August 2013

Technical Brief

How sure are you?

Judging quality and usability of data collected during rapid needs assessments

Contents

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Checklist: Data Quality Overview

Ask yourself	Check for	Scale
Is the data/information usable?	• Relevance • Importance • Completeness	Not usable | Usable
Is the source reliable?	• Qualifications • Reputation • Motive for bias	Do not know | Unreliable | Fairly reliable | Usually reliable
Is the research tool/methodology producing good quality data/information?	**Quantitative research** • Validity/Accuracy • Generalizability • Reliability/precision • Objectivity **Qualitative research** • Credibility • Transferability • Dependability • Confirmability	Do not know | Low quality data/information | Medium quality data/information | High quality data/information

1. Introduction

Data, information, and evidence are different and distinct concepts. **Data** refers to a collection of disordered, raw material relevant to your research from which **information** is abstracted in order to make sense. Indeed, in order to acquire meaning, data must be processed, organised and interpreted[1] in a given context, which transforms it into information.

Information can be used as **evidence** to support arguments and draw conclusions. The difference between information and evidence has to do with whether or not it relates directly to a claim or an explanation. Whilst all evidence is information, not all information is evidence. Whether or not evidence can be used to support a claim has to do with the overall quality of data and its practical value for supporting findings.

A considerable amount of research on data quality has been carried out in the statistics and social science fields, focusing on investigating and describing categories of desirable attributes of data. These attributes commonly include criteria such as *accuracy, precision, completeness, relevance, etc.* Nearly 200 such terms exist and are stretched and misused regularly; there is little agreement in their nature (are these concepts, goals or criteria?), definition, and measurement.

The objective of this technical brief is to provide guidance on how you could assess the quality of information used as evidence for decision-making during humanitarian needs assessments. It aims to assist analysts in understanding the distinction between *sources* and *information*, assessing the quality of different data types (primary and secondary data), and using appropriate criteria for judging information generated through quantitative or qualitative research methods. It suggests ways of dealing with inconsistent information and offers advice on how to use evidence, establish confidence in findings and, communicate uncertainty.

[1] See [ACAPS Technical Brief, 2013 Compared to what?]

2. When gathering data/information

2.1. Evaluating the usability of information

This paper suggests three criteria that can be used to determine the usefulness of information collected in the field or through secondary data review. Each is explained below along with questions that can be used to gauge how well the information meets that particular criteria.

Relevance denotes how well the retrieved data meet the information need of the user. Relevance may include concerns such as timeliness or novelty of the result. To be useful, the information must be central to your argument, not merely be on the same general topic. For example, if you are working on a displacement profile for an ongoing conflict, displacement figures from two years ago may no longer be relevant (but you can still use information about displacement patterns or lessons learned). Too much information, especially that with little relevance, can make the analysis process both more difficult and a lot longer. Therefore, it is important to be able to identify and focus on what contributes directly to your research topic.

Questions to ask include:
Is the data up to date? Does it answer the research questions? Are the definitions and concepts that form the basis of the data the same? Is there a logical relationship between the secondary data and the primary data used? Can this be used as a proxy for some information needs? Does the information presented support or refute your thesis? Do you have counter arguments for the information refuting your ideas? Does the material provide new information?

Importance refers to whether or not the information is worth considering for your research. When evaluating data, the term *importance* is often confused with the term *significance*. In statistics, *significant* means *probably true* (i.e. not due to chance). However, *significance* does not equal *importance*, and a result can be significant without being important. Importance asks the larger question about differences: *are the differences between samples big enough to have real meaning and be of practical analytic value?* The challenge is that statistically significant differences can be found even with very small differences if the sample size is large enough. Conversely, a result may not be statistically significant because the sample size is too small, but the difference found could potentially be important.

For example, research found that consumption of bottled water (A) gives significantly better protection against water borne disease than boiling water using traditional methods (B) (65% sure that it is better). As such, if you currently use water treatment B, you might want to change to water treatment A to get better results, because there is a 65% chance that practice A is more effective. However, this level of significance does not tell you if the difference between B and A is big enough for you to alter your behaviour. It is 65% sure that A is better than B, but the improvement might be so small, and depend on other factors such as cost of water, length of time households typically boil water, and access to bottled water, that it may not be worth altering your practice.

Data completeness refers to an indication of whether or not all the data necessary to meet current or future information needs are available in the data resource. It measures the degree to which all required data is known, in relation to the questions the analyst is trying to answer. A dataset might be considered complete for a given set of questions, as it holds all the information needed, but incomplete for a different set of questions.

For instance, if you have market data by year for the last five years, it will allow you to compare one year to the next, but if you are looking to understand seasonality trends and the data is not disaggregated by month or season, you cannot compare summer trends with winter trends. The data is not sufficient, and therefore, not complete.

Questions to ask include:

- *Does the data exist? Is the data available for public use? Is it complete or do you need more information?*
- *Is the size and shape consistent with expectations? Does it have all the anticipated categories? Are all the fields or variables included? Does it contain the expected number of records?*
- *Does it cover the required time period?*

2.2. Evaluating the reliability of sources

Information from unreliable sources is not always true, up-to-date, or accurate. As a consequence, using unreliable sources in a report can weaken the credibility of the assessment or detract from the overall strength of the conclusions.

When evaluating the quality of information, the first step is to assess its source and decide how trustable it is. A source refers to the entity (person, organisation) which provided the information that is used. The source can be more or less difficult to identify, depending on whether:

- The source spoke to you directly,
- The document used clearly cites the author (book, academic journal, etc.),
- The document used just refers to the organisation which produced it (reports, review, press article, etc.),
- The document used does not give any information at all (dictionary, fragment of a document impossible to trace, etc.).

Reliability of the source will depend on elements such as the source's qualification, integrity, motive for bias and reputation. Ask:

1) Does the source have the necessary qualifications or level of understanding to make the claim?

- *What relevant experience does the source have?*
- *Where does the source work? Is he/she affiliated with a reputable institution or organization?*
- *What is the academic or professional background of the source?*

2) Does the source have a reputation and positive track record for accuracy?

- *What other works/information has the source published/produced?*
- *What do you think of the source? What do other people think of the source?*
- *Has this source been cited or quoted by other experts in the field in the past?*

3) Does the source have a motive for being inaccurate or overly biased?

