FOR FIELD TESTING

CEDRA

Climate change and Environmental Degradation Risk and Adaptation assessment

An environmental tool for agencies in developing countries

tearfund

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Climate change and Environmental Degradation Risk and Adaptation assessment

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If you have feedback on how you would like to see CEDRA improved, or if you are a Tearfund partner and would like help with implementing CEDRA, please email Tearfund's Environmental Sustainability Advisor: mike.wiggins@tearfund.org.

Tearfund is a Christian relief and development agency building a global network of local churches to help eradicate poverty.

CEDRA

Climate change and Environmental Degradation Risk and Adaptation assessment

An environmental tool for
agencies in developing countries

Contents

Background

CEDRA helps agencies working in developing countries to access and understand the science of climate change **and** environmental degradation and to compare this with local community experience of environmental change. Climate change cannot be addressed in isolation from environmental degradation as the two are very closely interlinked.

The dangers of not taking into account both climate change **and** environmental degradation

If risks from climate change and environmental degradation are not fully considered, there may be serious consequences:

- **Development work may fail** due to, eg soil degradation and crop failures, flooding, mudslides or pollution
- **Development work may prove less effective**
- **Development costs may increase**
- **Development work may not be sustainable** because environmental issues become such a major concern that community members no longer see the development activities as relevant
- **Development work may unwittingly increase exposure to sudden disaster** from climate change and environmental degradation
- **Disaster risk reduction responses may be ineffective** because they do not allow for the fact that environmental change can increase the intensity and frequency of disasters over time.

Using CEDRA, agencies can prioritise which environmental hazards may pose a risk to their existing projects and project locations, enabling them to make decisions to adapt some projects, stop doing some projects or start new ones. In this tool, adaptation options are discussed and decision-making tools are provided to help organisations plan their responses to the hazards identified.

Agencies working in disaster risk reduction (DRR) as well as general development agencies will find CEDRA useful. In addition, policy makers may find CEDRA useful as a resource for helping grass-roots organisations to understand projected climate change and environmental degradation impacts and respond to them. CEDRA is designed, ideally, to be used by people who are experienced in planning and managing development projects.

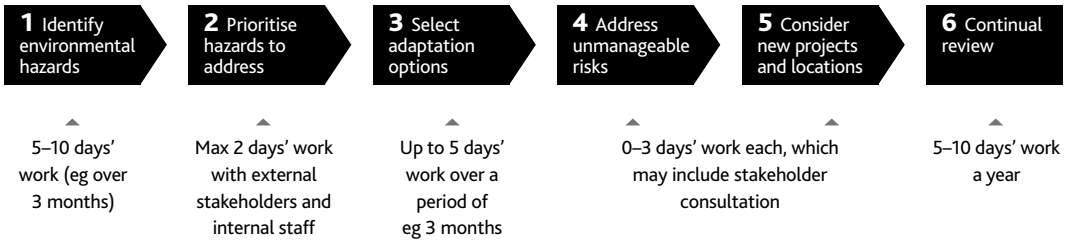
It includes a series of exercises to help the user to complete the CEDRA Steps and Report. An imaginary project called The Somuni Women's Rehabilitation Programme is used to illustrate many of the exercises.

Disaster risk reduction is also closely linked to environmental adaptation. The DRR community has already developed many of the essential tools. This is briefly discussed on page 7, and more extensively in Tearfund documents listed in Appendix B, Useful resources, page 67.

How to use CEDRA

- Below is a sample time frame. An average of 22 workdays on CEDRA may be needed, but the work is best carried out alongside other usual needs assessment and project planning – therefore reducing the number of extra hours needed to allocate to CEDRA. The work is expected to be shared between members of staff and even with other agencies and to take place over a period of eg three months.
- Before doing CEDRA, please read through this whole document first, because you may realise you have already completed some of the stages in your existing project work.
- There are exercises to guide you and help you draw up your CEDRA Report. A blank Report Format for your own use is on page 52. For an imaginary illustration of a completed report, please see page 42.

CEDRA steps with sample time frame



Addressing risks from both climate change and environmental degradation

Climate change and environmental degradation affect all types of development projects in all countries. If development agencies are serious about contributing to the reduction of poverty in the communities in which they work, they must give consideration to the climatic and environmental hazards which impact on their projects. Climate change and environmental degradation are proceeding rapidly and are already affecting many communities in developing countries.

Environmental degradation

Environmental degradation (ED) is the consequence of past and present generations using up or damaging natural resources faster than nature can restore them, such that few, if any, of those resources remain for the next generation.

Environmental degradation impacts may include, for example:

- destruction of forests, causing soil degradation and threatening agricultural livelihoods
- building of dams or diverting rivers upstream causing water shortages and increased workloads to collect water
- destruction of coastal protection such as mangroves, leading to exposure to storm damage, waterlogging of soils, and relocation of communities
- smoke and air pollution from factories using chemicals causing increased ill health
- all of the above can lead to increased poverty.

Slash and burn of forests in Brazil damages the soil and plants and contributes to climate change

Marcus Perkins / Tearfund

Climate change

Climate change (CC) is any long-term significant change in the climate over time, caused by nature or human activities. It includes, for example:

- unpredictable rainfall patterns leading to lack of access to safe water
- rising temperatures and drought leading to crop failure and food insecurity
- increased likelihood of hazards, such as floods and landslides and more severe cyclones (hurricanes/typhoons).

In order to ensure that development work is appropriate and helps people who are most vulnerable to environmental and other hazards, a deeper awareness of environmental issues is needed. Assessing risks from the environment is not something done as an afterthought in development planning; it should rather be an integral part of project cycle management.

It is not always possible to determine which changes are due to environmental degradation and which are due to climate change. The important thing is to understand what is changing and plan an appropriate response.

Traditional community-based coping mechanisms to deal with short-term changes in the climate or environment are likely to be relevant, but insufficient to cope with the recent rapid rate of change. New adaptation methods for dealing with the new risks arising from human-induced changes are therefore needed.

Further information

The CEDRA Field Tool Checklist on page 53 gives more examples of the most common types of ED and CC and the possible impacts they may have which may affect project activities.

The Tearfund book *ROOTS 13 Environmental sustainability*, gives further background information on climate change and environmental degradation.

The case study below shows how Tearfund partners have helped people to adapt to changing weather patterns due to climate change.

CASE STUDY

Adapting to climate change

Francisco Neto has a small plot of land in north-east Brazil where his family grows a wide range of fruit trees, vegetables, cereal and fodder plants. Neto remembers that in the 1980s there was a stream running through their farm that flowed nearly all year. In the 1990s the water level fell gradually and now the stream becomes dry three months after the rainy season ends. To help solve this problem the family built a dam for irrigation and livestock.

'We are now irrigating much more than we did five years ago, because it is hotter and drier for half the year. We are concerned we may run out of water in the future as the climate is now so variable' Neto comments.

'I hear of climate change in the newspapers, but I can feel its effects on myself and on my crops. The sun is hotter, the temperature is higher, and the wind is drier. I hear about the greenhouse effect, desertification and "El Niño". I don't understand it, but the results are drought in the Amazon, floods in some parts of north-east Brazil and more [severe] whirlwinds.'

Marcelino Lima, Diaconia-PAAF, Brazil. Email: marcelino@diaconia.org.br *Footsteps 70*

Jim Loring / Tearfund

Francisco's new irrigation water

Environmental adaptation and disaster risk reduction are closely linked, but not the same

The United Nations estimates that nine out of every ten disasters are now climate-related. Recorded disasters have doubled in number from 200 a year to more than 400 over the past two decades.

Douglas Alexander, UK International Development Secretary,
Keynote address to ODI – APGOOD, 19 January 2009

DRR practitioners will find CEDRA useful because CC and ED are increasing the frequency and severity of disasters.

In return, other users of CEDRA will find DRR tools useful because they help organisations and communities to reduce hazards and reduce their vulnerabilities to disasters, including those caused by CC and ED (see, for example, reference to DRR tool 'PADR' on page 9 below).

Further discussion about the links between environmental adaptation work and DRR can be found in documents listed in Appendix B, Useful resources.

Participation and knowledge sharing

Participatory decision making

Many of the CEDRA exercises would best be carried out through focus group meetings which include a range of stakeholders. If possible, these should be conducted as part of community meetings that are an ongoing part of project planning or usual pre-project needs assessments. This would enable stakeholders to play a strategic role in selecting the most sustainable adaptations and should result in a strong sense of ownership by them. It should also encourage further valuable sharing of knowledge.

Collaboration and knowledge sharing

The impacts of climate change and environmental degradation affect the success of all agencies' projects. Smaller agencies such as community groups still need to respond to these impacts, but they may not always have the capacity or resources to conduct CEDRA. Agencies should look for opportunities to collaborate and share information. If they fail to collaborate, they are less likely to help communities to become resilient.

CEDRA has been developed for use by development agencies which have a number of projects spread throughout a sub-country zone, or a country or wider area. However, CEDRA is best used by a group of development agencies working together. This can have many advantages, including sharing of workload, skills and resources, and creating a joint advocacy platform to influence policy change or get other agencies on board with environmental issues.

Villagers discuss changes in the environment and climate, and their plans to adapt farming methods

Mike Wiggins / Tearfund

CEDRA can also be conducted by skilled consultants. However, it is usually far better to build and retain internal skills in an organisation, especially since the risks from climate change and environmental degradation are growing rapidly, and ongoing monitoring and evaluation of these will be necessary.

Background exercise

Consider, for example:

- Are there other agencies that can join with you in conducting CEDRA? Even though another agency's development goals may be very different, resources can be shared and the learning outcomes useful to inform all project types. Consider the benefits and costs of this approach.
- Can you work with others to share your knowledge and skills with smaller agencies? Another agency may already be running a climatic and environmental information centre which you can contribute to (see, for example, **Red Cross / Red Crescent Climate Change Focal Points** on page 16). Can you run workshops for this purpose?

Other related Tearfund environmental tools and resources

See http://tilz.tearfund.org/Topics/Environmental+Sustainability

- **Tearfund Climate Country Profiles** review the projected impacts of climate change on countries Tearfund partners are working in. New ones are being added regularly.
- ***ROOTS 13: Environmental Sustainability*** considers how development agencies' projects and office activities, and individuals' personal lifestyles, affect the environment and climate; and also the ways the changing environment and climate affect projects, lives and organisations' work. It outlines various practical responses that we can make.
- **Tearfund's Environmental Assessments (EA)** are provided at two levels (see below). An EA is a project planning tool to assess the impacts of individual projects on the local environment and the impacts of the local environment on the project. It helps development workers to determine whether to modify the project design, change the project location, and compare alternative projects to select the least harmful / most beneficial. Increasingly donors are asking for Environmental Assessments to be submitted with project proposals.

  Basic level EA: *ROOTS 13* contains a basic EA; this is to support projects which have little obvious impact on or from the environment. It is for agencies which seek good environmental practice in their work.

  Medium level EA: this is for use in projects which have a more obvious interaction with the environment, eg agriculture / small construction / water and sanitation projects.

