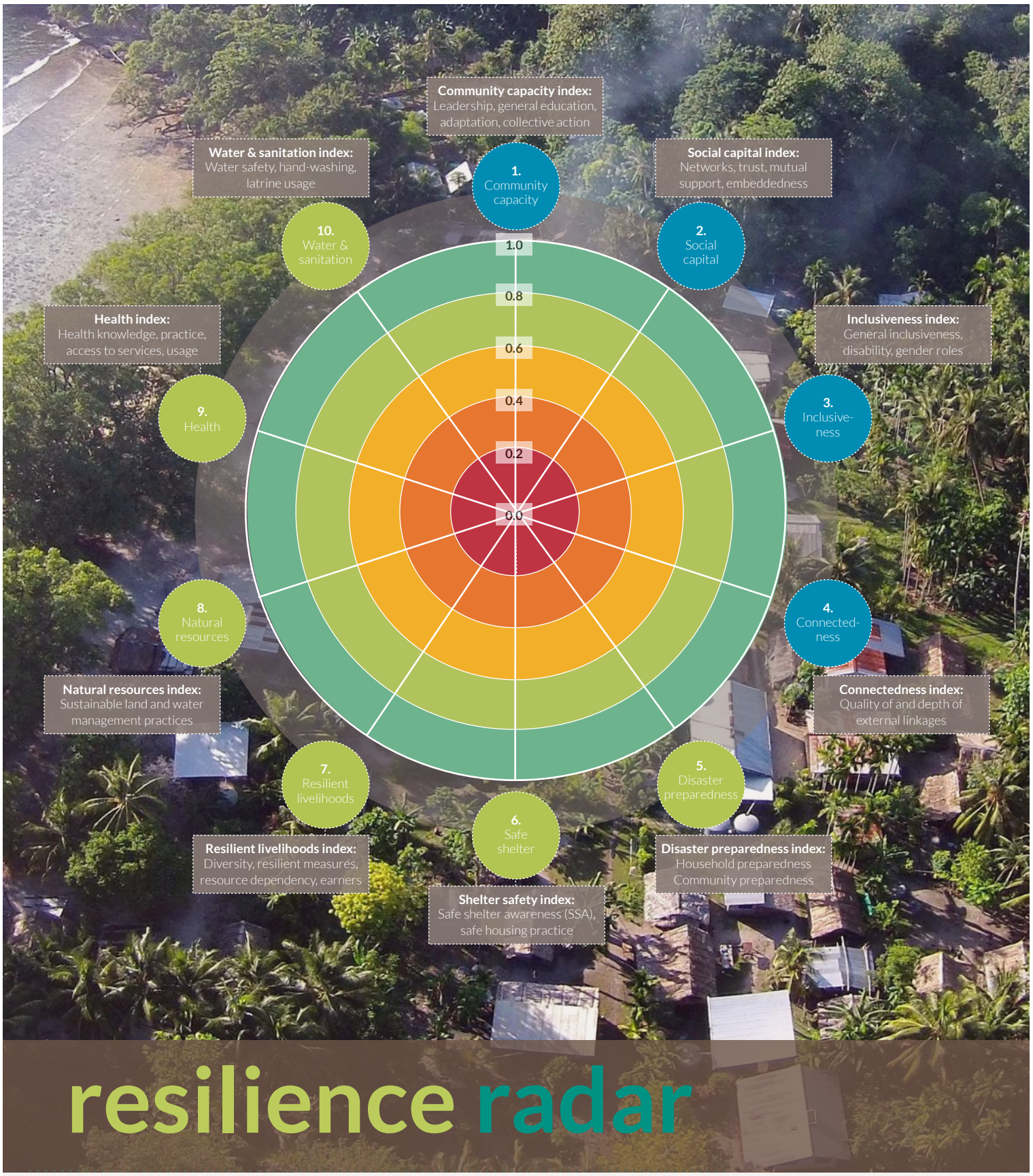

resilience radar

user manual

Version 1.1
April 2017

a practical tool to measure community resilience

banyaneer™

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Resilience radar - user manual.
A practical tool to measure community resilience.

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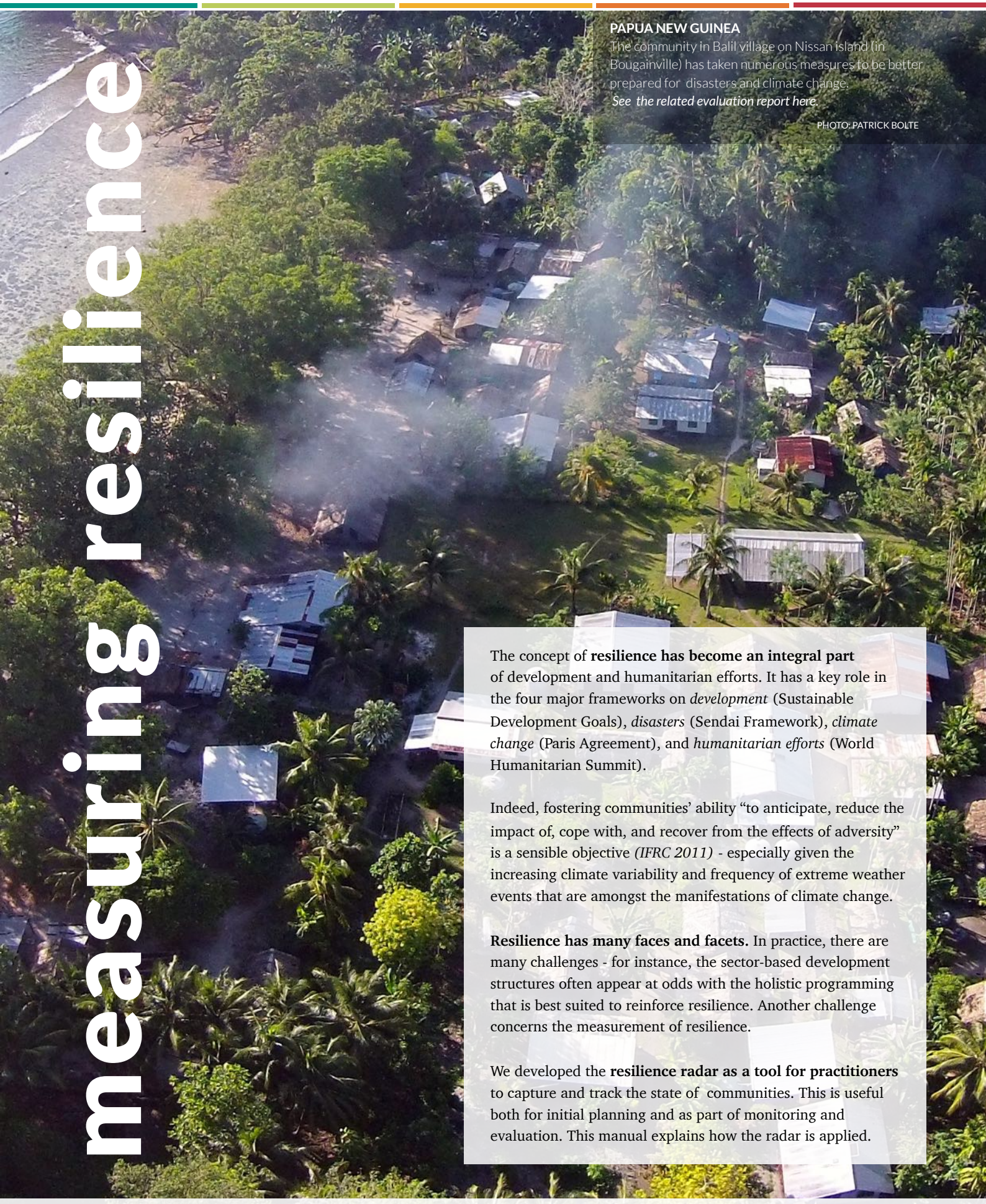
how do you **measure resilience?**

measuring resilience



PAPUA NEW GUINEA
The community in Balil village on Nissan island (in Bougainville) has taken numerous measures to be better prepared for disasters and climate change.
See the related evaluation report here.

PHOTO: PATRICK BOLTE

The concept of **resilience has become an integral part** of development and humanitarian efforts. It has a key role in the four major frameworks on *development* (Sustainable Development Goals), *disasters* (Sendai Framework), *climate change* (Paris Agreement), and *humanitarian efforts* (World Humanitarian Summit).

Indeed, fostering communities' ability "to anticipate, reduce the impact of, cope with, and recover from the effects of adversity" is a sensible objective *(IFRC 2011)* - especially given the increasing climate variability and frequency of extreme weather events that are amongst the manifestations of climate change.

Resilience has many faces and facets. In practice, there are many challenges - for instance, the sector-based development structures often appear at odds with the holistic programming that is best suited to reinforce resilience. Another challenge concerns the measurement of resilience.

We developed the **resilience radar as a tool for practitioners** to capture and track the state of communities. This is useful both for initial planning and as part of monitoring and evaluation. This manual explains how the radar is applied.

Five questions...

What is the resilience radar?

The resilience radar is a tool to assess and illustrate the resilience level of a particular target group - one or several communities supported by a development project. It consists of ten indices, each of which has a possible score between 0.0 and 1.0. These indices refer to the underlying processes and outcomes of resilience, and are based on a standard survey. Survey responses are interpreted as numerical values; the result to each question can be easily read in a single chart - making it easier to understand what the data tells us.

The resilience radar has the greatest value if it is applied at least twice - at the start of a project (baseline) and at the end of it (endline). It has **two important functions**. *First*, the baseline pattern helps to identify needs that a project may seek to address. *Second*, the comparison between baseline and endline patterns shows where changes have occurred over time - supporting the eventual attribution of project impact.

Who is the resilience radar for?

The radar is designed for all project managers and monitoring staff involved in projects that aim to reinforce community resilience. It can be applied 'as is' or modified and expanded to the needs of a particular context. The resilience radar benefits managers by providing a starting point for initial assessments, thus helping to design the overarching direction of a project: which dimensions deserve most attention; to what extent can programming build on existing strengths? The entire questionnaire or sections of it can be re-applied several times throughout a project, thus tracking progress and helping to identify challenges as they emerge.

What are the limitations?

Three limitations should be noted. *First*, the radar measures resilience as inherently defined by the ten indices and underlying questions.[1] While the tool construction considered existing literature, there are many interpretations of the resilience concept. The resilience radar implies a mixed role of (general) processes and capacities and (sector-based) outcomes. It refrains from weighting the ten dimensions and implies equal roles of these dimensions.

Second, it should be noted that as a quantitative tool, the radar has limited ability to investigate certain outcomes: it may show for instance that a community has poor links to external actors, but says little as to *why* they are poor. The use of complementary qualitative tools is therefore recommended.

The *third* limitation is that the dual application of the radar (baseline/endline) does not in itself assess impact but merely observes change. Banyaneer can provide optional add-on modules (e.g. to what extent has the project played a role behind this change) when needed.

What you will need...

The resilience radar is based on household surveys. Project managers thus need to ensure that teams are capable to run such surveys. While the questionnaire and basic elements of data analysis come with the resilience radar, one still needs to be able to prepare the sampling frame (how many households/who needs to be interviewed?), and to collect the data. If additional analysis is required (e.g. impact analysis), some statistical knowledge is needed.

At Banyaneer, we offer support in two ways: we provide general baseline survey training that builds the required expertise of your team in conducting surveys. We also offer on-demand advice for specific challenges (e.g. sampling, data analysis). Such intermittent support can be provided remotely, and is a cost-effective way to help you get the results you need.

How should this manual be used?

