



acaps

INTRODUCTION TO

ACAPS RISK ANALYSIS METHODOLOGY

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Introduction

It is generally accepted in the developmental and humanitarian spheres that strategies and programmes must not only be informed by the current situation and lessons learnt from the past, but also by considering how the future may evolve. Decision making should be forward-looking. A 2014 paper published by the ODI states 'To deal with uncertain futures, Flexible and Forward-looking Decision Making cannot base its decisions solely on evidence from past or existing capabilities and structures; it must also consider possible futures.'¹

Risk analysis is one of the tools humanitarians have to assist them 'look forward'. Other branches of forward-looking, or anticipatory analysis include forecasting and scenario-building. There is much similarity between the three, but the emphasis of each is different:

- **Forecasting** is the process predicting (often imminent) future events and their consequences or effects. ^[1]Forecasts can, indeed should, lead to Forecast based Action (FbA)
- **Risk Analysis** is the process of identifying and unpacking potential future events that may negatively impact individuals, assets, and/or the environment ^[1](i.e. what can go wrong, how likely it is to happen, what are the potential consequences). Risk analysis usually identifies one individual issue at a time (e.g. civil unrest, coup, currency collapse, disease epidemic, harvest failure, etc.).
- **Scenario-building** is the process of visualising a range of possible future conditions or events and their expected consequences or effects, which may be positive, negative or neutral. A scenario usually considers a more holistic view of the possible future and may incorporate the unfolding of a number of different risks.

Forecasting aims to identify the probable future; **risk analysis** aims to identify the plausible futures with significant negative humanitarian consequences; while a set of **scenarios** aims to represent the spread (or variation) that the future could take.

ACAPS undertakes both risk analysis and scenario-building but not forecasting. **This note outlines the purpose of, and methodology used by ACAPS for risk analysis.** A separate note details the scenario-building methodology.

Neither risk analysis nor scenario building is an exact science. Both can however be carried out systematically using a clear approach. Identifying potential hazards and estimating impact and probability are skills that improve with practice. ACAPS' methodology provides a framework to guide the forward-looking analysis process and provide a level of consistency between analysts. The terminology used in both methodologies is consistent.

¹ [ODI - Planning for an uncertain future March 2014](#)

Objective

The objective of ACAPS risk analysis is to enable humanitarian² decision makers to understand potential future changes that would likely have humanitarian consequences. By exposing the more probable developments and understanding their impact, they can be included in planning and preparedness which should improve response.

At ACAPS, risk analysis enables us to:

- a. ensure our monitoring of and reporting on countries and crises is forward-looking and our consequent analysis more informed;
- b. gain advance warning about countries and crises on which we ought to report in more depth;
- c. publish specific risk reports as necessary.

All of which aim to inform the ACAPS audience, and thus the humanitarian community, of likely future events.

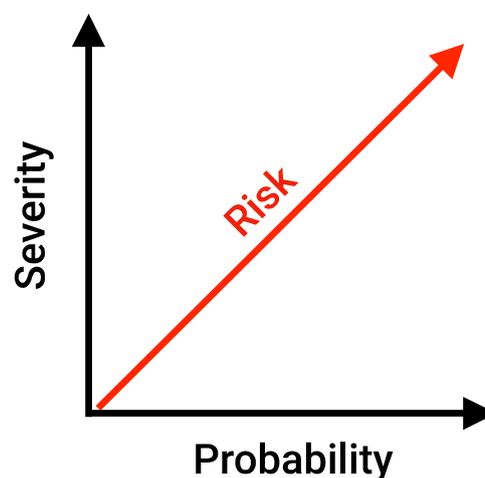
This document describes the methodology to be followed by ACAPS staff when undertaking risk analysis.

² While the humanitarian community is the primary audience for ACAPS' analysis, developmental organisations are also users.

