

Module 7: Tools and Methods for Risk and Vulnerability Assessment

Introduction

In the previous modules we learned about climate impacts on landscapes and livelihoods and hence possible options in adaptation and mitigation. This module presents tools and methods to assess risk and vulnerability, and explains their objectives and key features.

Over the last decade, numerous tools and methodologies for systematically assessing climate and non-climate risks and vulnerabilities have been developed by many donors and NGOs. Today, the range of those tools is so broad that practitioners face a challenge in choosing the most appropriate tool for their needs.

Why do we need tools?

Assessing risks and vulnerabilities is a first step toward better understanding the local context and hence towards avoiding and reducing risks.

Adaptation to climate change and disaster risk management measures are place and context specific, and no single strategy will meet the needs of all communities in a particular region (c.f. [Module 4](#) and [5](#)). A sound understanding of the causes and effects of climate change is therefore required for identifying the appropriate solutions that respond best to the changing climate in the short to the longer-term. Risk and vulnerability assessments provide the information base for this.

At the local level, the appropriate first step to assessing future climate risks is an assessment of past and current risks. Measures that reduce the vulnerability and exposure to present climate variability could also reduce vulnerability to future climate risks.

Risk and vulnerability assessment tools also allow comparing assessments from different time periods, contexts and locations.

Box 1: Why do we need tools?

Assessing risk and developing strategies to support coping and adaptation (e.g. CRISTAL, CEDRIG, VCA toolbox, DRR planning tool).

Tools help to systematically address hazards and risks; identify current and future vulnerability and climate risk.

Make the link between scientific, decision-makers and local knowledge in a systematic way.

Assist users in raising awareness and getting a better understanding of natural hazards, risks, vulnerabilities and coping capacities.

Types of tools (categorisation)

Although a wide range of tools are available, most of the tools follow a similar structure and include the following steps:

The Adaptation Process:

1. Identify vulnerabilities and climate risks
2. Identify adaptation measures
3. Select and prioritize adaptation measures
4. Plan and implement adaptation measures
5. Evaluate and monitor

Source: OECD, 2009

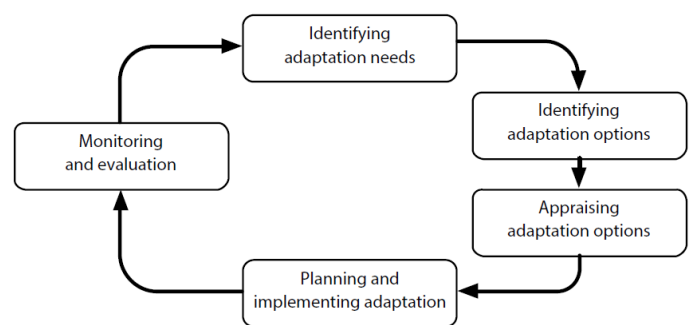


Figure 1: Adaptation process ([PROVIA's guidance on assessing vulnerability, impacts and adaptation to climate change, 2014](#))

Climate risk management tools can be categorized into three main types based on their **principal functions** (Harmonising Climate Risk Management, OECD 2012):

(1) Process guidance tools: Provide guidance on how to analyse climate and non-climate risks and opportunities and integrate climate change adaptation (CCA) and disaster risk management (DRM) aspects into development cooperation. It can be further distinguished between:

- **Screening tools:** Initial systematic examination, whether the project/ policy/strategy is in a sensitive sector or region. It gives you a kind of overview of the context (“quick and dirty analysis”).
- **Assessment tools:** Identify current and potential hazards in a systematic manner and then identify adequate options.

(2) Data and information provision tools: Provide and generate data and information on access to climate data, modeling programmes, etc.

(3) Information & knowledge sharing platforms: Provide and offer practitioners a virtual space to share knowledge and experiences.

Table 1 presents the three types of tools and some examples for each type.

