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CEDRIG

Climate, Environment and Disaster Risk Reduction Integration Guidance

Guidance to improve resilience and reduce impacts in development cooperation and humanitarian aid

Part II CEDRIG Handbook






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CEDRIG in a nutshell

Tackling disaster risk emanating from climate variability, climate change, environmental degradation and tectonic activities is widely perceived as one of the greatest challenges faced today. These risks significantly influence the resilience of systems and communities. Developing countries are particularly vulnerable to those disaster risks due to their high dependence on natural resources and limited coping capacity. Hence, climate change, environmental degradation and natural disasters pose an increasing challenge to meeting sustainable development goals and seriously undermine core development priorities such as poverty alleviation.

The Swiss Agency for Development and Cooperation (SDC) aims to systematically integrate climate, environment and disaster risk reduction (DRR) into development cooperation and humanitarian aid in order to enhance the overall resilience of systems and communities. **The Climate, Environment and Disaster Risk Reduction Integration Guidance CEDRIG** is an approach to support SDC staff and their project partners in analysing whether existing and planned cooperation strategies, programmes and projects are at risk from disasters emanating from climate variability, climate change, environmental degradation and/or tectonic activities, as well as whether they have an impact on greenhouse gas (GHG) emissions and/or the environment.

The guidance helps to define measures to reduce such risks and impacts and build more resilient livelihoods. It is not the aim of CEDRIG to develop targeted climate change adaptation or DRR projects but rather to consider climate, environment and DRR systematically as important factors when developing a new strategy, programme or project.

CEDRIG follows a combined approach (see Figure 1). On the one hand, it helps to manage disaster risks emanating from climate change, environmental degradation and/or natural hazards (risk perspective). On the other hand, it also helps to reduce the impacts of strategies, programmes or projects on GHG emissions and/or the environment (impact perspective). On the risk perspective, this is done by adaptation to climate change, adaptation to degraded environments and DRR. On the impact perspective, the concepts of climate change mitigation and environmental impact mitigation are applied.

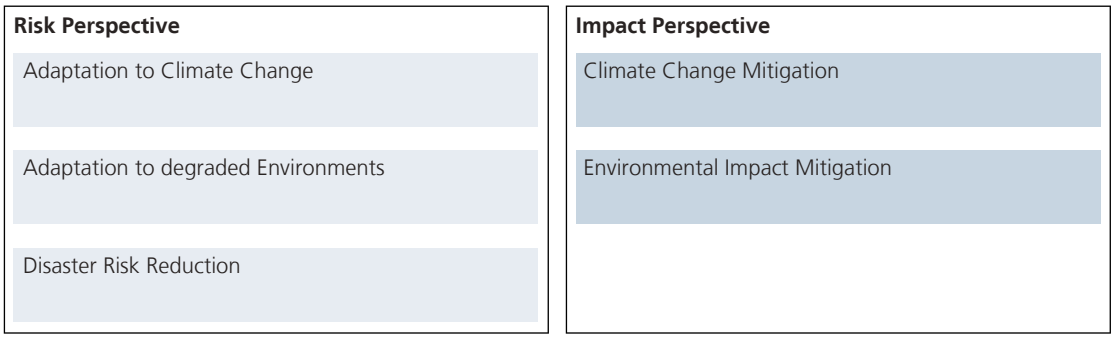


Figure 1 Risk and impact perspective of CEDRIG.

CEDRIG is modular and flexible and reflects the specific requirements for integration into SDC's project cycle management (PCM). CEDRIG is comprised of three modules as outlined in Figure 2.

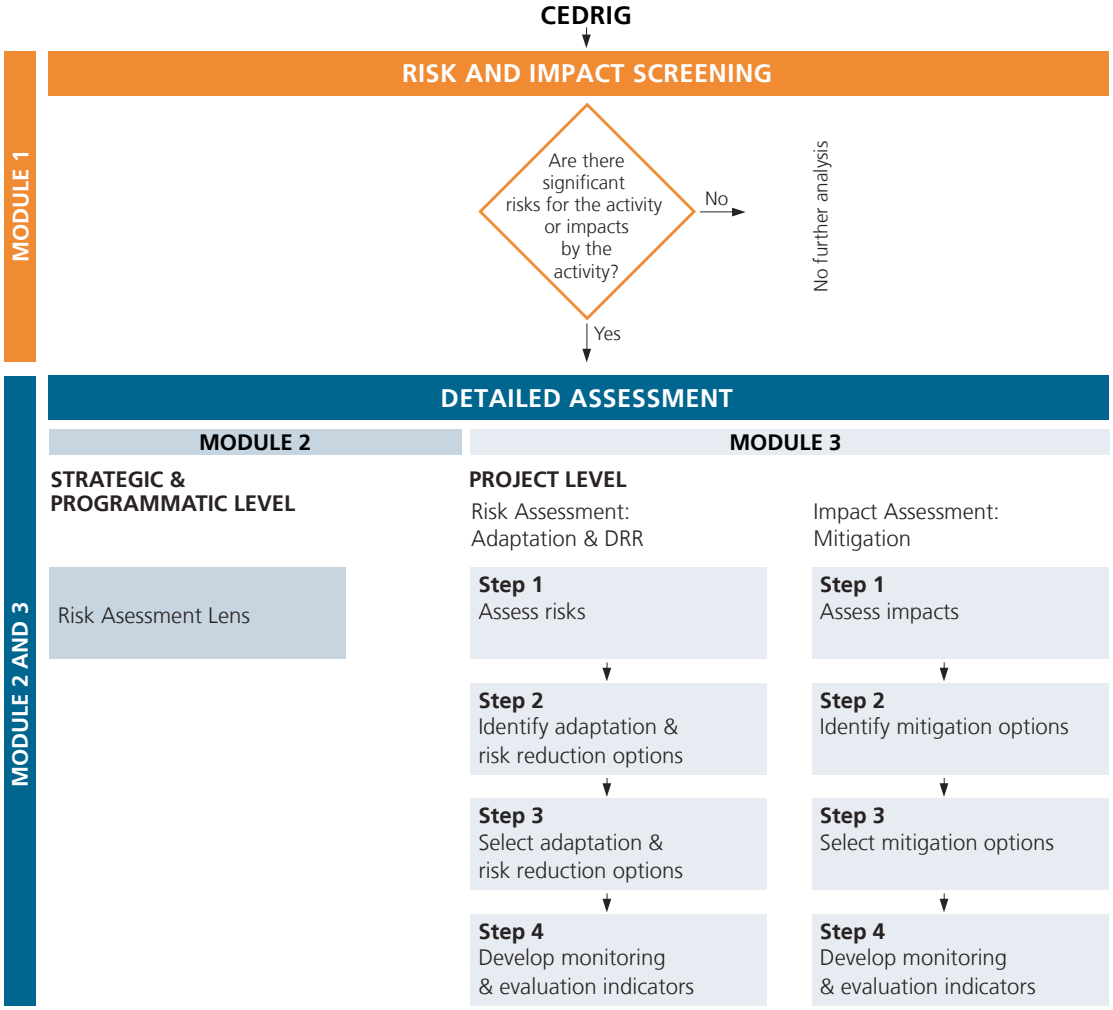


Figure 2 Overview of the modules of CEDRIG.

Module 1 - Risk and Impact Screening: This module (taking max. 1-2 hours) serves as an initial filter to assess whether strategies, programmes or projects are at significant risk from disasters emanating from climate change, environmental degradation and/or tectonic activities and whether they have a significant impact on GHG emissions and/or the environment. The result of Module 1 is used to decide whether a Detailed Assessment must be conducted (Module 2 or Module 3). The main conclusions should be reflected in the entry proposal (for new activities) or the review (for new phase of running activities) and serve as an input for the planning process.

Module 2 - Detailed Assessment at Strategic and Programmatic Level: Module 2 (taking 2 to 3 days, without taking into account the preparation time) allows to systematically integrate adaptation to climate change, adaptation to degraded environments as well as DRR into an existing or planned strategy or programme. Module 2 is only applied when possible significant disaster risks have been identified under Module 1 and a more thorough assessment is considered necessary. At the strategic and programmatic level, the approach is called **Risk Assessment Lens**. The results of the Risk Assessment Lens are integrated into the strategy document and its results framework.

Module 3 - Detailed Assessment at Project Level: Module 3 allows to systematically integrate adaptation to climate change, adaptation to degraded environments as well as DRR into an existing or planned project. Furthermore, it allows systematic integration of climate change mitigation and environmental impact mitigation into an existing or planned project. Module 3 is applied when possible significant disaster risks and/or impacts have been identified under Module 1 and a more thorough assessment is considered necessary. At the project level, the approach is called **Detailed Risk and Impact Assessment** and follows a **four step approach:** 1) assessment of risks and impacts, 2) identification of adaptation and risk reduction options as well as mitigation options, 3) selection of options, and 4) definition of monitoring and evaluation indicators. The results of the Detailed Risk and Impact Assessment are integrated into the mandatory risk assessment in the planning documents and the logframe of SDC's projects.

	MODULE 1 Risk and Impact Screening	MODULE 2 Detailed Assessment at Strategic & Programmatic Level Risk Assessment Lens	MODULE 3 Detailed Assessment at Project Level Detailed Risk & Impact Assesement
What for	First screening	In depth assessment at strategic level	In depth assessment at project level
What	› Disaster risks from climate variability, climate change, environmental degradation and/or tectonic activities › Impacts on GHG emissions and/ or the environment	› Disaster risks from climate variability, climate change, environmental degradation and/or tectonic activities › Four step approach (steps A to D)	› Disaster risks from climate variability, climate change, environmental degradation and/or tectonic activities › Impacts on GHG emissions and/or the environment › Four step approach (steps 1 to 4)
How	Proposed to conduct individually or participatory with involved project partners	Proposed to conduct in form of a workshop with project partners (assign at least three persons for preparation and planning of the workshop, moderation, preparation of thematic inputs)	Proposed to conduct in form of a workshop with project partners (assign at least three persons for preparation and planning of the workshop, moderation, preparation of thematic inputs)
Length	Max. 1-2 hours	Team process: 2 to 3 days Plus variable time for preparation	Team process: 2 to 3 days Plus variable time for preparation
When	Beginning of the planning process or new phase	As early as possible when strategy or programme planned	Elaboration of project document and credit proposal (as early as possible)
Who	NPO & country desk	SDC strategy team, ev. with selected partners	SDC programme officer and project team (including implementing partner)
Integration	Conclusions into entry proposal or in TOR for review, input in risk assessment	In the strategy or programme (Results framework)	In the planning document = PRODOC, Logframe and Credit Proposal (incl. its respective risk assessment part)

Figure 3 Overview of organisational and procedural issues of CEDRIG.

MODULE 1: Risk and Impact Screening

Aim

The **screening** aims at identifying whether a strategy, programme or project (hereafter called activity) is potentially at risk from disasters emanating from climate change, environmental degradation and/or natural hazards and whether an activity may have an impact on GHG emissions and/or the environment. For the description of the term disaster risk and other definitions please refer to Box 1 in Part I (page 5). The goal is to conduct a **rapid and basic assessment of risks and impacts** and make the decision whether to proceed with a Detailed Assessment (Module 2 for strategic level or Module 3 for project level) or not. Please note that some risk always exists. The question is whether the probability and potential negative impacts constitute a significant additional risk. Therefore, disaster risks may be assessed in comparison to other risks (e.g. social, institutional etc.) for an activity that might have been identified within the regular risk assessment process in the planning phase. The screening shall be applied at a very early stage of the planning phase. It is meant to be completed in a rather generic and quick manner. The screening can be conducted with only minimal knowledge of climate change, environmental degradation and natural hazards and without access to detailed climate data.

What to do

The screening has two components:

- (A) Risk Screening
- (B) Impact Screening

These should be performed by answering the key questions presented in the **template format** under subchapter "*Results of the Risk and Impact Screening and tables to complete*". At the end of the process, you will make an overall estimation of the risks and impacts. Based on your estimation you shall decide whether a Detailed Assessment shall be conducted or not (Module 2 and Module 3). In general, it is recommended to pursue a Detailed Assessment if the risks are high and the capacities to cope with these risks are low. Hence, if you consider that the risks for the activity will negatively affect the resilience of systems or if the impact of the activity are high and the capacities of women and men to absorb or reduce those impacts are low, a Detailed Assessment should be conducted. The following key questions should be answered:

- Are there any significant disaster risks for the activity caused by climate change, environmental degradation and/or tectonic activities, taking into account the vulnerability of the community or systems?
- Are there any significant impacts on GHG emissions and/or the environment by the activity, taking into account the capacities of the community or systems?

Please note that there is a certain level of subjectivity on what is meant by "significant" risk and subsequently on whether there is a need to conduct a Detailed Assessment.

Instructions:
Use the Risk Screening table provided on page 8 and the Impact Screening table on page 11. Tables can be downloaded from the CCE and DRR Network websites.

Elaboration of the Risk and Impact Screening

The screening will best be conducted by the national programme officer in charge of the intervention as he or she is familiar with the context and the focus of the intervention. There is no need to conduct extensive data research (although some information has to be gathered) or hold broader stakeholder consultations in order to complete this first quick screening. The time needed to conduct the screening shall not be longer than 1-2 hours. The decision whether to proceed and perform a Detailed Assessment should be taken by the responsible person at the COOF and reported in the entry proposal.

Entry points and how to make use of the results

The screening is applied at the beginning of the planning process of a new activity or during the review of a running activity (see PCM in Figure 5, Part I). Main conclusions (estimation of overall risks for the activity and impacts by the activity) should be reflected in the entry proposal (for new activities) or the review (for new phase of running activities) and serve as an input for the planning process.