The resilience radar consists of five elements: the questionnaire, a supplementary sheet, an illustrations chart for enumerators, the data analysis sheet, and this manual. **Read this manual first!**

The manual is structured in four chapters: *Chapter 1* provides a general description. *Chapter 2* discusses the ten separate indices (why are they included, which questions are to be asked, how question results are turned into index scores, and what a particular score tells you). *Chapter 3* provides guidance for amending the radar and for any challenges that may occur in the process.

We hope you will find the resilience radar useful, and that it will guide and help assess your work in reinforcing the resilience of the communities you support. Banyaneer provides the basic tool free of charge, and we welcome any feedback on your experience.

1. One particular problem with measuring resilience concerns the 'circular logic' (see Winderl 2014:16). Because *actual* resilience is extremely difficult to measure (e.g. whether a community *actually* recovers more rapidly from a disasters), tools measure proxies or 'characteristics' supporting resilience instead, assuming that high proxy values correlate with a high level of actual resilience .

   The circular logic that Winderl and others criticize is this: Assume you have an effective livelihood intervention and measure a livelihood proxy before and after your intervention. If the endline value is higher than the baseline value, this may indicate that the intervention has been effective.

   As Winderl points out, this does however not necessarily mean that the community is *actually* more resilient (because we do not know for sure that the proxies are right). Like other tools, the resilience radar cannot completely escape from this problem. However, by combining outcome and process indices, the chances are that high scores do correlate with *actual* resilience.

Why (and how) we built the resilience radar

From Laotian hillsides to atolls in Papua New Guinea, from Myanmar's mountains to typhoon-hit areas in the Philippines: since the start of Banyaneer, we have been fortunate to visit more than 400 communities - evaluating or advising development projects.

Most of these projects aimed to reinforce the resilience of the communities they were working with. Over the years, two questions emerged that kept us exploring: **first**, what makes a community 'resilient'? **Second**, how can one measure the level of resilience? The resilience radar is our (imperfect) answer to both questions.

A look at the extensive literature was our starting point. While there is debate over the definition of **resilience**[2], most authors would agree that resilience is not merely the sum of specific capacities (such as the existence of an early warning system), but that less tangible aspects such as **social capital**, **connectedness**, and **general community capacity** (at problem-solving, adaptation etc) matter at least as much. This matches our experience, and helps explain why amongst those communities supported by the same project, some 'perform' better than others.[3]

As part of one evaluation, we asked 30 communities in India to weight different aspects on their relative importance in making them resilient. Out of four broad categories (economic, knowledge, social and governance factors), the communities rated social factors[4] as the most important (29.6%).

But if these 'intangible' dimensions related to underpinning processes matter so much, development practice appears to show that many projects do not consider them enough.

We therefore decided that a resilience-related tool would have to **make the 'intangibles' tangible**.

Furthermore, we realized that many resilience projects are somewhat hamstrung by the sector-based expertise and structures of their organizations (and indeed their donors). In practice, this translates to many resilience projects being based on the formula '**single sector plus X**' - taking an organization's core expertise (or direction of the donor call) as a starting point, and adding another sector (often through the formation of consortia).

By contrast, a more needs-based and comprehensive design may be better suited to reinforce resilience. However, we have yet to see such open-ended approaches in practice (where community needs and priorities shape a project, no matter what sectoral expertise will be required to address these priorities. Our ambition for a resilience tool was thus to **illustrate the holistic nature of resilience**.

Our hope is to spark **truly integrated multi-sectoral projects that also capture and build on the 'intangibles'** - the process dimensions of community capacity, social capital, inclusiveness, and connectedness.

This takes us to the question of **measurement**. How did we decide that one dimension should be included while leaving out another one? How did we select sub-components, questions, and ascriptors, and index formulae?

There are **three points** we would like to raise.

First, the resilience radar is inevitably based on a **compromise**. On the one hand, we wanted to include all main dimensions of resilience. On the other hand, we wanted to keep the length of the survey acceptable, and thus had to limit the number of questions (the questionnaire includes 99 questions). In order to solve this dilemma, we did two things: we focussed on what we thought as being most critical. And we kept the radar flexible - if you need to gather more detail on a particular dimension, you can simply add questions. See chapter 3 for further advice on amending the radar.

The *second* point concerns **weights**, or the question as to whether one dimension is more important for resilience than another (and if so, by how much?). In the absence of valid and universally applicable information, we decided against weights for the ten dimensions.

In fact, we chose a radar chart as the overall illustration, and refrained from aggregating data further into a single 'resilience index'. Thereby, we avoid the dilemma of unknown weights, while also illustrating the complexity of resilience. Admittedly, this radar solution does not solve the issue of weights - nonetheless, we think that it provides a useful tool for development practice.

2. The debate on resilience is too complex to be summarized here - we adopt the definition proposed by IFRC of resilience being the ability "to anticipate, reduce the impact of, cope with, and recover from the effects of adversity". See appendix C for the list of key publications reviewed when preparing the resilience radar.

3. This observation should be familiar to most development practitioners. In our experience, the strength of social capital is indeed one of the key 'success' factors, along with a strong 'transmission belt' (good information flow between project team and communities) and a flexible project frame (that leaves room for communities to plan interventions).

4. The research in the two Indian states of Tamil Nadu and Andhra Pradesh was carried out through community workshops in 30 villages. We first discussed the concept of resilience, and then conducted a piling exercise: tasked to illustrate the proportional relevance of 13 factors, villagers were asked to place a finite number of stickers on a flipchart grid. The 13 factors were classified in four categories: **economic aspects** (quality of houses, level of savings, diversity of livelihood), **knowledge aspects** (education level, knowledge of disaster preparedness, health-related knowledge), **social aspects** (mutual support, women's involvement, civic engagement, support from relatives elsewhere), and **governance aspects** (connectedness to government and external actors, quality of public infrastructure, and quality of public services).

Seven of the ten dimensions include sub-indices, and again, we refrained from assigning weights: the overall index is the average of its sub-indices (technically, we thus assume equal weights). The only exception to this rule concerns the safe shelter index (SSI). This index consists of safe shelter awareness (SSA) and safe shelter practice (SSP). Sufficiently confident that safe houses matter more than knowledge thereof, we assigned twice the weight to practice than we assigned to awareness (see more on this matter in part 2.6).

The *third* point concerns **ascriptor values** - the numbers we use to interpret the answer options. Given the score range of all indices (from 1.00 to 0.00), we naturally gave 1.00 for the 'best' option and 0.00 for the 'worst' in terms of resilience. With very few exceptions, all other options in between have ascriptors that represent equal intervals. For instance, questions with four answer options have ascriptor values of 0.00, 0.33, 0.67 and 1.00.

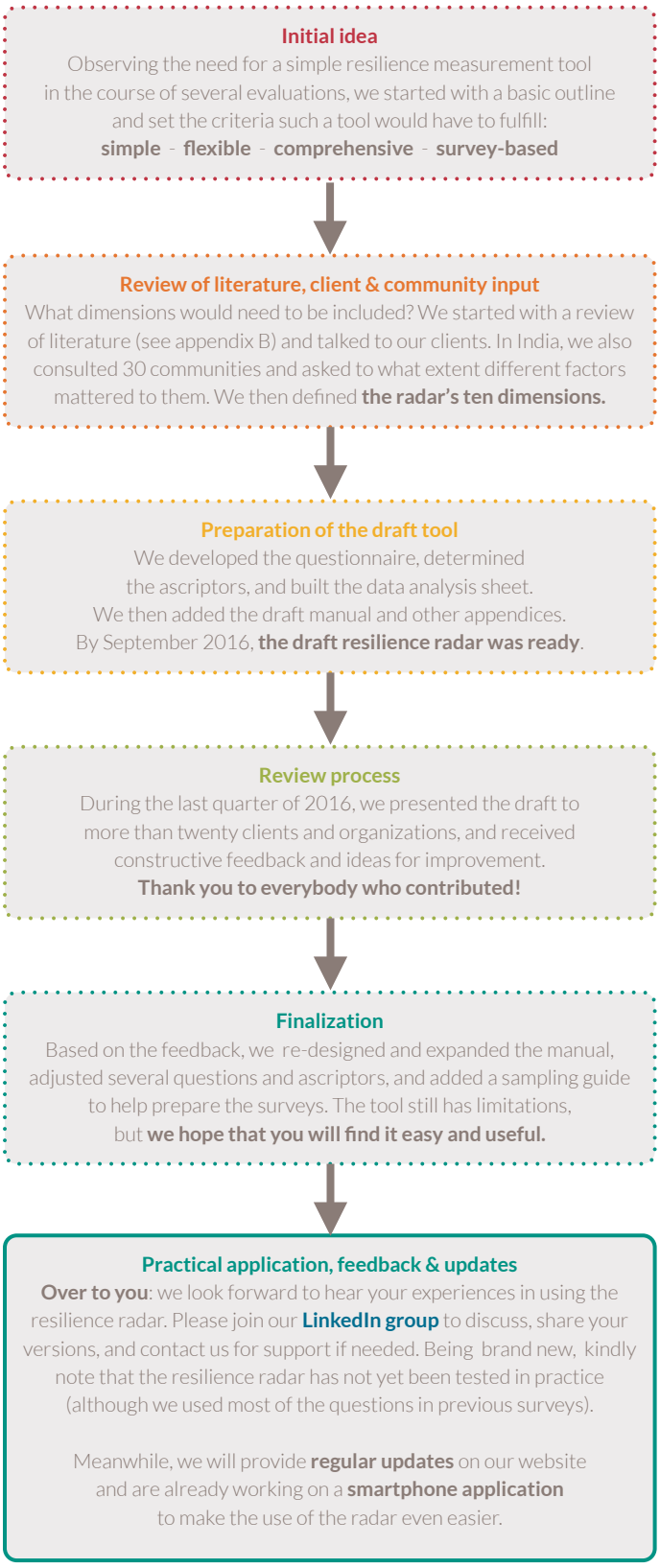
In terms of dimensions that have been left out, there were some contestants - in particular, education, nutrition, and power. Education and power are in fact not entirely excluded but subsumed under community capacity and inclusiveness (to limited degrees). With regard to nutrition, we felt that the link to resilience is too much a long-term relation. However, in response to feedback, we added food security as a sub-index to resilient livelihoods.

In summary, the resilience radar is as much an imperfect tool as it is an experiment (that we hope will prove useful nonetheless). It enables the measurement of the ten dimensions, comparisons over time (baseline versus endline) and between nearby communities (e.g. target versus control group). It enables the measurement of resilience as inherently defined by the radar.

The pay-off for its flexibility (that we see as paramount) is the limitation in terms of comparing data between separate surveys. A recent paper on the four global development and humanitarian frameworks recommends to jointly track progress (see Peters et al. 2016:12). With its flexibility, the radar will not automatically generate the desired meta-data - however, it can help track progress for individual communities and project areas.

We hope that you will take part in this experiment - applying the radar, amending it to your context, and sharing experiences and resources with others. Please join our LinkedIn group and discuss with other users.

We see this version of the resilience radar as the starting point of an ongoing process of elaboration and refinement. At our end, we look forward to this process, and will do what we can to facilitate exchange and improvement. Together, let us build a community of practice, help advance resilience, and document the progress with robust data.



1. Introduction

CAMBODIA
In Ratannakiri's Prak village, farmer Kham Thong sits in front of his vegetable garden and pond - created with the support of Annâdya, an EU-funded food security project that also addressed many other challenges and led to a more resilient community. *See the related case study here.*

PHOTO: CEDRIC DELANNOY

The concept of **resilience** has become integral to most development and humanitarian programming. The idea that communities are able to "anticipate, reduce the impact of, cope with, and recover from the effects of adversity without compromising their long-term prospects" (IFRC 2011) has indeed become one of the key objectives of many development projects.

