above.



3.4. Design a flexible interview instrument

a) Choosing a research instrument

There are several ways that one can conduct qualitative research with stakeholders including:

- [Focus groups](#), where a small group from the target population are brought together to discuss the topic of interest.
- [Observations](#), where a researcher spends time with the target community to directly observe their behavior.
- [Unstructured interviews](#), a “controlled conversation”, where interviewees lead the direction of the interaction.
- [Semi-structured interviews](#), where the interviewer prepares a pre-conceived guide with the same pre-set, but open-ended questions being asked of all interviewees

In our case, it was important that the instrument elicit study participants’ detailed explanation of their understanding of triggers of weather-induced disasters, their livelihood-specific effects, and humanitarian actions in response to weather-related hazards. As described in Galetta “*the semi-structured interview is sufficiently structured to address the specific dimensions of your research question, while also leaving space for study participants to offer new meanings to the topic of study*”^{xv}. For this reason, a semi-structured interview design was selected to facilitate that each participant could speak at length according to his or her knowledge, while also ensuring that the participant’s responses addressed key themes of interest and that interviewer bias was minimized as much as possible.

3.5. Question design

Research instrument design is highly specific to the research objectives; in our case, it was also important that the interview instrument be adaptable to the knowledge of each interviewee. Here we discuss our questionnaire design as an example of the process (See Appendix A for the questionnaire used for the Somalia study); for your case, it will be necessary to revise the questionnaire to fit your project context and objectives.

Importantly, the instrument includes notes to help the interviewer guide the open part of the discussion (i.e., when to prompt the interviewee). It also includes advice on when to move the discussion forwards. Finally, semi-structured interviews are an intensive process; we recommend keeping interviews to 1-1.5 hours.

Table 1 presents the structure and content of our study interview instrument. Appendix A presents the interview questionnaire used for the purposes of the present study in Somalia. This includes text to be read aloud to study participants prior to beginning the interview, to ensure their informed consent to participating in the research (see Section 3.8).



TABLE 1 STRUCTURE AND CONTENT OF QUESTIONNAIRE

Questions	Content/theme
2-3 questions	Participant's professional background/role
3-4 questions	Key theme: Livelihood-specific effects of disasters
2-3 questions	Key theme: Triggers of weather-induced disasters
2-3 questions	Key theme: Humanitarian action in response to weather-related hazards
2 optional questions	Use of climate/weather information

To provide the interviewer with useful background information, we started our interview by asking an initial set of questions on the participant's professional role and responsibilities and the extent of their use of weather information in routine planning. The questionnaire also includes an optional set of questions which inquires, as appropriate, as to the participant's use of climate and weather information in more detail.

Our study protocol needed to be adaptable according to the expertise of the study participant being interviewed, while also enabling data collection on the three key themes noted in Figure 1: livelihood-specific effects of disasters, triggers of weather-induced disasters, and humanitarian decision-making in response to weather-related hazards. Consequently, our questionnaire included three clusters of questions relevant to each theme. Many interviewees will not have experience about all three themes, so at this point, we chose for the facilitator to ask the participant to select which two of the three key themes they wanted to focus on for the interview according to their knowledge of the issues, allowing the facilitator to choose the sets of interview questions to use accordingly.



a) Questions on livelihood specific impacts of disasters

- To understand *livelihood and other context-specific effects of disasters*, it was necessary to ask the interviewee to select a specific area of the country/region of interest, with which they were particularly familiar. Subsequently, the interviewer can ask the study participant for details concerning the geography, livelihood groups (for example camel herder, dentist, maize farmer), and weather/climate trends of the area.
- To understand further the interplay of context-specific factors in determining the consequences of weather hazards, the interviewee can be asked to describe the situational context of a “normal” non-disaster year in the area, and afterwards, ask the interviewee to compare with a disaster year. Here it is important to decide in advance if you wish for the interviewee to define what disaster means (even if that did not include a “weather” disaster) or to specifically talk about weather hazards. In our project, we chose for the interviewee to define disaster.
- It is important to ask the interviewee to cite specific years, to ensure that the study participant give precise information and does not speak in general terms.
- Furthermore, concerning any weather-related aspects mentioned, the interviewee should be prompted to be explicit (for example, instead of reporting “poor rains” as a characteristic of the disaster year, distinguishing whether the poor rains were due to a late onset, poor distribution, etc., as well as what defines a “late” onset or “poor” distribution for the area).
- Explaining the disaster year should also require discussing specific livelihood effects in the area; however, if it occurs that the study participant does not provide these details on their own, the interviewer should prompt the interviewee to discuss livelihood outcomes during the disaster year (i.e., effects on staple crops, livestock production, water access, etc.).
- Finally, it is important to inquire as to what sub-groups are most detrimentally affected in the area during the disaster year; additional livelihood-specific aspects of weather impacts can arise in responding to the question.

