

Tool Name: Risk Indexing	
What is it?	Risk indexing is a systematic approach to identify, classify, and order sources of risk and to examine differences in risk perception.
What can it be used for?	<ul style="list-style-type: none"> • assessing how socially differentiated groups of people perceive risks in terms of identifying risk and its severity • identifying and prioritizing risks by distinct subpopulations • identifying quickly who is experiencing what problems and where, in order to direct further assistance and research (for example, prior to the design of long-term questionnaires and surveys in order to identify which issues should be concentrated on)
What does it tell you?	<ul style="list-style-type: none"> • the nature and variation of risks faced within a population and the causes of heterogeneity in risk perception • the variation in risks experienced subjectively within a heterogeneous population that can occur across space, time, demographic, or economic characteristics • important issues that are underemphasized or overlooked by outsiders • the ranking of the severity of different sources of risk, conditional on the respondent group • the likely impact on risks presented by a proposed policy change
Complementary tools	Social mapping, time line, risk matrix
Key elements	An open-ended questionnaire can be used (see Quinn 2001).
Requirements	
Data/information	The tool generates data; the only prior information required is for establishing the sampling frame.
Time	2 to 3 hours
Skills	Basic mathematical skills
Supporting software	Spreadsheet software for graphing results
Financial cost	The study will cost \$30,000 to \$100,000 as part of a participatory study, depending on the number of communities sampled and the geographical scope of the study.
Limitations	A general problem is that the interconnectedness of challenges faced by local analysts makes categorization of responses rather arbitrary. It is a static representation that captures relatively few aspects of seasonal difference and no changes over years (so a one-off, cross-sectional representation of declared risks experienced or perceived in an unusual year might produce misleading results if interviews are conducted after unusual flooding, drought, or disease outbreaks). Mathematical calculations of the incidence and severity indices might in some circumstances be difficult to explain quickly and clearly in order for local analysts to undertake the process.
References and applications	<p>Quinn, C. 2001. "Risk Mapping in Semi-Arid Tanzania: Review of Common Pool Resource Management in Tanzania." Report prepared for NRSP Project R7857 (DRAFT). http://www.york.ac.uk/res/celp/webpages/projects/cpr/tanzania/pdf/An nex7.pdf.</p> <p>Smith, K., C. Barrett, and P. Box. 1999. <i>Participatory Risk Mapping for Targeting Research and Assistance: With an Example from East African Pastoralists</i>. http://glcrsp.ucdavis.edu/projects/project_subpages/PRMP_folder/PR MPrt3.html.</p>

Risk Indexing: Procedures and Examples

Time, Materials, and Skills Needed

Allow two to three hours to conduct and analyze a participatory risk indexing exercise and to ensure that a full discussion occurs with local analysts.

Markers and large sheets of paper are required. Notebooks/paper and pens will be needed to for local analysts to make notes/lists and for the note-taker to record the discussion generated. A calculator might be needed.

The discussion group will include a facilitator, observer/note-taker, and selected local analysts. The facilitator and observer/note-taker should be experienced in both the principles behind the use of participatory tools and methods as well as in their practical use.

Possible Approach

The following approach is a general example that can be adapted to suit the local context, views of local analysts, and the research objectives.

Step 1: Select Local Analysts. Identify the groups of people to talk to about their perceptions of risk. These decisions will be based on the objectives and depth of information required for the research. For example, separate gender groups might be useful in order to obtain different perspectives regarding the incidence and severity of risk. However, it might also be necessary to break down the population into further categories (such as occupation, location, age, and so on). Separate groups of about 10 local analysts should reflect any relevant and important social divisions.

An alternative option is to conduct individual interviews and select respondents opportunistically or purposively (see Quinn 2001).

<http://www.york.ac.uk/res/celp/webpages/projects/cpr/tanzania/pdf/Annex7.pdf>).

Step 2: Provide Introductions and Explanations. When working with each group, the facilitator and observer/note-taker should begin by introducing themselves and explaining carefully and clearly the objectives of the discussion and exercise. Check that the local analysts understand and feel comfortable with what will be discussed.