Key principles

At ACAPS risk analysis refers to the process of identifying potential hazards, determining the probability of their occurring, and estimating their potential impact within a defined time period. Through this process the risk that each identified hazard poses is determined. Risks are usually considered within a fixed timeframe of one to six months.³

- Risk analysis depends on a solid understanding of the context and on investigating the interaction of the variables that cause or resist change.
- Risk analysis is a process that should be repeated at regular intervals and the change in risk recorded over time.
- Risk analysis improves with time: regular reviews of risks that analyse why previously identified risks did or did not materialise will help strengthen the analyst's ability to create chains of events and assess probabilities. Documenting this builds the evidence base for ACAPS as a whole.
- Risk analysis is not an exact science: an event identified by one analyst as a hazard, might be identified by another as a trigger for different event which the second analyst considers the hazard. This is of little consequence; the important issue is that the sequence of events and a hazard are identified.⁴
- Risk is a function of Severity and Probability: i.e. the risk posed by a potential event increases as either the expected severity of the event increases or the probability that it will occur increases.
- The probability of a risk does not need to be high for it to be of concern. That a hazardous event is estimated to have a 50% probability of occurring should be cause for concern for humanitarians. In some cases a probability as low as 30% (just under a one in three chance of occurrence) may be a concern.
- Risk analysis aims to prompt preparedness by providing early warning of potential crises.



³ At ACAPS risks analysis is scheduled every three months, identified risks are then constantly monitored. Thus there is little value in monitoring potential risks beyond six months.

⁴ See the example on p6

Key terms

Much of the terminology around risk analysis (and scenario-building) is confusing and often mis-used. Different humanitarian organisations use terms in different ways which also often differ from more-widely agreed definitions used beyond the humanitarian sphere. The most important concepts are capacity; exposure; hazard; impact; indicator, probability; risk; variable; and vulnerability. At ACAPS we adopt the following definitions:

Assumption: the direction that a variable can take (e.g. increase, decrease). When an assumption is observed to occur, it becomes an **indicator**.

Coping capacity (often called simply **capacity**): the ability of people, organisations and systems, using available skills and resources, to manage adverse conditions, risk or disasters. (UNISDR).

Exposure: the number of people exposed to the hazard and requiring additional humanitarian assistance as a direct consequence of the hazard materialising (also known as People in Need – PiN)

Hazard: a potential event, process or human activity that may cause significant negative humanitarian consequences such as loss of life, injury or other health issues, damage to or loss of property, social or economic disruption, or environmental degradation. Hazards usually fall into one of eight categories:

- biological
- conflict
- environmental:
- economic;
- geological or geophysical;
- hydrometeorological;
- political; and
- technological

each of which can have many sub-categories. Hazards can also be seasonal events that are anticipated to have a greater than normal impact. See the glossary for further explanation of the hazard types.

Impact: the expected overall humanitarian consequences of a risk. This includes both the increase in the number of people in need of assistance (the exposure of the event), as well as an increase in level(s) and type(s) of need(s) (the intensity of the hazard). Impact depends on exposure to the hazard, the intensity of the hazard, and the population's vulnerability and capacity⁵

Indicator: an event that signals an increased or decreased probability of a hazard occurring. Indicators may be also called triggers. It is simplest to think of an indicator as an event that contributes to the hazard materialising.

Intensity: the degree to which basic needs (i.e. essential goods and services) are affected as a consequence of a hazard.

Probability: the chance of a hazard materialising, usually expressed as a number between 0 and 1, or as a percentage. While the terms likelihood and probability are used interchangeably within

⁵ For a much more detailed explanation of severity see [ACAPS Technical Brief: Severity Measures in Humanitarian Needs Assessments](#)

the humanitarian community, we use probability at ACAPS (see the Probability explained section for more details).

Risk: the probability of a hazard (or multiple hazards) occurring combined with the estimated impact of the hazard(s). In other words: **Risk = Impact x Probability.**

Impact threshold: a threshold below which the expected severity of humanitarian consequences would not require an international humanitarian response.

Variable: a factor that will have a determining influence over the direction the future will take depending on how it changes (varies). Variables are neutral (e.g. conflict, humanitarian access, and food prices NOT increasing conflict; increased humanitarian access; etc.). Variables fall into four categories:

- the current drivers of change;
- possible future drivers of change;
- the resilience/vulnerability of the population; and
- the in-country capacity to respond

Many variables will exist (and many may be inter-related) in any context of which any number could be considered hazards. The essence of risk analysis is to identify the most significant event that directly causes the humanitarian crisis; that is the hazard. The events preceding it are triggers and those succeeding it are consequences.