b) Questions on weather related triggers of disaster

- For the theme of *weather-related triggers*, the question on the disaster year example mentioned above elicits details on multiple shocks or stresses experienced by communities in the area during the disaster year.
- However, to ensure that the study participant does not limit their discussion to weather-related shocks, it is important to follow-up and ask the respondent as to additional causes or factors influencing the detrimental impacts experienced during the disaster year; for instance, it is useful to give examples of non-weather-related causes associated with insects, institutions, markets, health, conflict, or social inequities to prompt the interviewee.



c) Questions on humanitarian action

- For the theme of *humanitarian action in response to weather-related hazards*, the interviewee can be asked to explain how they or their organization intervened in the area during the disaster year mentioned (although the study participant may have included this information already in their description of the evolution of the disaster year).
- Here, it is particularly useful to inquire as to timing of the organization's actions as the disaster year unfolded. This provides helpful context to understand subsequent questions, on how the organization (or the interviewees themselves) decided to take the actions named, and if there are aspects of the socio-environment that the organization monitors.

3.6. Choosing facilitators

It is also important that the interviews be carried out by someone with extensive training in qualitative research methods and has ideally played a meaningful part in the design process. This often means that interviewers need have at least graduate level training in social science fields such as sociology or anthropology.

In small studies such as ours, studies might be fully conducted by the researcher who designed the questionnaire. In larger studies, larger number of enumerators might be needed to carry out the research. In this case, it is important to dedicate time to training the enumerators such that they have a clear understanding of the research objectives and purpose of the research instrument and ensure that each is approaching the survey instrument in the same way. As is feasible, it is valuable to contract enumerators who are from the area and native in the local languages, such that they can assist and support the accurate translation of the interview instrument, as necessary. In some cases, depending on their background and prior training, enumerators can be included in the analysis of qualitative data collected (section 7). There should also be clear expectations discussed from the onset about how enumerators interact with the study, for example whether they will become authors on any resulting papers. If an external partner or consultant is being hired to lead the work, then their relationship with their fellow social scientists and any enumerators should be clearly laid out in advance.

3.7. Initial pilot & revisions

Prior to carrying out the interviews with study participants, it is important to pilot the questionnaire on 2-3 individuals from the country/region of interest to verify that the questionnaire considers important cultural or other contextual considerations and revise it accordingly. It is also key that the interview does not go over-long, to avoid interview fatigue and abuse of the study participant's time. Finally, if multiple enumerators or interviewers are required, it is another opportunity to check that everyone is approaching



the interviews in the same way. After this step, it is common to revise questions or even the research design, then repilot and repeat until the instrument is both consistent and answers the research objectives.

If the instrument needs to be conducted in multiple languages, it is also important to work with local experts and translators, rather than simply pressing “google translate”. Many cultures have completely different ways of asking the same question, along with different ways of treating courtesy and privacy. Working with local experts to make sure that the instrument is actually asking for the needed information is key. This process can take additional piloting and revision, working alongside professional translators and local experts.

3.8. Ethics review board approval, local laws and related considerations

a) Ethics review boards and privacy laws

Any research involving humans should be submitted and approved by an independent Ethics Review Board (called an Institutional Review Board or IRB by many Universities and research organizations). An ethics review board is concerned with protecting the welfare, rights and privacy of all human subjects and ensuring that they do not come to inadvertent harm. Practically, approval from a formal ethics review board is required before any human subjects research can be published in peer-reviewed journals. If this document is being used to support working with an external consultant/partner, they should be able to provide relevant written Ethics Board approval before any work is started.

Ethics boards ensure that a study adheres to the principles of respect of persons, beneficence and justice. Potential participants should be given complete information on what their participation in the study would entail, and to have the opportunity to consent or not in participating. Utmost care should be taken to ensure that the study does not cause harm and to protect the privacy and confidentiality of research subjects (more information concerning how to securely store data from interviews is provided in section 6). In some countries/regions, there are specific privacy laws that must be followed such as the European Union’s General Data Protection Regulation (GDPR).