Results of the Risk and Impact Screening and tables to complete

- As a result of this screening, the key questions in the template checklist provided below are completed.
- Overall risks are roughly estimated.
- Overall impacts are roughly estimated.
- It is decided whether a Detailed Assessment shall be conducted or not.

A) Risk Screening

RISK SCREENING				
Questions	**Yes**	**Not sure[1]**	**No**	**Explanation[2]**
1. Exposure and hazards				
1.1. Does the activity take place in at least one of the following areas or sectors?				
› Agriculture and food security (including livestock and fisheries)				
› Forestry (e.g. reforestation, forest management, agro forestry)				
› Land use management				
› Water Resource Management				
› Biodiversity conservation				
› Water and sanitation				
› Urban development (including land use and planning)				
› Health				
› Infrastructure and transport (e.g. communication, roads, transport)				
› Energy (e.g. hydropower)				
› Others				
1.2. Is the activity located in any of the following types of sensitive geographical areas, zones and/or protected areas?				
› Arid/semi-arid zones				
› Tundra				
› Mountain ecosystems				
› Small islands				
› Coastal regions				
› Deltaic areas, flood plains, alluvial fans, peat land				
› Zones exposed to (tropical) storms				
› Zones exposed to extreme cold and/or snowfall				
› Zones within the reach of volcanic activity				
› Zones exposed to landslides				
› Seismic zones				
› Zones exposed to wildfire				

1 It will not always be possible to respond clearly with "yes" or "no" to a particular question; in this case "not sure" should be marked.

2 Add a comment if you feel that a clarification or explanation is necessary, e.g. specifying the type of activity (from the listing) that is concerned.

Questions	Yes	Not sure[1]	No	Explanation[2]
› Zones exposed to biological hazards (e.g. locust)				
› Zones exposed to chemical hazards (pesticides, chemicals)				
› Zones in the vicinity of hazardous material (e.g. vicinity to industrial plants)				
› Zones exposed to heavy air pollution				
› Primary forests				
› Others				
1.3. Are the objectives of the activity affected by one of the following hazards?				
› Shifts (special and temporal) in mean temperature and rainfall patterns				
› Extreme temperature and precipitation events				
› Droughts				
› Storms and/or cyclones				
› Volcanic eruptions				
› Earthquakes (including tsunamis)				
› Mudflows, landslides				
› Rock-, snow-, ice-avalanches				
› Floods, inundations				
› Deforestation				
› Desertification				
› Wildland fires				
› Degradation (land, soil, ecosystems, biodiversity)				
› Soil, water and air pollution (including contamination by hazardous material)				
› Other natural hazards				
1.4. Do the hazards above significantly endanger the achievement of the objectives of the activity?	The activity is significantly endangered if it is located in a sector and in a geographical area exposed to hazards. To answer the question, an overall evaluation of questions 1.1–1.3 is needed: …….			
2. Impacts and Vulnerability				
2.1. If the activity is exposed to hazards mentioned above, which impacts do you expect?				
Impact on water resources and their management				
› Increased frequency of high flow events (floods)				
› Increased peak flows, runoff and river bank erosion				
› Seasonal or permanent reduction in the availability of freshwater, e.g. seasonal changes in stream flows				
› Increased pathogens and disease vectors as a result of higher water temperature (e.g. malaria)				
› Decrease in water resource quantity and quality				
› Others				
Impact on coastal systems and low-lying areas				
› Raised sea level and increases of coastal erosion				
› Changes in wave direction				
› Others				
Impacts on ecosystems, their properties, goods and services				
› Loss or shifts of habitats and changes in ecosystems				
› Acceleration in desertification, soil loss and erosion processes				
› Increased and accelerated land sliding				
› Increased pollution of ecosystems, soils and lands				
Impacts on food and forest products				
› Decrease in food productivity				

Questions	Yes	Not sure[6]	No	Explanation[7]
› Decrease in forest productivity				
› Others				
Impacts on human health				
› Increased frequency and/or severity of disease and pest outbreaks				
› Increase in negative health impacts due to atmospheric pollution patterns				
› Increased frequency and/or severity of negative health impacts due to polluted water systems				
› Loss of human lives				
› Human migration				
› Others				
Impact on Industry, settlement and society				
› Loss or damage of infrastructure				
2.2. Are there particularly vulnerable groups potentially affected by the impacts (e.g. women, children?	If yes, please specify which groups are affected: ……			
2.3. Which of the following factors reduce their vulnerability? Which of the following factors increase their vulnerability?				
Questions	**Increase**	**Not sure[3]**	**Reduce**	**Explanation[4]**
› Human capital: skills, knowledge, health and ability to work				
› Social capital: social resources, including informal networks, membership of formalised groups, relationships of trust that facilitate co-operation and inclusion of vulnerable groups				
› Natural capital: natural resources such as land, soil, water and forests				
› Physical capital: basic infrastructure (roads, water & sanitation, schools, information and communication technologies (ICT) and producer goods (tools, equipment))				
› Financial capital: financial resources including savings, credit, insurance and income from employment, trade and remittances				
› Political capital: power and capacity to influence political decision-making, formal and informal participation, access to political processes, freedom and capacity to collectively organise and claim rights				
2.4. Do you estimate that communities and systems involved in the activity are potentially vulnerable to the impacts under 2.1?	Make an overall evaluation of 2.1. to 2.3: ……			
3. Overall estimation of the risk for the activity				
3.1. Based on the evaluation 1.4 and 2.4, do you estimate that there are significant risks for the activity and that a Detailed Assessment should be carried out?	Yes No In general, it is recommended to do a Detailed Assessment if the activity is significantly endangered by impacts and the vulnerability is high.[5]			
3.2. If a Detailed Assessment shall be carried out, go to Part II, Module 2 (for strategic and programmatic level) or Module 3 (for project level) part A.				

Table 1 Risk Screening.

3 It will not always be possible to respond clearly with "yes" or "no" to a particular question; in this case "not sure" should be marked.

4 Add a comment if you feel that a clarification or explanation is necessary, e.g. specifying the type of activity (from the listing) that is concerned.

5 Please note, that also in case of unclear effects (many times "not sure" marked), it might be advisable to conduct a Detailed Assessment.

B) Impact Screening

IMPACT SCREENING				
Questions	**Yes**	**Not sure[6]**	**No**	**Explanation[7]**
1. Exposure and impacts				
1.1. Does the activity take place in at least one of the following areas or sectors?				
› Energy generation and distribution				
› Transport				
› Construction (housing, infrastructure, etc.)				
› Industry				
› Agriculture (including livestock) and rural development				
› Water				
› Urban development (including land use and planning)				
› Tourism				
› Forestry				
1.2. Is there a risk that the activity produces the following negative impacts on GHG emissions and/or the environment?				
› Impacts on increasing GHG emissions				
› GHG emissions by operation of buses, cars, airplanes, ships, trains, etc.				
› GHG emissions by generation and distribution of energy (e.g. diesel generator)				
› GHG emissions from heating, cooling and construction of buildings				
› GHG emissions by digestion processes of cattle and other ruminant animals (production of fermentation gases) and manure concentration in more intensive systems				
› Others				
Negative impacts on water				
› Impacts of infrastructure on natural water regimes				
› Contamination of water through pesticides, chemicals				
› Siltation of reservoirs				
› Water pollution, changes in groundwater resources, depletion of water resources				
› Others				
Negative impacts on air				
› Release of air pollutants by operation of buses, cars, airplanes, ships, trains, etc.				
› Release of air pollutants by generation and distribution of energy (e.g. diesel generator)				
› Release of air pollutants from heating, cooling and construction of buildings				
Negative impacts on ecosystems				
› Impacts of infrastructure on ecosystems etc. (e.g. new access roads)				
› Deforestation by excessive consumption of fuel wood				
› Deforestation, forest degradation and unsustainable land use				

6 It will not always be possible to respond clearly with "yes" or "no" to a particular question, in this case "not sure" should be marked.

7 Add a comment if you feel that a clarification or explanation is necessary, e.g. specifying the type of activity (from the listing) that is concerned.

Questions	Yes	Not sure[6]	No	Explanation[7]
› Resource use displacement: protected areas may increase the pressure on other resources				
› Unsustainable use of natural resources				
› Others				
Negative impacts on soils				
› Impacts of infrastructure on soil				
› Contamination of soils through pesticides, chemicals				
› Soil degradation, desertification, erosion and acidification				
› Microbial transformation of nitrogen fertilisers in soils				
› Others				
1.3. Is there a significant risk that substantial negative impacts are caused by the activity?	To answer the question, make an overall evaluation of 1.1 and 1.2: …….			
2. Capacities				
2.1. Which of the following factors increase or reduce the capacity of people to reduce the impact of the activity?				
Questions	**Increase**	**Not sure[8]**	**Reduce**	**Explanation[9]**
› Human capital: skills, knowledge, health and ability to work				
› Social capital: social resources, including informal networks, membership of formalised groups, relationships of trust that facilitate co-operation and inclusion of vulnerable groups				
› Natural capital: natural resources such as land, soil, water and forests				
› Physical capital: basic infrastructure (roads, water & sanitation, schools, ICT) and producer goods (tools, equipment)				
› Financial capital: financial resources including accessible savings, credit, insurance and income from employment, trade and remittances				
› Political capital: power and capacity to influence political decision-making, formal and informal participation, access to political processes, freedom and capacity to collectively organise and claim rights				
2.2. Do you estimate that women and men involved in the activity have the capacities to manage the risks of negative impacts identified in 1.3?	Make an overall evaluation of 2.1 taking into account 1.3: ……			
3. Overall estimation of the impact of the activity				
3.1. Based on the evaluation 1.3 and 2.2 do you estimate that there are significant impacts by the activity and that a Detailed Assessment should be carried out?	Yes No In general, it is recommended to do a Detailed Assessment when assessed impacts are high and capacities of women and men to reduce those impacts low.[10]			
3.2. If a Detailed Assessment should be carried out, go to Part II, Module 3 (for project level) part B.				

Table 2 Impact Screening.

8 It will not always be possible to respond clearly with "yes" or "no" to a particular question; in this case "not sure" should be marked.

9 Add a comment if you feel that a clarification or explanation is necessary, e.g. specifying the type of activity (from the listing) that is concerned.

10 Please note, that also in case of unclear effects (many times "not sure" marked), it might be advisable to conduct a Detailed Assessment.

MODULE 2: Detailed Assessment at Strategic and Programmatic Level

The **Risk Assessment Lens** (Module 2) shall be applied when the screening (Module 1) indicates a need for conducting a Detailed Assessment. The methodology for this assessment targets a different level of consideration (more strategic) than the project level (Module 3). Module 2 outlined in this section aims at strategies such as country, sector or cooperation strategies. Also complex programmes may be better assessed with this module. For practical reasons, only reference to the strategic level is made in the handbook. The process of CEDRIG at strategic and programmatic level and the inter-linkages between Module 1 and Module 2 are shown in Figure 4.

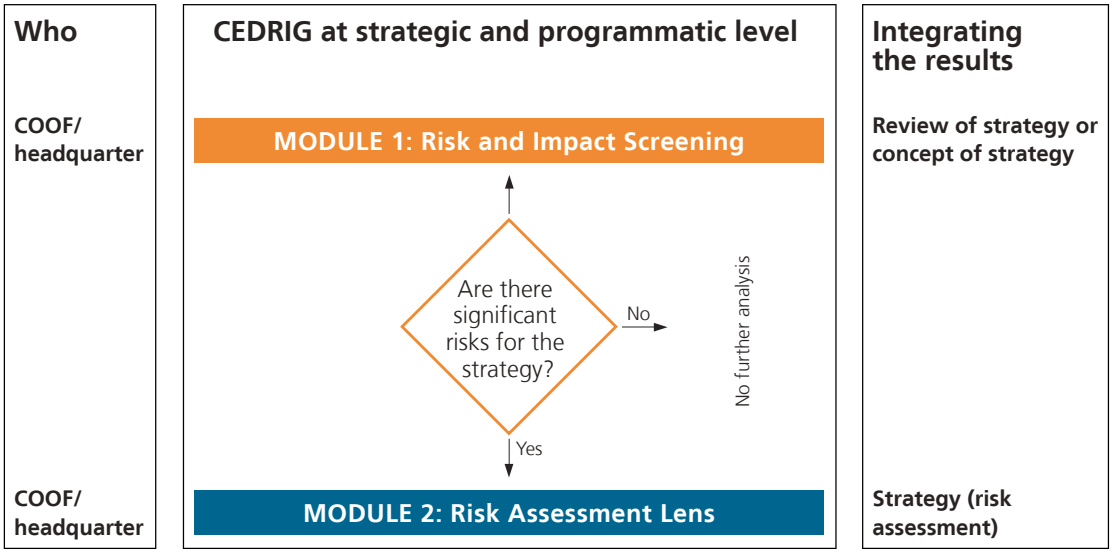


Figure 4 Module 1 and 2 at strategic and programmatic level.

Aim

The Risk Assessment Lens focuses on the **assessment of disaster risks emanating from climate variability, climate change, environmental degradation and/or tectonic activities**. For the details concerning the equation of disaster risks and further definitions please refer to Box 1 in Part I (page 5). The aim of applying the Risk Assessment Lens is to appraise whether the strategic goals, objectives or priorities are at risk from disasters and conceive a strategy which is more effective at reaching its objectives increasing the resilience of systems and communities. Incorporating disaster risks emanating from climate change particularly require planning with longer time scales and a wider range of possible variability in mind. The Risk Assessment Lens shall be applied as early as possible in the planning of a new strategy or programme or a new phase of an existing strategy and programme (e.g. during the planning workshop).