Table 1: Types of climate risk management tools (modified from [Harmonising Climate Risk Management, 2012](#); [Making Adaptation Count, 2011](#); [Climate Change Knowledge Portal, WB](#))

Type of tools		Purpose	Examples of tools
Process guidance tools	Screening tools	These tools can guide users through the entire CRM/adaptation process (e.g. from awareness-raising to monitoring and evaluation), or just one or several steps in the process (e.g. assessing current and future climate risk). The majority are available as documents (e.g. booklets, reports), although some are available as computer programmes.	CEDRIG, SDC ADAPT, WB
	Assessment tools		CEDRIG, SDC CRiSTAL, iisd, IUCN Intercooperation, SEI Integrating climate change adaptation into development planning, GIZ CEDRA, Tearfund Climate Vulnerability and Capacity Analysis Handbook (CVCA), Care Climate Guide, Red Cross/Red Crescent Adaptation Wizard, UKCIP Adapting to climate variability and change: a guidance manual for Development, USAID
Data and information provision tools		These tools tend to depend on some computing capacity and a growing number on Internet access. They tend to be databases, modelling programs, mapping and visualisation tools.	UNDP Climate Profile CAIT Climate Models CI:GRASP SERVIR Google Earth Adaptation Layer GIS for hazard mapping Ecocrop, FAO
Information & knowledge sharing platforms		Typically knowledge platforms, increasingly reliant on the internet and user-generated content. They can be important for <i>validation</i> of Type 1 and Type 2 tools, as these platforms can offer a space for user feedback and offer some sort of quality control mechanism. They also help to build a <i>community of practice</i> around climate change adaptation and disaster risk management.	WeAdapt Adaptation Learning Mechanism (ALM), UNDP Climate-Adapt Climate and Development Knowledge Management (CDKN) Global Adaptation Network (GAN) ICIMOD Climate Change Knowledge Portal, WB PreventionWeb GNDR: Views from the Frontline SDC's E+CC Network SDC's DRR Network

Another useful reference is the [Climate Planning guide](#) developed by the Climate and Development Knowledge Network (CDKN). The guide considers over 30 tools, which are presented according to the three categories and helps in selecting the most appropriate tools based on needs and the context.

Some tools in more detail

Risk assessment tools such as CRiSTAL and CEDRIG are process guidance tools that support practitioners to systematically analyse a defined context (e.g. project), climate and non-climate related risks and vulnerabilities. Both tools follow the 4-step approach that is in line with the standardized process defined by the OECD on mainstreaming adaptation to climate change in development.

CRiSTAL – Community-based Risk Screening Tool, Adaptation & Livelihoods

The **Community-based Risk Screening Tool, Adaptation & Livelihoods (CRiSTAL)** is a **project-planning tool** that helps users design activities that support adaptation at the community level¹.



Its approach draws from the Environmental Impact Assessment methodology and the Sustainable Livelihood Approach. CRiSTAL looks at how ongoing or planned project activities positively or negatively affect an environmental system.

CRiSTAL is organized according to **three phases**, which build on each other (Figure 2):

- A. Understand the livelihoods and climate context
- B. Evaluate the implications for the project
- C. Support monitoring and evaluation (M&E) of climate adaptation

For each phase, the tool guides the user through different analytical steps with **specific outputs** (Figure 2):

- A. A list of livelihood resources for women and men that are (i) most affected by climate hazards and (ii) most important for responding to the impacts of these hazards.
- B. A list of project adjustments and prioritized new activities that support climate adaptation and a list of key opportunities and barriers to revised/new project implementation.
- C. A list of desired adaptation outcomes and important influencing factors to be monitored.