Research conducted by university academics is assessed by their institution’s IRB (Institutional Review Board) or equivalent committee. Other research organizations have their own ethics boards, equally there are external organizations who can work with companies for internal research. For research in foreign countries, there are often legal requirements to get ethics board approval in *both* the academic’s home country and the country where the research will be conducted (another reason to build strong relationships with local academics!). The review process can take several weeks or months and it is important that this be considered in project timelines. For the purposes of planning timelines, it should also be highlighted that IRB approval is required even prior to piloting the questionnaire with “practice” interviewees. If you are an organization hiring a consultancy or external partner to conduct the research, you may wish to confirm with them their approach to ethics and privacy considerations, as part of your due diligence, prior to hire.



Equally, prior to commencing work, it is important to check whether there are any internal policies held by your organization, and if you are externally funded, your donor, on topics such as fieldwork, ethics, data privacy, research independence or conflicts of interest. For example, it may be helpful to consult your own organization's Code of Conduct, Ethics Code or similar policies to ensure the work is fitting and appropriate. If in any doubt, stop and check before proceeding.

3.9. Conduct the interviews and collect records

Once the research instrument is ready and approved, the interviews can commence. It is imperative in qualitative research that accurate records are kept of the entire process to maintain academic integrity and to ensure that results can be double checked or verified. To preserve each interview and to speed analysis, all interviews should be audio-recorded with participants' consent. Furthermore, audio-recordings should be stored on a private device or drive that prevents free sharing or access. Measures such as these are important for the protection of study participants' confidentiality and privacy and are often required by ethics review boards.

3.10. Code and analyze results

To preserve the audio recordings and facilitate analysis of the interviews' content, it is common that each audio-recording should be transcribed.

The next stage is to "code" the transcriptions. Coding is the process of labelling and structuring qualitative data to identify patterns in the data and associations among the relevant research themes. There are two main approaches:

- Deductive coding, where in advance of the analysis, you use prior understanding and knowledge of the research problem to develop a list of pre-defined themes, ideas or keywords to use for the assignment of codes.
- Inductive, or data-driven coding, where you approach the interview transcripts with no previously identified codes. This can be useful when carrying out an exploratory study or when no prior theoretical concepts or frameworks exist for the research problem of interest.

Examples of codes and themes used for the Somalia weather risk research are given in Table 2 below. Dedicated software is available such as Atlas.Ti, MAXQDA or InVivo to help facilitate the coding process and analysis of results. Using the software, it is possible to define sub-categories of codes and assess patterns within and across themes.



TABLE 2. EXAMPLES OF CODES FOR QUALITATIVE ANALYSIS OF INTERVIEWS

Questions	Content/theme
Weather-induced disasters in Somalia and their triggers	Weather-related indicators and their thresholds
	Combinations of shocks
	Non-weather-related factors such as disease, conflict or population pressure
Livelihood specific effects of disasters	When/why disaster is specific to a livelihood group
	Who is most detrimentally affected by a disaster
Humanitarian action in response to weather-related hazards	Types of information products that are key for decision-making
	How weather and climate information is used

Systematic coding is also important in preventing interviewer bias. For example, especially when studying “hot topics”, it is common during a conversation for an ‘inner/gut feeling’ about someone’s opinion, or for personal opinions and biases to influence our memories of it. In contrast, coding the actual transcript allows for systematic and structured analysis of the information shared by the informant during their interview.

Initial findings can also help direct other parallel qualitative and quantitative research. For example, in our study initial findings from our interviews have been useful in making initial recommendations for the types of weather statistics that are most important to focus on, which in turn allowed the development of a second round of interviews to gather more nuance. They have also unearthed other sources of reports and literature that provide further illumination on the topic.



Similarly to socio-economic quantitative analysis (for example, an analysis of data collected through household survey methods), the raw data files of informants' responses would not be the practical, shareable outputs. Rather, outputs from the qualitative analysis include: the *codebook* of the labels used for each code, description of the concept or theme the code refers to, and explanation of how the code relates to other codes in the analysis; cluster *diagrams* and other figures to represent relationships identified among the codes and themes. In our case, outputs of the qualitative analysis will provide information on which combination of weather trends and socio-economic factors are most significant for predicting disaster situations per livelihood groups in key humanitarian areas of intervention.