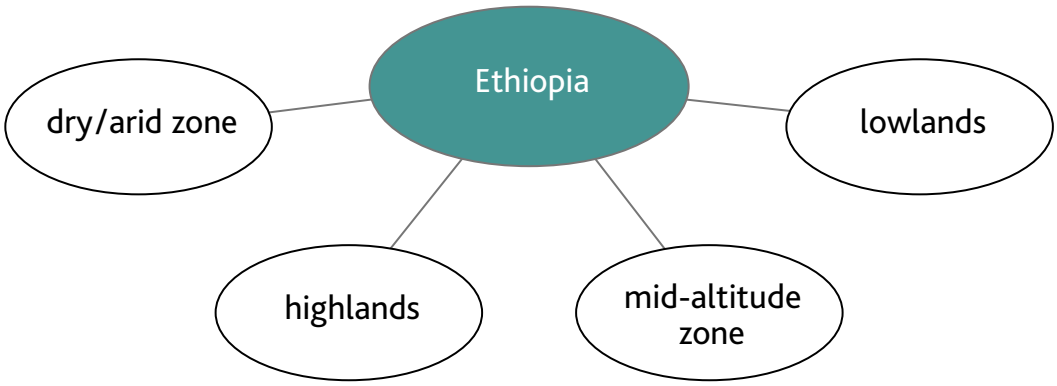
  Higher level EAs: (often called Environmental Impact Assessments – EIAs) are widely used by civil engineers and others who work on major construction work such as large dams and power stations. Tearfund has not developed a tool at this level as they are beyond the scope of Tearfund's partners' usual work.
- **PADR – Participatory Assessment of Disaster Risk** is Tearfund's community-level tool for assessing the hazards, vulnerabilities and capacities (HVCs) of a community (see *ROOTS 9* in **Appendix B, Useful resources**). PADR helps communities see cause-effect relationships, prioritise risks and develop community methods for reducing them. PADR applies to climatic and environmental disasters and also to geophysical disasters including earthquakes, landslides, tsunamis and volcanoes. It can be used in **Exercise 1.5**, page 23 of CEDRA as a resource for gathering community-based information.

Step 1 Identifying climatic and environmental hazards from scientific and community sources

This step helps agencies based in developing countries to access reliable scientific information about the impacts of climate change and environmental degradation in the country's zones (ie sub-country regions or districts) where they work. This includes information about past, present and projected future climatic and environmental change. This step also helps agencies to collect community knowledge and adaptive capacities and compare these with scientific projections. The following sub-steps take us through this process.

1.1 Identify different zones within a country

In Ethiopia, there are four distinct geographical zones



Certain environmental hazards, such as increased frequency of cyclones, can affect whole countries and also multiple countries. In most places, however, the occurrence of the hazard can vary substantially according to location. Coastal zones, for instance, may face the hazard of increasing soil salinity, while arid zones may instead experience increased temperatures, leading to drought and crop failures.

Unless the physical geography is similar throughout the country or region, it will be necessary to assess the different hazards threatening different zones. A development agency working throughout Ethiopia, for instance, would find it helpful to assess risks in each of the zones shown in the diagram above.

Exercise 1.1

Discuss the physical geography in the areas where you work and identify zones where you need to know the likely environmental changes. If you are working with other agencies, consider each organisation researching different zones. Zones or areas could include:

- coastal
- wetlands
- dry/arid/desert
- arable land
- flood-plains
- lakelands
- highlands
- mid-altitude
- lowlands
- forests
- cloud forest
- rainforests
- semi-arid or steppe
- tundra
- grasslands including savannah

Example *Staff at The Somuni Women's Rehabilitation Programme discuss the locations of their various projects and identify that they work in the **flood-plains zone** and **mid-altitude zone**.*

1.2 Think about the type of information needed

As we saw above, different climatic and environmental hazards will affect different areas and sectors.

This sub-step helps agencies to think about what types of hazards concern them. This forms a basis for working out what scientific information they need to find out, and the questions they need to ask both scientists and the communities in which they work.

The following step would ideally be completed by a participatory focus group, comprised of staff, beneficiaries and possibly other community members.

The CEDRA Field Tool Checklist on page 53 is a key tool to use in this and other CEDRA steps – see example below.

Exercise 1.2

Use the **CEDRA Field Tool Checklist** on page 53 – which shows likely impacts of climate change and environmental degradation and possible adaptation options to take in response.

Go down the first column and tick the possible impacts which may affect your projects, underlining parts of the text which you think most apply to you. Also, add other impacts which you think of. If you are not sure if the impacts relate to you, don't worry – tick them for now. Impacts will become clearer as you continue with your research in later exercises.

Do this for each of the different zones in which you work (see **Step 1.1**).

NOTE: many of the impacts may not be relevant to you. Ignore these. Highlight those that are relevant or add your own. People in different locations will find that different impacts are relevant to them.

Example

How the Somuni Women's Rehabilitation Programme completed part of the CEDRA Field Tool Checklist on page 53

	Likely impacts of climate change and environmental degradation	Adaptation option
Land	**Crop damage and failure** ☑ Crops can be damaged by increased rainfall or unpredictable distribution and intensity of rainfall. ☑ Crop damage and failure result in lack of seed for the next planting season. ☐ ~~Reduced crop yields due to disease, pests, soil degradation, lack of water for irrigation, overuse of chemical fertilisers.~~	**Maximise crop yields** ☐ Ask farmers to report on … ges in growing patterns. ☐ Advance sowing dates; w… Seasonal climate change … decisions taken. ☐ …
Land	**Too little irrigation water, or too much water (due to intense rainfall or flooding)** ☐ Lack of water eg due to drought, hotter seasons, dams upstream or rivers being diverted upstream. ☐ Flooding and sea level rise mean land cannot be used or crops fail or are lost. ☑ Increased inability to cultivate land due to waterlogging of soils. We have no lower land to drain this water to.	**Maximise irrigation water availability** ☐ Work with communities to develop strategies for water harvesting ☐ Minimise wastage of water used in irrigation by introducing more efficient techniques (eg drip feed rather than flood). ☐ …
Land	**Landslides, mudslides, sea level rise, destruction to coast lines** ☑ Loss of trees and agricultural land due to landslides. and threat to houses below ☐ Coastal land used for agricultural purposes is lost to the sea as sea levels rise, impacting livelihoods and food security.	**Prevent and protect from landslides, mudslides, coastal erosion, sea level rise** ☐ Protect and / or re-establish mangroves in coastal areas to provide a natural barrier between the sea and land. ☐ Protect and / or plant trees and other vegetation along river / lake / lagoon banks to protect them from erosion.

NOTE
Complete this column later.

Information about how to use the Adaptation options column of the CEDRA Field Tool Checklist is provided in Steps 3.1 and 3.2 below.

1.3 Compile a list of questions that you need answered

This step provides ideas for questions you may wish to answer through your research. These questions can be put to scientists, communities, government offices, and other stakeholders, to help gather information on recorded and observed changes.

Exercise 1.3

For each of the zones, write a list of questions relevant to the information you identified in the previous step. You may find that some of the questions are the same for different zones; this may reduce the extent of the research needed. It is important, however, to make sure you collect all the information needed for each zone where you work.

Examples of questions are below. You won't need all of these questions and you may need to add your own questions related to the possible impacts you identified or were unsure about in **Exercise 1.2**. In collecting the answers to these questions you may wish to use the table provided for this purpose – see **CEDRA Field Tool Questions** on page 50.

- What are the most important climate change and environmental degradation hazards the zone faces?
- Do you have information about past and present changes regarding the following?
  - Annual and seasonal rainfall – amount, duration
  - Annual and seasonal average temperatures
  - Annual and seasonal average storms – frequency, severity, eg wind / sandstorms
  - Annual and seasonal flooding or sea level rise – frequency, severity, area covered
  - Occurrences of mudslides and landslides or wildfires
  - Frequency of drought recurrence
  - Changes in the water table (annual records)
  - Soil quality / fertility
  - Desertification
  - Deforestation
  - Crop yields / food (in)security / famine
  - Decline in biodiversity – plants, fish and animals (migratory patterns, declining fish and animal populations)
  - Fresh water availability and quality, including details about pollution
  - Salinisation of soil
  - Availability and quality (eg whether polluted) of irrigation water
  - Crop pests and disease carriers
  - Land degradation due to chemical fertilisers
  - Air pollution levels / acid rain / smog
  - Destruction of coastal protection
  - Seasons, eg when do rainy seasons start and end?
  - Population movements
  - Changes in health risks related to climate change and environmental degradation
- Do you have information about future projected changes in the above for the next
  - 5 years?
  - 10 years?
  - 20 years?
  - 50 years?
- Do you have records of which types of people are being most impacted by any of the above changes, eg in terms of health and mortality rates, livelihoods, general well-being?
  - women
  - children
  - people living with HIV and AIDS etc

Example

The Somuni Women's Rehabilitation Programme wrote down questions related to impacts that it ticked and underlined in the previous exercise

Questions	Answers	Sources
Do you have records of past and present…		
• changes in crop yields?		
• changes in annual and seasonal rainfall?		
• instances of landslides?		
Do you have information about future projected changes in the above for the next…		
• 5 years?		
• 10 years?		
• 20 years?		
• 50 years?		

NOTE
This is an example. Your list of questions is likely to be longer than this.

1.4 Collect scientific information to help answer your questions

Each country and region will have its own sources of scientific information. Scientific information, including data, maps and graphs, is available for both climatic and environmental change, and for anticipated risks of disasters. The relevance, availability and quality of this information will vary between localities and sectors. If you are unable to find information specific to your zone, use country or regional level information instead.

New sources of scientific information are continually being developed and climate change and environmental degradation are advancing rapidly. It is therefore very important that we check, at least annually, whether scientific projections have been updated – see Step 6 below.

Making sense of scientific information

Scientists may be interested in providing information that can be useful, but they can often communicate in terms that are hard to understand! Development agencies don't need to allow scientists to overwhelm them with huge amounts of data to sort through! Be confident in asking for help if needed, so that information is received in a form that makes more sense. Ask them to identify specific bits of information from a lengthy mass of records – for example, you can ask for annual or seasonal averages of rainfall and temperature, and for extremes (highs and lows) instead of, for example, ten years of hourly or daily rainfall records.

When using scientific information in report writing, it is best to use balanced language since you can never know for certain what will happen or why. It is better to say 'scientists say it looks very likely' rather than 'it will definitely happen'. You can be certain that change is occurring relatively rapidly, but exactly what the change looks like is uncertain. However,

scientists, in fact, use very cautious language – 'probable' impacts of climate change and environmental degradation have over 90% certainty of happening!

NOTE: Steps 1.4.1, 1.4.2 and 1.4.3 which follow, do not have to be carried out in that order. If you have access to the internet you may find it helpful to access the internet sources listed under 1.4.3 first.

1.4.1 Identify people who may be able to provide climate change and environmental degradation information for your country / zone

FIRST POINTS OF CONTACT – WHO DO *YOU* KNOW AND WHO DO *THEY* KNOW?

People you already know in your local area may have knowledge or interest in the environment and be willing to share this information with you. These may include other agencies, community workers and local government officials such as environmental, water, health, agricultural or food security technical officers.