- *What are the source values and goals?*
- *Are there any reasons for questioning the honesty or integrity of the source?*
- *Does he/she benefit financially by promoting a particular view?*
- *Does the source have any obvious bias, this may be political, religious, cultural, sector etc., or a conflict of interest?*
- *Did you consult the source? Did the source come to you with information?*
- *Is he/she an innovator or a follower and promoter of the status quo?*

Depending on the answers to these questions, one might initiate further investigation to seek better quality sources. If a source does not pass the above guidelines, it does not mean that the information provided is false. It just indicates that the source may not be reliable.

Because unreliability of sources does not equal poor data quality, it is not recommended to only select reliable sources and to discard non reliable ones. However, it is recommended to tag the collected information (either at field level or when collating secondary data) with a reliability level, such as follow:

Level	Reliability
0	Reliability cannot be judged
1	Usually reliable: *UN organisations, large NGOs, military entities, Reuters/Alertnet, BBC, CARE, etc.*
2	Fairly reliable*: Some press sources, less mature NGOs etc.*
3	Unreliable: *In some cases; government reports, local media, etc.*

2.3. Evaluating the research method

Secondary data has, by definition, undergone at least one layer of analysis. As such, it should not be considered free from potential subjectivity, misinterpretation, judgement, or bias. Therefore, it is often useful to read the original research study and assess the research method applied and not just use the data at face value.

The research method refers to the set of tools and processes used to collect and analyse data to produce the information. Assessing the quality of the research method can help assess the confidence associated with the information.

Two families of research method exist, qualitative and quantitative[2]. They use fundamentally different approaches and call for different evaluation criteria, through an in-depth review of each step of the research. However, both methods can be used together and support or challenge each other's findings.

[2] A detailed overview of the main differences between both methods in outlined in the annex, section 6; see also ACAPS Technical Brief, 2012 Qualitative and Quantitative Research Techniques for Humanitarian Needs Assessment

Qualitative research is exploratory and used when one seeks detailed information about one narrow topic, does not know what to expect, to define a problem, or develop an approach to a problem. It is also used to go deeper into issues of interest and explore nuances. Common data collection methods used in qualitative research are: focus groups discussion; key informant interviews; direct observation, etc. Small sample sizes are used, targeting specific geographical areas or groups of interest.

Qualitative research is often used for rapid assessment to:

- Look for a range of perceptions and feelings about an issue or experience
- Understand different perspectives or situations between groups and categories of affected population
- Uncover underlying motivations and factors that influence population behaviour, coping mechanisms and opinions
- Provide information to design a quantitative study or survey
- Explain findings from a quantitative study.

Quantitative research seeks to measure and compare conditions. It is often aimed to test hypotheses, quantify problems, and understand how prevalent they are in the population of interest. Representative samples are used to generalize results to a larger population group. Quantitative research is often used at later stages of an emergency (i.e. in-depth assessments) to:

- Identify evidence regarding cause and effect relationships
- Describe characteristics of relevant groups of people
- Test specific hypotheses and examine specific relationships
- Identify and size population segments
- Project results to a larger population.

Critical analysis of research methods leads the analyst to test information collected against a set of criteria and assess its overall quality.

Each type of research has its set of criteria, detailed in the next section:

Quantitative research	Qualitative research
Internal validity/ accuracy	Credibility
External validity/ generalizability	Transferability
Reliability/ consistency/ precision	Dependability
Objectivity	Confirmability

2.3.1. Evaluating quantitative research

To evaluate the quality of information collected through quantitative research, analysts should examine the processes used to produce findings (i.e. the research methodology), and test results against four criteria.

Internal validity/accuracy refers to the degree of certainty that a given proposition, inference or conclusion is true. The validity of a measurement tool (for example, a survey questionnaire) is the degree to which the tool measures what it claims to measure and is concerned with the rigor with which the study was conducted (design, care taken to conduct measurements, decisions concerning what was and wasn't measured, etc.). When exploring causal relationships, internal validity refers to the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore.

Example: Inferences are said to possess internal validity if a causal relation between two variables is properly demonstrated. A causal inference may be based on a relation when three criteria are satisfied:

1) The cause precedes the effect in time
2) The cause and the effect are related (co-variation)
3) There are no plausible alternative explanations for the observed co-variation.

If a medical treatment is said to be effective on medical condition X, the inference is consider to have internal validity if the measurement tool included these three criteria.

External validity/generalizability is related to generalizability of the results (hence to the representativity of your sample), and is concerned with the degree to which the proposition, inference or conclusion of the research will hold for other people/situation in other places and at other times.

Example: If you find that the frequency of meals decrease every year in village A during the lean season, because of reduced food availability and no other sources of food in the area, can you extend this proposition to another village/the whole region, where variation and timing of food availability is said to be the same?

Reliability/consistency/precision refers to the degree to which a research instrument produces a measurement consistent over time and repeatable under similar methodology and consistent conditions.

Example: During a nutrition survey, a child who weighs 25 kg steps on a scale 5 times and gets readings of 19, 22, 28, and 24, then the scale is not reliable. If the scale consistently reads "21", then it is reliable. Measurement instruments such as questionnaires must be reliable from one interviewer to another or when used with different affected groups.

Validity is more difficult to establish than reliability and depends first and foremost on reliability. A measure can be reliable but not valid, but to be valid a measure must be reliable.

For example, if a scale is reliable it tells you the same weight every time you step on it as long as your weight has not actually changed. However, if the scale does not work properly, this number may not be your actual weight. If that is the case, this is an example of a scale that is reliable, or consistent, but not valid. For the scale to be valid *and* reliable, not only does it need to tell you the same weight every time you step on the scale, but it also has to measure your actual weight.

Objectivity refers to the degree to which a research instrument uses a numerical scale of standard units that is unambiguously understood by users. The purpose of objectivity is to eliminate the perceptive variability of individual observers. This criterion reflects the degree to which bias are avoided (cognitive, cultural or sampling bias).

Example: If you ask three key informants to define the extent of the damage on school buildings after flooding, you should make sure that each of them understand the difference between “not damage”, “partially damaged”, “very damaged” and “completely destroyed”. You can verify this by checking if the 3 key informants are using the same answer if asked about the same building.

Statistical knowledge and skills are required to test validity, reliability and objectivity of results obtained using quantitative approach. Detailing those techniques goes beyond the scope of this document. Refer to statistical guidelines, to a statistician or an epidemiologist for questions related to the evaluation of data obtained through quantitative research methods.