Step 3: Produce a Risk Index. Ask the local analysts to discuss among themselves and to list their perceptions of major risks of any type that are encountered in their community.

Ask the analysts to rank the risks they have identified. This could be done through matrix ranking (especially within a group) or by simply assigning a value of 1 to the risk identified as most severe, 2 to the risk identified as second-most severe, and so on. Risks thought to be equally severe can have the same number, with any subsequently ranked risks picking up the numbering accounting for ties (that is, 1, 2, 3, 4, 5, 6, 7, 8, 9...). At this stage the analysts should not attempt to define the severity of the risks.

After ranking all the risks, ask the local analysts to discuss each in turn, ensuring that the discussion includes how they solved each of these problems in the past, why they can no

longer solve the risk, and how they would like to solve them, if they had not already addressed these issues. Use questions to probe further where appropriate to get more details or pursue related topics.

It is important that local analysts decide the major risks they face rather than being told to choose from a biased list from the researcher. The possible problem of risk inter-relatedness can be addressed by noting risks individually unless mentioned in the same sentence, in which case they are considered as one risk (such as if both insecurity and animal health are mentioned as problems, they are noted as individual risks and the distinctions drawn by local analysts are maintained even though they might both influence food security. If, however, drought or livestock losses due to drought and food shortage are mentioned in the same sentence, all are considered as one risk).

The list of risk categories is then used to create an “incidence” index and a “severity” index for each risk. These methods are described in step 4.

Step 4: Analyze a Risk Index. The subjective *incidence index* for the group (for example, of women from a particular ethnic group or of male pastoralists) is calculated as a simple proportion of the number of analysts who identified a particular risk out of the total number of analysts in the group. This gives a figure of between zero (no one affected) to one (all affected) and shows how widespread the risk is perceived to be within the group.

The *severity measure*, which shows the perceived severity of the risk compared to all the others identified, is slightly more difficult to calculate because the total number of risks identified by different groups might differ significantly (for example, one group might identify and rank five risks, another group three risks, and another group eight risks, and so on). An approach to overcome this difference is to use an index method that puts the risk severity into a range of between one (most severe) and two (least severe). The most severe risk, therefore, always has an index value of one, the least severe always two, and those in between are converted onto the index scale and given equally spaced intermediate values. The severity index value for each risk is calculated using the following formula:

$$\text{Severity Index Value} = 1 + \frac{(r - 1)}{(n - 1)}$$

where r is the rank of a risk among a total number of n risks identified.

The severity index value is calculated for each group and then the mean value is calculated from the subset of local analysts who identified the particular risk. In this way the severity of the risk is separated from the incidence.

The two distinct index measures can also then be combined to produce a joint index measure based on a context-appropriate weighting of severity and incidence, which can be calculated using the following formula:

$$\text{Risk Index} = \frac{\text{Incidence index value}}{\text{Severity index value}}$$

This joint measure is useful because the index then ranges from zero (zero incidence) to one (universally most serious risk) and is easy to compare and analyze. The figures can be analyzed to compare particular risks across population subgroups and different risks within the same subgroup, which can be useful for targeting policies and programs to areas that will produce greater impacts.

All the index measures can be shown graphically; it is also possible to geo-reference the data using a global positioning system (GPS) and to show the spatial/ecological differences in risk incidence and severity in a geographic information system (GIS) display. When updated periodically, seasonal or other periodicity in local analysts' experience of risk can also be shown.

Step 5: Conclude the Activity. Check again that the local analysts know how the information will be used. Ask the analysts to reflect on the advantages, disadvantages, and the analytical potential of the tool. Thank local analysts for their time and effort.

Points to Remember

Good facilitation skills are key. The approach outlined above is a general guide; be flexible and adapt the tool and approach to local contexts and needs.