SECOND POINTS OF CONTACT

Your first points of contact may be able to provide you with other useful contacts. If you are not already doing so, it is also a good idea to contact some of the people listed below. You may not have time to contact every possible person, so it would also be helpful to share the research load with other agencies in your zone who also wish to complete CEDRA.

In prioritising who you are going to contact, please note that a wide variety of sources will give you a better chance of identifying the risks your projects will face (also see tips on reliable internet sources below). It would be helpful to collect some information from scientists, some from government officials or UN agencies, and some from other development agencies.

- **Scientists from your country's national meteorological office** (or similar) Meteorological offices study the atmosphere scientifically, maintain national and local weather records, and focus on weather processes and forecasting. Some offices provide climate projection data, to aid management of climate change.

- **Scientists in relevant faculties in your country's universities** Try the universities' departments of the Environment, Ecology or Earth Sciences.

- **Other scientists from environmental research agencies**.

- **Government officials** See people appointed as National Climate Change Focal Points in Table 1 below; also national or local government offices such as Environment, Health or Agricultural Ministries.

- **UN and other multilateral agencies working in the area of climate change and environmental degradation**.

Try for example:

- **UNEP – United Nations Environment Programme** Country information can be found via the following website (UNEP may be represented by the UNDP) www.unep.org/Documents.Multilingual/Default.asp?DocumentID=296
- **UNDP – United Nations Development Programme** Country information can be found via the following website (which may also have information on Disaster Risk Reduction strategies) www.undp.org/countries/
- **GEF – Global Environment Facility** Regional / country people called Focal Points may be available via the following websites www.gef-ngo.net/ www.gefonline.org/Country/CountryProfile.cfm
- **IFAD – International Fund for Agricultural Development** Country programme managers' email addresses come up in the bar at the bottom of the following webpage, when you hover your cursor over the person relevant to your country: www.ifad.org/operations/projects/regions/country.htm

NOTE
These agencies may have a person called a Focal Point and a country adaptation strategy. Try to access these. Networking with these people may also lead to fruitful funding contacts.

- **Other development agencies** interested in climate change and environmental degradation. For example, the Red Cross / Red Crescent Climate Change Focal Points.

At the time of writing this document, The Red Cross / Red Crescent Climate Centre is running a 'Preparedness for Climate Change Programme' in the countries listed below, with other countries likely to join soon. The programme is likely to end by 2010, but it is expected that each country will retain a 'Climate Change Focal Point'. Contacting the Climate Change Focal Point is invited for possible networking and knowledge sharing purposes. This person can usually be found in the Disaster Management department in the relevant Red Cross / Red Crescent National Society (contact details for national societies are available on the website www.ifrc.org/address/directory.asp).

If your country is not listed below, you are invited to contact the following person at the international Red Cross / Red Crescent Climate Centre in The Netherlands for advice on whether climate information is available in your country: Madeleen Helmer, Head of the Climate Centre, tel: +31 (0)70 44 55 886 or email: climatecentre@redcross.nl
(For an updated list of countries where the Climate Centre works and details of the Preparedness Programme, go to the website www.climatecentre.org/index.php?page=14.)

TABLE 1
Red Cross / Red Crescent Climate Change Focal Points (Oct 2008)

Antigua and Barbuda	El Salvador	Jamaica	Nicaragua	Thailand
Argentina	Ethiopia	Kenya	Philippines	Tonga
Bahamas	The Gambia	Kiribati	Seychelles	Trinidad and Tobago
Burkina Faso	Grenada	Kyrgyzstan	Solomon Islands	Uganda
Colombia	Guatemala	Lao	St Kitts and Nevis	Uzbekistan
Cook Islands	Guyana	Madagascar	Tanzania	Zimbabwe
Costa Rica	Honduras	Malawi		
	Indonesia	Mauritius		

1.4.2 Access national government sources

For information on climate change and environmental degradation most governments have:

- a person who is their 'Climate Change Focal Point'
- a document called a National Communication (NC)
- a document called a National Adaptation Programme for Action (NAPA).

The documents above contain information on both current and projected future impacts of climate change and environmental degradation, along with information on country adaptation strategies.

Many governments also have a document called a National Action Programme to Combat Drought and Desertification (NAP) and a person who is a national Focal Point for the country's disaster risk reduction programme.

The table below provides useful contacts for finding these documents and identifying the people who are the Focal Points in each country.

TABLE 2
National government sources of information

Source	Description	Website
National Communication (NC)	Contains information on greenhouse gas emissions and national vulnerability to climate change.	http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php
National Focal Points	The person who is the national 'Climate Change Focal Point' should be a useful contact for relevant government departments and for links regarding advocacy work.	http://maindb.unfccc.int/public/nfp.pl
National Adaptation Programme for Action (NAPA)	Contains national priority adaptation activities which will make the country less vulnerable to climate change.	http://unfccc.int/adaptation/napas/items/4585.php
National Action Programme to Combat Drought and Desertification (NAP)	Contains useful information such as maps on soil and wildlife patterns and other environmentally-related records, as well as national plans to combat drought and desertification.	www.unccd.int/actionprogrammes/menu.php Follow the links to the relevant region and country.
National Platforms for Disaster Risk Reduction	Contains links to governments which have a national platform for disaster risk reduction, along with details of the relevant national Focal Points.	www.unisdr.org/eng/country-inform/ci-guiding-princip.htm

1.4.3 Access internet sources of information

Internet sources of information about climate change are being developed very rapidly (but unfortunately the same is not true of environmental degradation). As with other sources of information they vary in reliability.

Advice to Tearfund has been that IPCC is one of the most reliable sources (see Table 4, below). However, it presents its findings in long documents with many graphs and data which can be hard for a non-scientist to accurately interpret, and it is only published at five- or six-yearly intervals, so the information becomes out of date. We would recommend the country summaries on the websites in Table 3; they are more accessible in the first instance.

TABLE 3
First-stop internet sources – country summaries

Source	Description	Website
Tearfund Climate Country Profiles	Country profiles compiled for countries where Tearfund's partners work. New countries are being added regularly.	http://tilz.tearfund.org/Topics/Environmental+Sustainability
Adaptation Learning Mechanism	Country profiles, projected changes in temperature, rainfall and climate-related disaster risks and impacts.	www.adaptationlearning.net/profiles/
UNDP Climate Change Country Profiles	52 country profiles.	http://country-profiles.geog.ox.ac.uk/ Click on 'Reports' next to the relevant country
World Bank Climate Change Portal	Click on local areas on the map to find out scientific projections of climate change. Provides detail of impacts on particular project types, plus suggested adaptation responses. NOTE: this tool has not yet been officially released and is at the user testing stage. It sometimes seems not to work. Keep trying – when it does work it's useful!	http://sdwebx.worldbank.org/climateportal/

NOTE
The sources listed in this step will be regularly updated on the Tearfund TILZ website
http://tilz.tearfund.org/Topics/Environmental+Sustainability

TABLE 4

Second-stop internet sources

Source	Description	Website
IPCC (Inter-Governmental Panel on Climate Change)	Summaries of scientific information on climate change according to region, and the impacts on ecosystems and societies.	www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter11.pdf
US Climate Prediction Center	Short-term weather forecasting, eg rainfall projections for Africa and Pacific Islands. Also tracking El Niño.	www.cpc.noaa.gov/ In left-hand menu click on location, eg 'Africa' or 'Pacific Islands' under 'Cross-cutting themes'; or 'El Niño' under 'Climate Weather'.
UNEP/GRID-Arendal	See maps and graphics filed by region covering deforestation and coastal intrusion, for example.	For maps and graphics: http://maps.grida.no/
International Research Institute for Climate and Society	Some useful descriptions of climate change adaptation projects and data, by region, sector and sometimes by country.	http://portal.iri.columbia.edu/portal/server.pt
Prevention Web (International Strategy for Disaster Reduction)	Contains country information on past disasters including occurrences, number of people affected.	www.preventionweb.net/english/ Go to 'Countries & Regions' tab.
EM-Dat Database	Contains information on past disasters. Searches can be carried out, eg by disaster type and country.	www.emdat.be/Database/terms.html
Famine Early Warning System	Features articles and reports on droughts and food shortages; up-to-date information clearly listed by region or country.	www.fews.net/Pages/default.aspx
Google Earth Climate Change	Hadley Centre resource showing projected impacts of climate change, areas of environmental interest, and adaptation projects. Very varied in content per country.	http://earth.google.co.uk/ http://earth.google.com/outreach/kml_entry.html#tClimate%20Change%20In%20Our%20World
Tyndall Centre Country Climate Data Sets	Provides monthly averages 1961–1990 and, separately, yearly averages 1901–2000 for (eg) daily mean temperature, precipitation and wet day frequency. (Useful for baseline information.)	www.cru.uea.ac.uk/~timm/cty/obs/TYN_CY_1_1.html

Exercise 1.4

NOTE
These sources of scientific information do not have to be accessed in the same order. You may find first points of contact to be really helpful in getting you started, however.

If you have access to the internet, you may find that a lot of your questions can start to be answered by following the internet links in the tables above. Identify which sources may best answer your questions (see **Exercise 1.3**).

Plan which order to contact them in. It is a good idea to use triangulation, cross-checking your sources to verify each piece of information that you use. Consider the following:

- Think about possible first points of contact: people you already know in your local area who have knowledge or interest in the environment. These may include other agencies, community workers and local government officials such as environmental, water, health, agricultural or food security technical officers.

  Phone or visit these people and ask them whether they have collected scientific information on the impacts to your locality from climate change and environmental degradation, and see if they can answer your questions developed in **Steps 1.2 and 1.3**. Ask them for the contact details of other people they know of in your country, who may have more relevant information.
- Your first points of contact should now have provided you with some useful other contacts. Identify other second points of contact and select which to approach first.

  Contact the second points of contact: visiting them is usually more fruitful than phone calls and letters. Go with questions about the type of information you need to know.
- If you have not already done so, try to visit the person who is your country's National Focal Point. Also, either through the websites below or via the National Focal Point, try to get hold of the government documents.
- View the websites listed in the above two tables and see if they help to answer some of your questions.

Finally, summarise key scientific findings that answer your questions from **Exercise 1.3**. Write this information in **Part 1a** of the **CEDRA Report Format**, page 52. See an example of a completed part of the report on page 21.

Example

How the Somuni Women's Rehabilitation Programme completed Part 1a of the CEDRA Report Format on page 52

The Somuni Women's Rehabilitation Programme identifies the following useful first points of contact:

– two environmental NGOs working in their district

– community food security workers

– a local government water and sanitation (WatSan) technical officer.

One member of staff meets with the above people. The environmental NGOs provide her with some basic information sheets about environmental changes in the zone. She finds out the names of two local government officials who monitor the impacts of climate change and environmental degradation in the district.

The member of staff visits these officials, one of whom agrees to be interviewed. She uses the questions her organisation drew up in Exercise 1.3. She also receives addresses for national government environmental contacts, whom she visits. They, in turn, help with names and telephone numbers of scientists and, again, she visits these people.