What to do

A. Analyse the context of climate change, environmental degradation and natural hazards

Try to assess whether and how the strategy under consideration will be affected by climate change, environmental degradation and/or natural hazards. You may also take into account existing risk scenarios. Please note that this is a qualitative assessment where a certain scope of discretion is left for the persons conducting this analysis. The assessment made in this step shall be included into the context analysis of the strategy document. While doing this assessment you should be able to answer the following three key questions:

- What are the most important natural hazards also related to climate change and environmental degradation in the country, region or sectors?
- What are the relevant factors influencing current and future vulnerability?
- Which key national development priorities, geographical areas, and/or sectors are likely to be particularly affected by climate change, environmental degradation and/or natural hazards?

Instructions:

- Complete the provided reporting format (Table 3, page 15). Table can be downloaded from the CCE and DRR Network websites.
- Consult the following available national information sources as appropriate: National Communications to the United Nations Framework Convention on Climate Change (UNFCCC); National Adaptation Programmes of Action (NAPAs, for LDCs[11]); in future National Adaptation Plans (NAPs); national implementation reports (e.g. midterm review, HFA Monitor) of the UN ISDR's HFA 2005–2015[12]; Common Country Assessment (CCA) of the United Nations Development Assistance Framework, GFDDR's Country Programmes[13], World Bank Country Assistance Strategies (CAS); World Bank's Country Environmental Analysis (CEA); National Environment Action Plan of the respective country or other links outlined in the "Recommended links and supporting material", page 16.

B. Assess to what extent the proposed strategic goals, objectives or priorities could be at risk from disasters and whether a business as usual strategy could lead to maladaptation

Based on the broad contextual analysis of step A you shall assess whether the intended strategic goals, objectives or priorities to be addressed in the strategy are particularly at risk from disasters. Furthermore, you shall think about whether the strategic goals, objectives or priorities could lead to maladaptation (refer to Part I Box 3 p. 7). The results gained from this step may be implicitly included into the strategy document for outlining the challenges in the geographic strategy area. You should be able to answer the following key questions:

- How and to what extent could the strategic goals, objectives or priorities be at risk from disasters?
- To what extent the strategic goals, objectives or priorities could lead to maladaptation?

Instructions:

- Based on your considerations made under step A, please complete the provided reporting format in Table 4, page 15. Table can be downloaded from the CCE and DRR Network websites.

C. Integration of disaster risk considerations in the strategy

In this sub-step you shall assess whether disaster risk considerations have already been adequately addressed during the planning phase and whether the strategy has been aligned with existing national adaptation and/or DRR strategies. Please note that this is a qualitative estimation and there is no explicit threshold for "adequately". The following questions should be answered:

- Have natural disaster risks been adequately considered in the strategy?
- Does the strategy adequately consider national adaptation and/or DRR strategies, policies or plans?

Instructions:

- Based on your considerations made under step A and B please complete the provided reporting format in Table 5, page 16. Table can be downloaded from the CCE and DRR Network websites.

D. Adjust the strategy if necessary

With the application of the former steps (step A to C) you will be able to conclude whether the strategy is at risk from disasters. You may now be in a position to decide:

a) Whether the goals, objectives or priorities of the strategy are at risk;

b) Whether the identified disaster risks have already been adequately addressed in the process of strategy development;

11 LDCs: Least Developed Countries advisable to conduct a Detailed Assessment.
12 ISDR: International Strategy for Disaster Risk Reduction
13 GFDRR: Global Facility for Disaster Risk Reduction and Recovery

c) Whether the strategy needs to be adjusted;
d) How the strategy needs to be adjusted (e.g. reformulation and/or recommendations for considering the identified risks at project or sectoral level) in order to enhance the resilience of systems and communities.

Instructions:

› Based on your considerations made under step A to C please complete the provided reporting format in Table 6, page 16. Table can be downloaded from the CCE and DRR Network websites.

Elaboration of Module 2

The Risk Assessment Lens for strategies is straightforward and rather short. Each step is conducted on the basis of the findings and considerations of the previous step. The responsible persons at the COOF should conduct the context analysis (step A) taking into account suggested links (outlined in the section recommended links and supporting material below). Steps B and C may best be conducted in discussion among strategy development team members. Decisions on an eventual adjustment of the strategy shall be taken jointly by the COOF and headquarters or during the planning workshop.

Entry point and how to make use of the results

The Risk Assessment Lens shall be applied as early as possible during the planning phase of a strategy or programme (see PCM in Figure 5, Part I). The proposed strategic goals, objectives or priorities shall be the entry point for the Risk Assessment Lens. The findings from the risk assessment (step A - C) as well as the revised strategic goals, objectives or priorities should be integrated in the strategy (risk assessment part) and its results framework.

Results of the Risk Assessment Lens and tables to complete

The findings of the sub-steps may be reported in the following tables.

Analyse the context of climate change, environmental degradation and natural hazards
What are the most important natural hazards also related to climate change and environmental degradation and/or natural hazards in the country, region or sectors? …
What are the relevant factors influencing current and future vulnerability? …
Which key national development priorities, geographical areas, and/or sectors are likely to be particularly affected by climate change, environmental degradation and/or natural hazards? …

Table 3 Proposed reporting format to assess the context of climate change, environmental degradation and tectonic activities. Can be downloaded from the CCE and DRR networks' website.

Assess the strategic goals, objectives or priorities			
	To what extent could the strategic goals, objectives or priorities be at risk from disasters	Assess the potential for maladaptation	Outline possible adjustments to be made
Strategic goal, objective or priority 1	Assess how and to what extent the goals, objectives or strategic priorities could be at risk from disasters	Assess to what extent the goals, objectives or strategic priorities could incentivize activities that become riskier under a changing climate (settlements in flood-prone areas) or whether the strategy could support activities justified under a development perspective but perhaps not justifiable under a climate change adaptation perspective	Assess how the strategy shall be adjusted, e.g. reformulations or recommendations for considering the identified risks at project or sectoral level
Strategic goal, objective or priority 2	…	…	…

Table 4 Proposed reporting format to assess the strategic goals, objectives or priorities.

Conclusions of the general assessment of whether the strategy already adequately addresses disaster risks or if it needs eventual adjustments should be reported in narrative format (in the revised strategy). The following Table 5 may help you to report your findings.

Integration of disaster risk considerations in the strategy		
		Explanation
Have disaster risks been adequately considered in the strategy?	Yes No	
Does the strategy adequately consider national adaptation and/or DRR strategies, policies or plans?	Yes No	

Table 5 Proposed reporting format to analyse whether disaster risk are already considered in the strategy.

Adjust the strategy (if necessary)		
		Type of adjustments
Does the strategy need to be adjusted due to the identified disaster risks?	Yes No	If yes, explain what kind of adjustments are needed (e.g. reformulations, recommendations at project level)

Table 6 Proposed reporting format to summarise eventual strategy adjustments.

Recommended links and supporting material

General information on issues related to climate change, environmental degradation and DRR at country level:

Adaptation Atlas (http://adaptationatlas.org/index.cfm) provides useful country specific mapping facilities.

The **Climate Change Knowledge Portal** (http://sdwebx.worldbank.org/climateportal/index.cfm) from the World Bank is a central hub of information, data and reports about climate change around the world. Here you can query, map, compare, chart and summarize key climate and climate-related information.

The WRI Platform **EarthTrends** (http://www.earthtrends.wri.org/) provides some country specific information regarding the state of environment.

EM-DAT (http://www.emdat.be/) provides systematic collection and analysis of disaster risk data. The database provides hands-on country and disaster profiles, disaster lists, reference maps as well as disaster trends.

Reports from **IPCC** (www.ipcc.ch/publications_and_data/publications_and_data_reports.htm) may also provide useful information on climate change projections.

Munich Re (http://www.munichre.com/de/reinsurance/business/non-life/georisks/natcatservice/default.aspx) comprising some 28'000 data records, NatCatSERVICE is the most comprehensive natural catastrophe loss database in the world. A comprehensive world map is available on NatCatService.

- National Environment Action Plan (NEAP) of the respective country.
- Websites of National Environmental Departments usually provide information on national key issues.

National Communications (http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php) of the respective country (all parties to the UNFCCC) include both the impacts of climate change and the emissions of greenhouse gases within their borders.

National Adaptation Programmes of Actions (NAPAs) (http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php) are issued by all LDCs that are members to the UNFCCC. They include country profiles with regard to climate change and key adaptation needs.

Preventionweb (http://www.preventionweb.net/english/) serves the information needs of the DRR community, including the development of information exchange tools to facilitate collaboration.

Hyogo Framework for Action progress reports (http://www.preventionweb.net/english/hyogo/progress/reports/?pid:222&pil:1)

Global Assessment Reports (http://www.preventionweb.net/english/hyogo/gar/) biannual report on global disaster risk reduction.

SAGE (http://www.sage.wisc.edu/mapsdatamodels.html) aims to improve the understanding of the global environment, and how it is being affected by human activities. To achieve this goal they provide maps, computer models and datasets to describe the behaviour of earth's terrestrial ecosystems, hydrological systems and climate.

Swiss Re (http://www.swissre.com/clients/client_tools/about_catnet.html) provides the CatNet™ functions and data facilitate a professional overview and assessment of natural hazard exposure for any location worldwide. This makes CatNet™ a valuable tool in preparing local, regional and cross-regional risk profiles. The main features of CatNet are natural hazard atlas, country-specific insurance data and links to disaster statistics.

The **UN ISDR** (United Nations International Strategy for Disaster Reduction) website (http://www.unisdr.org/) provides information with regards to DRR such as country information, HFA focal points, national platforms, reports on HFA implementation, disasters/events statistics, library on DRR, definition of DRR terms, etc. It also provides a list of national platforms focal points: (http://www.unisdr.org/eng/country-inform/ci-national-platform.html).

UNDP Climate Change Country Profiles (http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/) provides country reports for over 50 countries containing a set of maps and diagrams demonstrating the observed and projected climate of the country.

The **UN platform** (**Division for Sustainable Development**) (http://www.un.org/esa/dsd/dsd_aofw_ni/ni_index.shtml) provides for selected countries profiles regarding key environmental challenges.

World Bank Country Environmental Analysis (CEA) (http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:21239844~pagePK:148956~piPK:216618~theSitePK:244381,00.html) for some countries, environmental analysis has been conducted.

MODULE 3: Detailed Assessment at Project Level

Module 3 shall be applied when the screening (Module 1) indicates that a Detailed Assessment must be conducted. The methodology for this Detailed Assessment differs from the methodology at the strategic and programmatic level (Module 2) and is specifically developed for SDC projects. Module 3 is divided in two parts. Part A is the Detailed Risk Assessment regarding adaptation (to climate change and to degraded environments) and DRR. Part B is the Detailed Impact Assessment regarding mitigation (climate change and environmental impacts). The process of CEDRIG at project level and the inter-linkages with Module 1 is shown in Figure 5.

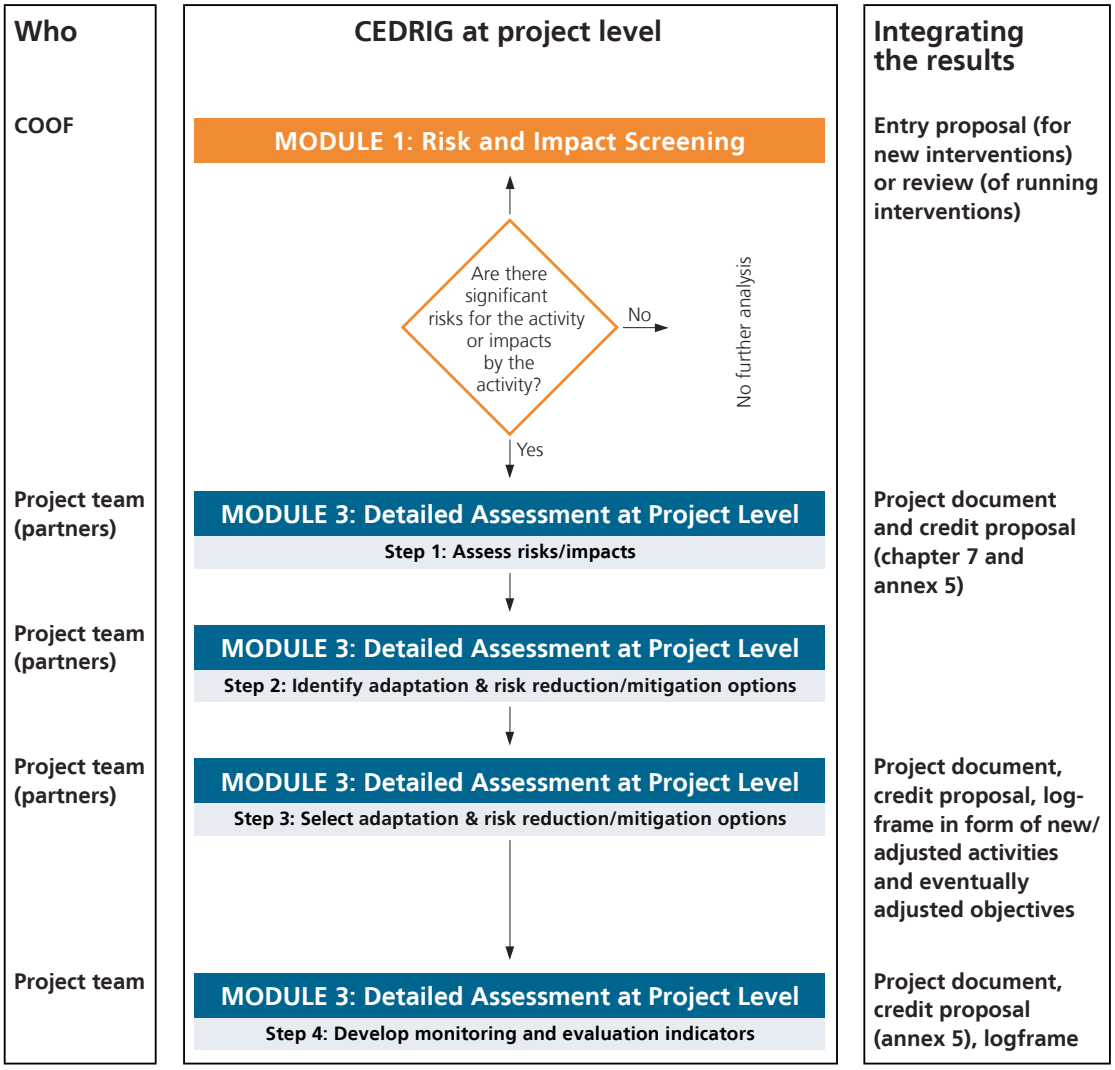


Figure 5 Module 1 and 3 at the project level. They follow the PCM of SDC.