Case Study Example: Risk Indexing by East African Pastoralists

This tool was developed to be a systematic but simple approach to classifying and ordering sources of risk faced by pastoralist populations in the arid and semi-arid lands of southern Ethiopia and northern Kenya who are regularly affected by a wide variety of shocks (such as droughts, floods, animal or human disease, conflict, border closures that restrict mobility, market access, grain and livestock prices, crop or livestock destruction by wildlife, and so on).

In order to identify and prioritize risks by distinct subpopulations, data were collected over six months by interviewing 120 groups within the study region (49 from Ethiopia and 71 from Kenya). Of these, 59 comprised women and 61 men. Attempts were made to interview one group of men and one group of women from each community, but this was not always possible. Some interviews were conducted opportunistically (such as with people who had come to town for the day).

The groups' responses were categorized into 15 major sources of risk: livestock prices; pasture access and quality; food availability; water availability; crop failure; crop destruction by wild animals; livestock disease; ethnic conflict, banditry, and raids; human illness (mainly malaria); access to a health clinic; access to shops; access to a school; ability to pay school fees; the need to relocate often; and transport and road conditions.

Table 1 presents the risk index both for the full sample and for a variety of subgroups. The index ranges from zero (no incidence) to one (universally most severe risk).

Table 1. Summary Subjective Risk Index

Source of risk	Full Sample	Ethiopia	Kenya	Female	Male	Poor	Middle	Wealthy	Agricultural	Agro-pastoral	Pastoral
Sample size	120	49	41	59	61	60	36	24	21	31	68
Food availability	0.56	0.69	0.47	0.64	0.48	0.62	0.48	0.51	0.37	0.60	0.60
Water availability	0.53	0.46	0.59	0.46	0.60	0.52	0.48	0.62	0.65	0.49	0.51
Animal disease	0.31	0.3	0.32	0.24	0.21	0.26	0.33	0.13	0.16	0.35	0.35
Access to health clinics	0.23	0.23	0.24	0.21	0.26	0.33	0.13	0.15	0.38	0.27	0.17
Livestock prices	0.15	0.15	0.14	0.08	0.21	0.08	0.25	0.16	0.07	0.13	0.18
Conflict/violence	0.14	0.06	0.19	0.15	0.13	0.20	0.15	0.00	0.09	0.11	0.17
Access to schools	0.12	0.17	0.09	0.12	0.12	0.16	0.11	0.05	0.21	0.14	0.09
Human disease	0.09	0.12	0.08	0.09	0.10	0.12	0.12	0.00	0.06	0.00	0.15
Wildlife crop destruction	0.07	0.01	0.11	0.08	0.06	0.04	0.17	0.00	0.21	0.08	0.02
Availability of farm inputs	0.07	0.16	0.00	0.06	0.07	0.09	0.04	0.07	0.15	0.11	0.02
School fees	0.06	0.00	0.09	0.07	0.04	0.08	0.06	0.00	0.06	0.05	0.06
Crop failure	0.05	0.11	0.08	0.03	0.07	0.04	0.09	0.00	0.10	0.04	0.04
Access to transport	0.05	0.01	0.08	0.03	0.07	0.02	0.12	0.02	0.08	0.03	0.05
Pasture availability	0.04	0.05	0.04	0.01	0.08	0.03	0.03	0.11	0.05	0.02	0.05
Consumer goods availability	0.04	0.02	0.05	0.05	0.03	0.04	0.01	0.09	0.02	0.02	0.05
Spatial mobility	0.01	0.00	0.01	0.02	0.00	0.01	0.01	0.00	0.00	0.00	0.01

Source: Smith, K., C. Barrett, and P. Box 1999.

The figures can be analyzed to compare risks across population subgroups and between risks within the same subgroup. For example, table 1 shows that the main problems across the whole population are insecure access to food and water. Outside of food and water shortage, none of the other 13 risks were declared by a majority of respondents. The frequency and severity of risks were also broken down by population subgroup (such as by country, gender, wealth category, and primary economic activity) with several differences being clear. For example, conflict is ranked as the most serious risk among the poor group, the second-least ranked risk among the middle group, and not mentioned at all among the rich group.