Another member of staff identifies the National Focal Point, and researches some of the internet sources described in the tables above in preparation for an interview with them. She finds a useful

document which summarises general climatic and environmental risks faced by the country. She checks how this relates to details provided in the Adaptation Learning Mechanism Summary.

These findings are written up in the CEDRA Report Format, Part 1a *(see below).*

Part 1a of the CEDRA Report Format can now be completed.

PART 1: Background information (Incorporate key findings from Exercises 1.4 and 1.5 for each zone where you work)

1a Scientific information	• Variations in rainfall mean that crop yields in the mid-altitude zone are already declining in the Somuni district and there is a projected decrease in crop yields of 10% or more by 2020. • Increased rainfall in the country by 10% in December to February and by 7.5% in March to November, by 2020. • The risk of landslides has increased.

NOTE
In practice, your findings will probably be more than those given here.

1.5 Collect community knowledge to help answer your questions

It is important that we don't rely only on scientific information about environmental change. Local people have considerable knowledge about past changes in weather and the environment, including local flora (vegetation, eg forest, shrubs, grass, agricultural crops), fauna (animals, birds, fish, insects) and other natural resources. They can usually advise on traditional plant species that are better able to cope with drought, flooding, salinity and so on. They will have experience about changing crop growth and pest and disease patterns. They are the rightful stewards of the resources in their area and will have knowledge about impacts on water supplies, food security and health. They will also have opinions about the community's ability to adapt or cope with these changes. This will help in identifying possible future adaptation methods.

The following case study shows how ignoring certain people's views can lead to serious environmental hazards being overlooked.

CASE STUDY
Community project in Bangladesh
Ignoring certain people's views can lead to serious environmental hazards being overlooked

In Bangladesh, rural communities in coastal and riverside areas have embarked on risk-reducing activities, designed to help them cope better with the devastating impact of cyclones. Contingency plans have been developed, volunteers trained etc, and community confidence increased. However, at the conclusion of a recent project assessment, villagers confided that their real priority was the day-by-day erosion of their land and loss of livelihood, as sea levels rise and encroachment accelerates.

Source: A Tearfund worker in Bangladesh

To collect community-based knowledge, involve several community members in participatory exercises. Try to include representatives from all the different sectors of the community (male,

Young Cambodians use a participatory tool

Peter Grant / Tearfund

female, young, old, rich, poor). The Tearfund *Facilitation Skills Workbook* provides detailed information on the use of participatory techniques (see Appendix B, Useful resources).

Participatory tools which could be used include:

- focus groups
- community mapping, including mapping of natural resources
- seasonal calendars
- historical time lines
- transect walks
- use of ranking / matrices
- storytelling / poetry.

NOTE
Local environmental record keeping would help to support your planning and advocacy. Consider keeping some environmental records, eg of temperature, rainfall levels, animal and bird migration, crop failures / yields, severity and length of floods, landslides, droughts or other environmental events.

When preparing for community exercises, use the questions compiled in Exercise 1.3 as a guideline for the information you wish to collect.

Facilitate a relaxed atmosphere, encouraging free discussion and dialogue. Ask open questions to gather information. Instead of asking 'Is there less rain?' ask 'What is the weather situation like now? How has it changed over the last ten years or since you were a child?'

Enabling open discussion may well reveal a number of surprising responses. Allow opportunity for these to develop, as the community may find ways forward that may not directly involve project activities. If maps, charts and matrices are produced, do not take these away from the community representatives. They should own them. They may provide powerful reminders for

community decision-making and action. Instead, make copies or photograph them, for your own use, with their permission. Ensure that full feedback is given following the assessment of community-based knowledge and that community representatives are included in the resulting planning for adaptation.

The Hazard Assessment section of the Tearfund tool, Participatory Assessment of Disaster Risk (PADR), which can be found on page 33 of *ROOTS 9: Reducing risk of disaster in our communities*, is helpful for collecting community perceptions. Agencies which have already carried out a PADR assessment may find they already have a valuable collection of community knowledge that can be applied to CEDRA.

Exercise 1.5

Staff should carry out a participatory exercise in one or more communities in each zone identified in **Exercise 1.1** to find out what the felt impacts of climate change and environmental degradation are in the zone. Choose a small selection of questions from the list of questions you wrote in **Exercise 1.3** and write them in everyday language, making them as open as possible.

At the same time collect:

- information on coping mechanisms and adaptation methods that have worked or failed in the community in the past
- information about any particular vulnerabilities members of the community mention, eg a lack of capacity to plan projects / any opposition to try particular new methods.

Summarise key community findings, including those that bring up new issues of concern to the community.

If there is conflicting evidence, write down evidence that is representative of the different members of the community who participated. It is important that differences of opinion are represented.

Write this information in **Part 1b** of the **CEDRA Report Format** on page 52. See example on page 24.

Example

A group of staff from the Somuni Women's Rehabilitation Programme were able to use findings of a PADR exercise that had been conducted in the mid-altitude zone during the previous year.

They also conducted new community-based research in one flood-plain community. During this research the team spoke separately to groups of older women and younger women, who each helped to develop seasonal timelines and community maps. Questions they asked were:

- *How has the weather changed since you were children?*
- *How have crop types and crop yields changed since you were children? In the last ten years?*
- *How have other natural resources (eg trees, water, plants, animals) changed since you were children?*
- *How have occurrences of landslides changed since you were children? In the last ten years?*
- *How does this affect your workload today?*
- *How has the community responded and adapted in the past to these environmental changes?*

– *Have there been any difficulties in making adjustments? Has anything been particularly successful? Why?*

The team also took the opportunity, using simple language, to share some information about what they had discovered in their scientific research.

See their summary in the example below.

SHARING COMMUNITY FINDINGS

Community experiences are useful not just for planning our own development strategy, but also for other agencies planning a response to climate change and environmental degradation in your country. Sharing this information with local and national government agencies may provide us with new openings to advocate on behalf of our beneficiaries. In addition, sharing the information back with the community can help the community to develop their own adaptation response.

Part 1b of the CEDRA Report Format can now be completed.

PART 1: Background information (Incorporate key findings from Exercises 1.4 and 1.5 for each zone where you work)

1a Scientific information	• Variations in rainfall mean that crop yields in the mid-altitude zone are already declining in the Somuni district and there is a projected decrease in crop yields of 10% or more by 2020. • Increased rainfall in the country by 10% in December to February and by 7.5% in March to November, by 2020. • The risk of landslides has increased.
1b Community experiences	• Seasons are not as they used to be. The rainy season is unpredictable, shorter and rainfall is more intense. • Crops are failing due to waterlogging and crop pests breeding faster. This means more work for us younger women. • Our health is suffering because there is not enough food due to crop failures, and we are the last ones to eat (older women). • We can list 8 species of animals and 12 species of plants that have disappeared from this area over the last 10 years.

NOTE
In practice, your findings will probably be more than those given here.

Should we implement new adaptation projects?

In response to completing Parts 1a and 1b, CEDRA then takes us through the steps of deciding whether we want to adapt any of our existing projects, or deciding that some of our projects are likely to fail and need replacing with alternative projects that meet the same outcomes. However, our findings in Step 1 may lead us to conclude that we want to undertake new adaptation projects that respond to hazards we were previously unaware of. This is discussed in the following steps, which should each be completed before we decide whether or not to implement new additional projects.

Step 2 Prioritising which hazards are the most important to address

This step helps development agencies to analyse the information they collected in the last step and prioritise the hazards they face so they answer the following strategic questions:

- Do we need to adapt our current projects?
- Do we need to stop some of our current projects?
- Do we need to start any new projects?

The following exercise helps us to analyse how impacts from climate change and environmental degradation put our projects at risk so that we can plan our adaptation responses.

2.1 Completing the project risk assessment part of the report

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1.	1					
	2					
	3					
	etc					
2.	1					
	2					
	3					
	etc					
3.	1					
	2					
	3					
	etc					
etc						

Exercise 2.1

NOTE
This exercise would need to be carried out by each individual member of a group of agencies that was conducting CEDRA.

Start to complete the table in **Part 2** of the **CEDRA Report Format**. At this stage, do not complete **column G of Part 2**, or **Part 3** (descriptions for how to complete these parts are given in exercises in **Steps 3, 4 and 5**). An example of this exercise is provided on page 28.

Sectors and projects – columns A, B and C

Refer to your organisational plan and:

- Write headings for **all** of the sectors where you work, into **column A** of the table.
- In **column B**, list **all** the projects that you are implementing in each sector. Depending on how many projects you are doing, it may be easier to group projects together into similar types.
- Add new rows for any new sectors and projects that you are considering implementing in response to new hazards identified in **Step 1**.
- If you are considering implementing new projects in response to new hazards identified in **Step 1**, then you may need to consult the community or other stakeholders to gain more information on risks and adaptive strategies.
- Refer to the information collected in **Exercises 1.4 and 1.5** and write details in **column C** about the impacts that could affect the projects. These impacts could be current or potential in the future. It is possible that some projects will not experience any climatic or environmental impacts, while others may encounter multiple impacts.

Significance of the impacts – column D

List the significance of the impacts in **column D**, considering factors such as value of the project, magnitude of the impact, duration involved and reversibility of the effect. Give the impacts numerical values as follows:

4 = Highly significant impact
This impact means the project can no longer proceed.

3 = Moderately significant impact
This impact will considerably affect the successful achievement of the project.

2 = Some significance
This impact will have some influence on the successful achievement of the project.

1 = Little or no significance
This impact is negligible to the successful achievement of the project.

Likelihood of the impacts – column E

List the likelihood of the impacts in **column E**. Give the impacts numerical values as follows:

4 = Highly likely impact will occur
75–100% likelihood of impact occurring within 5 years.

3 = Moderately likely impact will occur
50–75% likelihood of impact occurring within 5 years.

2 = Some likelihood impact will occur
25–50% likelihood of impact occurring within 5 years.

1 = Little or no likelihood impact will occur
0–25% likelihood of impact occurring within 5 years.

Exercise 2.1

continued

Risk of the impacts

Multiply the numbers in **column D** by the numbers in **column E** and write the result in **column F**.

Significance X Likelihood = Risk

Priority projects

Projects with risk scores of between 6 and 16 are priority projects that need to be either adapted or else stopped completely and replaced: see **Step 3**. At your discretion, you may decide to adapt any of those with a score of 6 or below as well.

NOTE
Proposed projects in response to newly identified hazards should also be evaluated through the above steps, to determine whether they also need adapting to make them resilient.