A) Detailed Risk Assessment: Adaptation and DRR

This chapter provides step-by-step guidance through the Detailed Risk Assessment process at the project level. Adaptation to climate change and to degraded environments as well as DRR are jointly addressed in this module.

Step 1: Assessing risks

Aim

Step 1 of the Detailed Risk Assessment builds on the basic screening conducted in Module 1. The aim of this step is to **identify the disaster risks emanating from climate change, environmental degradation and/or natural hazards** for the project activities. For the equation of disaster risks and related terms please refer to Box 1 in Part I (page 5). It is the most complex and comprehensive step of the Module 3. The following steps 2 to 4 depend significantly on the quality of this step 1.

What to do

A. Collect available data on climate variability and climate change, environmental degradation, tectonic activities and socio-economic information

Compile historical data sets for your area of concern (project area, region, etc.) including temperature, precipitation and extreme events (frequency and severity) as well as environmental degradation patterns and information regarding tectonic activities. Include also local knowledge and qualitative assessments or surveys of local people, especially when local climate data is not available. Based on this, you will have a first overview on issues related to climate variability, climate change, environmental degradation and tectonic activities and will be able to identify relevant hazards.

Not only information on climate change, environmental degradation and natural hazards are important for a risk assessment; the risk from disasters depends very much on the vulnerability of people and systems. Data and information on the socio-economic and environmental conditions as well as the policy environment must therefore to be included in the Detailed Risk Assessment. With this information you will be able to obtain an overview on these conditions and proceed with the next sub-steps.

Instructions:

- Note your findings according to the reporting format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites.
- Consult links provided in section *"Recommended links and supporting materials"*, page 24 as a basis for this step and search for relevant information at national or sub-national level. You will most likely not be able to find data on sound climate projections or scenarios for your project area, or what you find will likely be highly uncertain. However, some links in the section *"Recommended links and supporting materials"* will provide a first idea on projected changes at a macro level.
- If you are not sufficiently familiar with the concepts of climate change and adaptation you may also consult FAO's webpage (http://www.webgeo.de/fw_32/) which provides an easily understandable overview on the topics of climate change, adaptation, DRR and implementing community based adaptation.
- Furthermore, the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) provides a good overview on the interrelation between DRR and climate change adaptation: http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf

B. Identify the most relevant hazards

Identify and qualitatively assess the most relevant natural hazards being influenced by climate change and environmental degradation in the project area or targeting the project's objectives or main activities. By interpreting hazard information and through local surveys or judgement of local people you will gain insights

on the severity and frequency of such events, whether these have changed over time, etc. To identify the most relevant hazards, consult disaster national statistics, surveys on past events, etc. Especially in the case of climate change you will not be able to make a scientific assessment on the future severity and frequency of such events and future (climate) scenarios are generally highly uncertain and not available at sub-national or local level. But gathering information on historical severity and frequency will help obtain a sense on whether these parameters have changed and in general the climate variability has increased or not.

Instructions:

› Include your findings in the format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites. You'll find examples of elements of the Risk Assessment in Example 1, page 23.

C. Identify assets most at risk

Whether the identified hazards have an impact on systems and populations depends very much on the present assets and their geographical distribution in the project area. For example floods may only have an impact on humans when their assets are located in the flood-prone area. With this step you will identify the assets *most at risk* from the identified hazards. You may use the concept of livelihood assets to identify the relevant assets and specify them.

Instructions:

› Include your findings in the format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites. You'll find examples of elements of the risk assessment in Example 1, page 23.

D. Identify factors influencing current and future vulnerability/adaptive capacities

Many of the factors which shape vulnerability have nothing to do with climate change, environment degradation and/or tectonic activities. Vulnerability of people or a community depends on several physical, human, social, economic and political factors. They can either positively influence the adaptive/coping capacities of people or on the contrary as a development barrier enhance the vulnerability of people. Gaining an overview of these relevant factors and how they interrelate is highly complex and requires a systemic view across different perspectives. This is not only important for assessing risks, but will also help better define appropriate adaptation and risk reduction options (steps 2 and 3). You may best proceed by charting influencing factors on a project area or system and showing their interrelations (e.g. in a mind-map). Focus on key and more direct influencing factors in case you cannot make an in-depth assessment. While concluding this step you will be able to answer the question "What are the relevant factors influencing current and future vulnerability and coping/adaptive capacity?"

Instructions:

› Include your findings in the format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites. Examples of possible influencing factors are shown in Example 1, page 23.

E. Identify the most important impacts of hazards today and in the future

Impacts are consequences of hazards on natural and human systems. Impacts of hazards differ substantially depending on available assets in a given area. By combining the information on relevant hazards (B), the assets most at risk (C) and the influencing factors (D), you will be able to answer the question "What are today and in future the most important impacts of the identified hazards on the assets at risk?"

Instructions:

› Include your finding in the format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites. You will find examples of possible impacts in Example 1, page 23.

› Consult the data resources outlined in chapter *"Recommended links and supporting material"*, page 24 especially the link of ci:grasp.

F. Perform a general and qualitative assessment of risks

Risk assessment is a combined assessment of relevant hazards and vulnerabilities. Qualitatively assess the magnitude of disaster risk on the project area/objective or main activity (low, high etc.) and provide a rationale for your risk assessment. You may also make a general assessment of risk at the level of the whole project (and not only at the level of single objectives and activities) in order to have a more holistic risk perspective. You should also make special reference as to whether vulnerable groups such as women and/or children are especially at risk.

Box 1 - Opportunities regarding Climate Change

Please note that there can also be potential opportunities for the project, which may arise from climate change. Such positive effects may be e.g. if crop yields are increasing due to warmer temperatures. However, while opportunities may arise in the short-term, they could become risks in the long-term.

Box 1 Opportunities regarding climate change.

Instructions:

› Include your finding in the format provided in Table 7, page 22. Table can be downloaded from the CCE and DRR Network websites. You will find examples of elements of the risk assessment in Example 1, page 23.

Elaboration of the step 1

The risk assessment of step 1 requires a combination of literature research, local surveys and stakeholder consultations. Data collection and literature research (A) will best be performed by one or more people of the project team. For further information on how to collect and analyse climate data please refer to GTZ (2009b). For the collection of climate data (eventually also for data regarding environmental issues) you may also consult local research institutions. The information shall be compiled in advance so that it can serve as a basis for broader consultations in subsequent steps. A first basic identification of relevant hazards (B), assets at risk (C) and relevant influencing factors (D) and impacts (E) might also be performed by a small group of people of the project team. However, these preliminary findings should be discussed and amended in a broader stakeholder consultation process (workshop) including project partners and local groups. For the general assessment of risks (F) and the verification of identified factors influencing adaptive capacity (E) consultation and involvement of different stakeholders is key. Appreciation of risk is generally not based on scientific and objective criteria but largely depends on political estimations and perceptions of stakeholders.

Entry point and how to make use of the results

The Detailed Risk Assessment at project level shall be applied as early as possible during the planning phase of a project (see PCM in Figure 5, Part I). The entry point is the logframe or other planning phase results such as outcome mappings. The information gained through this risk assessment (Table 7) should be integrated into the planning documents: (1) into the project document and (2) into chapter 7 (risk management) and Annex 5 (risk analysis) of the credit proposal. The identified risks and impacts shall be transferred to the table in annex 5 as follows:

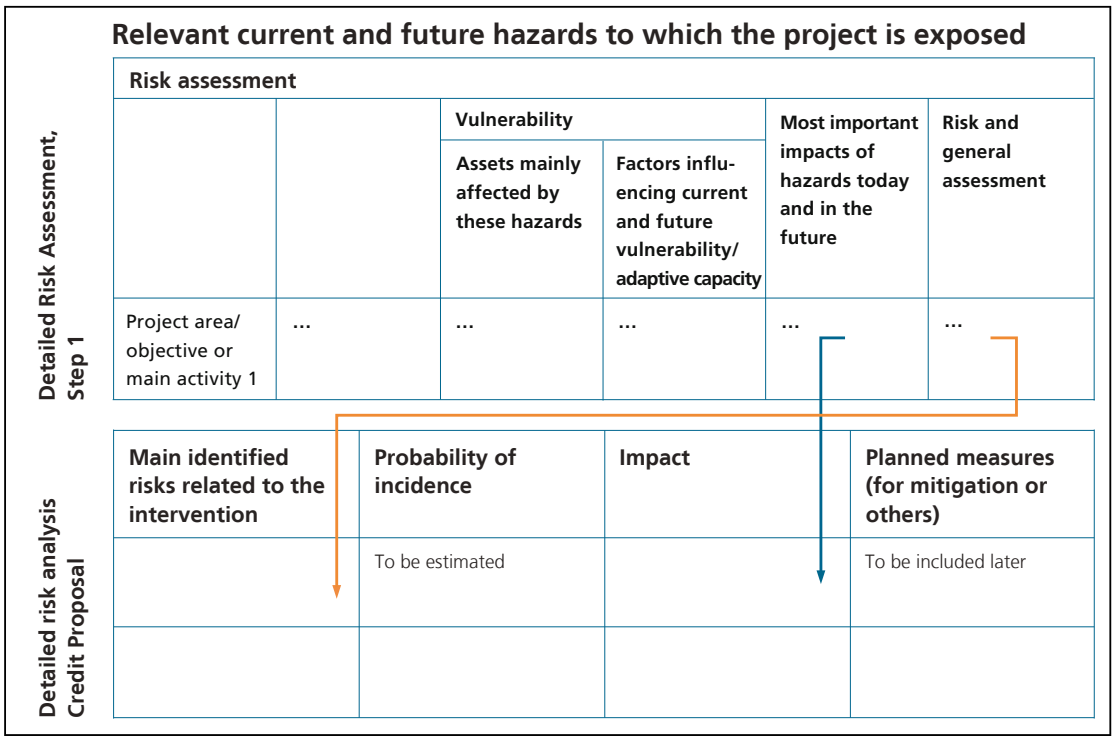


Figure 6 How to transfer the results of step 1 into the annex 5 of the credit proposal on detailed risk analysis.

Please note that in order to complete the table, you will need to add the **probability of incidence** and the **planned measures**. While the latter will result from step 3, the former has to be estimated during risk assessment.

Results of step 1 and tables to complete

- Relevant information on hazards influenced by climate change and natural environmental degradation and socio-economic data and information is collected.
- Relevant current and future hazards are identified and vulnerabilities are qualitatively assessed.
- Overall risks are assessed.

The result of this step may be summarised in the format of the following Table 7:

Risk assessment					
	Relevant current and future hazards to which the project is exposed	**Vulnerability**		**Most important impacts of hazards today and in the future**	**Risk and general assessment**
		Assets mainly affected by these hazards	**Factors influencing current and future vulnerability and/or adaptive capacity**		
Project area/ objective or main activity 1	List most relevant hazards and roughly assess their frequency and severity today and in the future	List and specify relevant livelihood assets	List relevant influencing factors and mention in what direction they influence (enhancing or limiting adaptive capacity/ coping capacity)	Mention relevant impacts.	Provide an overall assessment of current and future risks. Include a qualitative assessment of the magnitude of the risks
Project area/ objective or main activity 2	…	…	…	…	…
Project in general	…	…	…	…	Overall assessment of risks for the whole project

Table 7 Proposed reporting format for step 1.

Where appropriate and according to the thoroughness of this assessment the table shall be complemented by explanations and interpretations in narrative format.