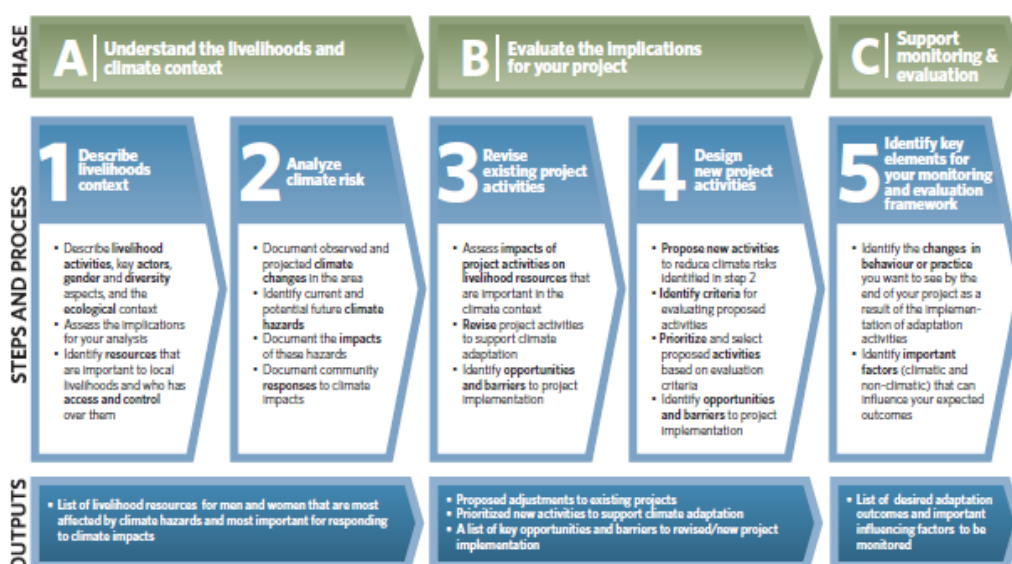


Figure 2: The CRiSTAL Framework (CRiSTAL User's Manual, 2012)

¹ [CRiSTAL User's Manual, 2012](#)

Some characteristics of CRiSTAL:

- Helps users **integrate climate adaptation into community-level projects**.
- Relies on a combination of **primary information** gathered through participatory methods at the local level (stakeholder consultations, project team discussions) and **secondary information** gathered through desk-based research. Hence, consultations are central to the CRiSTAL process.
- **Decision-making framework** centred on **livelihoods**. Livelihoods provide the entry point for the analysis.
- **Time:** Typically, the users will need between *two and five days* to conduct all the steps, which includes time for preparation, local consultations, data entry into the tool and data analysis.
- **Format:** CRiSTAL is a desktop application compatible with Microsoft Windows 7 operating systems and higher versions. It is currently available in English. (please check www.cristaltool.org for updates).

There are also sector specific CRiSTAL tools for e.g. Food Security, Forest and the CRiSTAL Park for protected areas. The tools and reference material can be downloaded from <http://www.iisd.org/cristaltool/>

Box 2: An application of CRiSTAL in Pakistan

The CRiSTAL tool was applied in 41 villages in the Chitral district of Pakistan for getting a better understanding of the occurrence and impacts of hydro-meteorological hazards on local livelihoods, and the importance of various livelihood assets for coping strategies.

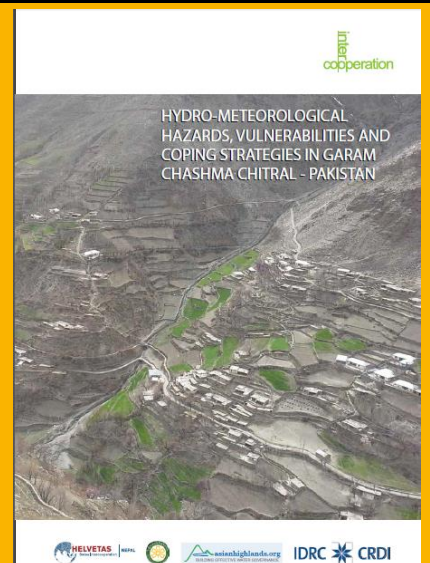
Results indicated that the three most severe disaster risks include flash floods, avalanches, and landslides and landslips. These disasters take a heavy toll on community livelihood assets including water resources, agricultural crops, infrastructure, and houses.