Vulnerability: the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards. (UNISDR)

Methodology

The process of analysing a risk involves estimating the humanitarian impact of a potential future event (a hazard) or situation and the probability of its occurring. Simplistically stated:

$$\text{Risk} = \text{Impact} \times \text{Probability (of the hazard)}$$

Estimating the impact of a hazard involves considering the number of people that would be in need as a result of the hazard materialising (the exposure); the degree to which basic needs (i.e. essential goods and services) are affected as a consequence of a hazard (the intensity); the underlying vulnerability of the population (both those in need and others affected); and the coping capacity of the affected population and in-country actors. Simplistically stated, Impact is a function of exposure, intensity, vulnerability, and coping capacity:

ACAPS's risk analysis process follows the following steps:

1. **Situation analysis:** understanding the overall context, including resilience and underlying vulnerabilities, as well as understanding the current situation, its drivers, and the in-country humanitarian response capacity.
2. **Identification** of potential hazards.
3. **Estimation** of the potential humanitarian impact (exposure, intensity, vulnerability and coping capacity) of each of the identified hazards, based on expected areas and populations affected, historical precedents, and similar situations elsewhere.
4. **Estimation** of the probability of each of the identified hazards occurring.
5. **Selection** of risk(s) and profiling. Based on a combination of impact and probability scores risks are categorised as negligible, low, medium or high.
6. **Monitoring and revision** of the risks and associated analysis as the situation evolves.

Essentially risk relates to the concept of potential future harm and is a function of the probability of a hazard occurring and the likely severity of the impact of that hazard.⁶ But in order to look forward, we must look at the past as well as the present.

A thorough situation analysis (Step 1) will facilitate the identification of a number of hazards, together with the associated triggers and consequences (Step 2). Each of these chains of events is then considered to estimate the expected humanitarian impact and assigned a rating based on the expected exposure, intensity of the impact, vulnerability, and coping capacity (Step 3) and the probability of the hazard materialising (Step 4). For each hazard a risk rating (negligible, low, medium, high) is calculated (Step 5) and those assessed to be medium or high risks are written up and regularly monitored (Step 6).

⁶ See ODI 2011/01: Risk in humanitarian action: towards a common approach?

Estimating potential impact

The objective of estimating impact is to determine the most probable humanitarian consequences if the risk occurs. The impact is calculated by considering the exposure of people to the shock, the intensity of the shock, and the vulnerability and capacity of those affected:

- ❖ **Exposure** should be expressed as the number of people requiring (additional) humanitarian assistance as a direct result of the hazard.
- ❖ **Intensity** should be expressed in terms of the increase in need (e.g. from moderately to severely food insecure, and/or additional sectoral needs (e.g. in need of food, health, and WASH assistance compared to only food assistance previously). It includes both the level and type of need.
- ❖ **Vulnerability** (which should include consideration of the population's capacity) will have been identified during the situation analysis.

Exposure

We calculate exposure both as an absolute number and a proportion of the total population simply because contexts are very different. An increase of 40,000 people in need in a small country such as Vanuatu is far more significant than in India. For both countries the absolute scale gives an exposure of 2 but on the proportional scale Vanuatu would score 3 and India 1. Expert judgement is required to decide which score to use: likely 3 for Vanuatu and 1 for India.

Score	Total increase in population estimated to be in need (PIN)	Proportion of PIN of total population
1	< 10,000	<5%
2	10,000 – 50,000	5 – 15%
3	50,000 – 100,000	15 – 30%
4	100,000 – 250,000	30 – 50%
5	> 250,000	>50%

Intensity

Intensity is essentially the strength of the hazard (think of the category of a cyclone). It involves estimating the depth to which the affected community will be affected.

Vulnerability

We consider vulnerability and capacity elements together: it involves estimating extent to which the affected community will be affected by the 'shock', taking into account their underlying vulnerabilities as well as any coping capacity or resilience. Combining intensity and vulnerability / coping capacity.