Recommended links and supporting material

EXAMPLE 1 - ELEMENTS FOR THE RISK ASSESSMENT

Project area/ objective, main activity	**Relevant current and future hazards to which the project is exposed**	**Vulnerability**		**Most important impacts of hazards today and in the future**	***Risk and general assessment***
		Assets mainly affected by these hazards	***Factors influencing current and future vulnerability/ adaptive capacity***		
› Rice production › Animal husbandry › Urban sanitation and water supply; Watershed management › Forest management › Transport infrastructure › Hydropower production	› Event hazards: droughts, heat waves, floods, storms, landslides, debris flows, rock-, snow-, ice-avalanche; tectonic hazards such as earthquake, volcanic activity, tsunami › Gradual shift hazards: sea level rise, climate zone shifts, salinization of areas › Hazards due to environmental degradation: air/ water and soil pollution, land degradation, deforestation, desertification, wild land fires, loss of biodiversity, ozone depletion	› Human capital: skills, knowledge, health and ability to work › Social capital: social resources, including informal networks, membership of formalised groups and relationships of trust that facilitate co-operation › Natural capital: natural resources such as land, soil, water and forests › Physical capital: basic infrastructure (roads, water & sanitation, schools, ICT) and producer goods (tools and equipment) › Financial capital: financial resources including savings, credit, insurance and income from employment, trade and remittances › Political capital: power and capacity to influence political decision-making, formal and informal participation, access to political processes, (access to vote), freedom and capacity to collectively organise	› *Enhancing factors*: Access to and control over natural, human, social, physical and financial resources (refer to assets), e.g. high level of education, good quality infrastructure, reliable water source, diversified income sources; user and property rights, decentralised organisation of public services, enabling policy environment, availability of an information and communication system/channels and appropriate ICTs › *Limiting factors*: Development barriers in general, e.g.: poverty, critical health conditions, low education, prevalence of highly vulnerable groups, high unemployment, degradation of vegetation, scarcity of natural resources, human pressure on ecosystems, conflict, etc.	› Water: Reduced freshwater ability, decrease in water quality & availability › Ecosystems: exceeded resilience of ecosystems, extinction of species, loss of habitats › Food: falling crop and timber productivity, decreasing fishery resources, soil erosion, desertification › Coasts: damage from floods and storms, coastal erosion › Health: impacts on human health, increased frequency/severity of disease and pest outbreaks, increased health impacts due to air/soil/water pollution › Settlement and society: Migration, increasing risk of conflicts, erosion of institutions › Victims (deaths), injured, displaced, affected people › Livelihood loss: such as harvests, financial (income) or physical capital (e.g. infrastructure)	

Example 1 Elements of risk assessment in step1. The table shows possible examples for the respective part of step1.

EXAMPLE 2 - RISK ASSESSMENT

Project area/ objective, main activity	**Relevant current and future hazards to which the project is exposed**	**Vulnerability**		**Most important impacts of hazards today and in the future**	***Risk and general assessment***
		Assets mainly affected by these hazards	**Factors influencing current and future vulnerability/ adaptive capacity**		
Rice production	Droughts are already occurring today and are projected to become even more severe in future. Gradual temperature increase will most likely continue.	Natural and financial capital	Low level of education of the community in general and prevalence of highly vulnerable minority groups.	Rice fertility and harvest will decrease with an increase in temperature and with more severe droughts.	Severe risks to the communities in the project area, as they are highly dependent on rice production. They will face a severe loss of income and food shortages due to decrease in harvest. The risk is assessed as high also due to limited adaptive capacity.

Example 2 Exemplary table for step 1.

General information on issues related to climate change, environmental degradation and DRR at a country level:

Adaptation Atlas (http://adaptationatlas.org/index.cfm) provides useful country specific mapping facilities.

ci:grasp (http://cigrasp.pik-potsdam.de/) performs as a climate information service and provides sound knowledge on current and projected climate stimuli, climate impacts and adaptation options at the national, sub-national and regional level. It can help to identify impact chains of different hazards.

Climate Change Knowledge Portal (http://sdwebx.worldbank.org/climateportal/index.cfm?page=why_climate_change) includes country profiles regarding vulnerability, risk reduction and adaptation to climate change.

The Conservancy **Climate Wizard** (http://www.climatewizard.org/) provides historic climate data as well as downscaled projections.

The UN platform (**Division for Sustainable Development**) (http://www.un.org/esa/dsd/dsd_aofw_ni/ni_index.shtml) provides for selected countries profiles regarding key environmental challenges.
The WRI Platform **EarthTrends** (http://www.earthtrends.wri.org/) provides some country specific information regarding the state of environment.

The **EMDAT** database (http://www.emdat.be/) provides global disaster statistics, including country-level disaster profiles.

General information on climate change can be found in the reports **IPCC** (www.ipcc.ch/publications_and_data/publications_and_data_reports.htm) which may include important information on climate change projections.

National Communications (http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php) of the respective country (all parties to the UNFCCC) include both the impacts of climate change and the emissions of greenhouse gases within their borders.

National Adaptation Programmes of Actions (NAPAs) (http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php) are available for all LDCs that are members to the UNFCCC. Including country profiles with regard to climate change and key adaptation needs.

National Environment Action Plan (NEAP) of the respective country.
Preventionweb (http://www.preventionweb.net/english/hyogo/progress/reports/?pid:222&pil:1) contains progress report regarding the Hyogo Framework for Action.

Preventionweb (http://www.preventionweb.net/english/hyogo/gar/) contains the biannual Global Assessment Report on Disaster Risk Reduction.

SAGE (http://www.sage.wisc.edu/mapsdatamodels.html) aims to improve the understanding of the global environment, and how it is being affected by human activities. To achieve this goal, they provide maps, computer models and datasets to describe the behaviour of Earth's terrestrial ecosystems, hydrological systems, and climate.

Swiss Re (http://www.swissre.com/clients/client_tools/about_catnet.html) provides the CatNet™ functions and data facilitate a professional overview and assessment of natural hazard exposure for any location worldwide. This makes CatNet™ a valuable tool in preparing local, regional and cross-regional risk profiles. The main features of CatNet are natural hazard atlas, country-specific insurance data and links to disaster statistics.

The **UN ISDR** (United Nations International Strategy for Disaster Reduction) website (http://www.unisdr.org/) provides information with regard to DRR such as country information, HFA focal points, national platforms, reports on HFA implementation, disasters/events statistics, library on DRR, etc. It also provides a list of national platforms focal points: (http://www.unisdr.org/eng/country-inform/ci-national-platform.html).

UNDP Climate Change Country Profiles (http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/) provides country reports for over 50 countries containing a set of maps and diagrams demonstrating the observed and projected climate of the country.

World Bank Country Environmental Analysis (CEA) (http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:21239844~pagePK:148956~piPK:216618~theSitePK:244381,00.html) contains environmental analysis for some countries.

Further readings and information:

For a better understanding about the concepts of climate change and adaptation at the community level, the **FAO's webpage** (http://www.webgeo.de/fw_32/) on climate change and adaptation provides a simple overview.

If you are interested more deeply in how climate change information is being researched and analysed, you may consult the **GTZ (2009b)** (http://www.gtz.de/en/themen/28938.htm) which provides guidance on how climate change information can be gathered, which experts shall be consulted during this process and how data from climate models need to be interpreted.

For information about "**ICTs and Disaster Management"** you can consult http://www.bcoalliance.org/climate-change or http://www.itu.int/ITU-T/climatechange or http://www.apdip.net/publications/iespprimers/eprimer-dm.pdf.

IPCC Data Visualization (http://www.ipcc-data.org/maps/.) as part of the Data Distribution Centre of the IPCC provides climate, socio-economic and environmental data, both from the past and also in scenarios projected into the future. Scatter plots from: http://www.ipcc-data.org/sres/scatter_plots/scatterplots_home.html.

The **Tearfund 2009b and 2009c** (http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/CEDRA%20D5.pdf and http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/EA_C9465_web.pdf) provide a hands-on manual on integrating climate change, environmental and disaster related risk into development cooperation.

The platform **WeAdapt** (http://weadapt.org/) provides knowledge sharing opportunities for the climate adaptation community including helpful links, tools and documents on adaptation topics; including also tools such as the **Climate Change Explorer** (http://weadapt.org/knowledge-base/using-climate-information/the-climate-change-explorer-tool). This tool is a desktop client that provides an interface to download, manage and visualize downscaled model output. It provides users with an analytical foundation from which to explore the climate variables relevant to their particular adaptation decisions.

Step 2: Identify adaptation and risk reduction options

Aim

Step 2 of the Detailed Assessment aims at **identifying possible adaptation (to climate change and to degraded environments) and risk reduction options**. A brainstorming of possible adaptation and disaster risk reduction options is conducted without considering feasibility, costs or other limiting factors. Only new or adjusted options that are not yet included in the project shall here be identified. This step 2 is designed to be rather simple and short and is closely linked with step 3 where the identified options will be evaluated. Steps 2 and 3 could also be taken together in one step.

Box 2 - What are adaptation and disaster risk reduction options?

A wide array of adaptation and disaster risk reduction options is already available; however more efforts are often required to deal with possible future climate developments or environmental changes. The focus of all types of measures shall rather be on prevention[14] and preparedness[15] than on response. Adaptation options can be classified along different structures, e.g. along sectors (water, agriculture, health, tourism, etc.) or along types of options such as:

› Policy development: These types of options include financial options (e.g. facilitate access to credit, payments for ecosystem services, risks transfer), spatial planning (e.g. design and implement zoning regulations and building codes), laws and regulations (e.g. adoption of local policy and ordinance initiatives, building codes), governance options or others (such as e.g. relocation of vulnerable population or infrastructure).

› Capacity development: Different categories of capacity development are possible. For example knowledge building such as improving environmental education or building capacity in weather forecasting or hazard mapping. Strengthening of monitoring and evaluation such as expanding monitoring programmes; developing capacity to model climate change effects and research. Supporting the development and implementation of early warning systems, etc.

› Awareness building: This includes measures to achieve a behavioural change as well as awareness building. Awareness building is often a precursor of capacity development. Awareness building activities mainly take place at a community, household, school and administration level. Awareness raising via campaigns and events leads to changes in behaviour and dissemination of good practices.

› Particular adaptation/disaster risk reduction: These types include activities to directly reduce risks in particular locations. The effects for the beneficiaries are directly visible. The measures can be in form of infrastructure options, which are normally technical options such as installation of wells, treatments and reuse of wastewaters, building dams, installation of collectors, storm gates and pumps. Many potential adaptation measures are not climate or environmental specific but constitute good practices that contribute to wider developmental and sustainability objectives (e.g. promote water efficiency, Integrated Water Resources Management, more robust crop seeds). This type of measures also includes the resettlement of people to safe grounds as well as risk transfer measures such as insurance solutions, which are not reducing but transferring the risk.

Box 2 These types of options refer to the SDC intern report: "Effectiveness of SDC's Commitments in Disaster Risk Reduction" (SDC 2010b).

What to do

The hazards, vulnerabilities, impacts and risks identified in step 1 shall be the starting point for brainstorming of possible adaptation and disaster risk reduction options. You may think of new options as well as of adjustments of already existing options of the project, as well as of very specific as well as of general options for the whole project. Options shall be considered irrespective of their feasibility. Furthermore it must be considered that societies generally have long experience in managing the impacts of degraded environments and/or weather events that can result in natural disasters. It is therefore advised to consider local knowledge which can be gathered through stakeholder consultations. While concluding this step, you will be able to answer the question "What are adaptation or disaster risk reduction options to be considered and which traditional knowledge and adaptation & disaster risk reduction options may be included?"

Instructions:

› Transfer the hazards, vulnerabilities, impacts and risks identified in step 1 into Table 8, page 27.

› Include your brainstormed options in the format provided in Table 8, page 27. Table can be downloaded from the CCE and DRR Network websites.

› A list of possible adaptation and disaster risk reduction options is provided in Example 3, page 28–29 and shall serve as a basis for this step. For sector specific considerations the links outlined on page 30 in subchapter *"Recommended links and supporting materials"* can be consulted.

14 Prevention: The outright avoidance of adverse impacts of hazards and related disasters (UN ISDR).

15 Preparedness: The knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions (UN ISDR).

Elaboration of step 2

Brainstorming of adaptation and disaster risk reduction options may be based on the supporting material in section *"Recommended links and supporting materials"* on page 30 and inputs from stakeholders. A preliminary list of options may be developed by a project team member and then be amended (e.g. by traditional adaptation options) through a broader consultation among project partners (workshop).

Entry point and how to make use of the results

The entry points of this step are the hazards, vulnerabilities, impacts and risks identified in step 1. The result of the brainstorming (Table 8) will be used for the selection of possible adaptation and risk reduction options and shall at this stage not yet be integrated into planning documents.

Results of step 2 and tables to complete

- Different categories of adaptation and disaster risk reduction options are assessed.
- Possible adaptation and disaster risk reduction options are identified regardless of their feasibility.
- Traditional knowledge is considered via stakeholder consultations.

Brainstorming of adaptation and disaster risk reduction options						
	Relevant current and future hazards to which the project is exposed	**Vulnerability**		**Most important impacts of hazards today and in the future**	**Risk and general assessment**	**Possible adaptation or risk reduction options**
		Assets mainly affected by these hazards	**Factors influencing current and future vulnerability/adaptive capacity**			
Project area/ objective or main activity *Transfer from step 1*	Transfer from step 1	Transfer from step 1	Transfer from step 1	Transfer from step 1	Transfer from step 1	List and specify possible options
Project area/ objective or main activity *Transfer from step 1*	…	…	…	…	…	…
Project in general	…	…	…	…	…	List and specify general options

Table 8 Proposed reporting format for step 2.

Recommended links and supporting material

The following matrix provides examples of different types of adaptation and risk reduction options according to sectors. Please note that the following matrix shows only some examples of options, and that categories and types of options may vary.