At the same time, the concept has been criticized for being too vague, and there is much debate as to how resilience could be measured. For programme managers, a related question concerns practical action: how can resilience be actually reinforced? Despite the rhetoric, "the danger is that 'resilience' provides a new term, but no new action on the ground" (Matyas/Pelling 2015).

Indeed, there are many challenges to reinforce resilience in practice. Two key concerns relate to the measurement of resilience, and the challenge to develop the holistic expertise required.

We developed the resilience radar to address both challenges. While we do not claim that the radar is the ultimate definition or solution for measuring resilience, we believe that it represents a sound compromise between practical needs and academic concerns.

As such, the radar not only captures the usually intended outcomes related to various sectors, but also the rather intangible aspects of resilience, such as **social capital** and general **community** capacity.

Being such a rounded tool, it also provides guidance for holistic programming, highlighting both strengths and areas of concern in a given community.

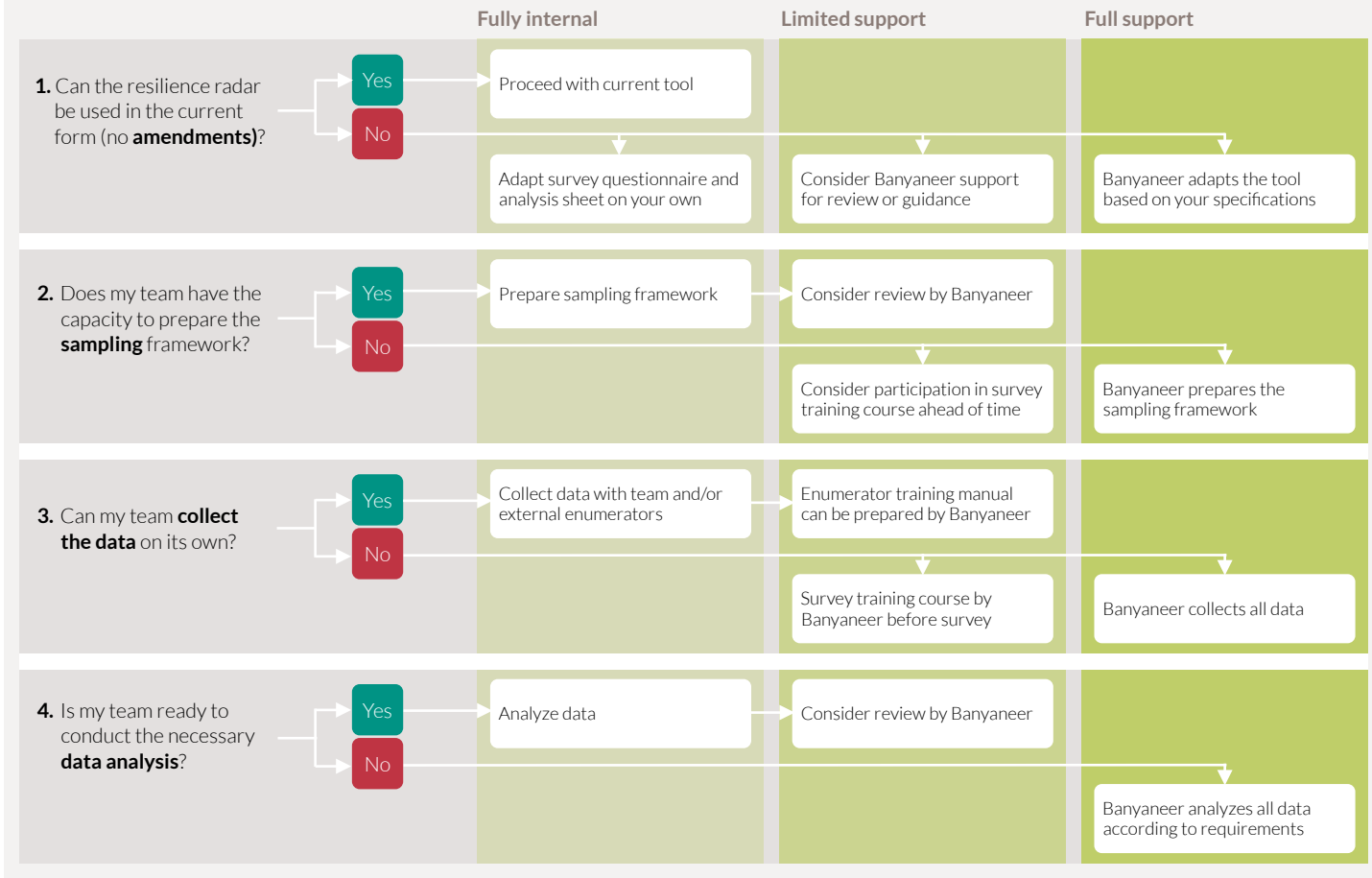
The resilience radar includes five components: **this manual**, the survey **questionnaire** *(appendix D)*, the **data analysis sheet** (that generates the resilience patterns based on survey data, *appendix E*), a **visual guide** for shelter questions *(appendix F)*, and a **supplementary sheet** for health questions *(appendix G)*.

Note that on its last page, this manual includes a **glossary** (**key terms** listed in the glossary are highlight in red) and the **list of abbreviations**. The illustration on the next pages shows what an **actual radar chart** may look like.

Get started by having a closer look at the overall logic of the radar before turning to the ten indices in chapter two. **Then** familiarize yourself with questionnaire and data analysis sheet, and **explore** how you may use the radar in the context of your project. The resilience radar is flexible - you can amend the Word-based questionnaire (and add a local language) and the Excel-based data analysis sheet. See chapter 3 for further guidance on amendments.

The chart below lists the support options for using the resilience radar - ranging between the free 'no frills' option to a complete package delivered by Banyaneer.

Using the resilience radar: what level of support do you require?



Illustrated: what a baseline and endline looks like on the resilience radar

Understanding the chart
Each radial line represents one of the ten dimensions. There are four dimensions mainly related to **processes** (shown in blue) and six dimensions mainly related to **outcomes** (shown in green). The strength of the community on each dimension is measured and expressed by an index. The lower a respective index value is, the closer it is to the center of the circle. Each index has a range between 0.0 (which falls into the center) and 1.0 (which falls on the circle's outer border).

Baselines and endlines
The chart shows the results of two surveys - one conducted as a baseline (red) and one as an endline (green). The index values are plotted onto one of five colour-coded rings, ranging from red (very low score) to aqua (very high score). These index values (dots) are linked to each other: the red line represents the **resilience pattern** found by the first survey. Similarly, the green line shows the resilience pattern by the second (endline) survey.

What does the chart tell us?
In this example, the change that has occurred between the two surveys can be easily grasped. As the green resilience pattern (endline) is larger than the red pattern (baseline), the assessed community is found to have increased its level of resilience. On all ten dimensions, the endline value is greater than the baseline value.

Both lines have shaded bands around them that signify the level of uncertainty ***(see box below)***. Where there is no overlap between baseline and endline bands, there is a **statistically significant change**. In the example, this is the case in all but three dimensions - safe shelter, resilient livelihoods, and natural resource management. On those three dimensions, the endline value is still greater - but we do not know with certainty that the actual score has increased amongst the entire community.

Key

Dimension mainly related to **processes**

Dimension mainly related to **outcomes**

Colour ring	Index score	Interpretation for resilience
	0.81 - 1.00	very high
	0.61 - 0.80	high
	0.41 - 0.60	medium
	0.21 - 0.40	low
	0.00 - 0.20	very low

The increase from baseline to endline value may be due to the project for which the surveys have been applied - as well as due to other factors. The change must not be misunderstood as impact - but can be examined in an impact assessment (when coupled with attribution questions such as 'to what extent has the project played a role')?

The tool is a useful reminder of the **holistic nature** of community resilience, and thus a call to action across multiple sectors or fields. In the example baseline, we see for instance that the community scores low (orange) on five dimensions and 'medium' (yellow) on five others.

How does it work?
Once the survey data is available, you will need to copy and paste it into the data analysis sheet. The radar chart is then automatically generated, and can be used as an image in project reports.

Can I make changes to the radar?
Yes. The resilience radar is meant as a template that you can adjust to your needs. You can add or change dimensions or the underlying questions, but will need to adapt the data analysis sheet accordingly. Banyaneer can help to make these changes, and check that everything works as it should ***(see support options on page 8)***.

Advanced | The bands - dealing with uncertainty

The values of each of the dimensions of the resilience radar come with a level of uncertainty (unless the entire population is sampled) that results from a combination of the individual components' uncertainties that constitute that dimension.

For example, the resilient livelihoods dimension is computed as the average of five components (livelihood diversity, resilient measures, natural resource dependency, income earners, food security). Knowing the **sampling** design of the survey (stratified, clustered, multi-stage), uncertainties of these components can be quantified individually.

These individual uncertainties aggregate to the overall uncertainty of the respective dimension according to the law of error propagation. Applying this law requires the entire survey data set, in order to estimate the inherent correlation structures between the components and their individual uncertainties.

With these overall uncertainties, the lines on the resilience radar turn into bands that highlight the ranges in which the true values of the different dimensions lie. This is particularly useful when comparing baseline and endline radars in the same plot, as non-overlaps between these bands indicate statistically significant differences. Note that a significant difference may exist even in case of overlapping bands.

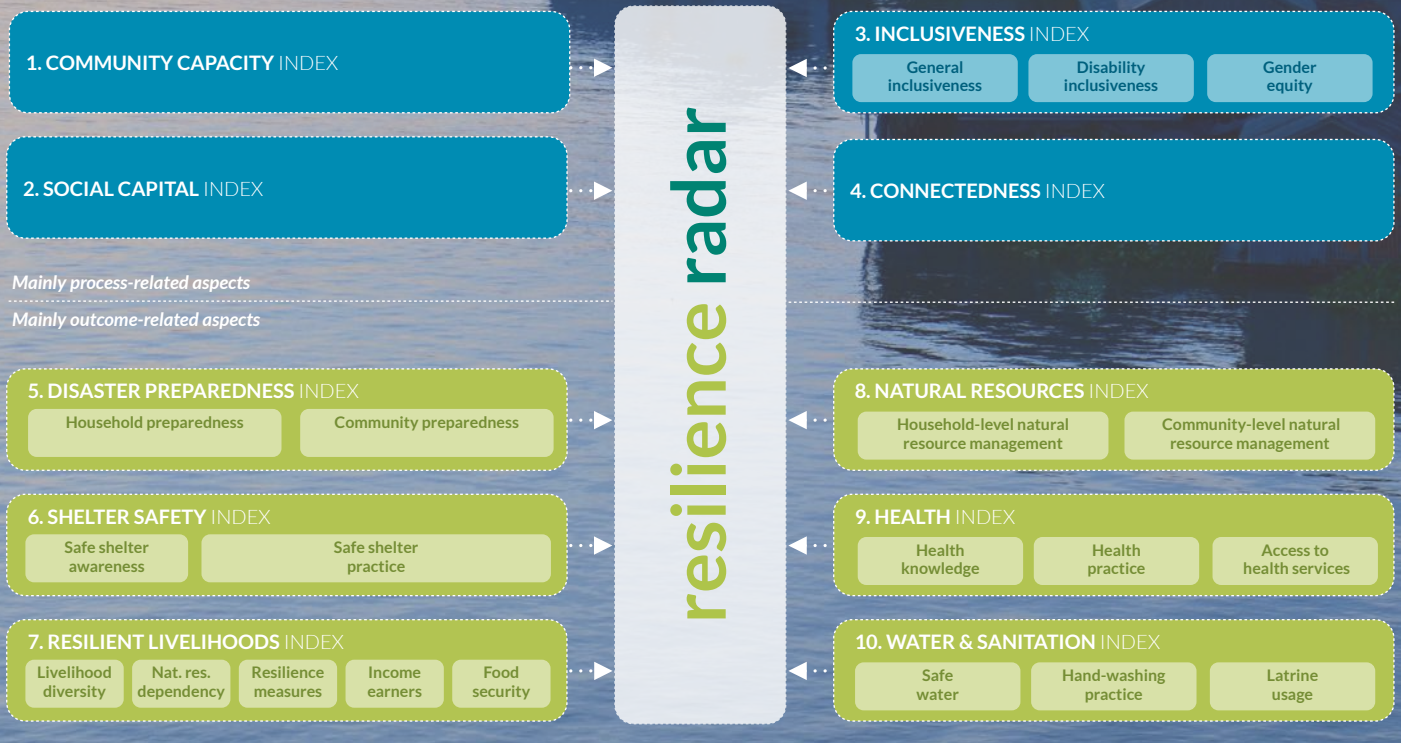
2. The indices

In order to measure the level of resilience of your target community, you will need to conduct a **household survey**. All surveys need to be well-prepared - in particular, you will need to develop a **sampling framework** and a **survey questionnaire**.