2.3.2. Evaluating qualitative research

As with quantitative information, analysts should evaluate the research methodology and use the following criteria to determine the quality of information gathered using a qualitative approach[3].

Credibility is the equivalent criteria of internal validity in quantitative research. It aims to establish results that are trustworthy from the perspective of the participants in the research, the purpose of qualitative research being to describe or understand the phenomena of interest from the participant's eyes.

Transferability is the equivalent criteria of external validity in quantitative research. It refers to the degree to which results can transfer or are relevant to other contexts or

[3] Annex 1 details the different strategies that can be used by assessment teams to improve the quality of data collected during rapid assessments using qualitative research methods.

settings similar to the research context. To allow for transferability, data should provide sufficient detail on the context of the fieldwork for stakeholders to decide whether the prevailing environment is similar to another situation with which he or she is familiar with, and whether the findings can justifiably be applied to the other setting.

Dependability is the equivalent criteria of reliability in quantitative research. It emphasizes the need for the researcher to account for the ever-changing context within which research occurs. The research is responsible for describing the changes that occur in the setting and how these changes affected the way the research approached the study.

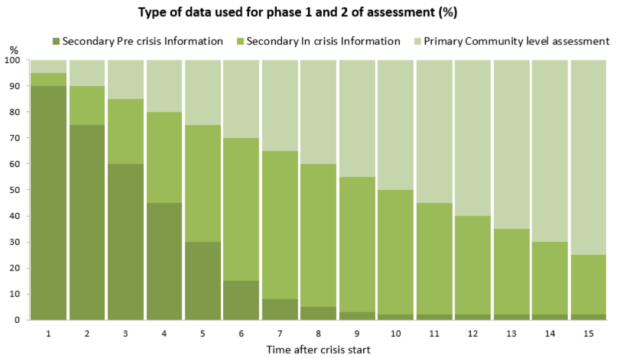
Confirmability is the equivalent criteria of objectivity in quantitative research. It refers to the degree to which results can be confirmed or corroborated by others. To achieve confirmability, researchers must take steps to demonstrate that findings emerge from the data and not from their own predispositions.

Once the research method has been evaluated, it is recommended to tag the collected information (either at field level or when collating secondary data) with a quality level, such as follow:

Level	Quality
0	Quality cannot be judged
1	High quality data/information
2	Medium quality data/information
3	Low quality data/information

2.4. Specific challenges related to primary and secondary data use

The majority of rapid assessment data after a sudden onset disaster will originate from secondary pre-crisis information. As the emergency evolves, humanitarian stakeholders and assessment teams will have greater access to the affected population which will allow the proportion of in-crisis data (both primary and secondary) used for analysis to increase. The following graph illustrates the type of data used for rapid assessments in sudden onset disasters and its importance through time:



Adapted from de Radigues, 2011

Using both types of data calls for different strategies when evaluating usefulness and quality.

2.4.1. Primary data

Primary data is data generated specifically for the assessment purpose and collected through a process that the assessment team can directly influence and control. Primary data is most often collected directly through face to face assessment with members of the affected community, but it can also include phone interviews, radio communication, email exchange, and direct observation.

Usability: Directly collecting data at the field level does not ensure that relevant or specific enough data will be obtained for what need to be known. Collection of primary data can present constraints which will limit the usability of the information:

- It can be difficult to obtain primary data early in the crisis (i.e. due to limitations of access to key informants, logistic, security).
- It can be costly and time consuming, especially if assessment teams need to collect data on large samples for the results to be transferable (i.e. Myanmar 2008, Pakistan and Haiti 2010).
- Information collected may have a limited relevance timespan. In a highly dynamic context, by the time data is gathered and conclusions are drawn, the information might be obsolete.

Quality: Primary data is often considered to be of high quality, in the opinion of assessment teams, because it is measured and gathered in person and on site. However, three common threats limit the quality of primary data: bias, measurement error, and poor data entry.

A. Bias refers to a systematic skewing of data collected. A biased enumerator is one who systematically over-estimates or under-estimates what is being measured. A biased sample refers to a sample in which all members of the population are not equally likely to be represented. Bias may occur because of under-coverage of some groups, due to large non-response rates among particular groups or because of lack of access. An example of bias would be an underestimation of income levels because those working longer hours in the sampled population have a higher non-response rate. Three types of bias are important to consider in humanitarian assessments: respondent, interviewer, and question induced bias.

<u>Respondent induced bias</u>

Faulty memory: Some respondents may answer a question incorrectly simply because they have a poor memory. The key to avoiding this problem is to steer clear of questions requiring feats of memory. Questions such as, *"Can you tell me how many people died in your district within the last 12 months?"* should be avoided, as people will tend to count deaths over the last three years.

Exaggeration and dishonesty: There can be a tendency by respondents to exaggerate claims about their conditions and problems if they think it can further improve their well-being. The interviewer must be alert to, and note any, inconsistencies arising. This is best achieved by checking key pieces of information with a variety of sources.

Failure to answer questions honestly or transparently: If interaction is not developed or managed sufficiently, the respondent may be unwilling to respond honestly. Also, if the respondent does not fully understand a question, he may give inaccurate answers. The interviewer needs to ensure that the respondent understands the questions being asked and responds to that question.

Misunderstanding purpose of interview: To avoid misunderstanding and manage respondent expectations, it is important to carefully explain the objectives of the survey, how the information will be used, issues of confidentiality, the identity of the interviewer and agency, and what is required of the respondent.

Influence of groups at interview: During interviews, the presence of other individuals is almost inevitable. Often, family members or neighbours will wish to join in the discussion. Such a situation can have important implications for the quality of data obtained. The respondent may be tempted to answer in a way that gives him/her credibility in the eyes of onlookers, rather than giving a truthful reply. In circumstances where the presence of third parties cannot be avoided, the interviewer must ensure as far as possible that the answers being given are the honest opinions of the individual being interviewed.

Courtesy bias: in an attempt to be helpful or give the *right* answer, respondents will give answers that they think the interviewer wants to hear, rather than what they really feel. The respondents may not wish to be impolite or offend the interviewer, and may therefore endeavour to give *polite* answers. The creation of a safe interview environment and sympathetic relationship between the interviewer and the respondent can help avoid courtesy bias.

Interviewer induced bias
It is also possible for the interviewer to introduce bias into an interview.

Organisational bias: The interviewer may be influenced by her/his professional background (mandate, specialisation, politics, etc.) and might administer the questionnaire in a way that affects results.