EXAMPLE 3 – ADAPTATION AND disaster RISK REDUCTION OPTIONS ACCORDING TO TYPES AND SECTORS (SELECTED EXAMPLES)

Type / Sector	Policy development	Capacity building	Awareness building	Particular adaptation/ disaster risk reduction
Water and Sanitation	› Introduce water pricing › Encourage water efficient production › Government water transfer programmes › Securing rights of access to water supplies for small-scale farmers	› Expand monitoring for water supply and use › Develop capacity to model climate change effects on a regional scale › Develop early warning systems	› Awareness raising at community, household and school level with regard to water usage › Work with communities regarding awareness raising for water harvesting	› Enhance watershed management, rainwater harvesting › Promote Integrated Water Resource Management › Install more wells, construct dams › Technical flood control measures › Mangrove tree buffers › Restoration of vegetation or tree cover › Protect key water and sanitation infrastructure › Promote filtration systems regarding polluted water systems › Install hand pumps on raised platforms above anticipated flood levels › Design water and sanitation infrastructure to withstand earthquakes › Install desalination systems
Agriculture and Rural Development	› Introduce payment for ecosystem services › Adopt land reforms that promote sustainable land management › Mainstream adaptation into local community management plans	› Promote soil conservation in farming practices	› Promote farmers' access to training, advisory services, financial services and market prices › Demonstrate year-round homestead vegetable gardening › Encourage the use of sustainable agriculture techniques to improve food security during dry periods	› Adopt drought-, flood- or salt- resistant crops and/or varieties › Soil conservation measures › Promote drip irrigation technologies › Promote stable vegetation covers › Create seed banks to allow replanting if crops fail, are damaged or destroyed › Include insurance or other forms of risk transfer
Forest/natural resource management	› Strengthen land planning and management institutions › Adopt land reforms that promote sustainable land management	› Implement adequate conflict prevention and management mechanisms	› Awareness raising at school and community level in order to change behaviour of natural resource management	› Maintain a critical mass of diversified, natural forest ecosystems in forest regions › Use adapted species (drought, flood, fire resistance) › Build firebreaks and strengthen fire management systems and procedures (e.g. installation of surveillance towers, water reservoirs) › Facilitate monitoring through remote sensing technology

EXAMPLE 3 – ADAPTATION AND disaster RISK REDUCTION OPTIONS ACCORDING TO TYPES AND SECTORS (SELECTED EXAMPLES)

Type / Sector	Policy development	Capacity building	Awareness building	Particular adaptation/ disaster risk reduction
Health	› Strengthen food safety regulation › Strengthen programmes aimed at fighting the effects of malnutrition › Develop emergency preparedness plans	› Promote good sanitation practices › Develop systems for monitoring drinking water, food quality › Build capacity for emergency preparedness plans › Strengthening local institutions and volunteers in order to respond to pre- and post-disaster measures. › Train health workers and others to respond to crises such as drought	› Awareness raising at e.g. household level in order that people know their preparedness plans (campaigns) › Awareness raising regarding air and water pollution › Public health and hygiene campaigns on water collection, conservation, non-contamination and coping with drought	› Implement sanitation practices, use of mosquito nets › Improve access of most vulnerable populations to health services › Upgrade or modernise refrigeration facilities to ensure proper conservation of drugs and vaccines › Promote access to community health
Education	› Education infrastructure planning keeping up with demographic patterns (e.g. in case of climate induced migration) › Strengthening programmes under the control of education	› Enhance quantity (through facilitating distance-learning) and quality (more interactivity) of education through appropriate ICTs	› Awareness-raising on climate change and its effects in schools	› Make educational infrastructure as "climate-resilient" and earthquake proof as possible
Energy	› Take climate change impacts into account in strategic decisions on energy infrastructure development (e.g. reduce dependence on hydropower where stream flows are expected to decrease)	› Capacity building with regard to renewable energies	› Awareness raising on links between energy supply, vulnerability, dependency of non-renewable sources	› Reduce dependency on single sources of energy, and opt for more diverse energy sources › Make energy conversion infrastructure more resilient to extreme climatic events and earthquakes
Urban Development	› Take into account climate variability in urban development planning (e.g. need for higher-capacity drainage and flood protection systems) › Relocate vulnerable population › Take into account environmental perspective in urban development planning	› Monitor trends in migration and human settlements to keep track of the most pressing needs and to integrate them in urban infrastructure investment planning › Promote technically sound hazards and risk maps	› Awareness raising among the population e.g. with regard to earthquakes.	› Climate resilient and sustainable urban settlements › Strengthen and upgrade key urban infrastructure and buildings to make them more climate resilient. › Building shelters (floods, cyclones) › Avoid building on or near slopes at risk of mudslides or landslides › Wherever possible, design water and sanitation infrastructure to withstand the shock of an earthquake
Private sector development, employment	› Undertaking public investments that enhance the resilience of essential infrastructure (e.g. transport, energy supply, water supply, telecoms) as a basis for private sector development	› General and sector-specific capacity building programmes focused on the dissemination of adaptation-related good practices and the development of adaptation plans (specific focus on Small and Medium Enterprises)	› Running awareness campaigns targeted at private enterprises about climate and environmental degradation related risks and challenges	› Setting up financial services (e.g. subsidised loans) to support the implementation of Small and Medium Enterprises climate adaptation programmes

Example 3 Examples of adaptation and risk reduction options.

EXAMPLE 4 – ADAPTATION OPTIONS ALSO SERVING AS MITIGATION OPTIONS

Please note that some adaptation options can also at the same time be climate change and environmental impact mitigation options. This is mainly the case for options within the agriculture, water, forestry and land use sector in general.

Example: Ensuring a critical mass of diversified forests or restoring soils in order to prevent soil and land degradation may at the same time sequester carbon and therefore serve both as an adaptation (to climate change and to degraded environments) and climate change mitigation options. Furthermore, using agricultural techniques such as contour bunding and check dams to delay the flow of rainwater and improve infiltration can also serve as adaptation and mitigation option. On the one hand, it helps to adapt to changing precipitation patterns, on the other hand it reduces negative impacts on the environment (e.g. if rainwater cannot be used one may otherwise have to pump the water from the aquifers).

You may consider these options also with a view to mitigation (climate change and environmental impacts) but without doing a detailed assessment according to part B (Impact Assessment; Mitigation), page 37.

Example 4 Adaptation options also serving as mitigation options.

Information on adaptation and risk reduction options can be found here:

If sector specific information is required, the ***sector scripts*** **of EuropeAid** (http://www.environment-integration.eu/component/option,com_docman/task,cat_view/gid,109/Itemid,278/lang,en/) might provide valuable information on how climate change is affecting different sectors and what possible options for adaptation might be chosen.

EuropeAid 2009 (http://www.environment-integration.eu/content/section/4/146/lang.en/) provides an Environmental Integration Handbook for EC Development Co-operation which contains information on sectorial environmental impacts and options.

HFA 2005 Hyogo Framework for Action 2005-2015 (outlining the international commitments and framework with regard to disaster risk reduction.

IFRC (http://www.climatecentre.org/) **The Red Cross/Red Crescent Climate Centre is the reference centre on climate change of the Red Cross/Red Crescent family.** The Centre's main approach is to raise awareness; advocate for climate adaptation and DRR (within and outside the Red Cross and Red Crescent).

National Adaptation Programme for Action (NAPA) (http://unfccc.int/national_reports/napa/items/2719.php).

Preventionweb (http://www.preventionweb.net/english/) serves the information needs of the DRR community, including the development of information exchange tools to facilitate collaboration. Information regarding the design and development of the project together with background documentation can be accessed here along with some services that have been put in place.

Tearfund 2009a (http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/CEDRA%20checklist.doc) CEDRA (Climate change and Environmental Degradation Risk and Adaptation assessment) provides a checklist including impacts and adaptation options according to different sectors.

The **UN ISDR** (United Nations International Strategy for Disaster Reduction) website: http://www.unisdr.org/ provides information with regard to DRR such as country information, HFA focal points, national platforms, reports on HFA implementation, disasters/events statistics, library on DRR, etc. It also provides a list of national platforms focal points: http://www.unisdr.org/eng/country-inform/ci-national-platform.html.

UNFCCC (http://maindb.unfccc.int/public/adaptation/) local coping strategies database provides summaries of different coping strategies (including local contact persons).

WRI 2007 (http://pdf.wri.org/weathering_the_storm.pdf) Weathering the Storm – Options for Framing Adaptation and Assessment provides an overview of case descriptions of adaptation strategies according to different sectors and countries including the relevant link (Annex starting page 43).

Step 3: Select adaptation and risk reduction options

Aim

After having brainstormed different adaptation (to climate change and to degraded environments) and disaster risk reduction options, **select the most appropriate options** based on a chosen set of criteria ("multi-criteria analysis"). This will form the basis for an eventual revision or adjustment of the project's activities. Implementing adaptation and disaster risk reduction options depends on different factors including both the inability of natural systems to adapt to the rate and magnitude of climate change, environmental degradation and/or natural hazards, as well as technological, financial, cognitive and behavioural, and social and cultural constraints (according to IPCC 2007). In this step the most promising and feasible options are selected. The following criteria might be considered to evaluate the options:

Box 3 - Recommended criteria to consider for selecting adaptation and disaster risk reduction options

- **Effectiveness in enhancing resilience**: The extent to which the adaptation and risk reduction option reduces vulnerability and enhances resilience of systems as well as provides other benefits. You might also think of **no regret** or low regret options: these are options that would be justified under current climate as well as under all plausible future scenarios, including the absence of climate change. No regret adaptation options are beneficial and cost effective, even if no climate change or environmental degradation occurs and shall therefore be favoured.
- **Cost**: This criteria concerns whether an adaptation or disaster risk reduction option is relatively expensive or inexpensive. It includes investment costs as well as costs over time such as operation and maintenance costs, reconstruction costs, etc. Please note that costs always have to be seen in the context of benefits. High costs can be justified by the high effect they have on enhancing resilience, meaning that low costs do not immediately mean superiority of the measure over a higher cost option.
- **Feasibility:** This criterion addresses how feasible the implementation of the options might be. It refers to whether the necessary human, legal, administrative, financial, technical and other resources are available. It also refers to whether general/public acceptance/willingness is present. Options that can be implemented under the current operational framework will normally be favoured over adaptation options that require new authority, new technology, changes in peoples' preferences or other significant changes.
- **Sustainability:** This criterion addresses how sustainable the measure would be. Not only in terms of social, economic and ecological sustainability, but also in terms of whether the option will sustain without financial support from development cooperation.

Box 3 Recommended criteria to consider for selecting adaptation and disaster risk reduction options.

What to do

A. Collect relevant data on the selected key criteria and score the options

The potential options from step 2 are assessed according to the most relevant criteria: effectiveness in enhancing resilience, cost, feasibility and sustainability. These criteria are not compulsory but suggested. Consider whether additional criteria for the assessment of the proposed adaptation and disaster risk reduction options are needed (e.g. time factor such as short verses long term) and include them accordingly. The assessment of these criteria shall mainly be performed qualitatively, preferably in discussion with the project team and partners. If available, you may include quantitative information, e.g. on costs of the options. The assessment will help to justify the selection of the measures that shall be implemented in the project. Explain your assessment of the options and score them.

Instructions:

- Transfer the possible adaptation or disaster risk reduction options into Table 9, page 33.
- Report the findings of step 3 in Table 9, page 33. Table can be downloaded from the CCE and DRR Network websites.
- Refer to Box 4, page 33 for further details.

B. Evaluate the options

Evaluate the different adaptation and disaster risk reduction options by taking into account all criteria. This assessment will also be conducted in a qualitative manner and you will be able to conclude which options are prioritised and shall be included into the project.

Instructions:

- Include your findings into Table 9, page 33. Table can be downloaded from the CCE and DRR Network websites.

C. Assess the options in an overall context

Assess the adaptation and risk reduction options from the "bird's eye perspective[16]". You should identify the set of most promising options with regard to the entire project and decide which ones shall be implemented. Try to assess whether this result makes sense from an overall perspective. If you select different options you shall also assess whether they will be effective together, i.e. if they overlap or complement each other. Furthermore, it is advised to consider a mix of short-, middle- and/or long-term options. It should be avoided to select only short term ones.

Instructions:

› Include your findings into Table 9, page 33. Table can be downloaded from the CCE and DRR Network websites. For an example of a filled out step please refer to Example 5, page 33.

D. Include selected options

Finally, include the most promising options into your project. You may therefore adjust or amend your main activities accordingly.

Instructions:

› Include the results into your project documents.
› Advice on how to transfer the results into Annex 5 of the credit proposal is depicted in Figure 6, page 21.

Elaboration of step 3

Assessment of options is highly subjective depending on the individual perceptions of the persons involved. This step shall therefore be pursued by a multidisciplinary team and through discussions and consultations among project partners and other relevant stakeholders (workshop where all the four steps shall be assessed). Especially sub-step C (assessment in an overall context) requires a close involvement of all project partners as they have to decide whether to include the newly identified options into the project.

Entry point and how to make use of the results

The entry point for step 3 is the brainstorming of adaptation options of step 2. The result of this process - namely the selected options - shall be integrated into the planning documents: (1) into the project document and (2) into chapter 7 (risk management), annex 2 (logframe) in form of new/adjusted activities and eventually adjusted objectives and into annex 5 (risk analysis) (see Figure 7) of the credit proposal.

Main identified risks related to the intervention	Probability of incidence	Impact	Planned measures (for mitigation or others)
Identified in step 1	Identified in step 1	Identified in step 1	Include proposed options identified here
...	...	...	...

Figure 7 Integration of step 3 into SDC's detailed risk analysis to be included in annex 5 of the credit proposal.

Results of step 3 and tables to complete

› The identified options are assessed with regard to the most relevant selection criteria.
› The most promising options are selected.
› The selected options are assessed with a "bird's eye perspective".
› The selected options are included in your project.

The result may be summarised in the format of Table 9. The overall assessment (bird's eye perspective) and decision on which of the options shall be implemented is best described in narrative format. Selected options must be justified with transparent evidence-based arguments and easily implementable options should be preferred.