Intensity – vulnerability level		Description of future 'imagined' state	
1	Minor	People are facing none or minor shortages or/and accessibility problems regarding basic services, such as food, health, shelter, and wash. People are able to meet basic needs without having to apply to irreversible coping strategies. There may be some needs but are not life-threatening.	Monitor situation
2	Stressed	People are facing some shortages or/and some availability and accessibility problems in regard to basic services, but they are not life-threatening. Needs are more increased but are still not life-threatening. The affected population can meet their need by applying copying strategies. There may exist localized/targeted incidents of violence and/or human rights violations.	
3	Moderate	People are facing shortages and/or availability and accessibility problems in regard to basic services that cause discomfort and/or high level of suffering which can result in irreversible damages to the health status, but they are not life-threatening. Significant gaps are visible, or people are marginally able to meet minimum needs only with irreversible coping strategies. As a result of shortages and disruption of services, may face potentially life-threatening consequences if not provided assistance. People may also face malnutrition. There may be physical and mental harm in populations resulting in a loss of dignity.	Assistance required
4	Severe	People are facing life-threatening conditions and significant shortages and/or availability and accessibility problems in regard to basic services causing high level of suffering and irreversible damages to health status. People may face severe food consumption gaps and have started to deplete their assets or already face an extreme loss of assets. This may result in very high levels of acute malnutrition and excess mortality. Presence of irreversible harm and heightened mortality as well as widespread grave violations of human rights.	Immediate assistance required
5	Extreme	People are facing extreme shortages or availability and accessibility problems in regard to basic services. Deaths are directly caused by the current conditions and there is widespread mortality. People face a complete lack of food and/or other basic needs and starvation, death, and destitution are evident. Acute malnutrition may be widely reported. They may face grave human rights violations.	

Overall impact

Once you have assigned exposure and intensity ratings for your hazard, combine these two metrics to get a final impact level from the chart below. Hazards that are assessed to have a very low or low impact may be discarded at this stage: they do not reach the **impact threshold** consideration as a risk *unless* there is a compelling reason to do so.

Intensity \ Exposure	1	2	3	4	5	6
5	Very Low	Low	Moderate	Significant	Major	Major
4	Very Low	Low	Moderate	Significant	Major	Major
3	Very Low	Low	Low	Moderate	Significant	Major
2	Very Low	Very Low	Low	Moderate	Significant	Significant
1	Very Low	Very Low	Low	Low	Moderate	Significant

Estimating probability

Probability explained

An event (or hazard)'s probability is the chance of its occurring. Unlike the rolling of a dice, where the probability of rolling a six is known, the probability of most events that would have major humanitarian impacts cannot be computed mathematically, thus a (inherently subjective) judgement must be made.⁷

In humanitarian reports, probability is often expressed in words such as “likely” or “unlikely”, although during the analysis process, ACAPS considers the probability of a risk occurring using percentages (or values between 0 and 1) and the descriptive terms as given in the scale below. Only when writing up the risk is this percentage converted into one of the descriptive terms. Using this approach to probability ensures we are being as structured as possible in our process. In both scenario-building and risk analysis ACAPS uses Medow and Lucey's unequal ranges of probability⁸ These are distributed on a five-point scale as follows:

Very low	Low	Moderate	High	Very high
< 10%	10 - 33 %	34 - 66 %	67 - 90 %	> 90%

Why unequal ranges?

In brief, there is much uncertainty in risk analysis:

- uncertainty about the strengths of the causal relationships between the relevant variables and the hazard
- uncertainty about the impact of the hazard
- the exposure levels we select (half the population; 100,000 people, etc.)
- the probabilities assigned to the variables

Thus having wider ranges in the uncertain centre reflects the inherent uncertainty on the methodology both to reflect the imprecision of risk analysis, and to require increased evidence to assign our potential hazard to the more certain extremes of the range.

Probability v likelihood

Many humanitarians use the term ‘likelihood’ because (in common usage) it carries a sense of being less exact. This is an incorrect use of the word, as likelihood refers to the chance that something one has observed was caused by a specific fact (i.e. how did we get here) whereas probability looks to the future (what is the chance that we will end up there).¹

Note that we do not use the terms ‘unlikely’ and ‘likely’. This is for two reasons. Firstly, to avoid confusion with the term ‘likelihood’ and, secondly and more importantly, because when a hazard is estimated to fall in the low or moderate range, we do not want to think of it as ‘unlikely’ in case that subliminally causes us to ignore it.