For the **resilience radar**, you may use the standard questionnaire provided. If you would like to add, change or delete questions, see chapter 3. If you are unsure about your sample size or other matters around surveying, we recommend you take part in one of our baseline survey training courses, or request remote on-demand support from Banyaneer.

VIETNAM A floating village in Vietnam's Mekong Delta: while houses are safe from changing water levels, the population in this region is faced with many challenges related to the interplay between climate change and natural resource management practices.

PHOTO: PATRICK BOLTE



2.1 Community capacity [CCI]

CCI	Community capacity	Strongly agree	Rather agree	Neither	Rather disagree	Strongly disagree
A.1	My community has **effective leaders.**	1.00	0.75	0.50	0.25	0.00
A.2	My community has the **resources** it needs to take care of its community problems.	1.00	0.75	0.50	0.25	0.00
A.3	My community supports programmes for **children and families**.	1.00	0.75	0.50	0.25	0.00
A.4	People in my community are able to get the **services** they need.	1.00	0.75	0.50	0.25	0.00
A.5	People in my community know where to **get things done**.	1.00	0.75	0.50	0.25	0.00
A.6	People in my community **communicate with leaders** who can help improve the community.	1.00	0.75	0.50	0.25	0.00
A.7	People in my community **work together** to improve the community.	1.00	0.75	0.50	0.25	0.00
A.8	My community looks at its successes and failures so it can **learn from the past**.	1.00	0.75	0.50	0.25	0.00
A.9	My community **develops skills and finds resources** to solve its problems and reach its goals.	1.00	0.75	0.50	0.25	0.00
A.10	My community has **priorities** and sets goals for the future.	1.00	0.75	0.50	0.25	0.00
A.11	My community **keeps people informed** about issues that are relevant to them.	1.00	0.75	0.50	0.25	0.00
A.12	I get **information** through my community to help with my home and work life.	1.00	0.75	0.50	0.25	0.00
A.13	People in my community **trust public officials**.	1.00	0.75	0.50	0.25	0.00

The questionnaire's first section revolves around general community capacity and includes aspects such as leadership and effective organization. The questionnaire lists thirteen positive statements; respondents have to select one of five options on the extent to which they agree to each statement.

If we simply took the percentages for respondents selecting the various answer options, we would have to look at 65 values (that is five options for each of the 13 statements). This is quite unwieldy and very difficult to interpret: it is not easy to understand what the data is telling us, or how it relates to the level of resilience.

Therefore, we added ascriptor values for each answer option. Since all statements are positive (e.g. "my community has effective leaders"), the highest level of agreement ("strongly agree") has the highest ascriptor value (1.0), while the lowest level of agreement ("strongly disagree") has the lowest (0.0). All other options have ascriptors with identical intervals between them *(see example below)*.

Example	%	Value	Score
My community looks at its successes and failures so it can **learn from the past**.			
Strongly agree	11%	1.00	0.110
Rather agree	22%	0.75	0.165
Neither agree nor disagree	19%	0.50	0.095
Rather disagree	30%	0.25	0.075
Strongly disagree	16%	0.00	0.000
Score (max. 1.00 - min. 0.00)			**0.445**

If we multiply the percentages for each answer option with the ascriptor and then take the average of the resulting values, we get to a single figure with a range between 0.0 (that is, if 100% of respondents selected "strongly disagree") to 1.0 (if 100% selected "strongly agree"). Staying with the example, it would be difficult to interpret the five percentages - or to compare response patterns between two different communities. By contrast, it is a lot easier if we look at the single figure at the bottom (0.445): it tells us that the level of agreement is roughly slightly below the middle between the *best* and *worst* possible score. Crucially, the single figure makes it much easier to compare between two communities, or to identify changes that one community experiences over time (such as in the comparison between **baseline** and **endline** survey results).

The index for community capacity is built on the same approach for each of the thirteen statements: it is simply the average score of all thirteen question scores. Once you have conducted the survey, enter the percentages into the data analysis sheet - and the score for community capacity (and all other aspects) will be displayed.

Why is community capacity included in the resilience radar?

General capacity to organize and deal with public matters is one of the key characteristics of a resilient community. Leadership, the ability to adapt, trust in public officials, information, resources and skills are all relevant in this context and are captured through the thirteen questions. The questions are based on the Communities Advancing Resilience Toolkit (CART).

Including this dimension of community capacity in the resilience radar highlights this area as a 'cross-cutting issue'. If general capacity is perceived to be strong, projects may for instance work with existing bodies instead of creating new ones (weak capacity would imply that structures need strengthening and/or the formation of new, additional bodies).

LAOS - social capital in action
Villagers in Attapeu province (southern Laos) working together to relocate a house. PHOTO: RALPH GUST-FRENGER

2.2 Social capital [SCI]

SCI	Social capital	Strongly agree	Rather agree	Neither	Rather disagree	Strongly disagree
B.1	People in my community feel like they **belong** to the community.	1.00	0.75	0.50	0.25	0.00
B.2	People in my community are **committed** to the well-being of the community.	1.00	0.75	0.50	0.25	0.00
B.3	People in my community have **hope about the future**.	1.00	0.75	0.50	0.25	0.00
B.4	People in my community **help each other.**	1.00	0.75	0.50	0.25	0.00
B.5	I have **friends** in my community.	1.00	0.75	0.50	0.25	0.00
B.6	I would **get involved** in trying to improve my community.	1.00	0.75	0.50	0.25	0.00

The six questions related to **social capital** are based on the same model as in the community capacity index. It lists statements on social embeddedness (B.1, B.5), collective action (B.2, B.6), mutual support (B.4) and aspirations (B.3).

The questions are based on CART - other elements of social capital are included under the dimensions of community capacity *(structural social capital)*, inclusiveness *(bridging capital)* and connectedness *(linking or political capital)*.

Why is social capital included in the resilience radar?

Social capital is as intangible as it is important for resilience. The cognitive aspects of social capital matter for overall resilience, and help shape collective efforts for community progress or recovery after an adverse event (such as a disaster) or in response to an ongoing or anticipated stressor. Communities that are characterized by trust and mutual support have been found more likely to rebound from adverse events, and there are numerous studies that find a positive correlation between social capital and various outcomes.

Conversely, lower levels of social capital (often found in post-conflict settings, in refugee camps and migrant squatters) have implications for certain types of programming that depend on trust (e.g. savings groups).

Getting an idea on the level of social capital is thus relevant when planning interventions (see IFRC 2013 for more information and practical advice ***here***). Furthermore, many projects have an effect on social capital (intended or not) and may thus contribute to greater resilience. It is therefore useful to measure this dimension.

2.3 Inclusiveness [INI]

GENERAL INCLUSIVENESS + DISABILITY INCL. + GENDER EQUITY

INI	Inclusiveness	Strongly agree	Rather agree	Neither	Rather disagree	Strongly disagree
GENERAL INCLUSIVENESS						
C.1	My community **treats people fairly no matter what their background is.**	1.00	0.75	0.50	0.25	0.00
C.2	In my community there are **no ongoing tensions or conflicts.**	1.00	0.75	0.50	0.25	0.00
PERSONS WITH DISABILITY						
C.3	Persons with disabilities have roughly the same **access** to community services as anybody else.	1.00	0.75	0.50	0.25	0.00
C.4	Persons with disabilities are **valued contributors** to community affairs and planning.	1.00	0.75	0.50	0.25	0.00
GENDER EQUITY						
	I would like to ask you a question about the men and the women in your village. **Generally, who in your village....**	Only men	Mostly men	Equal shares	Mostly women	Only women
C.5	...**takes part** in community meetings?	0.00	0.50	1.00	0.50	0.00
C.6	...**speaks** during community meetings?	0.00	0.50	1.00	0.50	0.00
C.7	...**influences decisions** about village affairs?	0.00	0.50	1.00	0.50	0.00
C.8	...**makes decisions** about village affairs?	0.00	0.50	1.00	0.50	0.00

The third index consists of three sub-sets concerning **general inclusiveness** (based on questions C.1 and C.2), inclusion of **persons with disabilities** (questions C.3 and C.4), and the **roles of men and women in public life** (questions C.5-C.8). The overall inclusiveness index is the average of the three sub-indices.

The first two sub-sets follow the same logic as for the previous dimensions. The third sub-set has different answer options and ascriptors - here, 'equal shares' gets the highest possible score of 1.0, and 'only men' or 'only women' the lowest one (0.0).

Why is inclusiveness included in the resilience radar?

A community is more than the sum of its members - working together makes everyone stronger. By contrast, tensions or conflicts tend to curtail development (and make it more difficult to implement projects). Communities that harness everybody's abilities, and that capture and address the needs of all members through inclusive problem-solving stand a greater chance at effective outcomes. By contrast, exclusive governance (a few lead based on their own priorities) bears the risk of overlooking needs and capacities of those excluded.

2.4 Connectedness [COI]

COI	Connectedness	Strongly agree	Rather agree	Neither	Rather disagree	Strongly disagree
D.1	My community works with **organizations** and agencies **outside** the community to get things done.	1.00	0.75	0.50	0.25	0.00
D.2	My community **approaches** relevant authorities if there is a problem we cannot solve on our own.	1.00	0.75	0.50	0.25	0.00
D.3	Authorities or other **external partners** usually take up our issues and **provide support**.	1.00	0.75	0.50	0.25	0.00

The fourth dimension of the resilience radar assesses the **connectedness** of communities with government agencies, groups, associations, and companies. The three questions D.1 to D.3 cover both sides of the relations between communities and external actors - approaches by the community to seek support as well as the level of responsiveness from external actors.

Why is connectedness included in the resilience radar?

Both in the management of general affairs and in times of crises, external support to communities is critical for general prospects and recovery from crises. If you think of two communities - one being isolated and un-supported, and the other one being well-connected and supported, the importance of connectedness (also referred to as linking or political capital) for resilience becomes clear.

The four dimensions listed so far - community capacity, social capital, inclusiveness and connectedness - all matter to the resilience of communities. In most projects, these are treated as 'cross-cutting issues.'

While they are not conventional sectors as such, many projects strive to enhance these processes or underlying dimensions - for instance through the formation of groups, promotion of stronger linkages to local governments, advocacy, and confidence-building measures.