16 Bird's eye perspective: to have an overall view of the project.

Assessment and selection of proposed options						
	Effectiveness in enhancing resilience	**Cost**	**Feasibility**	**Sustainability**	**Further criterion?**	**Overall evaluation**
Possible adaptation or risk reduction options *Transferred from step 2*	Explain how effective the option is enhancing resilience and score with (0) not effective, (1) effective, (2) very effective Consider in your assessment whether the option is "no-" or "low-regret"	Explain how costly the option is and score with high costs (0), medium costs (1), low costs (2)	Explain how feasible the option is to implement and score with not feasible (0), feasible (1), very feasible (2)	Explain how sustainable the option is and score with e.g. low (0), medium (1), high (2)	Explain and score the options to the criterion of your choice accordingly.	Make an overall assessment of the option with regard to the outcome of the criteria scoring. Cost/benefit considerations shall be taken into account. Options with highest scores in all criteria shall be preferred.
...						

Table 9 Proposed reporting format for the assessment and selection of adaptation and risk reduction options.

Recommended supporting material

The following questions might help to address the four main criteria.

Box 4 - Questions to consider while assessing the criteria

Effectiveness in enhancing resilience	**Cost**	**Feasibility**	**Sustainability**
› Is the option reducing vulnerability and enhancing resilience? › Is the option providing co-benefits for other sectors? › Is the option flexible? Can it be adjusted in response to changing conditions? › Is the option a no- or low-regret option? › How big is the group of beneficiaries? (Options that provide small benefits to large numbers of people will often be favoured over those that provide larger benefits, but to fewer people.) › Is the option targeting the most vulnerable communities/people?	› Is the option relatively expensive or inexpensive compared to other options ("cost efficient")? › Are the initial costs of implementation high or low? › Are the costs over time (operation and maintenance, administration and staffing, etc.) high or low? › How high are the external costs of the option (take into account non-economic costs and economic and/or quantifiable costs)?	› Do necessary human, legal, administrative, financial and technical resources exist? › Is there a need to adjust other policies to accommodate the adaptation option? › Is the option acceptable to local stakeholders (socially, culturally)? › Are these resources available for use?	› Is the option socially, economically and environmentally sustainable? › Is the option sustainable in the longer term without financial support from external development cooperation?

Box 4 Questions to conclude the assessment and selection of the proposed options.

EXAMPLE 5 - ASSESSMENT AND SELECTION OF PROPOSED OPTIONS

	Effectiveness in enhancing resilience	**Cost**	**Feasibility**	**Sustainability**	**Further criterion?**	**Overall evaluation**
Drought resistant crop	2 The option is very effective, as it is directly linked to the main risk and hence enhances resilience.	1 Relatively high initial costs (purchase of crops), but no additional operational costs.	1 The option is feasible but faces some initial barriers (farmer's acceptance of the new seeds, training requirements, changes in practices)	1 Potentially large sustainability benefits. The new crop seeds need to be well established and accepted by the farmers to sustain after termination of the project.	None	The option contributes to increased climate resilience. Needs investments in training and awareness building in order to be effective and sustainable. However benefits are estimated as higher than costs.

Example 5 Exemplary table for step 3.

Step 4: Define monitoring and evaluation indicators

Aim

As a final step you will **define indicators for monitoring and evaluation regarding the success of the adaptation and disaster risk reduction options**. Furthermore, you will need to make an overall assessment of the measures included regarding their contribution to resilience enhancement.
The aim of this step is to define indicators to monitor (and evaluate) the impacts, outcomes and outputs of the implemented adaptation and disaster risk reduction measures. Whereas outputs refer to the products, capital goods and services which result from a development intervention, the outcomes are the likely or achieved short-term and medium-term effects of an intervention's outputs (definitions of the Development and Co-operation Directorate (DAC) of the OECD). The evaluation of climate change adaptation and disaster risk reduction options is an especially challenging task, primarily because measures may incorporate long-term risks from climate change and natural hazards, which may lead to a discrepancy between the project duration and the time horizon of occurrence of those natural phenomena. Furthermore, most development options have a strong implicit climate change adaptation component, which makes it difficult to distinguish between the comparison scenarios with and without. However, this should not prevent from evaluating whether an action was justified or not. You shall still try to evaluate whether the intended benefits have been achieved, resilience enhanced and/or whether there have been any adverse outcomes.

What to do

A. Define new or adjust impact, outcome and output indicators

During the project planning phase the monitoring system will be developed and indicators defined for the logframe. You shall therefore – based on eventually revised activities – define or adapt the outcome and output indicators related to the introduced measure in order to follow their contribution to the purpose and expected results of the project. If the overall project goal (impact) has been adjusted or amended you shall also adjust impact indicators to be included in the logframe for project evaluation purpose. Output indicators are normally formulated quantitatively or semi-quantitatively, e.g. numbers of people trained; degree of implementation of early warning systems etc. In general, they do not differ from output indicators formulated for any kinds of projects. Outcome indicators are generally formulated in a more qualitative manner and reflect a change in behaviour. In order to complete this step, you shall work with the logframe, such that existing indicators shall be adjusted or amended or new indicators shall be included.

Instructions:

- Report the results from this step in the format provided in Table 10, page 35. Table can be downloaded from the CCE and DRR Network websites.
- Examples of possible impact, outcome and output indicators are listed in Example 6, page 35–36. Specific links for defining indicators are provided in section *"recommended links and supporting material"*, page 36.

B. Overall assessment and questions for the evaluation

As described above, it is extremely challenging to evaluate the outcome of adaptation and disaster risk reduction options. You should therefore already at this stage try to consider whether the included measures and hence revised activities, outputs, outcomes or impacts are meeting the overall target of enhancing the resilience of communities and systems. You should address the questions below to accomplish this, and may again discuss them during the project evaluation. For the evaluation you may also amend your questions with the proposed set outlined in Example 7, page 36.

- Are the measures defined adequately addressing the risks identified?
- Are the measures suited for enhancing the resilience of communities and system?

Instructions:

- Report the results from this step in the format provided in Table 11, page 35. Table can be downloaded from the CCE and DRR Network websites.
- A list of possible further questions to be address during the evaluation is provided in Example 7, page 36.

Elaboration of the step 4

Impact, outcome and output indicators may be defined by one or two persons of the project and then be discussed with and verified by the project team. This can be done either during the workshop, where step 1-3 are jointly elaborated or afterwards. The overall assessment of sub-step B shall be jointly addressed during the workshop.

Entry point and how to make use of the result

As the logframe is the key reference for monitoring progress and results during the implementation of the project, it shall serve as the entry point for step 4. Hence, the result of this step shall be integrated into the logframe and the respective project document.

Results of step 4 and tables to complete

The results of this step may be summarised in the format of the following tables:

A Indicators for monitoring and evaluation	
Goal (impact)	**Impact indicators**
Goal 1	Define impact indicators
Goal 2	...
Purpose (Outcome)	**Outcome indicators**
Purpose 1	Define outcome indicators
Purpose 2	...
Results (Outputs)	**Output indicators**
Result1	Define output indicator (e.g. quantitative ones)
Result 2	...

Table 10 Proposed reporting format for the evaluation and monitoring indicators.

B Control questions
Are the measures defined adequately addressing the risks identified? …
Are the measures suited for enhancing the resilience of communities and system? ...

Table 11 Proposed control questions for the overall assessment and evaluation.

Recommended links and supporting material

EXAMPLE 6 - EXAMPLES OF IMPACT, OUTCOME AND OUTPUT INDICATORS

	Impact	**Outcome**	**Output**
Policy development	› Increased overall resilience through implementing policy actions	› Legislators pass policy provision in favour of pro-environmental land-management/ agricultural practices etc. › National climate change and/ or DRR plan established and implemented › Climate change and DRR is mainstreamed in the local political institutions	› Number of mechanisms for coordination (e.g. evacuation, climate change) between sectors is established › Number of e.g. districts with a written policy that includes environmental issues or climate change adaptation into official planning
Capacity development	› Increased overall resilience reached through implementing capacity development activities	› Perceived change in ability to respond to future change achieved	› Number of early warning system installed › Number of trainings in soils conservation provided › Local emergency response team established
Awareness building	› Reduced vulnerability through awareness building measures	› Change in behaviour reached (e.g. watershed management, soil conservation in farming practices)	› Number of schools and students for awareness raising reached

	Impact	Outcome	Output
Particular adaptation/ disaster risk reduction	› Increased overall resilience reached by reducing exposure to environmental and climate related disasters by implementing particular adaptation options	› Higher yields due to cultivation of drought resistant crops and improved water management › Perceived change in ability to respond effectively to future environmental and climate change achieved › Perceived change in individual vulnerability achieved	› Amount of drought resistant seeds available by farmers › Number of water and irrigation systems adapted

Example 6 Examples of impact, outcome and output indicators.

EXAMPLE 7 - POSSIBLE CONTROL QUESTIONS

› Has the overall resilience of affected systems been improved?
› In what sense have the measures enhanced resilience of the affected systems?
› Are the risks which justified the measures still anticipated?
› Have any impacts from climate change, environmental degradation and/or natural hazards been felt? If yes, did the measures work as intended?
› Did the measures lead to any kind of maladaptation?
› Have the implemented measures led to non-climate/DRR related benefits (no regret measure)?

Example 7 Possible control questions to be considered.

Guidance and literature for monitoring and evaluation of adaptation and risk reduction options is still very limited. Most guidance dealing with integration of climate change adaptation into development cooperation does not properly address monitoring and evaluation. More information is available in the context of DRR.

You may find some ideas related to monitoring and evaluation of adaptation measures here:
GIZ 2011a (http://www2.gtz.de/dokumente/bib-2011/giz2011-0445de-klimawirkungen.pdf) **provides a Sourcebook for climate specific monitoring in the international cooperation.**

GEF: Tracking Tool for Adaptation Projects (AMAT): http://www.thegef.org/gef/tracking_tool_LDCF_SCCF

Tearfund 2009b (http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/CEDRA%20D5.pdf) provides a Guidance on Climate Change and Environmental Degradation Risk and Adaptation assessment.

USAID 2007 (http://www.usaid.gov/our_work/environment/climate/docs/reports/cc_vamanual.pdf) provides a Guidance manual for Development Planning.

You may find some ideas with regard to different kind of environmental, climate and other issues related indicators in the **World Bank indicator database** (http://data.worldbank.org/indicator/all)**.**

You may find some ideas with regard to monitoring and evaluation of DRR measures here:
ISDR 2008 Indicators of Progress (http://ocha.unog.ch/drptoolkit/PreparednessTools/DRR/Indicators_of_Progress_HFA%20-%20ISDR.pdf) provides guidance on measuring the Reduction of Disaster Risks and the Implementation of the Hyogo Framework for Action.

ProVention 2007 (http://ebookbrowse.com/gdoc.php?id=306191691&url=c96daf891ef73b736990c7c8a1008ab1) provides guidance on evaluating Disaster Risk Reduction Initiatives: Guidance not 13.

IFRC 2010: Disaster Risk Reduction and Climate Change Adaptation National Plan/Programme Suggested Performance Framework, internal document of International Federation of Red Cr oss and Red Crescent Societies, December 2010.

B) Detailed Impact Assessment: Mitigation

CEDRIG not only assesses whether an activity (strategy, programme or project) is at risk from disasters emanating from climate change, environmental degradation and/or natural hazards, but also whether the activity itself causes impacts on GHG emissions and/or the environment. This section therefore refers to climate change and environmental impact mitigation (referred to hereafter as mitigation). The DRR terminology of mitigation, meaning measures undertaken to limit the adverse impact of natural hazards, are described in this handbook as adaptation and risk reduction measures (see Part I, chapter 1.3.2, page 9).

Aim

The objective of this assessment is to identify the **main impacts of existing or planned activities on GHG emissions and the environment**. It analyses how projects or programmes can contribute to reduce GHG emissions and negative environmental impacts and identifies alternative options to maximise these contributions.

What to do

The process follows the four step approach as described in Module 2 but in less detail.

Step 1: Assess impacts on GHG emissions and/or the environment

This step is straightforward and will help you to become more conscious of the project or programme's possible impacts on GHG emissions and/or the environment. You first list the **relevant project areas, objectives, main activities or sectors** of the programme or project already identified during the screening in Module 1. You will then elaborate on **potential impacts** of these sectors, project areas, objectives or main activities already identified in the screening in Module 1 (Question 1.2 of the Impact Screening in Table 2, page 11: "Is there a risk that the activity produces the following negative impacts on GHG emissions and/or the environment?"). You may qualify these risks and complement them if needed.

Instructions:

- Report your findings according to the reporting format displayed in Table 12, page 39. Table can be downloaded from the CCE and DRR Network websites.
- Examples of possible impacts are displayed in Example 8, 40. Specific links regarding environmental impacts are provided in section *"recommended links and supporting material"*, page 40.

Box 5- Opportunities regarding Climate Change mitigation
Please note that there can also be a potential for opportunities, which may arise from the activities in your programme or project. Such opportunities will mainly arise regarding reducing adverse impacts on climate change. For example, switching the energy source from coal-fired to a renewable source lowers on the one hand GHG emissions, and on the other might also result in opportunities regarding independency of energy supply (e.g. if local biomass sources are being used).

Box 5 Opportunities regarding climate change mitigation.

Step 2: Identify climate change and environmental impact mitigation options

In this step you shall brainstorm on possible mitigation options for the identified impacts. You can consider two categories of options:

- **Options improving existing processes, practices**, e.g. by considering energy efficiency in building and industries, using the potential of restoration of natural degraded forests and bush land, re- and afforestation, reducing emissions from deforestation, reducing air pollutants from processes by altering technologies and transport systems, reducing soil and water contamination by altering practices and technologies and unsound waste management, modifying agricultural practices and introducing agro forestry.
- **Options adding a mitigation component to the project**, e.g. using agricultural waste for energy production, energy recovery, using renewable energy sources, promoting technical approaches (e.g. water conservation techniques, waste water treatment, sustainable waste management and land conservation measures).

Please note that several mitigation options (mainly climate change mitigation options) may also serve as adaptation options (refer to Example 4, page 30).