Personal bias: The interviewer's identity might influence the way he/she asks questions, understands responses and reports results (i.e. ethnicity, social background, religion, gender, language, personal history, and age). Also, her/his behaviour might influence the answers provided by the respondents (facial expressions, body language, tone, manner of dress, style of language, reactions to answers, and sympathy to the problems).

When respondents give answers, the interviewer must be careful not to *react.*' A note of *surprise* or *disbelief* may easily bias the respondent's answers. Interviewers must strive to respond with a uniform polite interest only; objectivity must be retained at all times.

Failure to follow instructions in administering the questions: It is often tempting for the interviewer to change the wording of a question or introduce inflections in questions. This can affect the respondent's understanding and can bias his/her replies. Particular problems may arise if the respondent does not understand the question as stated and the interviewer tries to simplify the question. The altered wording must be sure not to constitute a different question.

Question induced bias
The quality of the questions asked through assessment (as well as surveys) is of great importance to ensuring that data is reliable.

Leading questions: The way questions are phrased may suggest a desired response/answer. The question should be framed as neutrally as possible.

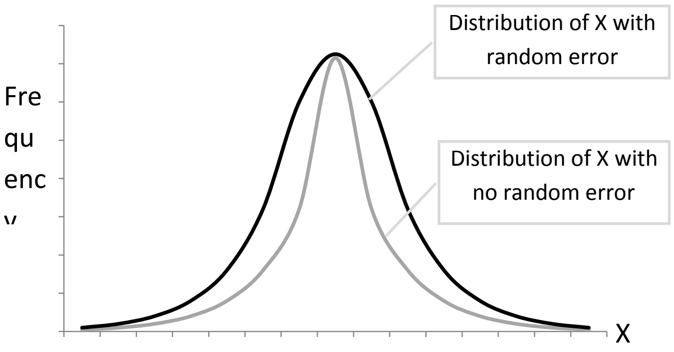
Poor questionnaire design is a problem in assessments when ambiguously worded questions are used. Questions may be unclear, may be understood differently from what the evaluator intended, and/or may lend themselves to multiple interpretations. Questions relating to cash transfers, for example, are often misunderstood. The distinction between gifts and loans often differs according to the setting. Assessment questions relating to monetary transfers may have to be context adapted in order to capture the information the question is intended to. Assessment forms should be designed to fit the local context, pre-tested, and screened for reliability of answers. Questionnaires should minimize the potential for confusion and inaccurate answers.

Question order bias: Topics and questions need to be presented in an order which minimizes the influence of one over another. Create trust before asking sensitive questions. Ask general questions before specific questions, positive questions before negative questions, behaviour questions before attitude questions, etc., and always finish on a positive note.

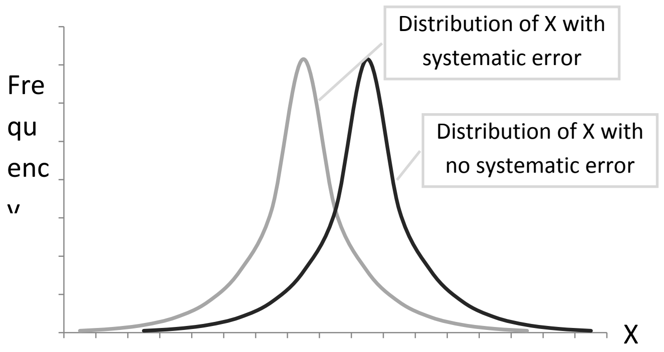
B. Measurement error results when there are errors in data collection where random error or *noise* is added to the data collected. Measurement error leads to imprecise estimates and weakens the analyst's ability to present meaningful results.

There is often a tendency to conflate measurement error (random error) with bias (systematic error). The two, however, are distinct.

Random error is non-systematic and does not affect the average, only the variability around the average



Systematic error (aka bias) refers to a systematic over-estimation or under-estimation, which does affect the average



C. Poor data entry can also impact the quality of the primary data. Data entry errors surface for a number of reasons: glitches in the data entry process, poor transformations and merges when multiple data sources are brought together, and often from missing data. The bottom line is *garbage in, garbage out*. If incorrect data is put in during the data entry process, the incorrect data will appear in the report when findings are generated from the database.

Educating and motivating data entry clerks goes a long way toward minimizing data entry problems. First make sure that the people who are entering data know what it will be used for, i.e. solving affected population problems, needs analysis, response planning, etc. This will give them an understanding of the importance of the data entry process. Then show them examples of what can happen if they don't enter the data correctly.

When time allows, it is worthwhile having each questionnaire entered twice (including for rapid assessments), by two different individuals, and then comparing the two versions for inconsistencies, check them against the questionnaire in the field, and retain the correct version. Keeping multiple versions of the survey data is also a useful way of guarding against lost or corrupted data files.

2.4.2. Secondary data

Secondary data is data collected for a purpose other than the current assessment through a process over which the analysts do not have any control and with quality that cannot be personally guaranteed. Secondary data is information collected by researchers typically not involved in the current assessment and has undergone at least one layer of analysis prior to be considered for inclusion in the assessment.

Secondary data can comprise published research, internet documents, media reports, evaluation reports, NGOs reports, Ministry of statistics data, academic research or an agency specific assessment.

Usability: By definition, secondary data was not gathered to answer your specific research question(s), which generally means that the specific information one is looking for will rarely exist at the right time, scale, or level of disaggregation. For example, secondary data might be too old to be relevant (a census more than 10 years old), or might be scaled at the national level, while you are interested only by coastal areas. Also, variables might not have been set in parallel to your research needs (information is not available for your age group of interest but for another age interval).

Determining the original purpose of the secondary data source is important due to its influence on the collection and analysis processes, from the population targeted to the specific wording of the assessment questions to the resulting interpretation.

Quality: Secondary data/information can be of high quality, but it can be difficult to judge due to the lack of raw data and method documentation. For instance, the analysts do not know how seriously the data was affected by problems such as low response rate or respondent misunderstanding of specific assessment questions.

Secondary data may also provide figures without specifying how (or when) it was collected or present inconsistencies without an explanation of them. More generally, secondary data might have gone through at least one layer of analysis, which may have introduced subjectivity, judgment, and bias.