Let us now turn to the outcome aspects. Six outcome indices are included in the resilience radar. They were selected and developed based on existing literature and on insights from community members across South & South-East Asia.

2.5 Disaster preparedness [DPI]

COMMUNITY PREPAREDNESS + HOUSEHOLD PREPAREDNESS

DPI	Disaster preparedness	Strongly agree	Rather agree	Neither	Rather disagree	Strongly disagree
COMMUNITY PREPAREDNESS [DPC]						
E.1	My community **tries to prevent** disasters.	1.00	0.75	0.50	0.25	0.00
E.2	My community **actively prepares** for future disasters.	1.00	0.75	0.50	0.25	0.00
E.3	My community can provide emergency services **during a disaster**.	1.00	0.75	0.50	0.25	0.00
E.4	My community has services and programs to help people **after a disaster**.	1.00	0.75	0.50	0.25	0.00
E.5	If a disaster occurs, my community provides **information about what to do**.	1.00	0.75	0.50	0.25	0.00
E.6	My community is **well-prepared for future disasters**.	1.00	0.75	0.50	0.25	0.00
E.7	My community has taken concrete measures to **reduce disaster risk**.	1.00	0.75	0.50	0.25	0.00
HOUSEHOLD PREPAREDNESS [DPH]						
E.8	**Does your household have a disaster preparedness plan?**	Yes				No
		1.00				0.00
E.9	**Do you know of any measures your household can take to be better prepared for disasters?**	Yes				No
		not rated - relevant for logic flow to E.10				
E.10	**What measures are you aware of?** *(Do not read options)* • Preparation of a lifeline kit • Family contingency planning • Preparation and knowledge on use of First Aid • Participate in different training or orientations • Know location of rescue personnel, equipment • Monitor happenings in the community • Listen to news or community warnings • Participate in awareness activities • Other	Multiple-select question 0.11 per correct answer				
E.11	**How prepared is your household to handle a disaster?**	Very unprepared	Somewhat prepared	Somewhat unprepared	Very unprepared	
		1.00	0.67	0.33	0.00	
E.12	**Which of the following statements best describes your household?** **(A)** We have **not done anything** to prepare for disasters or emergencies and **we do not plan to**. **(B)** We have **not done anything** to prepare for disasters or emergencies **but we plan to do so soon**. **(C)** We just recently **began preparing** for disasters or emergencies. **(D)** We are **prepared** for disasters or emergencies.	(A)	(B)	(C)	(D)	
		0.00	0.33	0.67	1.00	
E.13	**In case of a big storm** *(note: replace 'storm' by main hazard in your area)* **, do you think that your household would be warned ahead of time?**	Yes				No
		1.00				0.00
E.14	**Through which channels would people be warned?** *(Do not read options)* • Bell • Whistle • Television • Other • Siren • Public address • Radio	Multiple-select question 0.125 per correct answer				
E.15	**Over the past twelve months, have you taken part in a disaster simulation/drill?**	Yes				No
		1.00				0.00

The disaster preparedness index is the **average of two sub-sets** that focus on preparedness at the community and household levels.

The **community preparedness index** is based on seven question, covering general preparedness and risk reduction (E.1-2, E.6-7) as well as specific functions before, during and after a disaster (E.3-5). The questions follow the same logic as those for previous indices.

The **household preparedness index** meanwhile is based on a wider range of question types. Some are based on simple yes/no answers (E.8-9, E.13, E.15), some on self-ratings (E.11-12), and some on multiple-select options (E.10, E.14). Note that for the two multi-select questions, enumerators should not read the options but select all applicable options based on the interviewee's response. The answer options can be adjusted to local context - if this is needed, the ascriptor values may need to be adjusted (the points 'earned' per option should equal 1 divided by the number of correct options). Question E.13 refers to 'a big storm' - this should be replaced by the main natural hazard that your target area is exposed to.

Why is disaster preparedness included in the resilience radar?

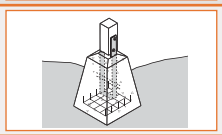
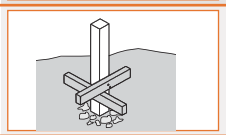
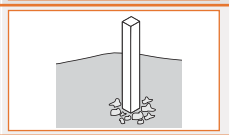
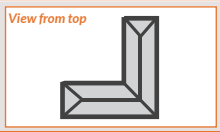
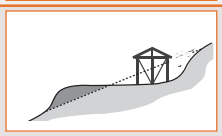
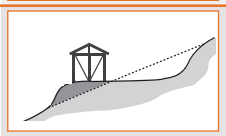
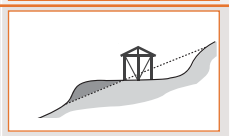
Numerous studies have shown how disaster preparedness can reduce hazard-induced damages and losses and - by implication - speed up the recovery process in the aftermath of a disaster. We have therefore included both household and community preparedness in the radar.

5. See Chreve and Kelman (2014) for an excellent overview of cost-benefit analyses of DRR. While the authors focus on risk mitigation, several of the studies reviewed actually cover other aspects as well. In a study Banyaneer conducted for IFRC ('How preparedness pays off' - IFRC 2016), we looked at several benefits of preparedness and the underlying mechanisms *(see here)*.

2.6 Safe shelter [SSI]

SAFE SHELTER AWARENESS + SAFE SHELTER PRACTICE

SSI Safe shelter

SAFE SHELTER AWARENESS [SSA]		Illustration A	Illustration B	Illustration C
F.1	**Which of the two houses is more storm-resistant?** [ROOFING] **House A** is more storm-resistant (1.0 score) than **house B** (0.0 score). The separate roof attached to the front of the house may be damaged by a strong storm (as it can be lifted), but the core part is likely to remain intact. Meanwhile, the roof of house B can be blown off, exposing residents and house contents.			no option C for this question
F.2	**Which of these houses will perform best in earthquakes or storms?** [BRACING] **House B** is the sturdiest (2.0 score), followed by **house C** (1.0 score). Without cross-bracing, **house A** is vulnerable to earthquakes and storm loads (0.0 score). Such houses can usually be retrofitted at little cost.			
F.3	**Which of the three foundations is the strongest?** [FOUNDATIONS] Foundations are fundamental to safe shelters - so **foundation A** (3.0 score) is more stable than **foundation B** (1.5 score) and **foundation C** (0.0 score). Without foundations, houses could be lifted up by strong storms.			
F.4	**Which house is the most earthquake and storm-resistant?** [OUTLINES] **House A** is the most earthquake and storm-resistant (1.0 score). Elongated (**house B**) and L-shaped (**house C**) houses have a proportionally greater surface area, and are more vulnerable to earthquakes (houses B and C have a 0.0 score).			
F.5	**Which of the three houses is least likely to suffer damage from a storm?** [SURROUNDING TREES] During storms, many houses are damaged by falling trees. **House B** (1.0 score) is therefore safer than **house A** (0.0 score). The safest house is however **house C** (1.5 score), which has a bushy tree planted next to it as a wind-break.			
F.6	**Which house is in the safest location?** [POSITIONING] Landslides can kill. By locating a house on flat ground - not too close to embankments (**House C**, 1.5 score), one can reduce the risk from landslides. **Houses A** (0.0 score) is too close to the hillside (being at risk from rocks and slides), while **House B** (0.0 score) may collapse due to unstable ground.			

SAFE SHELTER PRACTICE [SSP]					
	Enumerator observations **To what extent have the following safe shelter principles been applied in the house construction?**	Applied fully	Applied partially	Not applied	Not assessable
F.7	The house has no open areas (e.g. verandas, porches) covered by the **main roof** *(as in illustration F.1B)*.	1.00	0.50	0.00	n.a.
F.8	The house has appropriate **cross-bracing** on all walls *(as in illustration F.2B)*.	2.00	1.00	0.00	n.a.
F.9	**Beams** rest on a recess of main poles *(as shown in visual guide)*.	1.00	0.50	0.00	n.a.
F.10	The house mainframe is connected to a **foundation** *(as in illustration F.3A or F.3B)*.	3.00	1.50	0.00	n.a.
F.11	The roof structure is reinforced by **storm straps** *(as shown in visual guide)* .	1.00	0.50	0.00	n.a.
F.12	The **distance of any trees** around the house is at least as long as the trees' height.	1.00	0.00	0.00	

The safe shelter index is based on two sub-indices related to safe shelter **awareness** (SSA, based on questions F.1 - F.6) and **practice** (SSP, based on questions F.7 - F.12).

While assessing both awareness and practice can be useful for programming (see next page), there can be little doubt that actually safe houses (and not just safety awareness) is what matters most to keep hazard-related damages and losses at a minimum.

Therefore, as the only index in the resilience radar that applies non-equal weighting, SSP is weighted twice, leading to this formula:

$$\text{Safe shelter index (SSI)} = \frac{\text{Safe shelter awareness} + 2 \times \text{Safe shelter practice}}{3}$$

To assess **safe shelter awareness**, the enumerator presents the respondent with the shelter visual guide *(appendix F)*, and refers his/her questions to these illustrations. As some aspects (foundations, bracing, positioning, trees) are more important than others for the safety of the house, higher maximum ascriptor scores have been assigned (following consultation with shelter experts). Overall, a respondent can get a maximum of 10 points; his/her actual points divided by 10 make up the SSA index value.

In terms of **safe shelter practice**, enumerators have to assess the actual structure and surrounding of the house. To do so, they will have to be sufficiently briefed to know what to look out for. Even then, it must be understood that this is a non-technical and rather indicative assessment unless enumerators with an engineering background are deployed.

Enumerators will have to inspect the house to assess the extent to which the six safe shelter principles represented by questions F.7 to F. 12 have been applied. Notably, all SSP questions refer to aspects that allow retrofitting at little cost. Some change between baseline and endline survey can thus be expected, provided that awareness-raising and retrofitting support has been effective.

Why is safe shelter included in the resilience radar?

"Earthquakes don't kill, buildings do" goes the saying. Indeed, adequate positioning and construction of buildings can make a huge difference to injuries, death, damages and losses related to other hazards as well - including storms, landslides and floods. Less damages and physical harm also means people can recover more quickly.

The inclusion of safe shelter awareness and practice in the radar can also inform programming, as the *illustration* to the right shows. However, further tools must be used - **never rely** on the radar alone!

Safe shelter: implications for programming

How does awareness and actual practice compare? By juxtaposing these two elements during the baseline application of the resilience radar, program teams can get ideas on the possible programming approaches. Make sure to add qualitative assessment tools however before deciding on your strategy.

2.7 Resilient livelihoods [RLI]

DIVERSITY + NAT. RES. DEP. + EARNERS / HH + RESIL. MEASURES + FOOD SECURITY

RLI	Resilient livelihoods				
LIVELIHOOD DIVERSITY [LDI]					
G.1	**Based on which of the following sources does your household make its living? Consider food for household consumption and income.**				
G.1a	**Type A** (natural resource-based sources)		G.1b	**Type B** (sources not based on natural resources)	
1	Crop and vegetable production (for household consumption)		1	Business income (non-agricultural)	
2	Crop and vegetable production (for sale)		2	Wages (permanent employee, non-agricultural)	
3	Livestock production		3	Casual labour (non-agricultural)	
4	Agricultural labour		4	Public service salaries	
5	Collection of non-timber forest products (NTFP)		5	Pensions or allowances	
6	Fishing, fish farming, aqua product collection		6	Cash for Work	
7	Trading of agricultural or fishing products, livestock and NTFP		7	Remittances (domestic or overseas)	
8	Other natural resource-based sources		8	Other sources not based on natural resources	
G.2	**Enumerator: based on the responses to G.1a/b, how many livelihood sources has the respondent's household ?**				
G.2a	**Type A** (natural resource-based sources)	Ascriptor	G.2b	**Type B** (sources not based on natural resources)	Ascriptor
a	No Type A source	0.00	a	No Type B source	0.00
b	One Type A source	0.33	b	One Type B source	0.33
c	Two Type A sources	0.67	c	Two Type B sources	0.67
d	Three or more Type A sources	1.00	d	Three or more Type B sources	1.00

Out of the main indices of the resilience radar, the **resilient livelihood index (RLI)** is the most complex. It represents the average of the following **five sub-indices**:

- Livelihood diversity (LDI),
- Dependency on natural resources (DNR),
- Income earner index (IEI) in a household,
- Resilience measures (RMI), and
- Food security index (FSI).