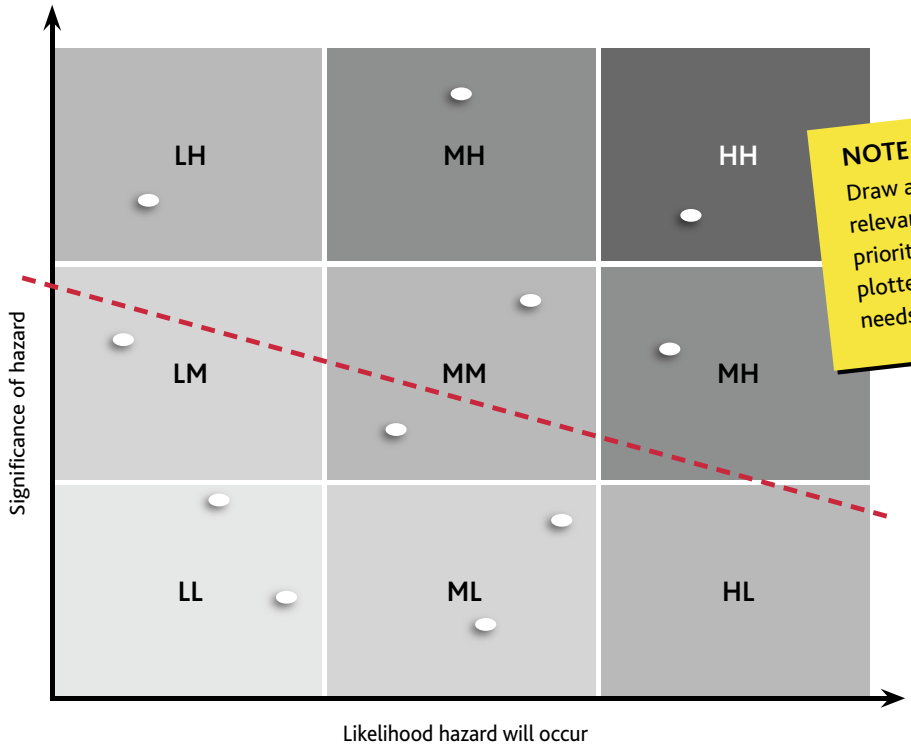
Using alternative ways of measuring risk

Participatory tools, such as focus groups and matrices, and further research into scientific facts can help us to assess significance and likelihood. An alternative to the above method of measuring risk is to use a simple block graph like the one below, and ask a focus group to place markers such as stones where the impacts from climate change and environmental degradation should lie on the graph. Columns C, D and E of the Report Format could then be merged and a record of whether each impact brings ML risk, HH risk, and so on, could be written down.

Graphical method of estimating risk

H = high
M = medium
L = low

The first letter in each box refers to likelihood, the second to significance. So 'HL' = High likelihood and low significance.



NOTE
Draw a cut-off line relevant to your own priorities. Every impact plotted above this line needs to be adapted.

Part 2, columns A–F of the CEDRA Report Format can now be completed.

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1. Livelihoods	Microcredit enterprises	Erratic rainfall could mean enterprises fail.	4	3	12	
		Predicted landslides mean communities may need to relocate.	2	2	4	
2. Agriculture	Tree nurseries	Rapid run-off is reducing soil quality.	3	4	12	
		Changes in rainfall mean tree pests breed faster; trees are dying. Likely to get worse.	4	4	16	
	Alley cropping	Trees may be susceptible to tree pests, preventing them from protecting crops	3	2	6	
3. All sectors	All projects	The risk of flooding could lead to beneficiaries' homes being destroyed. This may affect their involvement in the project.	4	4	16	
4. New sector	New project	Potential impacts associated with this project	2	1	2	

NOTE
Complete this column later (see Step 3).
In practice, your findings will probably be more than those given here.

Step 3 Selecting appropriate adaptation options

Adaptation is not new. Throughout history, humans have adapted to a changing climate and environment. What is new is the rapid pace of climate change and environmental degradation that brings the new challenge of adapting at a much faster rate than before. Delaying action will only result in increased costs and ultimately greater risk to vulnerable people.

Step 2 helped us to highlight projects that we need to adapt to face these new risks and identify new projects. Projects listed in Part 2 of the CEDRA Report Format that have risk scores of 6 and above need to be adapted in some way. Step 3 helps us identify and choose between different adaptation strategies and tools. Some of the strategies to adapt existing projects are often costly or ineffective when implemented, so we may want to stop some projects entirely and design new ones that meet the same objectives, or design new projects that respond to higher priority hazards that we have identified in Step 1. Each new project or project activity needs to go through Part 2 of CEDRA so that risks from the environment and climate can be assessed.

Here is an example of one very successful adaptation to environmental degradation **and** climate change implemented by a Tearfund partner.

CASE STUDY

Replanting mangroves

The removal of vegetation along the shoreline of a thin strip of land in Honduras, for use as firewood and to clear spaces for houses and other purposes, has led to significant coastal erosion. This has exposed communities to impacts of storm surges associated with hurricanes. Homes, infrastructure and livelihoods are being lost as a result. Water supplies are affected, impacting people's health.

Although this environmental degradation has long been recognised, it was only when community-based participatory tools were used that the nature and scale of the threat was clearly defined. Small groups of neighbours and family members have effectively replanted mangroves to protect the shore from further erosion, and to provide a barrier to the storm surges.

MOPAWI, Honduras

Geoff Crawford / Tearfund

3.1 How to find out about different adaptation options

Before we decide how to adapt the existing projects in our portfolio, or whether to implement additional projects in response to newly identified hazards, first we need to become aware of different types of adaptation.

Reactive adaptation is responding to an existing situation after the impacts of climate change and environmental degradation have been felt, eg relocating after coastal erosion has occurred.

Anticipatory adaptation is action planned before the impacts have been felt. This can include actions to reduce vulnerabilities through building capacities, eg education and awareness-raising programmes about projected reductions in annual rainfall, and those to deliver technical solutions to address challenges, eg building a sand dam to raise the groundwater table.

In reality, most adaptation actions are part reactive and part anticipatory.

Adaptation options can also be described as **'soft'** solutions – such as building capacities of people affected by the hazard so that they become more resilient to the impacts – or **'hard'** solutions, ie technical responses with more tangible outputs, such as drought-resistant crops or flood diversion channels.

We need to research and discuss adaptation tools and options that are appropriate to our zone and sector by asking community members and, if possible, technical specialists such as government technical advisers or other development workers.

There is a wide variety of possible adaptation options. Some ideas are described in the CEDRA Field Tool Checklist on page 53. A small section of the checklist is shown below.

Part of the CEDRA Field Tool Checklist, showing a range of possible adaptation options

	Likely impacts of climate change and environmental degradation	Adaptation option
Land	**Crop damage and failure** ☐ Crops can be damaged by increased rainfall or unpredictable distribution and intensity of rainfall. ☐ Crop damage and failure result in lack of seed for the next planting season. ☐ Reduced crop yields due to disease, pests, soil degradation, lack of water for irrigation, overuse of chemical fertilisers.	**Maximise crop yields** ☐ Ask farmers to report on invasive species and changes in growing patterns. ☐ Advance sowing dates; workshops with farmers. Seasonal climate change projections reviewed, decisions taken. ☐ Crop diversification and crop mixing; mix of crops and trees in agroforestry systems to spread risk and increase biodiversity; animals can also be integrated into these systems allowing effective recycling of manure and providing a valuable source of protein. ☐ Introduce drought-, flood- or salt-resistant crops. ☐ Use 'closed loop' agricultural technique, to maximise crop use and soil quality at all stages.
	Too little irrigation water, or too much water (due to intense rainfall or flooding) ☐ Lack of water eg due to drought, hotter seasons, dams upstream or rivers being	**Maximise irrigation water availability** ☐ Work with communities to develop strategies for water harvesting ☐ Minimise wastage of water used in irrigation by

Many options are already found in development programming or traditional practices, while some require new skills and resources. This is a rapidly developing area where new approaches used elsewhere may be appropriate to our activities. Links to adaptation options are to be made available on TILZ during 2009 (http://tilz.tearfund.org/Topics/Environmental+Sustainability).

Websites which give examples of other adaptation options and coping strategies include:

- If your country has one, your National Adaptation Programme for Action (NAPA) http://unfccc.int/national_reports/napa/items/2719.php
- Practical Action – click on the left-hand menus, on 'Technical enquiries' then 'Adaptation to Climate Change' for some examples of adaptation options on the website http://practicalaction.org/
- UNFCCC local coping strategies database http://maindb.unfccc.int/public/adaptation/
- UNFCCC, Climate Change: Impacts, Vulnerabilities and Adaptation to Climate Change in Developing Countries http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/txt/pub_07_impacts.pdf (see Table V-5 on p31)
- Weathering the Storm – Options for Framing Adaptation and Assessment (World Resource Institute) www.wri.org/publication/weathering-the-storm (see annex starting on p43).

3.1.1 Managing risk associated with adaptation

There are often several possible options for adapting to the impacts of climate change and environmental degradation on our projects. When selecting adaptation options, it is important to compare different options and identify the advantages and disadvantages of each. This process is called **risk management**. We should consider different ways of managing risk by identifying who is best placed to implement each adaptation activity (it may not be our agency), and how the adaptation may be undertaken.

The table below helps us to see how varied our responses may be.

TABLE 5
CEDRA risk management options

Option	Description	Example
Avoid the risk	Modify the project(s) or carry out the same project(s) in a different location. In doing this you should meet the same outcomes while avoiding the risk.	If erratic rainfall means there is a risk of a livelihood project failing it could be adapted, eg planting rice that can cope with longer periods of intense rain.
Reduce the risk	Adjust the project(s) to reduce the impact of the risk.	Using the same example as above, the project could diversify to include enterprises that are not all reliant on rain.
Retain the risk	Retain the risk, eg strengthen the project and/or implement a new adaptation project to resolve the risk (this increases cost).	If an agricultural project risks crop failure from floods you may grow root vegetables that are more resilient to floods and also construct a flood diversion channel.
Transfer the risk	Identify who else could be best placed to manage all the risk (eg another agency already working on this issue, or a government department responsible for addressing this). Or, insure against the risk.	If soil erosion has made land less productive, so that tree nurseries wither and die, you could cooperate with a local land protection group in the local council and monitor their progress on improving the soil and preventing further erosion.
Share the risk	Carry out a stakeholder analysis to determine who is best able to manage different aspects of the risk.	Food security projects could promote sustainable agricultural projects if the World Food Programme could agree to provide food if crops fail; and also if the government could help with transport of goods to market or with providing food aid to the community.
Absorb the risk	Continue the project(s) as normal, but in the knowledge that some projects will fail when the risk occurs: you must set aside monies to repair the projects.	Design houses with two walls that will collapse on impact by a rapid flood, so the remainder of the house remains standing and occupants are not harmed, but in the knowledge that repairs will be necessary.

This table should be referred to when selecting and comparing alternative potential adaptation options (Step 3.2) to identify who is best placed to manage the risk of the adaptation option potentially failing, and how. Step 4 addresses what to do if the risks to our existing projects are unmanageable.

SHOULD WE BE MANAGING RISK?

Managing risk has been promoted through religious teachings throughout history. The story below provides an example relating risk management to Islamic teachings from the Koran.

CASE STUDY

Risk and religious teachings

One 70-year-old man from Momand village in Dand district of Afghanistan opposed a Tearfund project saying 'Disasters are the will of God. Why are you trying to interfere with God's will?'

Tearfund's local team had anticipated this from the community and responded by telling the story of Nu Allai Salam from the Koran who listened to the will of God and prepared for the coming disastrous flood and saved himself and his family and all the animals. This was acceptable to the old man who was impressed at the Koranic knowledge of the team and how they wanted to use it to inform their project activities.