2.4.3. Key questions

Key questions to ask when checking on the quality of your data, secondary or primary:

- Is it a product of our own observation or a result of unsubstantiated rumour?
- Have any other people made or reported the same observation?
- What methods were used to collect and analyse the data? Are they sound and proven methodologies?
- In what circumstances was the observation made or reported?
- How reliable are those making or reporting the observation?
- What motivations or bias may have influenced how the observation was made or reported?

3. When conducting analysis

Analysts must consider all available information during the analysis phase and will give greater weight to higher quality information. When presenting their findings, they will consider as evidence the pieces of information which fit the criteria of either refuting or supporting the argument at hand.

Key rule for selecting evidence include:

- Relevance: the information relied upon must be applicable to the point in issue.
- Hearsay: second hand information is given less weight.
- Best evidence requires the use of the most original source of any evidence wherever possible.
- Corroboration: when key information can be confirmed by another reliable source, greater weight can be placed on it when drawing conclusions.

3.1. From observations to conclusions

The analyst should seek to formulate findings (about relationships and when making conclusions) which are believable and as close as possible to the truth. Two types of mistakes are possible to make when formulating findings: to conclude that there is no relationship when in fact there is (discounting information), and to conclude that there is a relationship when in fact there is not (misinterpreting information). It can also be that the analyst does not see the whole picture and gives to much weight to a single factor, when the causal relationship is actually the results of a multiplicity of factors.

3.1.1. Discounting information

Analysts tend to make more of information that confirms their beliefs and pay less attention to information that contradicts them. This is a particular problem in qualitative analysis, due to the volume and complexity of the data at hand. Because the data are complex, analysts have to rely more on insight and intuition and can, as a result, leap to biased or inaccurate conclusions.

It is also easy to be influenced by the presumptions and prejudices with which we begin our analysis. Every analysis is based on a variety of assumptions (some of which analysts may not even realize) about the nature of the data, the procedures used to conduct the analysis, and the match between these two. Failure to question the assumptions behind your analysis can easily lead to erroneous conclusions.

There are several ways in which analysts can reduce the errors associated with neglecting data. Of these, probably the most important is to look for corroborating or converging information. *Just how much data does support our impressions?* Claims must be reasoned from sufficient evidence if they are to be judged plausible. If we can assess the weight of evidence underpinning our analysis, then we can make a critical assessment of the empirical scope of our insight.

In addition to the evaluation of the quality and significance of the information at hand, strategies for evaluating the strength of evidence involve:

Enumerating the amount of data. As sample and numbers get smaller, confidence in their accuracy is reduced. The frequency with which an issue is reported or detected will indicate its empirical scope and consistency. If the scope of the category is surprisingly slight, then we may wish to reassess its practical value for our analysis overall. Information may be consistent only because it is highly correlated or redundant, in which case many related reports may be no more informative than a single report. Or it may be consistent only because information is drawn from a very small sample or a biased sample.

Looking for exceptions, extreme, deviant or negative cases. By focusing on exceptions, extremes, or negative examples, analysts can counter the inclination to look only for evidence that confirms our views. Contradictions can give rise to unexpected findings, which ultimately strengthen explanations. Both the central tendency, and the extreme cases, are relevant for getting the big picture.

Negative/deviant case analysis is an analytical procedure that is meant to refine conclusions until they account for all known cases without exception. The process involves developing hypotheses and then searching for cases, elements or instances which contradict the conclusions, patterns or explanations that are emerging from data analysis. If no contradictory cases are found after extensive searching, the hypotheses are considered more credible because no evidence has been found to negate them. If such contradictory evidence *is* found, the hypotheses are modified or broadened to account for the new data associated with the negative cases.

This process continues until the hypotheses have been modified to account for all negative cases and no new negative cases can be found. This strengthens the credibility of the findings and ensures all information is taken into account.

Deviant cases sometimes provide the exception that proves the rule. Analysts should then explain why both statements can make sense without disconfirming each other. Inconsistencies which remain impossible to explain are said to be *disconfirming*, whereas deviant cases can be contextualised and understood as *extreme cases, anomalies* or *outliers*, caused by variability in the context.

3.1.2. Misinterpreting information

Even if analysts have confronted all the information, they may still misinterpret the data. To produce a valid account, analysts need to be objective. It means taking account of information without forcing it to conform to one's own wishes and prejudices and accepting the possibility of error.

Analysts cannot verify explanations in the way that they can verify the outcome of an arithmetic sum. They deal with probabilities rather than certainties; no matter how certain they feel they are right, the most they can hope to do is present the best possible account of the data. However, even this may not account for all the facts, and they may have to settle for an explanation which accounts only for most of them.

While analysts may never be certain that their judgement is correct, they can reduce the chances of error. To minimize misinterpretation of the information, analysts should develop rival and alternative interpretations of the data and refrain from judging between them until they can chose one *beyond reasonable doubt*.

Criteria which may influence analysts in weeding out weaker interpretations and narrowing their choice to those which make most sense of the data are as follow:

- *Which explanation is more straight forward?* The more complex the interpretation, the less convincing it may seem. Decision makers tend to prefer simple explanations over more complex ones, not just because they are easier to grasp, but also because they are more powerful.
- *Which explanation is more credible?* Complex explanations can suffer a credibility gap as analysts are required to accept more and more parts in order to justify the whole.
- *Which explanation is more internally coherent and consistent? How many conflicts and contradictions do they accommodate or resolve?* Explanations which reduce rather than increase the number of issues which remain unresolved enable a clearer understanding of the interpreted data.
- *Which interpretation or explanation has greater empirical scope and consistency?* Check the completeness of different explanations. How well do they account for the evidence at our disposal? How many loose ends do they tie up? Is the chosen explanation sufficiently wide in scope to include most of the data? Explanations which take account of the bulk of the data will be more convincing.

Of course, the answers to these questions may not be clear or consistent, and the analyst may be left to choose in terms of a balance of conflicting probabilities. Most analytical uses of evidence are a matter of making inferences, rather than arriving at obviously true claims from clearly factual information. The strategy is to look for a range of plausible interpretations rather than assuming one right answer exists. The range of possible interpretations can ultimately be controlled by attending carefully to context.

3.2. Context and plausibility

The decision makers' willingness to accept an interpretation is powerfully connected to their ability to see its *plausibility*, that is, how it follows from both the supporting details selected by the analysts and the language used in characterizing those details.

An interpretation is not a fact but a theory. Often, the best analysts can hope for with their explanations is not *Yes, that is obviously right* but rather *Yes, I can see why it might be possible and reasonable to think as you do*.