Let us go through each of them.

For the **livelihood diversity index (LDI)**, the enumerator will read a list of potential livelihood sources (G.1), broken down in the categories of those that are based on natural resources (Type A) and those that are not (Type B). Based on the responses, the enumerator will then have to make a selection in question G2a/b to quantify the number of sources. The more sources a household has, the higher are the ascriptor scores. The average of the two ascriptor scores (G2a/b) is the LDI score.

The distinction between Type A and Type B sources is to reflect the fact that Type A sources tend to be more directly exposed to extreme

weather (storm, floods, drought) and other adverse events (pests, insect infestations). Both the overall number of livelihood sources, as well as the dependency on natural resources, is thus expected to influence the level of resilience.

Dependency on natural resources [DNR]		Ascriptor
G.3	How many percent would you say **type B sources** above contribute to your livelihood?	
1	76-100%	1.00
2	51-75%	0.67
3	26-50%	0.33
4	0-25%	0.00

Following up from the types of livelihood sources, the **dependency on natural resources index (DNR)** is based on a single question (G.3), asking for the estimated extent to which a household depends on sources **not** based on natural resources. The higher the share of type B sources, the higher is the ascriptor score.

Income earners index [IEI]		Ascriptor
G.4X	How many household members contribute to your household's livelihood?	
1	Single member	0.00
2	Multiple members	1.00
G.4Y	Proportion between **income earners** (G.4b) and **household members** (G.4a)	
1	Earner ratio 1.00 - 0.67	1.00
2	Earner ratio 0.66 - 0.34	0.50
3	Earner ratio 0.33 -0.01	0.00

Number of Earners	Number of household members									
	1	2	3	4	5	6	7	8	9	10
1	1.00	0.50	0.33	0.25	0.20	0.17	0.14	0.13	0.11	0.10
2		1.00	0.67	0.50	0.40	0.33	0.29	0.25	0.22	0.20
3			1.00	0.75	0.60	0.50	0.43	0.38	0.33	0.30
4				1.00	0.80	0.67	0.57	0.50	0.44	0.40
5					1.00	0.83	0.71	0.63	0.56	0.50

The **income earners index (IEI)** is based on two questions - the number of household members (G.4a) and the number of income earners (G.4b). The result to the second question is classified as either **single earner** (ascriptor value: 0.00) or **multiple earners** (1.00, see G.4X).

The results to both questions are then used to determine the earner-to-members ratio *(see table above)*. This ratio is either classified as **high** *(green, ratios 1.00 - 0.67)*, **medium** *(yellow, ratios 0.66 -0.34)*, or **low** *(red, ratios 0.33 - 0.01)*. The ascriptors are 1.00 for a high ratio, 0.50 for medium, and 0.00 for low ratios.

The overall income earners index IEI is the **average of the two scores**. The **first score** (single versus multiple earners) reflects the fact that single-income households are at greater risk (i.e. the income-earner dies or falls sick). Single-earner households are therefore 'weighted down'. Conversely, the **second score** (earner-to-members ratio) reflects the fact that a higher number of dependents increases costs and risks (e.g. school fees, healthcare) and tends to leave less to save and build buffers. Households with many dependents are thus 'weighted down' too.

Resilience measures [RMI]		Ascriptor
G.5	Is anyone in your household a member of a savings group?	
1	Yes	1.00
2	No	0.00
G.6	Do you think that your household could get access to credit?	
1	Yes	1.00
2	No	0.00
G.7	Does your household hold insurance for house, assets or crops?	
1	Yes	1.00
2	No	0.00
G.8	What is your level of household debt?	
1	We have no debt.	1.00
2	We can repay our debt within 3 months.	0.75
3	We can repay our debt in 3 - 6 months.	0.50
4	We can repay our debt in 7 - 12 months.	0.25
5	We will need more than one year to repay our debt.	0.00

The fourth sub-index concerns **resilience measures index (RMI)** - it is based on the answers to four questions (G.5 - G.8) concerning factors that play a role on a household's level of resilience

Membership in a **savings group** of course entails **access to credit**, but has other benefits as well (building up savings) and is thus covered though a separate question. **Insurance** is amongst the most important measures for resilient livelihoods; although a foreign concept in many settings, we believe it shall be included (notably, promotion of crop insurance schemes is included in many resilience programmes). The level of **household debt** is not a 'measure' as such - however, a low level of debt can make a huge difference to prospects of recovery from a shock of ongoing stressors. It is therefore included under the resilience measures dimension.

Food security [FSI]		Ascriptor
G.9	Which of the following statements best applies to your HH?	
1	All of our household members have enough to eat throughout the year.	1.00
2	There are times in the year when we do not have enough food to eat.	0.75
3	We generally have to prioritize who gets sufficient serves.	0.50
4	None of our household members has enough food to eat for all or most of the year.	0.25

The final sub-index regards **food security index (FSI)**. It is based on a single question (G.9) to determine the level of food security in the household.

2.8 Natural resources management [NRI]

HOUSEHOLD NRM + COMMUNITY NRM

Managing natural resources well (such as water, fields, forests, wildlife and fish), and minimizing pollution and degradation matters for community resilience - not the least, to sustain these resources for the long run. The radar captures some key aspects on the household and community levels. The natural resources management index **is the average of these two sub-sets.**

NRI	Natural resources management	
HOUSEHOLD LEVEL [NRH]		Ascriptor
H.1	What energy source does your household use for cooking?	
1	Wood, regular stove or open fire	0.40
2	Wood, smoke-free or energy-efficient stove	0.80
3	Electricity	1.00
4	Gas	1.00
H.2	Where do you collect the wood for cooking? (if 1 or 2 in H.1)	
1	Only cut wood from trees	0.00
2	Mainly cut wood from trees	0.33
3	Mainly dead wood/branches on the ground	0.67
4	Only dead wood/branches on the ground	1.00
H.3	Does your household segregate solid household waste?	
1	Yes	1.00
2	No	0.00
H.4	How do you dispose of inorganic household waste (e.g. plastic, tins)?	
1	Mainly dump around the house	0.25
2	Mainly dump in a nearby river or sea	0.00
3	Mainly dump in a bin	0.75
4	Mainly burn	0.25
5	Mainly recycle	1.00
H.5	Does your household look after any agricultural fields or gardens?	
1	Yes	relevant for skip logic
2	No (go to H.9)	
H.6	How do you fertilize your fields or gardens?	
1	Not at all.	1.00
2	We only use organic fertilizer.	1.00
3	We mix organic and chemical fertilizers.	0.50
4	We only use chemical fertilizer.	0.00
H.7	To what extent do you use pesticides?	
1	Not at all.	1.00
2	We apply pesticides about once a year.	0.67
3	We apply pesticides 2-3 times a year.	0.33
4	We apply pesticides 4 times a year or more often.	0.00
H.8	Regarding the majority of your fields or gardens, how do you mainly irrigate the crops or vegetables?	
1	Not at all; we rely on the rain.	0.00
2	The fields are connected to an irrigation system (canals).	1.00
3	We use groundwater from wells.	0.00
4	We use a rainwater harvesting system.	1.00

In terms of **household-level NRM**, the first two questions refer to energy used for cooking - note that questions H.2 is only asked if wood is used. With wood often managed unsustainably, use of fire-wood is a major contributing factor to deforestation.

The questionnaire also covers solid waste management (H.3 - H.4), and amongst respondents that manage fields or gardens, the use of fertilizers, pesticides, and water for irrigation (H.6 - H.8). The three questions related to agriculture refer to critical aspects in terms of possible degradation and pollution.

COMMUNITY LEVEL [NRH]		Ascriptor
H.9	Does your community have a committee or group that manages or regulates the use of natural resources such as water, land, forests, wildlife, or fish?	
1	Yes	1.00
2	No	0.00
H.10	In terms of the use of natural resources, which of the following statements applies best to your community?	
1	Every household can use as much as it wants or needs.	0.00
2	There are some rules/regulations/restrictions, but these are not well enforced.	0.50
3	There are some rules/regulations/restrictions, and these are well enforced.	1.00
H.11	With the current usage patterns, would you say that in five years time, the community will still have the same level/quality of natural resources to rely on?	
1	Yes, certainly: the level of resources is certain to be sustained	1.00
2	Yes, likely: the level of resources is likely to be sustained	0.67
3	No, unlikely: the level of resources is likely to diminish	0.33
4	No, certainly not: the level of resources is certain to diminish	0.00

In terms of **community-level NRM**, the three questions H.9 to H.11 refer to the (self)-regulated management of natural resources. Such measures (e.g. water management committees) can be effective in sustaining resources well into the future.

Depletion of natural resources (often in densely populated areas) can have damaging effects (e.g. land subsidence due to groundwater depletion) that endanger livelihoods, exacerbate risks, and make post-disaster recoveries more difficult. In some cases, these effects interplay with those of climate change, making better management and adaptation even more important for greater resilience.

2.9 Health [HEA]

KNOWLEDGE + PRACTICE + ACCESS + USAGE

In all of its aspects, health is critical to the resilience of communities. The health index captures several aspects through **four sub-indices** on knowledge, practice, access to health services, and barriers to actually using these services. **The overall health index is the average of the values of the four sub-indices.**

HEA	**Health**	
KNOWLEDGE [HKI] (refer to the two most prevalent diseases in the area)		Ascriptor
I.1	Are you familiar with the disease [Tuberculosis (TB)]?	
1	Yes	1.00
2	No	0.00
I.2	What are the signs and symptoms of [TB]? (See health sheet)	
1	Respondent can list 5 or more of the above symptoms	1.00
2	Respondent can list 3-4 of the above symptoms	0.67
3	Respondent can list 1-2 of the above symptoms	0.33
4	Respondent cannot list any of the above symptoms	0.00
I.3	Are you familiar with dengue fever?	
1	Yes	1.00
2	No	0.00
I.4	What measures can you take to prevent [dengue fever] (See health sheet)	
1	Respondent can list 5 or more of the above measures	1.00
2	Respondent can list 3-4 of the above measures	0.67
3	Respondent can list 1-2 of the above measures	0.33
4	Respondent cannot list any of the above measures	0.00

The **health knowledge index [HKI]** consists of four questions that should be related to the **two most prevalent diseases in the area**. This standard version refers to tuberculosis and dengue fever, asks whether the respondent is familiar with these and then proceeds with questions on symptoms and measures. Use the supplementary sheet *(appendix G)* to easily replace the diseases with those that are applicable in your survey area (the sheet contains a list of symptoms and preventative measures for major common diseases).

Note that the enumerator will have to check with the questionnaire to see whether listed symptoms/measures could be named. The enumerator will then make a selection on the number of correct symptoms (question I.2) or measures (I.4).