The Radio project is now highly regarded in informing people how to adapt to the impacts of climate change and environmental degradation.

Reference: http://tilz.tearfund.org/Topics/Disaster+Risk+Reduction/ – then press link *DRR Mini Case Studies* and under title *HFA Thematic Area 3* press *Afghanistan Case 3*.

Kate Bowen / Tearfund

3.2 How to choose which adaptation options to take and which tools to use

Decisions about which actions to take should be based on criteria that are important to the local community and the organisation. A matrix could be used for this (see example in Exercise 3.2, below). Here are some possible criteria that may help us in our selection of appropriate adaptation options:

- Effectiveness in building capacity of vulnerable people
- Effectiveness in increasing resilience to climate changes and environmental degradation
- Cost-effectiveness
- Time-frame
- Number of people helped
- Environmentally sustainable in both long- and short-term
- Extent to which it helps prevent population displacement
- Compatibility with national adaptation objectives

- Culturally and socially compatible (though it may be necessary to challenge some cultural and social norms)
- Practicality of the option – is it achievable? Do we have the technical skills, resources and organisational capacity to deliver it? (see below)
- Extent to which it can have ongoing influence over policies, practices and attitudes of local communities, government officials and so on.

3.2.1 Organisational capacity

Organisational capacity greatly affects 'what we can do' in terms of adaptation response.

Does our organisation have the necessary resources (human skills and financial resources in particular) to respond to the climatic and environmental risks identified? What strengths and opportunities can our organisation use in order to improve resilience in our projects, programmes and communities?

Consider and prioritise:

- **Protected elements** Identify which resources are not likely to be significantly affected by climate change and environmental degradation – so that you can see which of your current resources you can continue to draw on.
- **Safe conditions** Identify what capacities already exist and what potential strengths and capacities could be incorporated into project designs.
- **Positive underlying conditions** Consider what political ideas, national strategies, economic principles and cultural practices could support and motivate adaptation responses. Projects should be designed to engage with and support these strengths.
- **Staff capacity** Focus on increasing organisational and staff capacities before delivering physical and technical adaptation actions. These will include building the capacity of staff to access and interpret scientific information, community-based knowledge, and other stakeholder knowledge, and comparing different adaptation options.

Building up awareness of environmental issues within the organisation (see *ROOTS 13: Environmental sustainability*) and improving external networking, knowledge sharing and awareness raising will all help increase ability to respond to environmental risks and impacts appropriately.

Once we have selected our criteria and considered organisational capacities, we can select our proposed adaptation activities. These should all be compared using the Risk-Ranking Matrix, below, in consultation with Table 5: CEDRA Risk Management Options, on page 32 above.

Exercise 3.2

Staff should go through **Part 2** of the **CEDRA Report Format**. For each project with a risk score of 6 or above (and, at your own discretion, lower risk scores) research and compare possible adaptation options. Write the solution in **column G, Part 2** of the **CEDRA Report Format**. If you conclude that there is no manageable solution, see **Step 4** and **Exercise 4.1**, below.

Several participatory tools including focus groups could be used to help discuss and select appropriate adaptation options. The matrix below is an example of a useful tool. Develop your own criteria based on participatory focus group discussions.

Using a table like the one below, focus group members can agree on how effective different options are. Criteria could be scored with one, two or three ticks, or with 'high', 'medium' or 'low' or with a numerical value assigned to each criteria.

NOTE: If the adaptation option in **column G** is an entirely new project, it will be necessary to go through **Part 2** of CEDRA so that the risks from the environment and climate can be measured. Each new project will also need to go through usual project design and design stages, and additional funding or external support may be required. It will be necessary to establish the level of intervention, the likely beneficiaries, the length of the planned intervention, and the inputs that will be required. Consideration should be given to what impact the activity will have on related cross-cutting issues, and establishing indicators for monitoring and evaluation.

Example

Risk-Ranking Matrix comparing options for responding to the risk of erratic rainfall to the Somuni Women's Rehabilitation Programme's microcredit enterprises

		Criteria								
		Helps the most vulnerable	Brings greatest resilience	Fast to do	Environmentally sustainable	Low cost	Culturally appropriate	Number of people helped	Risks can be appropriately allocated and managed	TOTAL
Adaptation options	Plant crops that can cope with longer periods of intense rain	✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	18
	Diversify to include enterprises that are not all reliant on rain	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	20
	Carry on the same as normal, but when crops fail have money set aside for food aid supplies	✓	✓	✓	✓	✓	✓	✓	✓	8

Below is a case study about an area already suffering from climate change, and the adaptation response of one Tearfund partner (Discipleship Centre). From a difficult situation, opportunities to respond positively were developed with the local people which have led to some unexpected benefits – in terms of the empowerment of local women and through mobilising local and ongoing response.

CASE STUDY

A successful adaptation project: storing rainwater in Rajasthan

In India, staff from the Discipleship Centre (DC), have carried out participatory disaster risk assessments with many vulnerable communities. They help them to consider likely hazards (such as drought or cyclones), and assess who and what would be affected. Then they help them to plan how to reduce the risks, building largely on the skills, resources and abilities available within the communities.

Rajasthan state increasingly suffers from droughts. Local communities struggle to cope with the impact of the droughts because people generally have few reserves. Water shortages are becoming more common. Staff from DC have encouraged local communities around Jodhpur to form Village Development Committees (VDC). These committees provided the first opportunity for men and women of different castes to meet together to make decisions.

In one case, the VDC made the decision to build rainwater cisterns. These are about 3–4 metres wide and 4 metres deep. During the rainy season, rainwater is collected via channels which run into the cistern. Each cistern can store 40,000 litres. When full, the cistern can provide drinking water for several families all year round. It could also be used to store water brought in by tankers in times of drought.

Discipleship Centre provided training and materials to help build one cistern using cement. However, one cistern was not enough to meet village needs. Motivated by their new awareness and understanding, the village committee decided to take their cause to their local government officials. DC staff helped the committee to make a formal application and provided advice on how to present their case. As a result of this application, the government has promised to build another ten cisterns for the village.

Oenone Chadburn, Disaster Risk Reduction Project Manager with Tearfund, and Blesson Samuel of Discipleship Centre, New Delhi. *Footsteps 70*

Richard Hanson / Tearfund

A child collects water from a rainwater tank in Brazil. Part of a project by Tearfund Partner, Diaconia

Part 2, column G of the CEDRA Report Format can now be completed.

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1. Livelihoods	Microcredit enterprises	Erratic rainfall could mean enterprises fail.	4	3	12	Diversify to include enterprises that are not all reliant on rain.
		Predicted landslides mean communities may need to relocate.	2	2	4	No action. Or possibly avoid risk by relocating livelihood sites.
2. Agriculture	Tree nurseries	Rapid run-off is reducing soil quality.	3	4	12	Cooperate with a local land protection group in the local council and monitor their progress on constructing contour bunds to slow down water run-off and retain soil.
		Changes in rainfall mean tree pests breed faster; trees are dying. Likely to get worse.	4	4	16	No manageable solution could be found regarding tree pests.
		Trees may be susceptible to tree pests, preventing them from protecting crops	3	2	6	Local NGO, Eco-trees, have agreed to identify and provide new tree species for alley cropping and to monitor them for resilience.
3. All sectors	All projects	The risk of flooding could lead to beneficiaries' homes being destroyed. This may affect their involvement in the project.	4	4	16	New project retrofitting homes to strengthen them against flooding. Local government technical officer has provided design and has agreed to inspect them at completion.
4. New sector	New project	Potential impacts associated with this project	2	1	2	New proposed adaptation project may itself need adapting.

NOTE
In practice, your findings will probably be more than those given here.

Step 4 What to do if the risks to our existing projects are unmanageable

The impacts of climate change and environmental degradation are likely to be so substantial that they become unmanageable in some locations. Scientists are increasingly advising that climate change is occurring at a much faster rate than previously anticipated. When we encounter this we may need to take very different courses of action to help our communities.

If addressing risks through adapting existing projects proves too costly, impractical or undesirable, a development agency may want to stop the project(s) or design a new project that meets the same objectives.

TABLE 6
Examples of possible alternative responses to unmanageable risks

Examples of unmanageable risks	Possible alternative action that helps to meet the same objectives
The risk of a coastal agricultural project failing due to flooding from sea level rise could be unmanageable if the cost of constructing a sea wall is too much.	Stop the project and provide help relocating the community to higher ground instead (where an agricultural project could be started later).
The risk of a fishing project failing due to fish stocks declining could be unmanageable if the political will to remove an existing dam upstream is too weak.	Stop the fishing project and start another livelihoods project; in the interim provide food aid.
The risk of a maternity clinic closing due to human diseases spreading may be unmanageable if fresh water resources continue to reduce due to contamination from local industries.	Close the maternity clinic and allocate resources to maternity clinics in neighbouring areas which have more secure access to fresh water. At the same time provide a transport service to enable women needing antenatal and postnatal care to travel to the other clinics.
The risk of an education project becoming redundant if more severe cyclones continue to destroy buildings and cause resettlement of the community.	Close the education project. Consider setting up a refugee camp with educational facilities and counselling services.

NOTE
It may also be that while individual adaptation options are achievable, the collective cost of implementing all options is unmanageable. It may be necessary to stop some of the projects for this reason.

Decisions about which projects to stop and which new projects to start should be taken in consultation with other stakeholders.

As mentioned, for each new project it will be necessary to go through Part 2 of CEDRA so that the risks from the environment and climate can be measured. Each new project will also need to go through the usual project identification and design stages.

Exercise 4.1

Address any unmanageable risks which could not be addressed in **Step 3**. Discuss the decision to stop the project with beneficiaries and other stakeholders. Consider whether collectively all the adaptation options written in **column G** are achievable, and if not, use participatory exercises to decide which projects to stop.

Write the new project in **column G** of **Part 2**, next to the relevant risk.

Example

The Somuni Women's Rehabilitation Centre identified that no manageable solution could be found regarding the increased breeding of tree pests and diseases due to changes in rainfall. The Centre's tree nurseries were failing because trees were dying. Pesticides were ineffective and costly, and also harmed other species. Projections from their scientific research showed the pests and diseases were likely to be an even worse problem in the future.

The objective of the tree nursery project had been to provide food security. In the face of the changes in the climate, the Centre decided to stop the tree nursery project and start another agricultural project that was more resilient to waterlogging and pests. After research into adaptation techniques being used elsewhere, and consultation with the project beneficiaries, they chose to introduce new drought- and flood-resistant root vegetables that had also been found locally to attract fewer pests.

The Centre then conducted **Part 2** *of CEDRA and assessed environmental risks to the project, and also integrated the project into its organisational plan, following usual project cycle management procedures.*

Any gaps in part 2, column G of the CEDRA Report Format can now be completed.