Explaining why a specific subject should be seen through a particular context is an important part of making interpretation reasonable and plausible. Depending on the context you choose, analysts will see different things:

- Evidence may support more than one plausible interpretation.
- Some evidence will better support some of these interpretations.

Analysts have to decide which possible interpretation, as seen through which plausible interpretive context, best accounts for what they think is most important and interesting to notice about the data. An important part of getting an interpretation accepted as plausible is to argue for the appropriateness of the interpretive context being used.

An interpretive context is a lens. What matters is that analysts share their data, show the reasons for believing that it means what they say it means, and do this well enough for a reader to find the interpretation reasonable (whether he or she actually believe it or not).

To make a claim plausible, the analyst can support it in two ways:

- Corroborating evidence by using several pieces of evidence which individually support the claim.
- Converging evidence by using individual pieces of information that do not suffice to support the claim, but when linked

together, constitute a robust body of evidence for supporting the claim. This type of argument needs to be highly contextualised and reasoning be made explicit.

Meanings and interpretation can always be refuted by people who find fault with your reasoning or can cite conflicting evidence. It is therefore especially important to locate the conclusions in the context of other assessments, surveys or studies which have achieved similar results, hence the importance of secondary data review during rapid assessments.

3.3. Dealing with inconsistent information

When analysing the body of information to extract findings, the analyst will be able to gather corroborating/converging pieces of information, but might have to deal with inconsistent/conflicting information even when the research method is sound. This occurs when informants provide different answers to a same question. For instance:

- One person tells you that the water source runs dry for two months of the year, whilst another tells you that it never runs dry.
- One person tells you that all the animals from the village are dead. Another tells you that half the animals are alive, but grazing far away.

These are three possible reasons for inconsistency of information:

- Perception: There is not always a *correct* answer. People's interpretation and understanding of events depends upon their own circumstances, values, social position and point of view.
- Access to information: Some people are better informed than others.
- Misrepresentation: Sometimes people purposefully provide misleading information.

There are some steps to follow to minimize and resolve inconsistencies as information is being collected.

Questions to ask include:
Does the new information contradict earlier collected information? Does information collected by one informant support or contradict information from another? Does the information collected by different members of the assessment add up? Is it logical and consistent? Does the information "make sense" when compared to the entire data universe collected so far?

Asking these questions leads to thinking of new questions to ask or to seek alternative information to clarify inconsistencies. This activity is called triangulation, a synthesis and integration of data collected through different processes, followed by examination, comparison and interpretation. It enables the analyst to increase his/her confidence in the validity/credibility and objectivity/confirmability of information (i.e.: is the information credible, accurate and unbiased?). Triangulation is also called cross-checking or cross-referencing.

3.3.1. Triangulation

There are four main types of triangulation:

Data triangulation (also referred as data sources triangulation) involves the use of multiple data sources in the same assessment to increase the validity/credibility of a research result. These sources are likely to be key informants, specialists or generalists, and interviews could be conducted with each of these groups to gain insight into their perspectives on the crisis. During the analysis phase, feedback from key informants would be compared to determine areas of agreement as well as areas of divergence. This is the most popular type of triangulation because it is the easiest to implement. It can also involve comparing primary data with secondary data as well as cross-checking collected data against baseline or analysed information.

Investigator triangulation involves using different investigators in the analysis process. Typically, this manifest as an assessment team composed of several enumerators, where each examines data using the same method. The findings from each participant would then be compared to develop a broader and deeper understanding of how different persons view the issue. If all arrive at the same conclusion, then the confidence is high. The method is effective in establishing validity/credibility and objectivity/ confirmability, but it might not be practical to get several analysts (time and financial constraints) during rapid assessments.

Theory triangulation involves using multiple perspectives to interpret a single set of data. It typically involves bringing together people with different academic backgrounds and/or professional expertise. It they interpret information the same way, it tends to demonstrate the truth of the research result, and minimise bias. This method can be time-consuming but is well-adapted to coordinated assessments involving professionals from several humanitarian sectors or clusters.

Methodological triangulation involves using multiple qualitative and/or quantitative methods to study the situation. For example, results from key informants interviews, focus group discussion, and direct observation could be compared to see if similar results are being found. If the conclusions are the same, validity/credibility is established. This method is quite popular but resource-consuming, and requires more time to analyse the information yielded by the different methods.

Triangulation can be used as a strategy to establish your level of certainty, and it is assumed that it will result in a single proposition, allowing validity to be confirmed. However, this assertion is not always true. Contradictions and inconsistencies are often discarded or categorised as untrue, when their analysis could be of great value and represent variability in the observed setting. When using qualitative research to study a complex phenomenon (one with a variety of contributing factors, high influence of context, etc.), social researchers suggest that convergence of data should not be expected when performing triangulation. Instead of a tool for validation, the triangulation process should offer different perspectives and give access to different versions of the phenomenon under scrutiny. Triangulation can be done to *add breadth or depth to our analysis, not for the purpose of pursuing 'objective' truth* (Flick, 1992).

As such, triangulation is not just a strategy to test/improve the overall quality of your information, but rather a new level of analysis allowing the treatment of contradictions and inconsistencies.

If strategies such as triangulation do not suffice to reduce the number of alternative explanations, analysts can seek support from colleagues to review the findings and get an outside perspective and expertise. This process is referred to as peer review.

3.3.2. Peer review

In the task of arbitrating between alternative explanations, analysts can appeal for support to colleagues, sectors specialists, decision makers, donors, and the affected population themselves. Representatives of the affected population may be able to comment on the authenticity of the conclusions. Sector specialists may be able to suggest different interpretations. Peer reviewers may suggest inadequacies in the coherence of the explanations. Decision makers may emphasize the practical significance of under-developed aspects of the analysis.

This is similar to what is called the "Delphi Decision-Making Process", which is commonly used in the medical sector and other fields, where the phenomenon being studied is complex and data/information is sometimes incomplete or inconclusive. This method may be defined as an expert brainstorming, where a series of questionnaires/surveys are sent to selected respondents through a facilitator who oversees responses of the panel. The responses are collected and analysed to determine conflicting viewpoints. The process is iterative and works towards synthesis and consensus building.