HEALTH PRACTICE [HPI]		Ascriptor
I.5	Are there reservoirs in the surroundings in which stagnant water could gather? [Observation]	
1	Yes	0.00
2	No	1.00
I.6	Over the past five years, have you taken part in a First Aid course?	
1	Yes	1.00
2	No	0.00

Concerning **health practice [HPI]**, enumerators need to observe whether there are reservoirs around the house in which stagnant water could gather (a breeding ground for mosquitos). The respondent will also be asked whether he or she attended a First Aid course over the past five years.

ACCESS TO HEALTH SERVICES [HAI]		Ascriptor
I.7	Are you aware of a community health worker who you can contact?	
1	Yes	1.00
2	No	0.00
I.8	Is there a functional primary health center in this community?	
1	Yes	1.00
2	No	0.67
I.9	If a woman in this community is pregnant, can she receive pre- and postnatal care (through a midwife)?	
1	Yes	1.00
2	No	0.00

Concerning **access to health services [HAI]**, three questions are asked on the availability of community health workers, primary health centers, and midwives.

USAGE OF SERVICES [HUI]		Ascriptor
I.10	When would you use formal health services?	
1	Never	0.00
2	In emergencies only	0.33
3	In emergencies, if there is prolonged or serious sickness, or to give birth	0.67
4	In emergencies, if there is prolonged or serious sickness, to give birth, and for check-ups *(go to J.1)*	1.00
I.11	**Multiple:** Which of the following factors keep you from using the health service more frequently?	
	• Long distance • Poor service • Beliefs or traditions • High cost • Lack of trust • • Long wait times • Loss of income	not rated

The final aspect concerns **usage of health services [HUI]**, with the ascriptors 'rewarding' more frequent use of health services - considering that such early visits and check-ups may reduce the risk of protracted diseases (and thus, social and economic losses).

The question on barriers (I.11) is not included in the calculation of the resilience radar. However, it may reveal information relevant for programming (what barriers need to be addressed?).

2.10 Water & Sanitation [WSI]

SAFE WATER + HAND-WASHING + HAND-WASHING

The final of the ten indices concerns water & sanitation, and is based on the **average of three sub-indices** on safe drinking water, hand-washing practices, and latrine usage.

WSI	Water & sanitation	
SAFE DRINKING WATER [WDW]		Ascriptor
J.1	What is your main source of drinking water, and do you treat it before drinking?	
1	Tap. treated	1.00
2	Tap., untreated *(go to J.3)*	0.00
3	Bottled water *(go to J.3)*	1.00
4	Closed well, treated	1.00
5	Closed well, untreated *(go to J.3)*	0.00
6	Open well, treated	0.50
7	Open well, untreated *(go to J.3)*	0.00
8	Rainwater harvesting, treated	1.00
9	Rainwater harvesting, untreated *(go to J.3)*	0.50
88	Other, treated	1.00
89	Other, untreated *(go to J.3)*	0.00
J.2	What do you usually do to make water safe to drink? (Do not read options)	
1	Boil OR water filter	1.00
2	Add bleach/chlorine	0.50
3	Solar disinfection	0.50
4	Strain water through cloth OR let it stand and settle	0.00
J.3	Does your household have sufficient drinking water throughout the year?	
1	Yes	1.00
2	No	0.00

Concerning **safe drinking water [WDW]**, the questionnaire includes a question that combines water sources and treatment practices (prior to consumption; J.1), a follow-up question on treatment methods (for those who say they treat water, J.2), and a question on sufficient water quantity (J.3).

HAND-WASHING PRACTICES [WHW]		Ascriptor
J.4	What are the activities you routinely associate with hand-washing? (read all options)	
1	• Before food preparation • After food preparation • Before feeding children • Before eating • After eating • After defecating • After cleaning baby's bottom • After caring for a sick person • After handling animals •	0.11 per selected option
J.5	Does the HH have a fixed water point for hand-washing? (Enumerator observation)	
1	No	0.00
2	Yes, there is a fixed water point but no soap.	0.50
3	Yes, there is a fixed water point and soap.	1.00

Regarding **hand-washing practices [WHW]**, enumerators list nine associated activities and ask whether the respondent washes his/her hands before or after the activity. For each selected option, they score 0.11 points (if all are selected, they thus get 1.00 points). The second question is an observation to assess whether respondents wash their hands with soap.

LATRINE USAGE [WLU]		Ascriptor
J.6	Do you have a latrine?	
1	Yes	1.00
2	No	0.00
J.7	How often do you clean your latrine?	
1	Daily	1.00
2	A few times a week	0.67
3	Weekly	0.33
4	Monthly	0.00

With regard to **latrine usage [WLU]**, we ask whether the respondent household has a latrine - and if so, about the frequency with which they clean the latrine. This is used as a proxy for actual usage and the value they attribute to the latrine.

THE PHILIPPINES
Survey interview in the area affected by Typhoon Haiyan. We suggest the use of smartphones to make data collection faster and more reliable. Making the process even easier, we are developing a smartphone app that has the questionnaire pre-installed.
PHOTO: PATRICK BOLTE

3. Adapting the radar

Regard the resilience radar as a flexible tool, as a template.

As mentioned in the introduction, the resilience radar does not claim to be perfect, but practical. While the indices and questions were selected on the basis of both current literature and practical experience, we do not claim that these are always the most appropriate to define and measure community resilience.

Reasons for adapting the radar

In fact, there are two key aspects that may require adaptations: **local settings** and **programme focus**.

Concerning the **specific local setting** of your programme, you may need to replace, change or add some questions. The questions on health knowledge are a case in point: they are concerned with tuberculosis and dengue fever as the main diseases and used as a proxy for more general health knowledge. Is malaria, diarrhoea or diabetes more common? Then replace these questions accordingly. In terms of shelter, not all of the questions and illustrations may be the most appropriate. Adapt these in order to make the questions and your radar as useful and locally adept as possible.

This holds also true when it comes to your **programme focus**. In order to keep the length of interviews and analytical requirements at a level that can be managed, the level of detail on each sector is limited. In fact, we would not be surprised if any sector expert would criticize the radar for lack of detail in terms of his/her sectoral expertise. Yes, there could be more questions related to water and sanitation, to health, disaster preparedness and so on. But as a holistic tool, the radar has to make compromises. Having that said, there is no problem in adding further aspects if you require these based on your theory of change.

As mentioned before, it may also be useful to add questions on attribution. Knowing that disaster preparedness is perceived as having improved does not necessarily mean that this is due to your project. You will also need to ask why this change has occurred to get an idea on your project's contribution and impact.

Electronic data collection

The resilience radar is based on a household survey, and we strongly encourage the use of an electronic data collection tool. This means that you gather data with the use of a smartphone or other hand-held device.

The two **key benefits** are greater speed and reduced room for error (because you will not need to transfer data from paper questionnaires to a computer). We have used iSurvey as a tool, and found it to be reliable, user-friendly, and inexpensive.

See a brief **video** on iSurvey *here*. Banyaneer and HarvestYourData, the team behind iSurvey, are working together to bring you the resilience radar as an app (planned for the second quarter of 2017).

As in any survey, you can also add open questions (i.e. where a text has to be entered). However, you should use open questions sparsely (only if they bring added value). After all, open questions take a lot longer to be read and analyzed!

How to adapt the radar

When making changes to the questions, it is important however that the logic of the resilience radar be maintained. You will thus need to identify suitable ascriptors (generally, 1.0 should be the value for the best and 0.0 for the worst outcome), and adapt the formulas in the data analysis sheet.

When you add questions, try to identify answer options with different normative values (e.g very bad - bad - good - very good) and then add respective ascriptor values. You may have noted that in most cases, we kept the difference between values identical. In the bad/good example, we would therefore propose very bad (0.0), bad (0.33), good (0.67) and very good (1.0).

When adapting the resilience radar, we recommend to start with the Word-based questionnaire *(appendix D)*. Highlight any changes you make in that file (use for instance the empty column available for translation into other languages). When the questionnaire is complete, adjust the data analysis sheet *(appendix E)*, and do not forget to update the formulas. Make sure you carry out a test run to see whether the new questions 'work' and whether the formulas are in place to generate the illustration of the radar.

Share your experience

The resilience radar is not a fixed instrument - so feel free to experiment, and then share your experience. We have set up a **LinkedIn group for users** of the radar and encourage you to join. Tell others what you have found, seek help, and discuss. To contribute to an expanding toolkit, share your versions (local languages, adaptations) with other. With your permission, we will upload these new versions to our website.

Banyaneer's role

We will review uptake and feedback of the radar, and plan regular updates of the tool. Furthermore, we would be glad to offer support that meets most budgets - from on-demand advice and consistency checks to more comprehensive solutions (including in-country support). We also welcome you to join one of our training courses - for details, see our website *http://banyaneer.com/training/* and check our Facebook page *(here)*.

Happy exploring!

We hope that you will find the resilience radar useful and wish you all the best for measuring (and strengthening) the resilience of the communities that you support. If you would like to dig deeper before getting started, we recommend some additional resources and complementary tools overleaf.

Appendix A | **Complementary resources**

QUALITATIVE MEASUREMENTS

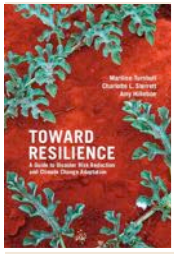
IFRC (2017): **Road map to community resilience. Operationalizing the framework for community resilience (FCR).**

http://preparecenter.org/sites/default/files/1310403-road_map_to_community_resilience-en-04.pdf

Having overall resilience programming in mind, the 'road map' includes the **resilience star**, a qualitative tool for participatory measurements as well as guidance to programming.

Many of the dimensions of the **star** are similar to those of the **radar** - the main difference between the two tools is in their approach.

With the star using a *qualitative* and the radar a *quantitative* approach, the two tools can be applied complementarily, providing the power of triangulation. By having two lenses - one for the wide angle (radar) and one for the close-ups (star) - projects would use robust frameworks for implementation, monitoring, and evaluation.



RESILIENCE PROGRAMMING

Turnbull, M., Sterrett, C.L., Hilleboe, A. (2013): **Toward resilience. A guide to disaster risk reduction and climate change adaptation.**

http://reliefweb.int/sites/reliefweb.int/files/resources/ECB-toward-resilience-Disaster-risk-reduction-Climate-Change-Adaptation-guide-english.pdf

Prepared for the Emergency Capacity Building (ECB) project, "Toward Resilience" is a user-friendly guide that all practitioners should consider as a key reference for their work on reinforcing resilience.

The guide sets off with ten key principles for an integrated approach to disaster risk reduction (DRR) and climate change adaptation (CCA) and then lays out how they can be applied over different phases of the project cycle, across the various sectors and contexts. "Toward Resilience" is an excellent introductory resource for staff at all levels, and the many case studies and charts, as well as a concise glossary of key terms, add to the guide's value for practitioners.

MEASURING RESILIENCE - AN OVERVIEW

Winderl, T. (2014): **Disaster resilience measurements. Stocktaking of ongoing efforts in developing systems for measuring resilience.**

http://www.preventionweb.net/files/37916_disasterresiliencemeasurementsundpt.pdf

In this UNDP publication, Thomas Winderl provides an excellent summary of methodological concerns related to the measurement of disaster resilience at various levels.

Furthermore, the paper gives an overview of available measurement tools, including 18 instruments that target sub-national levels.

The report is a formidable resource for those who would like to learn more measuring resilience - in particular for researchers and monitoring and evaluation professionals. It also proved invaluable for the development of the resilience radar.