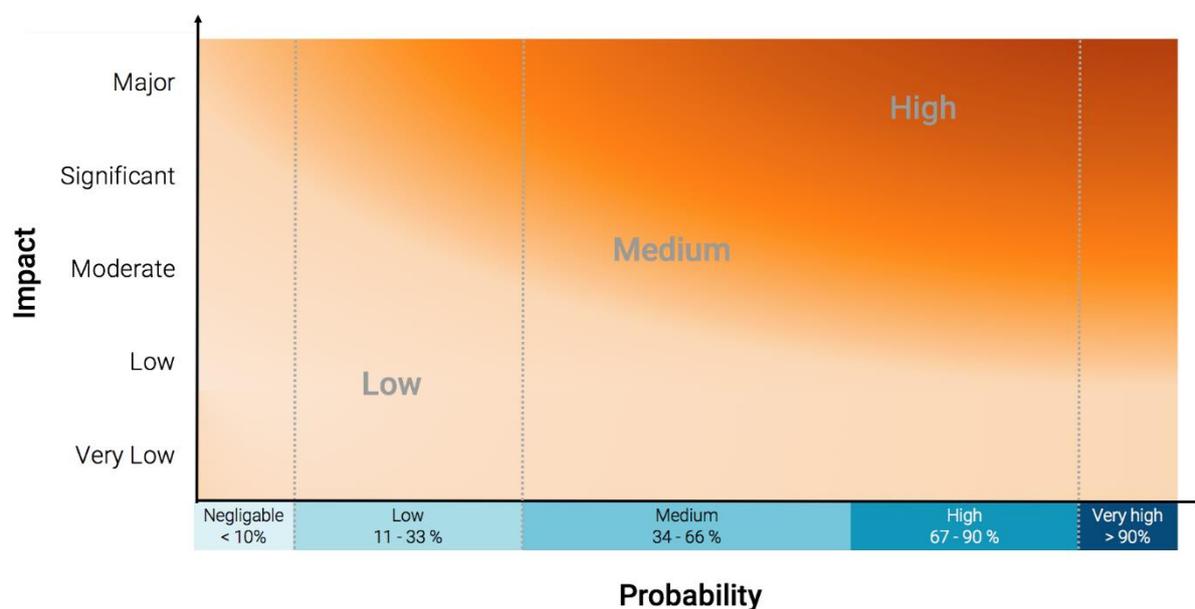
So probability estimates help us prioritise risks primarily by showing which are so improbable that they can reasonably be ignored. If we assess that the probability of any risk is high or very high or very high, then we should act immediately. A risk assessed as moderate should also make us take notice.

⁷ The exception being the forecasting of extreme weather, which is usually reasonably correct, although the severity with which it affects a region is still something of a subjective assessment.

⁸ See [Expert judgment - the use of expert judgment in humanitarian analysis: theory, methods and applications. ACAPS 2017](#) p161-2 for why unequal ranges are more suitable than equal ranges.

Selection criteria

As stated earlier, at ACAPS we define Risk as Probability x Impact. We combine the probability with the impact for each hazard, or combination of hazards using the chart below. This gives us the risk. Risks will fall into one of three categories: Low, Medium and High.



Inclusion criteria

Low risks can be ignored unless there is a compelling reason to do otherwise. For medium and high risks, a risk profile should be written up and monitored. Furthermore:

- Seasonal hazards should only be included if there is evidence that the season will be worse than in a normal year, or when the response capacity is weak (perhaps because resources have been stretched addressing an ongoing situation) and the season can be expected to have substantial humanitarian consequences or when the resilience and coping capacity of the population have been eroded.
- Risks that relate to current or ongoing events should only be included if they represent an escalation that will lead to new humanitarian needs beyond the impact threshold.
- The focus should be on emerging risks rather than trends.

The above criteria are only a guide. If a risk scores as a 'low risk, but you feel that it should be treated as a 'medium' risk do so.