3.3.3. Solving inconsistencies

The process of cross-checking information and/or getting it reviewed by outside experts can lead the analyst to conclude:

- Inconsistencies or contradictions could not be explained without invalidating original hypotheses or refining hypotheses to such an extent that they cannot be generalised or understood as a trend. As a consequence, the analyst should accept that the initial hypothesis is not applicable, and cannot be presented as a claim.
- Inconsistencies or contradictions originate from unreliable sources, significant bias, weak methodology, or all of these combined. As such, they do not invalidate hypotheses, but the analyst should be able to identify and communicate the cause of deviance.
- Inconsistencies or contradictions can be explained and help refine hypotheses.

In the last case, the analyst should include the analysis of inconsistencies/contradictions as part of the findings. There are two options:

- Inconsistencies or contradictions originate from extreme cases/exceptions which, when put in context and analysed, do not actually contradict the overall body of information.
- Inconsistencies or contradictions are organised in trends, which suggests that they originate from variability:
  - Spatial variability (variability over locations)
  - Temporal variability (variability over time)
  - Cyclical variability (variability over seasons, months, days, etc.)
  - Variability in population groups (Residents affected vs. IDPs)
  - Variability in context (environmental, socio-economic, security, etc.)

Variability should call for refining hypotheses or creating new ones to avoid discounting important information.

3.4. Determining confidence level

The complex nature of humanitarian crises and the lack of predictability around the type, volume, and quality of secondary and primary data available will always challenge the precision and accuracy of conclusions.

Analysts must critically evaluate the body of evidence and, all things considered, make their best estimation about the conditions of the affected population. The less data is available, the more the use of expert judgment and a consensus building approach among partners will be necessary to overcome the lack of evidence, and the more important will be the communication on the confidence of your findings. Ultimately, assessing the degree of confidence over your findings involves two elements: agreement and evidence.

Agreement ↑			
	High agreement Limited evidence	High agreement Medium evidence	High agreement Robust evidence
	Medium agreement Limited evidence	Medium agreement Medium evidence	Medium agreement Robust evidence
	Low agreement Limited evidence	Low agreement Medium evidence	Low agreement Robust evidence

Evidence →

The level of agreement refers to the degree of consensus among experts or decision-makers examining the situation. The strength of the evidence refers to overall information quality: information usability, source reliability, quality of the research method, corroboration and convergence with other pieces of information.

When consulting with experts, be aware of a tendency for a group to converge on an expressed view and become overconfident in it. One way to avoid this is to ask each member of the team to write down his or her individual evaluation of the level of agreement with each statement before entering the group discussion.

Confidence scale	Terms	Likelihood
	Virtually certain	99 – 100% probability
	Very likely	90 – 100% probability
	Likely	66 – 100% probability
	About as likely as not	33 – 66% probability
	Unlikely	0 – 33% probability
	Very unlikely	0 – 10% probability
	Exceptionally unlikely	0 – 1% probability

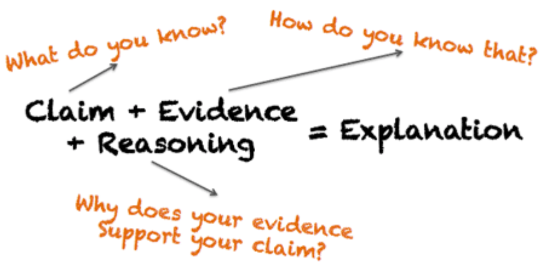
Scales or classifications can also be used to describe uncertainties. Here, everyday language is used, but the words used are clearly defined in the text. A fixed scales (fixing probability terms to chance intervals) and consistent use of language makes it easier to remember, and messages are perceived as more credible. It also enables readers to make comparisons between topics, as in the following chart:

Whether confidence is expressed qualitatively or quantitatively, terms should be carefully chosen to express the probability that a statement is true. The way in which a statement is framed will have an effect on how it is interpreted (e.g. a 10% chance of dying is interpreted more negatively than a 90% chance of surviving).

4. When communicating your findings

4.1. Use evidence to support your claim

When presenting findings, it is important to display the evidence, i.e. the body of information which allowed analysts to formulate their conclusions. Indeed, providing conclusions and explaining how you got there will help ensure that what you say is believable, as you share with the audience the analysis process which justifies your statement. Evidence will support your claim, however, you should never assume that what is obvious to yourself is obvious to others. This is why it is important to explain the reasoning linking the evidence with the conclusion.



Credits: http://www.edutopia.org

- Claim: a statement or conclusion that answers the original question/problem
- Evidence: data that supports the claim. The data needs to be appropriate and sufficient to support the claim.
- Reasoning: a justification that connects the evidence to the claim showing why the data counts as evidence by using appropriate and sufficient principles.

Claims from your findings must be logical, defendable, and accurate. Be prepared to outline *why* your assertions are correct and *why* the audience should believe you. Put yourself in the audience's shoes and challenge your conclusions and the process which brought you to those conclusions. Offer your readers the reasons for believing that the evidence means what you say it means.

Use evidence to advance your claim, not just confirm it. Explore how the evidence does not fit the claim, and use what you learn to reshape the claim, making it more accurate.

4.2. Demonstrate the quality of your evidence

Evidence is meant to support your claim, but it needs to be good enough to earn the trust of your audience. Indeed, explanations (claim + evidence + reasoning) are not enough if you cannot demonstrate sound basis for your argument. As such, your level of confidence is dependent on the characteristics of the information you analysed. Present conclusions to the audience based on these characteristics, building on:

- Type of data and information used for the research (primary, secondary)
- Relevance and sufficiency of the data/information
- Level of reliability granted to the sources
- Research methodology and the quality of information (according to the set of adapted criteria developed earlier in this document)
- Limits of your data both in terms of methodology and content
- Inconsistencies/contradictions you dealt with, and if relevant, a short negative case with tentative explanation, and/or results of the peer review process.

4.3. Communicate about uncertainty

When developing conclusions or findings, analysts should clearly differentiate facts from judgements or assumptions and interpretation from data. Potential confounders should be openly acknowledged in the assessment results. Know the claims you cannot make and help readers understand the limitations of the data and analysis so they do not misuse the results.

Limitations in analysis will emerge from the interpretation phase and should be reported, either in written form (be explicit and honest about limitations) in the final report or in verbal presentations (be prepared to discuss limitations).