SOCIAL CAPITAL AND RESILIENCE

IFRC (2012):
Of networks, norms, and trust. The role of social capital in reinforcing community resilience

http://preparecenter.org/sites/default/files/social_capital_report_of_norms_networks_and_trust_low_res.pdf

Prepared by Banyaneer for the International Federation of Red Cross and Red Crescent Societies (IFRC), this study illustrates the role of forms of social capital - such as networks, trust, and mutual support - in community resilience.

Looking at the experience of nine urban and rural communities in Nepal, Myanmar and China, the study shows that social capital represents a foundation for resilience, especially when it extends to external actors.

It gives practical recommendations as to how social capital can be assessed and incorporated into programme design.

7 useful websites

Looking for further ideas? We recommend the resource sections of these seven websites - full of tools, guides, studies and illustrations on resilience programming. There is also further guidance on qualitative assessments that could complement the resilience radar as part of your project's monitoring and evaluation plan.

- **ALNAP** *www.alnap.org*
- **Better evaluation** *www.betterevaluation.org*
- **Global Disaster Preparedness Center** *www.preparecenter.org*
- **BRACED - Building Resilience and Adaptation to Climate Extremes and Disasters** *www.braced.org*
- **Humanitarian Library** *www.humanitarianlibrary.org*
- **Humanitarian Practice Network** *www.odihpn.org*
- **Preventionweb** *www.preventionweb.org*

Appendix B | **Literature**

Adger, W.N. (2003). Social Capital, Collective Action, and Adaptation to Climate Change. *Economic Geography* 79(4), 374-404.

Bahadur, A., Ibrahim, M., Tanner, T. (2010): *The resilience renaissance? Unpacking of resilience for tackling climate change and disasters*. Institute of Development Studies (for the Strengthening Climate Resilience (SCR) consortium): Brighton, UK.

Chreve, C.M., Kelman, I. (2014) Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction. *International Journal of Disaster Risk Reduction* 10, 213-235.

Frankenberger, T., Mueller M., Spangler T., Alexander S. (2013). *Community Resilience: Conceptual Framework and Measurement. Feed the Future Learning Agenda.* Rockville, MD: Westat.

Grootaert, C., van Bastelaer, T. (2002). *Understanding and measuring social capital: synthesis of findings and recommendations from the Social Capital Initiative*. Cambridge University Press.

IFRC (2011). *Characteristics of a Safe and Resilient Community*. Community-based disaster risk reduction study.

IFRC (2013). *Of networks, norms, and trust. The role of social capital in reinforcing community resilience*.

IFRC (2016). *How preparedness pays off. Evolution, costs, benefits and prospects of disaster risk management in Georgia.*

Isham, J., Kähkönen, S. (1999). *What determines the effectiveness of community-based water systems? Evidence from Central Java, Indonesia on demand responsiveness, service rules, and social capital.* Social Capital Initiative Working Paper No.14. Washington DC: World Bank.

Israel, G., Beaulieu, L., Hartless, G. (2001). The influence of family and community social capital on educational achievement. *Rural Sociology* 66: 43-68.

Kawachi, I., Kennedy, B.P., Glass, R. (1999). Social capital and self-rated health: a contextual analysis. *American Journal of Public Health* 89: 1187-1193.

Matyas, D., Pelling, M. (2015). Positioning resilience for 2015: the role of resistance, incremental adjustment and transformation in disaster risk management policy, *Disasters* (39) Supplement 1: 1-18.

Mechler, R. (2008). *The Cost-benefit analysis methodology. From Risk to Resilience Working Paper No.1*. Kathmandu: ISET.
World Bank, (2001). *Instruments of the Social Capital Assessment Tool.*

Mitchell, T., Harris, K. (2012). *Resilience: A risk management approach*. Overseas Development Institute.

Norris, F.H., Stevens, A.P., Pfefferbaum, B., Wyche, K.F., Pfefferbaum, R.L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology* 41(1-2), 127-150.

Peters, K., Langston, L., Tanner, T., Bahadur, A. (2016). *'Resilience' across the post-2015 frameworks: towards coherence?* ODI working paper.

Putnam, R. D.(1995). Bowling Alone: America's declining social capital. *Journal Of Democracy* 6 65–78.

Sherrieb, K., Norris, F.H., Galea, S. (2010). Measuring Capacities for Community Resilience. *Social Indicators Research* 99: 227–247.

Tanner, T., Rentschler, J. (2015). *Unlocking the 'triple dividend' of resilience. Why investing in disaster risk management pays off*. Interim policy note, ODI/GFDRR/World Bank.

UNISDR (2015). *Sendai Framework for Disaster Risk Reduction. 2015-2030.*

Vanhoebrouck, P., Sagala, S. (2010). *Not so helpless victims. Social Capital Roles in the 2009 West Sumatra Earthquake Recovery.*

Walker, B.H., Salt, D. (2005). *Resilience Thinking: sustaining ecosystems and people in a changing world*. Washington DC: Island Press.

Winderl, T. (2014). *Disaster resilience measurements. Stocktaking of ongoing efforts in developing systems for measuring resilience*. United Nations Development Programme.

Appendix C | **Glossary**

Community
For our context, 'community' refers to the sum of people living in a geographically defined area, such as a village or suburb. The other use of the term - in the sense of social or cultural communities - is included under social capital.

Connectedness
We use the term to describe the density and quality of relationships between communities and external actors, such as government agencies, enterprises, and organizations. Connectedness assumes two-way communication - interaction and responsiveness.

Inclusiveness
The quality of including all sections of a community (or society) in public processes. In particular, this means that no section (based on gender, ethnicity, income, religion, disability etc) is implicitly or explicitly excluded from engaging in community affairs.

Quantitative and **qualitative** tools
Two different sets of tools used for assessments and evaluations. ***Qualitative*** tools are text-based, use unstructured or semi-structured response options, provide more depth but are less generalizable. ***Quantitative*** tools are number-based, use fixed response options, generate less depth but more breadth (and are more generalizable). It often makes sense to ***combine the tools*** in mixed-method approaches, thus obtaining views on reality that are both deep and broad. Consider combining the (quantitative) resilience radar with qualitative tools.

Resilience
The ability of a system (e.g. community) to anticipate, reduce the impact of, cope with, and recover from the effects of adversity - without harming long-term prospects. The resilience radar looks at the functional dimensions - what does a community need to have to be resilient?

Sampling
A process used in statistical analysis in which a pre-determined number of observations are taken from a larger population. When conducting a survey, such as the one proposed for the resilience radar, one must establish a valid sampling design to obtain the required data. Good sampling also prevents waste of resources: you interview as many respondents as needed - not more, and not less.

Social capital
Features of social organization such as networks, norms and social trust that facilitate coordination and co-operation for mutual benefit (Putnam 1995:67). This includes structural (e.g. networks) as well as cognitive aspects (e.g. trust, norms). Note that the resilience radar's social capital index only includes cognitive aspects (embeddedness, trust, mutual support), while other aspects of social capital are included under 'community capacity' and 'connectedness'.

Survey
A systematic approach to gather specific information from a particular population. Household surveys are typically used for many development projects - mostly with one round of repetition (as baseline and endline survey). Surveys need to be well-prepared (sampling, questionnaire, enumerator training, testing) and usually require some statistical analysis to get the desired information ('what is the data telling us?').

List of abbreviations

CART	Communities Advancing Resilience Toolkit
DRR	Disaster risk reduction
IFRC	International Federation of Red Cross and Red Crescent Societies
NGO	Non-governmental organization
NRM	Natural resources management
M&E	Monitoring and evaluation
ODI	Overseas Development Institute
SDG	Sustainable Development Goals
WASH	Water, sanitation and hygiene

Indices and sub-indices

CCI	**Community Capacity Index**
COI	**Connectedness Index**
DPI	**Disaster Preparedness Index**
DNR	Dependency on natural resources (sub-index to RLI)
DPC	Community preparedness (sub-index to DPI)
DPH	Household preparedness (sub-index to DPI)
FSI	Food security index (sub-index to RLI)
HAI	Health services access (sub-index to HEA)
HEA	**Health Index**
HKI	Health knowledge (sub-index to HEA)
HPI	Health practice (sub-index to HEA)
HUI	Usage of health services (sub-index to HEA)
IEI	Income earner index (sub-index to RLI)
INI	**Inclusiveness Index**
LDI	Livelihood diversity (sub-index to RLI)
NRC	Natural resource management - community (sub-index to NRI)
NRH	Natural resource management - household (sub-index to NRI)
NRI	**Natural resource management index**
RLI	**Resilient Livelihoods Index**
RMI	Resilience measures index (sub-index to RLI)
SCI	**Social Capital Index**
SSA	Safe Shelter Awareness (sub-index to SSI)
SSI	**Safe Shelter Index**
SSP	Safe Shelter Practice (sub-index to SSI)
WDW	Safe drinking water (sub-index to WSI)
WHW	Hand-washing index (sub-index to WSI)
WLU	Latrine usage index (sub-index to WSI)
WSI	**Water and Sanitation Index**

The concept of **resilience has become an integral part** of development and humanitarian efforts. Indeed, fostering communities' ability "to anticipate, reduce the impact of, cope with, and recover from the effects of adversity" is a sensible objective - especially given the increasing climate variability and frequency of extreme weather events that are amongst the manifestation of climate change. Resilience is also the overarching goal of the Sendai Framework for Disaster Risk Reduction.

Resilience has many faces and facets. In practice, there are many challenges - for instance, the sector-based development structure often appears at odds with the holistic programming that is best suited to reinforce resilience. Another challenge concerns the measurement of resilience.

We developed the resilience radar as a tool for practitioners to capture and track the state of communities. This is useful both for initial planning and as part of monitoring and evaluation. This manual explains how the radar is applied.

Please join our LinkedIn group: resilience radar - community of practice here. Share your experience - we would love to hear from you!

Publications prepared by Banyaneer

IFRC 2016: How preparedness pays off: evolution, benefits, costs and prospects of disaster risk management in Georgia.
Author: Patrick Bolte *view report*

CARE 2015: The adapting atolls. Final evaluation of the project 'Community-based adaptation to climate change in Nissan district, Papua New Guinea.
Author: Patrick Bolte, Boris Orlowsky *view report*

CARE 2015: Food, water, rain, risk: the uphill struggle to adapt. Final evaluation of the MAKA'AS project on community-based adaptation in Timor-Leste.
Authors: Dennis Eucker, Patrick Bolte, Boris Orlowsky *view report*

Handicap International 2014: Empowerment and participation: good practices from South & South-East Asia in disability inclusive disaster risk management.
Authors: Patrick Bolte, Samadhi Marr, Dewi Sitompul *view report*

IFRC 2012: Of norms, networks, and trust. The role of social capital in reinforcing community resilience.
Authors: Patrick Bolte, Dennis Eucker, M. Fitri Rahmadana *view report*

IFRC 2012: The long road to resilience. Impact and cost-benefit analysis of disaster risk reduction in Bangladesh.
Authors: Dennis Eucker, Patrick Bolte *view report*

IFRC 2011: After the storm: recovery, resilience reinforced. Final evaluation of the Cyclone Nargis operation, 2008 - 2011.
Authors: Floyd Barnaby, Patrick Bolte, M. Fitri Rahmadana *view report*

IFRC 2011: Breaking the waves. Impact analysis of coastal afforestation for disaster risk reduction in Viet Nam.
Authors: Patrick Bolte, Floyd Barnaby, M. Fitri Rahmadana, Nguyen Kim Cuc *view report*

Resilience radar. User manual.
Patrick Bolte, Boris Orlowsky, Samadhi Marr, Sally Moore, Annick Schubert, Dewi Sitompul, M. Fitri Rahmadana

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