The assessment revealed that people opt of various short- and long-term strategies to cope with risks and adapt themselves to various risks and likely hazards. However, there is a high need for replacing short-term coping strategies with longer-term adaptation measures. For instance, the changes necessitate cross-sectional adaptive research to reassess the suitability of crops cultivars and cropping patterns under changing temperature since crops, especially commercial crops, are important coping strategies for communities to deal with risks, but at the same time it is the vulnerability of agriculture which makes people.

Adaptation strategies and better governance are also needed for irrigation water management. This includes better management of irrigation channels and introduction of efficient on-farm water management techniques.

The study underlines that adaptation measures need to go hand in hand and shared solutions from all actors involved at all levels is crucial.

Source: [Intercooperation Pakistan, 2015: Hydro-meteorological hazards, vulnerabilities and coping strategies in Garam Chashma Chitral-Pakistan](#)



CEDRIG – Climate, Environment and Disaster Risk Reduction Integration Guidance

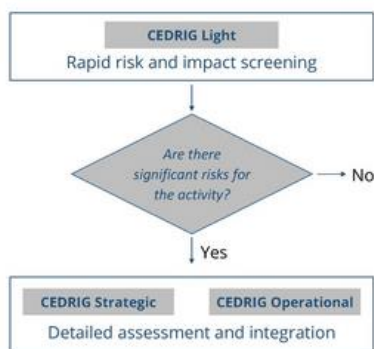


Figure 3: Structure of CEDRIG (SDC, 2016)

The **Climate, Environment and Disaster Risk Reduction Integration Guidance (CEDRIG)** provides guidance for integrating climate change mitigation, adaptation to climate change, environment and disaster risk reduction into development cooperation and humanitarian aid.

The Swiss Agency for Development and Cooperation (SDC) has developed the tool to help its staff and operational partners through the process of screening and assessing project interventions. It addresses **climate, environment and DRR risks** and looks at both **adaptation** (referred to as risk perspective) **and mitigation** (referred to as impact) **potentials**. It reflects whether existing and planned strategies, programmes and projects are at risk from climate change, environmental degradation and natural hazards as well as whether these interventions could further exacerbate GHG emissions, environmental degradation or risks of natural hazards.

The tool offers three independent modules (Figure 3):

- **CEDRIG Light:** for a rapid assessment (Screening of risks and impacts).

- **CEDRIG Strategic:** Detailed assessment of strategies and programmes
- **CEDRIG Operational:** Detailed assessment of projects.

Both CEDRIG Strategic and CEDRIG Operational are detailed assessments, but are applied at different levels.

CEDRIG Light, a rapid risk and impact screening, serves as an initial filter to assess whether a strategy, programme or project is potentially at risk due to climate change, environmental degradation or natural hazards. It also aims to determine whether an activity may have a negative impact on greenhouse gas emissions or the environment, or whether it creates new risks or exacerbates existing ones. The screening helps to decide whether or not a detailed assessment is needed (CEDRIG operational). For more information, see <http://www.cedrig.org/>.

CEDRIG Light

How: CEDRIG Light is designed to be completed rapidly, with minimal knowledge of climate change, environmental degradation and natural hazards.

What is needed: CEDRIG Light can be done without access to detailed data or information. A document describing the main components of the activity or a draft should be available, ideally a logical framework.

Who: CEDRIG Light is proposed to be conducted individually (e.g. by the project manager or project officer) or in a small group.

When: Ideally, CEDRIG Light is applied at the very beginning of the planning process of a new activity. It can also be used while implementing an activity to check its sensitivity with regard to climate change, environmental degradation and natural disasters.