Pay additional attention to reporting uncertainties if:

- They highly influence the strategic advice provided
- The outcomes are close to a policy goal, an emergency threshold or standard (i.e. nutrition threshold)
- The outcomes point to a possibility of morally unacceptable harm or a catastrophic event
- Being wrong in one direction (of the outcomes) is very different than being wrong in the other when it comes to policy advice
- Controversies among stakeholders are involved
- Value-laden choices and assumptions are in conflict with stakeholder views and interests
- Fright factors/media triggers are involved
- There are persistent misunderstandings among audiences
- Audiences are likely to distrust the results due to low or fragile confidence in the researchers or the organisation that performed the assessment.

Many words and expressions of common language can be used to express uncertainties:

- Uncertainty wording, such as *likely*', *probably, not certain*'
- Auxiliary verbs, such as *may, might, seem*
- Statements that indicate the status of the study, such as *preliminary findings*, *as a first approximation*, *further research is needed, based on current insights*
- Statements regarding the scientific consensus concerning a claim, such as *there is considerable trust in [claim]*, *many sector specialists consider [claim], it is widely held that [claim]*
- If, then constructions: *if we may assume [assumption], then [claim]*
- Constructions with conjunctions: *however, although; [statement], however [uncertainty]. For* example: *to the best of our knowledge it is likely that we will meet the need of more than 80% of the affected population in the coming three months, however, our knowledge is limited by.... and that implies that....*

Avoid using ambiguous language when reporting uncertainty. Be sure that wording used does not contradict the numbers. Compare the relationships between numbers and words for different topics, and aim for consistency in their use.

The following good-practice criteria for adequate uncertainty communication are recommended:

- Decision makers should have access to the uncertainty information they need to be aware of and know where to find (more detailed) uncertainty information
- The uncertainty information offered should be consistent across different reports, different issues, different authors, etc.

- Essential uncertainty information should be located in sections of the report that are most likely to be read by the audiences
- The information on uncertainty is clear to the readers and should minimise misinterpretation, bias, and differences in interpretation between individuals
- The information on uncertainty is not too difficult to process by the readers
- Uncertainty communication should meet the information needs of the target audiences, and therefore is context dependent and customised to the audiences
- The overall message (claims and uncertainty information) is useful to the audiences for making decisions, for use in debates, and for forming personal or professional opinion.
- The overall message (claims and uncertainty information) is credible to the readers (well underpinned and unbiased).

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6. Annexes

The following table details the different strategies that can be used by assessment teams to improve the quality of data collected during rapid assessments using qualitative research methods.

Quality criterion	Strategies used to promote qualitative research quality
Credibility	• Adoption of appropriate and well recognised research methods. • Development of early familiarity with culture of participating organisations • Random sampling of individuals serving as informants • Triangulation (data triangulation, methods triangulation, investigator triangulation, theory triangulation, environment triangulation) • Tactics to help ensure honesty of informants • Iterative questioning in data collection dialogues • Negative case analysis (cases that disconfirm the researcher's expectations and tentative explanation) • Debriefing sessions between researcher and superiors • Peer scrutiny of the project, external audit (outside experts) • Admission of researcher's beliefs and assumption (aka "reflective commentary" or "reflexivity") • Description of background, qualifications and experience of the researcher • Member checks of data collected and interpretations/theories formed • Thick description of phenomenon under scrutiny • Examination of previous research to frame findings • Participants feedback • Low-inference descriptors (ex: verbatim)
Transferability	• Provision of background data to establish context of study and detailed description of phenomenon in question to allow comparisons to be made • Pattern matching (predicting a series of results that form a distinctive pattern and then determining the degree to which the actual results fit the predicted pattern) • Extended fieldwork (research over an extended time period to provide validation and discovery)
Dependability	• Employment of "overlapping methods" • In-depth methodological description to allow study to be repeated
Confirmability	• Triangulation (mainly investigator triangulation to reduce the effect of personal bias) • Admission of researcher's beliefs and assumption (aka "reflective commentary" or "reflexivity") • Recognition of shortcomings in study's methods and their potential effects • In-depth methodological description to allow integrity of research results to be scrutinised

The following table presents the attributes of qualitative and quantitative research methods[4].

	Qualitative Research Method	Quantitative Research Method
When to use it	• When in-depth understanding of a specific issue is required • To understand behaviour, perception and priorities of affected community • To explain information provided through quantitative data • To emphasize a holistic approach (processes and outcomes) • When the assessor only know roughly in advance what he/she is looking for Recommended during earlier phases of assessments	• To get a broad comprehensive understanding of the situation • To get socio-demographic characteristics of the population • To compare relations and correlations between different issues • When accurate and precise data is required • To produce evidence about the type and size of problems • When the assessor knows clearly in advance what he/she is looking for Recommended during latter phases of assessment
Objectives and main features	• To explore, understand phenomena • Provides in depth understanding of specific issues • Detailed and complete information, contextualization, interpretation and description • Perspectives, opinions and explanations of affected populations toward events, beliefs or practices	• To seek precise measurement, quantify, confirm hypotheses • Provides a general overview • Provides demographic characteristics • Objective and reliable • Apt for generalization • Objectively verifiable • Prediction, causal explanation
Data format	• Data can be observed but not measured • Mainly textual (words, pictures, audio, video), but also categorical	• Data which can be counted or measured. Involves amount, measurement or anything of quantity • Mainly numerical and categorical values
Answers the questions	Answers questions arising during the discussion • How? • Why? • What do I need to look for in more detail? Questions are generally open ended	Answers a controlled sequence of questions with predetermined possible answers • What? • How many? Questions are closed
Perspective	• Looks at the whole context from within • Searches for patterns • Lends itself to community participation. Seeks depth of perspective though ongoing analysis (e.g. Waves of data)	• Looks at specific aspects from the outside
Methods	• Individual interviews • Key informant interviews • Semi-structured interviews • Focus group discussions • Observation	• Quick counting estimates • Sampling surveys • Population movement tracking • Registration • Structured interviews
Sampling	• Non random (purposive)	• Random
Design and instruments	• Flexible, the assessor is the primary instrument for data collection and analysis.	• Fixed, standards control the assessor's bias.
Questionnaire tool types	Checklist with open questions and flexible sequence	Predetermined questionnaire with sequence and structure
Analysis	• Use inductive reasoning • Involves a systematic and iterative process of searching, categorizing and integrating data • Describes the meaning of research findings from the perspective of the research participants • Involves developing generalizations from a limited number of specific observations or experiences • Analysis is descriptive	• Uses deductive methods • Descriptive statistics • Inferential statistics

[4] WFP, 2009, p5, see also PARK companion, JIPS/ACAPS 2012.