The final output of such work is often an academic paper, where the research is drawn together into a coherent narrative. This can take several months to prepare after the final interview phase.

4. Conclusions and lessons learned

In the case of our Somalia research project, key to design and implementation of the qualitative research was assessment of the humanitarian institutional landscape in the country/region of interest. Furthermore, the involvement of local collaborators was critical for gaining this understanding. Using an interview instrument that enabled data collection on primary research themes of i) livelihood-specific effects of disasters, ii) causes of weather-induced disasters, and iii) humanitarian action in response to weather-related hazards was also important; however, the instrument had to also be flexible and adaptable to the study participant's expertise. Finally, systematically coding the qualitative data according to our three key research themes was a key in ensuring that the study achieved its objectives. Following these steps can help achieve targeted results with the robustness to inform relevant weather information products for the humanitarian sector.

The previous discussion demonstrates that qualitative research is important to address challenges for effective anticipatory action, including those related to the context-specificity of weather impacts, the interplay of multiple shocks in contributing to a disaster, and the complex dynamics of weather and non-weather-related stresses. Correspondingly, qualitative research can help analyze the triggers of weather-induced disasters with livelihood- and other contextual specificity and assess humanitarian and other potential insurance related actions in response to weather-related hazards. In this way, the research outputs can provide guidance for developing weather information products most relevant for monitoring, anticipating and responding to disaster situations.



5. User-checklist for conducting qualitative research

Finally, we provide a checklist of qualitative research study elements that are commonly used in successful studies. We hope this is also useful for those engaging an external consultant or partner to conduct the work.

1. Does the project have strong links with local collaborator and researchers who can help provide context and add to the study design?

These collaborations will be important for:

- a. Information on the institutional landscape in the country/region
 - b. Recommendations on potential interviewees
 - c. Adapting questionnaire to local context and language
 - d. Suggestions for social science researchers with local experience with whom to connect
2. Have feedback and input from your target research users been sought on study objectives and design? This is crucial in making sure that your study objectives are aligned with any parallel or larger research efforts.
 3. Is the project informed about the main institutions involved in weather risk management in the country/region of interest, and according to the study objectives? *This knowledge will be important for identifying the participants to include in the study sample.*
 4. Has a research instrument been developed according to the study's objectives and considered the knowledge base of the population under study? It is likely that this is an iterative process with steps 1-2. If you choose to pre-assign codes, this is also a good point to think about how you will code the questionnaire, to ensure that the instrument is effective as possible.
 5. Is it clear what the final output of the study is and how the information will be used? Has enough time been allocated for analysis before the end of the project?
 6. For non-English speaking contexts, are you working with local researchers or organizations familiar with the research themes to properly translate the questionnaire into the local language? Note that your local collaborator, mentioned above, can be helpful for this.
 7. Have you considered the ethics of you as a researcher or your organization conducting this research? This is important relevant if you represent a commercial entity conducting research close to an area of conflict of interest. It is also important for individual researchers to consider their own bias that they might bring into interviews (especially as semi-structured interviews are considered 'guided conversations').



8. Has the research been formally cleared with a relevant ethical review board, likely in both your country and in the country of study? If you are not sure on this step, it is important to find an expert who can talk you through the process (i.e., professional social scientists).
9. Have you piloted the interview questionnaire to verify that the questions and interview protocol make sense in the local cultural context? It is likely that this process will be iterative and lead to adjustments to the questionnaire and research design.
10. If carrying out data collection via a team of interviewers, are the enumerators all social science researchers who have enough training to be able to effectively carry out the study? (Ideally at least graduate level)
11. If carrying out data collection via a team of interviewers (and not just one person), have they been trained such that they all follow the same protocol and facilitate the interviews in the same way? This is crucial to ensure standardized data collection across the sample of key informants.
12. Have proper records been made of all the interviews (likely recordings and transcriptions) and stored them according to the requirements of ethics review board certificate and any local laws?
13. Have you clearly defined codes and made sure that they are systematically being applied to promote that coding is as reliable, consistent, and accurate as possible?
14. Is there a clear pathway to include the information directly within the weather risk design process? For example, summary documents or collaborations between the social scientists and weather risk design experts.



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