Duration: Maximum of one hour

Source: [CEDRIG SDC, 2016](#)

Should the rapid assessment conclude that a detailed risk assessment is necessary, CEDRIG Operational (for projects) or CEDRIG Strategic (for strategies and programs) are applied.

The aim of **CEDRIG Operational** is to systematically integrate climate change, environmental issues and natural hazards at a project level. CEDRIG Operational helps to determine whether or not the project goals, aims or priorities are at risk of climate change, environmental degradation or natural hazards. It also aims at determining whether the project may have a negative impact on the climate or the environment, or whether it creates new or exacerbates existing risks. CEDRIG Operational results in i) shared understanding on climate change and disaster risk and environment aspects; ii) identifying possible risks and negative impacts by the intervention; and iii) integration of adaptation, disaster risk and environmental measures.

CEDRIG Operational

How: CEDRIG Operational is proposed to be conducted as a multi stakeholder workshop. It requires a thorough preparation.

What is needed: The starting point is an in-depth context analysis in the area of the project, describing the climate change, environmental and disaster risk conditions. This analysis needs to be done prior to the workshop and can be carried out with the help of external experts. The results shall be presented to the participants at the beginning in order to provide a common ground for the subsequent detailed assessment. Furthermore, a document describing the main components of the project or a draft of it should be available, possibly a logical framework.

Who: Key responsible staff and selected partners. It is recommended to benefit from an external facilitator familiar with the CEDRIG tool.

When: Ideally, applied at the very beginning of the planning process of a project or at the mid-term review.

Duration: Approximately two days, with the recommended option of adding a day by visiting the location of the project on the second day.

Source: [CEDRIG SDC, 2016](#)

Box 3: An application of CEDRIG in Myanmar

Disaster Risk Management and Adaptation to Climate Change are important cross-cutting topics of a community-led coastal management project implemented in two states in Myanmar. The eight-year project focuses on three main components: fisheries, agriculture and ecosystem conservation. CEDRIG was applied in order to define **practical disaster risk management/adaptation to climate change (DRM/ACC) measures** during an interactive three-day **workshop**.

Among the 24 **participants** there were project staff of the management, sectoral specialists and community facilitators from local partner NGOs, as well as invited guests from the local government and the donor agency, who actively contributed with their different knowledge, experience and perspectives.

The CEDRIG workshop started with a presentation of **basic DRM/ACC concepts** to introduce all participants to the topic and an introduction to the country's DRM strategy based on its national risk profile to understand the broader government framework. Thereafter, a half day **field visit** allowed interaction with communities, and ensured practice-oriented approach for the CEDRIG application.

Based on their project experience and the field visit the participants applied the **CEDRIG light/screening**, which confirmed the earlier assumption that a systematic in-depth risk assessment is required. Through participatory group discussions and plenary presentations participants systematically identified the major risks, identified and selected possible measures using the CEDRIG structure and its reporting tables, which were introduced by a facilitator.

The final results of the group works were validated by the project management, included in the ongoing **work plan** and in the monitoring system.

Source: HELVETAS Swiss Intercooperation, Mission Report Myanmar 2016

Participatory Rural Appraisal (PRA) tools

When analysing risks and vulnerabilities with the CRISTAL and CEDRIG tool, a number of participatory rural appraisal tools such as risk map, hazard and crop calendar, transect walk, and vulnerability matrix, can be of great use. The CARE Handbook on Climate Vulnerability and Capacity contains a good overview of PRA tools relevant in a climate context and makes the bridge to climate variability and change.