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1. Livelihoods	Microcredit enterprises	Erratic rainfall could mean enterprises fail.	4	3	12	Diversify to include enterprises that are not all reliant on rain.
		Predicted landslides mean communities may need to relocate.	2	2	4	No action. Or possibly avoid risk by relocating livelihood sites.
2. Agriculture	Tree nurseries	Rapid run-off is reducing soil quality.	3	4	12	~~Cooperate with a local land protection group in the local council and monitor their progress on constructing contour bunds to slow down water run-off and retain soil.~~
		Changes in rainfall mean tree pests breed faster; trees are dying. Likely to get worse.	4	4	16	No manageable solution could be found regarding tree pests. Stop the project!
	Project introducing new drought- / flood-resistant root vegetables	(Impacts are likely to be low: crop chosen is pest-, drought- and flood-resistant.)	n/a	n/a	n/a	n/a
	Alley cropping	Trees may be susceptible to tree pests, preventing them from protecting crops	3	2	6	Local NGO, Eco-trees, have agreed to identify and provide new tree species for alley cropping and to monitor them for resilience.
3. Infrastructure	Flood-resistant housing	The risk of flooding could lead to beneficiaries' homes being destroyed. This may affect their involvement in the project.	4	4	16	New project retrofitting homes to strengthen them against flooding. Local government technical officer has provided design and has agreed to inspect them at completion.
4. New sector	New project	Potential impacts associated with this project	2	1	2	New proposed adaptation project may itself need adapting.

NOTE
In practice, your findings will probably be more than those given here.

Step 5 Considering new projects and new project locations

CEDRA may sometimes lead us to determine that neighbouring zones or communities face greater risks from climate change and environmental degradation than our own projects and beneficiaries. The following exercise helps us consider whether we want to work in new locations or with new beneficiaries.

Exercise 5.1

This is a broad, strategic exercise. A focus group or staff discussion can be held to decide whether to carry out this optional exercise.

In the course of your previous discussions and research, have you discovered other zones or people which are more vulnerable to climate change and environmental degradation? Consider whether to collect new scientific information and community information for those zones, prioritise the risks, and decide whether you want to start work there.

Write any decisions you make in **Part 3** of the **CEDRA Report Format**.

Example

The Somuni Women's Rehabilitation Programme decided it would like to research the neighbouring wetland zone when it read in its country's NAPA that it is an area at greater risk. Following research, the staff found that the risks were only slightly greater than in the flood plains and mid-altitude zone, and therefore decided that they would not start a new project in the wetland zone.

The staff considered the different groups of women in the districts where each member group worked. It observed that women living with HIV and AIDS would be most vulnerable to projected changes. The Somuni Women's Rehabilitation Programme decided to start a new project working with these women and compared alternative projects using a matrix.

Part 3 of the CEDRA Report Format can now be completed.

PART 3: Any decisions made to work in new zones or with new beneficiaries (see Exercise 5.1)

Women living with HIV and AIDS will be most vulnerable to the identified impacts from climate change and environmental degradation. We have compared different types of projects and have identified that an **advocacy project** would be an effective way of addressing this need.

NOTE
In practice, this part of a report will be longer than the example given here.

The completed CEDRA Report Format is shown below.

PART 1: Background information (Incorporate key findings from Exercises 1.4 and 1.5 for each zone where you work)

1a Scientific information	• Variations in rainfall mean that crop yields in the mid-altitude zone are already declining in the Somuni district and there is a projected decrease in crop yields of 10% or more by 2020. • Increased rainfall in the country by 10% in December to February and by 7.5% in March to November, by 2020. • The risk of landslides has increased.
1b Community experiences	• Seasons are not as they used to be. The rainy season is unpredictable, shorter and rainfall is more intense. • Crops are failing due to waterlogging and crop pests breeding faster. This means more work for us younger women. • Our health is suffering because there is not enough food due to crop failures, and we are the last ones to eat (older women). • We can list 8 species of animals and 12 species of plants that have disappeared from this area over the last 10 years.

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1. Livelihoods	Microcredit enterprises	Erratic rainfall could mean enterprises fail.	4	3	12	Diversify to include enterprises that are not all reliant on rain.
		Predicted landslides mean communities may need to relocate.	2	2	4	No action. Or possibly avoid risk by relocating livelihood sites.
2. Agriculture	Tree nurseries	Rapid run-off is reducing soil quality.	3	4	12	~~Cooperate with a local land protection group in the local council and monitor their progress on constructing contour bunds to slow down water run-off and retain soil.~~
		Changes in rainfall mean tree pests breed faster; trees are dying. Likely to get worse.	4	4	16	No manageable solution could be found regarding tree pests. Stop the project!
	Project introducing new drought- / flood-resistant root vegetables	(Impacts are likely to be low: crop chosen is pest-, drought- and flood-resistant.)	n/a	n/a	n/a	n/a
	Alley cropping	Trees may be susceptible to tree pests, preventing them from protecting crops	3	2	6	Local NGO, Eco-trees, have agreed to identify and provide new tree species for alley cropping and to monitor them for resilience.
3. All sectors	All projects	The risk of flooding could lead to beneficiaries' homes being destroyed. This may affect their involvement in the project.	4	4	16	New project retrofitting homes to strengthen them against flooding. Local government technical officer has provided design and has agreed to inspect them at completion.
4. New sector	New project	Potential impacts associated with this project	2	1	2	New proposed adaptation project may itself need adapting.

NOTE
In practice, your findings will probably be more than those given here.

PART 3: Any decisions made to work in new zones or with new beneficiaries (see Exercise 5.1)

Women living with HIV and AIDS will be most vulnerable to the identified impacts from climate change and environmental degradation. We have compared different types of projects and have identified that an **advocacy project** would be an effective way of addressing this need.

Step 6 Continual review

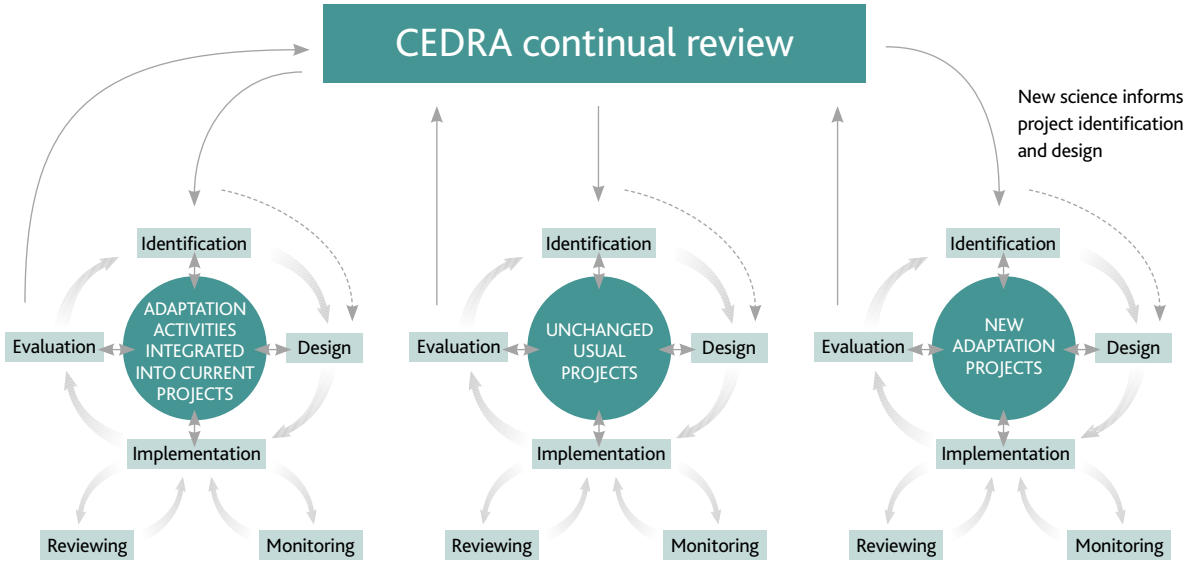
Incorporating an awareness of climate change and environmental degradation into all we do

It is important that CEDRA is not done once and then forgotten about. Information collected in CEDRA should be reviewed annually and new research carried out, or our projects may fail. Review helps us keep up to date with current experiences and future projections of the impacts of climate change and environmental degradation and how these changes may affect, or have already affected, our projects. Note that this applies to all projects, not just the new ones or the ones with environmental adaptation elements.

It is unlikely that the entire CEDRA exercise would need to be completed annually. However, if new impacts are identified it will be necessary to follow through the rest of the CEDRA Steps 2 to 5.

The diagram below highlights the importance of integrating learning from the normal project cycle (see Step 6.1) into the annual review of CEDRA. It also demonstrates integrating new findings about the science and community experiences of climate change and environmental degradation (see Step 6.2) into the project cycle. *ROOTS 5: Project Cycle Management* provides full details of how to carry out project cycle management; see reference in Appendix B, Useful resources.

CEDRA CONTINUAL REVIEW AND PROJECT CYCLE MANAGEMENT



CEDRA findings feed into project identification and design stages of existing projects, adapted projects and new projects. Evaluation of all of these kinds of projects feeds into the annual review and update of CEDRA findings. This, in turn, feeds into existing, adapted and new projects.

6.1 Learning from evaluation

Reflecting on the value of the inputs, activities, outputs and outcomes of the adaptation projects which were taken in response to CEDRA is an important part of the regular review. This will predominantly occur through the evaluation stage of the project cycle. Modified and newly agreed adaptation activities listed in column G of Part 2 of the CEDRA Report Format, and those new projects listed in Part 3, should be built into the project cycle plan and into action plans. In this way, adaptation activities should undergo regular monitoring and evaluation.

Evaluation will help to show what difference the adaptation actions have made, providing an opportunity for organisational learning (you may wish to change things to improve performance) and for motivating staff that progress is being made.

One of the best summaries of the monitoring and evaluation of risk reduction initiatives can be found on the weblink below. This guidance note gives a clear step-by-step summary with clear examples and tables to aid understanding.
www.proventionconsortium.org/themes/default/pdfs/tools_for_mainstreaming_GN13.pdf

All evaluations should help to answer the following questions:

- Have the intended benefits been achieved?
- Have there been any adverse outcomes?
- What were the critical issues and the lessons learned?
- How could we do it better next time?

However, evaluations can be easier said than done. Steps should be taken to ensure that the adaptation projects and initiatives avoid the following common problems:

- **Lack of collection of baseline data** All projects need to measure change. This is best done by collecting data at the beginning, regularly during the project, and at end of the project, and seeing what has changed. Many projects are eager to start activities and forget to effectively document data. And remember that this data could also be useful for donors and scientists.
- **Lack of beneficiary consultation** The people who have felt the change the most should be the primary beneficiaries. There should always be some form of participatory exercise to understand the impact of the project from the grassroots level.
- **Failure to assess the indirect impacts of the project** Very often evaluations confine themselves to whether the activities and outcomes in the logframe have been achieved, which overlooks both positive and negative impacts which have occurred as an indirect result of the activities. Ensure that the evaluation includes impact assessment approaches where possible.

It may be difficult to evaluate the adaptation action if it is preparing people for the risk of a landslide which has not occurred (yet) or if, for instance, temperature rises are so gradual it is hard to tell after two years what difference our action has made.