Instructions:

- Report your findings according to the format provided in Table 13, page 39. Table can be downloaded from the CCE and DRR Network websites.
- Examples for possible mitigation options are outline in Example 9, page 41.

Step 3: Select climate change and environmental impact mitigation options

This step shall be developed analogously as for selecting adaptation options (refer to step 3 in part A). You shall evaluate the identified mitigation options according to the key criteria such as effectiveness, cost, feasibility, sustainability and additional criteria, if appropriate. You should also take into account possible trade-offs arising from mitigation options. Trade-offs may arise when e.g. rural energy supply is promoted (leading to increased GHG - eventually also air pollutants – emissions) which is however acceptable from a development perspective. You shall then score the options.

Please consider that costs always have to be seen in the context of benefits. High costs can be justified by a high effectiveness, meaning that low costs measures are not always preferable. Furthermore, it is advised to consider a mix of short-, middle- and/or long-term measures. It should be avoided to select only short term ones.

Finally, you should evaluate the options from an overall perspective and define which one is the priority to be included in the project or programme.

Instructions:

- Report your findings according to the format provided in Table 14, page 39. Table can be downloaded from the CCE and DRR Network websites.
- You may refer to step 3 in part A, page 33.

Step 4: Define new or adjust impact, outcome and output indicators

Define or adjust impact, outcome and output indicators for the measures to be implemented. Output indicators are similar to other project output indicators and are not explained in detail here. In order to monitor the effect of the measure you will also define outcome indicators. Such indicators might be the amount of GHG emissions reduced, the amount of energy saved or the energy efficiency improved, increase of forest area (% of land area), reduction of water pollution from industry (% of total emissions). You may also define impact indicators for project evaluation if your project overall goal has been altered. Furthermore a final overall assessment is needed, whether the measures defined and included in the project are adequately addressing the impacts identified. You may also want to return to this question during the project evaluation.

Instructions:

- Report your findings according to the format provided in Table 15, page 39 and Table 16, page 39. Table can be downloaded from the CCE and DRR Network websites.
- Specific links regarding indicators are provided in section "recommended links and supporting material", page 40.

Results of the Impact Assessment

You may report your findings in the tables below:

Result step 1) Assess impacts on GHG emissions and/or the environment

Impact on GHG emissions and/or the environment	
	Potential impacts of the project
Project area/objective or main activity	Describe and/or amend potential impacts identified in Module 1 (B, question 1.2)
Project area/objective or main activity	…

Table 12 Proposed reporting format for step1.

Result step 2) Identify climate change and environmental impact mitigation options

Brainstorming of mitigation options	
	Possible mitigation options
Project area/objective or main activity *Transfer from step 1*	List and specify possible mitigation options addressing the identified impacts above
Project area/objective or main activity *Transfer from step 1*	…

Table 13 Proposed reporting format for step 2.

Result step 3) Select climate change and environmental impact mitigation options

Assessment and selection of proposed options						
	Effectiveness	**Cost**	**Feasibility**	**Sustainability**	**Further criterion?**	**Overall evaluation**
Possible mitigation option Transferred from step 2	Explain how effective the option is and score with (0) not effective, (1) effective, (2) very effective	Explain how costly the option is and score with high costs (0), medium costs (1), low costs (2)	Explain how feasible the option is to implement and score with not feasible (0), feasible (1), very feasible (2)	Explain how sustainable the option is and score with e.g. low (0), medium (1), high (2)	Explain and score the options to the criterion of your choice accordingly.	Make an overall assessment of the option with regard to the outcome of the criteria scoring. Take into account also cost/ benefits considerations. The option(s) with the highest scores shall be preferred.
…						

Table 14 Proposed reporting format for step 3.

Result step 4) Define new or adjust impact, outcome and output indicators

Monitoring and evaluation indicators	
Goal (impact)	**Impact indicators**
Goal 1	Define impact indicators
Goal 2	…
Purpose (Outcome)	**Outcome indicators**
Purpose 1	Define outcome indicators
Purpose 2	…
Results (Outputs)	**Output indicators**
Result1	Define output indicator (e.g. quantitative ones)
Result 2	…

Table 15 Proposed reporting format for step 4.

Result step 4) Make a final overall assessment

Control questions
Assess from an overall perspective, whether the measures defined are adequately addressing the impacts identified? …

Table 16 Proposed control questions for the overall assessment and evaluation of step 4.

Elaboration of the four steps

The assessment of impacts on GHG emissions and/or the environment and possible mitigation options shall be conducted by consulting the provided supporting materials and filling in the result tables. This shall be completed through discussions among the project team members and stakeholder consultations, as appropriate.

Entry point and how to make use of the result

The project logframe to be developed shall serve as the entry point for this exercise. The identified options and the respective monitoring indicators shall be included in the project document and the credit proposal (chapter 7; risk management, annex 2; logframe and annex 5; detailed risk analysis).

Recommended links and supporting material

EXAMPLE 8 - NEGATIVE IMPACTS ON GHG EMISSIONS AND THE ENVIRONMENT	
Sectors, project area/objective or main activity	**Climate & environmental impacts**
Impacts increasing GHG emissions	› Relatively high methane emissions of ruminants and emissions from manure › Increase in electricity use can result in potentially higher emissions (compared to scenario without electricity) › Intensively or unsustainably managed forests can result in higher emissions › Road construction leading to higher traffic volume and higher air pollutants and GHG emissions › Some practices may lead to an increase in transport volume and higher GHG emission › Deploying ICTs in projects has considerable GHG emission potential › Unsustainable waste management practices may lead to increased GHG emissions
Negative impacts on water	› Use of pesticides or chemicals (in agriculture or industry) and unsound solid waste management can result in water pollution and enhanced health problems › Some practices can have adverse impacts on water quality and water quantity (e.g. by large pumping systems) › Unsustainable water practices can result in degradation of aquifers and result in lack of drinking water
Negative impacts on air	› Some practices in industries (e.g. brick) can have adverse impacts on air quality and result in severe health problems › Road construction leading to higher traffic volume (transport) and higher air pollutants
Negative impacts on ecosystems	› Intensively or unsustainably managed forests or lands can result in degraded forestal land › Loss of habitable land by unsustainable land management › Loss of biodiversity by unsustainable land management
Negative impacts on soil	› Inappropriate fertilizer use, compaction of soils, tillage of organic soils › Use of pesticides or chemicals (in agriculture or industry) can result in soil pollution

Example 8 Examples of possible impacts on GHG emissions and the environment.

EXAMPLE 9 - POSSIBLE MITIGATION OPTIONS IN SELECTED SECTORS	
Sector	**Climate change and environmental impact mitigation options**
Use of Energy (in transport, building, household level etc.)	› Improve energy efficiency e.g. in building (insulation of houses etc.), industry, etc. › Improve energy savings by reducing system losses › Change from fossil fuels to renewable energy sources › Opt for investment in energy-efficient and low-carbon transport modes › Use fuel efficient stoves and cooking methods

Sector	Climate change and environmental impact mitigation options
Agriculture and soil	› Modify agricultural practices, e.g. promote climate and environmental friendly farming which increases carbon stored in soil and soil quality (minimum tillage, organic farming and others) › Avoid burning biomass on fields but rather use it as a source of energy replacing fossil fuels or incorporate in soil to increase soil fertility, or producing biochar instead of burning › Avoid energy-intensive farming systems (high-input in fertilizers, pumping of groundwater and long distances to markets) › Promotion of sustainable technical approaches: organic an low input farming, efficient irrigation, use of local agro-biodiversity › Promote crop rotation to maintain soil quality, minimise erosion (reducing the risk of desertification), promote crops diversification and crop mixing › Avoid or minimise or use products with low toxicity › Use Integrated Pest Management approaches › Use local seeds where possible, produced and distributed through existing channels
Water	› Introduce water resource planning and water management systems › Avoid large pumping systems (farm ponds) which reduce groundwater quantity › Promote sustainable incentive schemes for water management › Promote less water-dependant crops in drier years › Protect and reforest water catchment areas to improve groundwater resources › Establish filtering systems › Treat wastewater for re-use in agriculture, industries and other sectors
Land	› Define protected areas › Develop financing mechanisms (payment for environmental services) to avoid land degradation
Livestock	› Rehabilitate degraded pasturelands (e.g. by alleviating nutrient deficiencies, re-planting grasses) › More efficient use of fertilisers, particularly nitrogen › Control and use methane emissions from manure › Use and enforce environmental regulation to control some practices that have an impact on climate and environment (e.g. regulation of manure application on crop- and pasturelands) › Encourage communities to conserve coastal mangroves and other vegetation to reduce rate of erosion and protect fish breeding grounds › Establish/expand animal disease monitoring and control system
Forest	› Develop sustainable afforestation and re-forestation projects specifically designed to support environmental and poverty alleviation goals as well as carbon sequestration › Increase carbon density in forests › Develop financing mechanisms ("payments for environmental services") to avoid deforestation and promote forest regeneration › Improve the enforcement of legislation aimed at preventing deforestation or unsustainable timber production activities › Adopt harvesting practices that minimise carbon losses and environmental depletion (e.g. maintaining partial forest cover, minimising losses of organic matter, avoiding most slash-and-burn techniques)
Waste	› Controlled incineration of organic waste, especially if associated with energy recovery, results in minor net CO_2 emissions and air pollutants › Recover landfill gas and use it as a renewable source of energy, for electricity and/or heat generation › Introduce sustainable waste disposal systems › Establish and maintain sites for sanitary and safe waste disposal operating at international standards › Limit waste movements through appropriate collection systems meeting accepted best practices
Urban development and infrastructure	› Avoid an increase in transportation by supporting shorter distances and public transport › Improve traffic management systems and guiding route choice, so as to reduce congestion › Modify building standards to improve (in a mandatory way) the energy efficiency of buildings › Using green construction principles while designing infrastructure › Infrastructure development with environmental benefits (e.g. for water treatment, sanitation, clean energy supply) › Promote sustainable land-use planning in order to reduce land consumption and the resulting adverse environmental impacts › Incorporate erosion mitigation measures in road construction activities

Industry	› More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution › Controlling emissions of non-CO_2 (e.g. fluorinated gases used in refrigeration and air conditioning systems) › Develop pollution mitigation and abatement plans, incorporating financial incentives where appropriate
Capacity building and advocacy	› Training in sustainable agricultural practices › Encouraging sustainable income diversity › Use of renewable locally produced building materials › Teaching adult learners and children about the causes and implications of environmental degradation, etc.

Example 9 Examples of possible mitigation options. Depending on the context, the feasibility of the options need to be assessed. Please note that several measures in the agriculture and forest sector may also serve as adaptation options. A list of further mitigation options can also be found in Tearfund 2009c: (http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/EA_C9465_web.pdf).

Impacts on GHG emissions and the environment - guidance manuals:

EuropeAid Sector scripts (http://www.environment-integration.eu/component/option,com_docman/task,cat_view/gid,109/Itemid,278/lang,en/) provide a good overview.

EuropeAid 2009 Environmental Integration Handbook for EC Development Co-operation (http://www.environment-integration.eu/content/section/4/146/lang,en/)

GTZ 2009a (http://www.gtz.de/de/themen/28918.htm) provides a useful tool on accounting for emissions.

A comprehensive collection of mitigation options, potentials, co-benefits and barriers outlined for different sectors can be found in: **IPCC 2007** (http://www.ipcc-wg3.de/publications/assessment-reports/ar4/working-group-iii-fourth-assessment-report).

The **Tearfund 2009c** (http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/EA_C9465_web.pdf) provides a hands-on manual on integrating climate change, environmental and disaster related risk into development cooperation also regarding the impact perspective. The manual also consists of a list of reduction options.

UNFCCC (http://unfccc.int/resource/cd_roms/na1/mitigation/Module_3/Module3.ppt) provides a short overview on mitigation options and potential according to different sectors.

On the **U.S. Environmental Protection Agency (U.S. EPA)** website (http://www.epa.gov/climatechange/emissions/index.html) you can find information on sources and sinks of different GHG.

Calculating GHG emissions:

The following link provides a guideline how to calculate GHG emissions in energy related projects:
The **GIZ 2011a** (http://www2.gtz.de/dokumente/bib-2011/giz2011-0445de-klimawirkungen.pdf) provides a sourcebook containing a long list of sources regarding calculating GHG emissions.

GTZ 2008 (http://www.gtz.de/de/dokumente/gtz2008-en-climate-ghg-emissions-accounting.pdf) provides a guidance on accounting for GHG emissions in energy related projects.

The **greenhouse gas protocol initiative** (http://www.ghgprotocol.org/calculation-tools/all-tools).

Defining indicators:

You may find some ideas with regard to different kind of environmental, climate and other issues related indicators in the **World Bank indicator database** (http://data.worldbank.org/indicator/all).

The **GIZ 2011a** (http://www2.gtz.de/dokumente/bib-2011/giz2011-0445de-klimawirkungen.pdf) provides a sourcebook containing guidance on climate specific monitoring within the international cooperation.

EuropeAid 2009 (http://www.environment-integration.eu/content/section/4/146/lang,en/) provides an Environmental Integration Handbook for EC Development Co-operation.

Certified Emission reduction projects:

SDC's Climate Change & Network can provide support with regard to certification process for emission reduction project (such as Clean Development Mechanism projects).

Imprint

Editor:
Federal Department of Foreign Affairs FDFA
Swiss Agency for Development and Cooperation SDC
Freiburgstrasse 130, 3003 Bern
www.deza.admin.ch

Design:
Visual Communication FDFA, Bern

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This publication is available in English, French and Spanish and can be downloaded from the website www.sdc.admin.ch/publications).

Bern, 2012