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Confederaziun Svizra

Federal Department of Foreign Affairs IDFA
Swiss Agency for Development and Cooperation SDC

Further reading:

- Hammill A. & Tanner T., 2011: Harmonising Climate Risk Management: Adaptation Screening and Assessment Tools for Development Co-operation, OECD Environment Working Papers, No. 36, OECD Publishing. Available at: <https://www.oecd.org/dac/43652123.pdf>
- CRISTAL: Community-based Risk Screening Tool – Adaptation and Livelihoods. Available at: <http://www.iisd.org/cristaltool/>
- Intercooperation Pakistan, 2015: Hydro-meteorological hazards, vulnerabilities and coping strategies in Garam Chashma Chitral-Pakistan. Available at: <https://assets.helvetas.org/downloads/hydro-meteorological-hazards-vulnerabilities-and-coping-strategies-in-garam-chashma.pdf>
- Climate, Environment and Disaster Risk Reduction Integration Guidance (CEDRIG). Available at: <http://www.cedrig.org/>
- CARE: Climate Vulnerability and Capacity Analysis Handbook. Available at: http://www.careclimatechange.org/files/adaptation/CARE_CVCAHandbook.pdf
- Climate and Development Knowledge Network (CDKN): Climate Planning Guide. Available at: <http://www.climateplanning.org/content/tool-types-and-categories>

Annex

Annex 1: Summary for key resources required for CRiSTAL

Resources	Data collection (I.e. local consultations)	Data entry and analysis (Individual or team meeting)
Knowledge	<ul style="list-style-type: none"> • Basic knowledge about climate variability and change, climate adaptation, livelihoods, community dynamics, community mobilization, gender and diversity, participatory approaches, Rapid Rural Appraisal/Participatory Rural Appraisal tools 	<ul style="list-style-type: none"> • Basic knowledge about climate variability and change, climate adaptation, livelihoods, community dynamics, gender and diversity
Skills	<ul style="list-style-type: none"> • Experience in applying PRA tools • Gender-sensitive facilitation skills (incl. ability to probe information from community members) • Ability to be fully functional in local language(s) 	<ul style="list-style-type: none"> • Basic computer literacy • Ability to synthesize different sources and types of information • Analytical skills
Participants	<ul style="list-style-type: none"> • At least two facilitators (one moderator and one note taker) • Facilitation team should include both men and women. Female facilitators should work with women's groups to increase comfort. • At least two focus groups (one group of men and one group of women) per community, each consisting of about 10 participants (maximum 15). Where there is marked heterogeneity in the community, especially in terms of power relations and self-expression, more focus groups are recommended. 	<ul style="list-style-type: none"> • The number of participants (project team and other local partners) will depend on the objectives and resources available. • CRiSTAL works well with a group of a dozen participants (project team and other local partners) but it can also work with smaller or larger groups. • It is highly recommended to involve a multistakeholder team (I.e., project team and partners from community, local government and civil society). For example, involving local government representatives can help to secure ownership of the results.
Time	<ul style="list-style-type: none"> • Plan at least four hours with each focus group and consult communities on an appropriate time for them. • Try to organize all focus group discussions at the same time but in different locations, to allow participants in different groups to speak freely. 	<ul style="list-style-type: none"> • Typically, data entry and analysis can take between a half a day and two days.
Materials	<ul style="list-style-type: none"> • Flipchart paper, colour markers, coloured paper, masking tape, notebooks and clipboards • Local materials such as stones, sticks, seeds, etc. • Recording device and camera to document the process (if deemed appropriate) • Snacks/lunch/water (depending on how much time the meeting will take, and where it will take place) 	<ul style="list-style-type: none"> • Computers/laptops - Ideally, but depending on the number of participants, it is recommended that more than one laptop is made available to enter the data according to the different focus groups. • The new version of CRiSTAL is only compatible with Microsoft Windows 7 operating systems and greater versions. • Printer (recommended but optional) to distribute the summary reports to all participants to facilitate analysis.
Cost	<ul style="list-style-type: none"> • Cost will vary according to the number of participants and the location of the community consulted. Keep in mind that consultations can be time consuming. • Plan to organize a meal for the community that has been consulted. 	<ul style="list-style-type: none"> • CRiSTAL is a free desktop application, available online (www.cristaltool.org). Once users have downloaded the tool, it can be used without being connected to the Internet. • Meeting costs and human resources