This should not stop us evaluating, or make us conclude that the action was unjustified. Instead, our evaluation should consider:

- Are the risks still anticipated?
- Have any impacts from climate change and environmental degradation been felt? How did the project or programme cope? Are new adaptation actions required?
- How easy was the project to carry out and how does this compare to our expectations?
- Were the costs as expected?
- Were there any adverse impacts on the environment? Do these adverse impacts outweigh the realised or potential benefits of the project?

Projects will only work sustainably towards the achievement of our development goals if, when implemented, they are appropriate for their situation and environment. We should continue to reflect on, revise and improve our plans during the course of our projects' lifetimes.

6.2 Reviewing the information collected from scientists and local communities (Step 1 of CEDRA)

Scientists are currently reporting that climate change and environmental degradation are progressing at a greater speed than expected. Staff should be reminded, at least every six months, of the impacts of climate change and environmental degradation. This information is summarised in Part 1 of the CEDRA Report Format and, because of the rapid speed of change, should be updated annually, including a review of both new and previously used sources of scientific and community information as follows:

- New sources of information are likely to have come to light through your contacts, your experiences in implementing your adaptation projects, and through media such as newspapers.
- Scientific sources previously used in CEDRA may have been updated – IPCC, for example, updates its data regularly and summarises its findings in new reports published every five to six years.
- Local communities may have more to say since you last collected information for CEDRA, in light of their changing experiences.

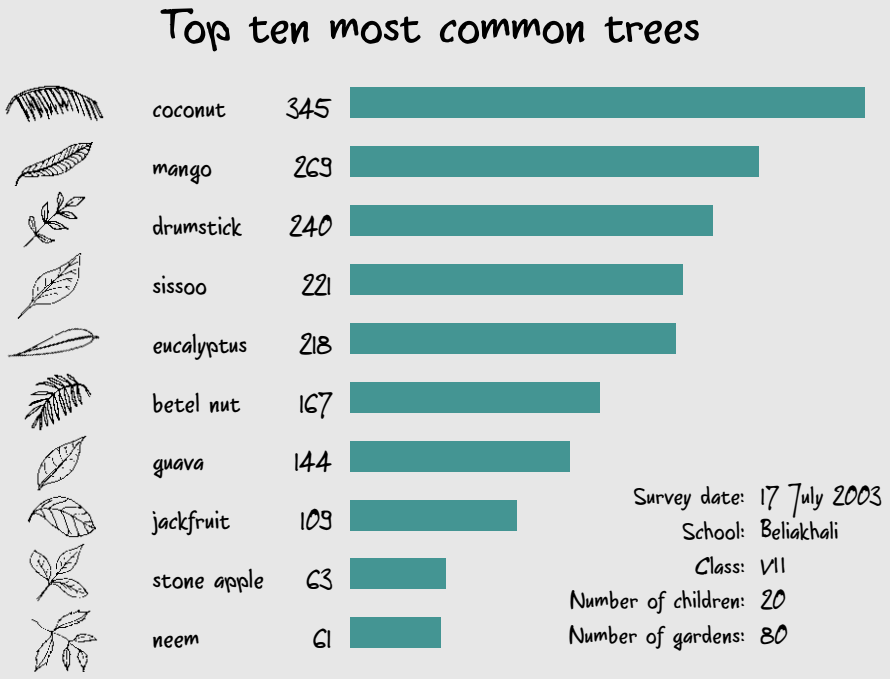
A plan should be prepared to collect and update scientific and community information annually, and to integrate relevant findings into the needs assessments of all new projects, as well as feed into the project cycle of all existing projects.

An example of new information that would be useful to collect to inform CEDRA and future projects, is **local environmental record keeping**. This will help with your planning and will provide evidence of environmental change, demonstrating the need for relevant projects. Consider keeping records of some environmental changes, such as temperature, rainfall levels, animal and bird migration or extinction, crop failures, loss of plant species, severity and length of floods, landslides, droughts, wildfires or other environmental events.

Example

Environmental record keeping using a tree survey, which would need to be carried out annually to compare findings

Adapted from *Creative Lesson Plan on Trees* by ENRE (Ecology and Natural Resource Education) project, 58A Dharmatola Road, Bosepukur, Kasba, Kolkata 700042, West Bengal, India. E-mail: enre_sc@vsnl.net



Exercise 6.1

Make a plan for how to follow up on CEDRA in future years.

As with any project you carry out, plan how to evaluate your inputs, activities, outputs and outcomes for each project that was undertaken in response to CEDRA. Think about what you want to and can measure. Plan to measure these things now, ideally before you start a project (create a baseline), and annually.

Consider how, when and by whom the actual impacts of climate change and environmental degradation on the project will be measured, as well as how to keep up to date with any new scientific data or stakeholder or community perceptions. Plan how relevant findings can be integrated into the needs assessments of all new projects, as well as be fed into the project cycles of all existing projects – adaptation projects or otherwise.

Example

The Somuni Women's Rehabilitation Programme decided that once a year they would host a conference to focus on environmental degradation and climate change issues. They decided to invite other women's groups to the meeting in order that they too could contribute to and benefit from the knowledge and learning that would be shared. Each group prepared for the meeting in advance and at the event the appointed leader of the meeting led them in feeding back to each other:

- *their experiences of implementing adaptation projects: evaluating inputs, activities, outputs and outcomes*
- *their communities' experiences of climate change and environmental degradation*
- *up-to-date science about the impacts of climate change and environmental degradation.*

One group each year was assigned the task of finding out whether the risks from climate change and environmental degradation had changed, or whether the science had improved so that more information was available. This information was shared.

CEDRA field tools

CEDRA Steps

NOTE
This table helps us to see which step or sub-step provides the information needed to complete each part of the CEDRA Report Format.

Step in CEDRA process		CEDRA Report Format part
Step 1	**Identifying climatic and environmental hazards from scientific and community sources**	
1.1	Identify different zones within a country	
1.2	Think about the type of information needed	
1.3	Compile a list of questions that you need answered	
1.4	Collect scientific information to help answer your questions	Part 1a
1.5	Collect community knowledge to help answer your questions	Part 1b
Step 2	**Prioritising which hazards are the most important to address**	
2.1	Completing the project risk assessment of the report	Part 2, columns A–F
Step 3	**Selecting appropriate adaptation options**	
3.1	How to find out about different adaptation options	
3.2	How to choose which adaptation options to take and which tools to use	Part 2, column G
Step 4	**What to do if the risks to our projects are unmanageable**	Part 2, column G
Step 5	**Considering new projects and new project locations**	Part 3
Step 6	**Continual review**	

CEDRA Field Tool Questions

Download this document from:
http://tilz.tearfund.org/Topics/Environmental+Sustainability

These questions are intended to help you collect scientific information and community knowledge, and are referred to throughout Step 1 of CEDRA. They are listed in Step 1.3.

NOTE
It would be easiest to complete this table on your computer using the Word document from the download link. Alternatively, expand the boxes before you print this document, or continue your notes on clearly labelled paper.

Questions	Answers	Sources
What are the most important climate change and environmental degradation hazards the zone faces?		

Do you have information about past and present changes regarding the following?		
• Annual and seasonal rainfall – amount, duration		
• Annual and seasonal average temperatures		
• Annual and seasonal average storms – frequency, severity eg wind / sandstorms		
• Annual and seasonal flooding or sea level rise – frequency, severity, area covered		
• Occurrences of mudslides and landslides or wildfires		
• Frequency of drought recurrence		
• Changes in the water table (annual records)		
• Soil quality / fertility		
• Desertification		
• Deforestation		
• Crop yields / food (in)security / famine		
• Decline in biodiversity – plants, fish and animals (migratory patterns, declining fish and animal populations)		
• Fresh water availability and quality, including details about pollution		
• Salinisation of soil		
• Availability and quality (eg whether polluted) of irrigation water		

Questions	Answers	Sources
• Crop pests and disease carriers		
• Land degradation due to chemical fertilisers		
• Air pollution levels / acid rain / smog		
• Destruction of coastal protection		
• Seasons eg when do rainy seasons start and end? (see below)		
• Population movements		
• Changes in health risks related to climate change and environmental degradation		

Do you have information about future projected changes in the above for the next		
• 5 years?		
• 10 years?		
• 20 years?		
• 50 years?		

Do you have records of which types of people are being most impacted by any of the above changes, eg in terms of health and mortality rates, livelihoods, general well-being?		
• women		
• children		
• people living with HIV and AIDS etc		

CEDRA Report Format blank copy

Download this document from:
http://tilz.tearfund.org/Topics/Environmental+Sustainability

This report format can be completed through carrying out the exercises contained in CEDRA Steps 1 to 5. An example of a completed format is provided on page 42.

NOTE
It would be easiest to complete this table on your computer using the Word document from the download link. Alternatively, expand the boxes before you print this document, or continue your notes on clearly labelled paper.

PART 1: Background information (Incorporate key findings from Exercises 1.4 and 1.5 for each zone where you work)

1a Scientific information	
1b Community experiences	

PART 2: Project risk assessment (Incorporate analysis from Exercises 2.1, 3.2 and 4.1)

Sig = Significance of impact: (4= high; 1= low) **Lik**= Likelihood of impact: (4= high; 1= low) **Rsk**= Risk = Significance X Likelihood (Multiply figures D and E)

A Sector(s)	B Projects	C CC and/or ED impacts	D Sig	E Lik	F Rsk	G Adaptation option
1.	1					
	2					
	3					
	etc					
2.	1					
	2					
	3					
	etc					
3.	1					
	2					
	3					
	etc					
etc						

PART 3: Any decisions made to work in new zones or with new beneficiaries (see Exercise 5.1)

CEDRA Field Tool Checklist

showing likely impacts of climate change and environmental degradation and possible adaptation options to take in response

Download this document from:
http://tilz.tearfund.org/Topics/Environmental+Sustainability

Tick the boxes next to the impacts that affect your project(s) and underline the parts of the text that are relevant to you. Also tick the adaptation options that may help you to avoid or reduce those impacts.

Capacity building, advocacy and networking

Likely impacts of climate change and environmental degradation	Adaptation option
Worsening vulnerabilities ☐ Vulnerable people, with lower capacities, will be in a weaker position than those with stronger capacities to withstand all of the impacts of climate change and environmental degradation described in this table, below. ☐ People most vulnerable to the impacts of climate change and environmental degradation are usually: – women including widows and pregnant women – children including orphans – older people – people with disabilities – people living with HIV and AIDS – people who are ill – people who are poor – people who are disenfranchised – people who are oppressed and/or in abusive relationships.	**Capacity building vulnerable groups** ☐ A wide range of capacity building work with vulnerable people. ☐ Examples of capacity building options: strengthening support groups, making sure vulnerable people are fully aware of and have ownership of evacuation plans, encouraging income diversity, developing home gardens, strengthening physical assets such as housing. Other capacity building options relating to specific impacts are suggested below. **Advocacy and networking** ☐ A wide range of advocacy work with vulnerable people. ☐ Examples of advocacy options: – Sharing information on local experiences of climate change and adaptation with governments. – Securing rights of access to water supplies for small-scale farmers. – Forming coalitions and networks to support and help resource initiatives (best practices, exchanges, gathering and sharing resources). – Setting up a project advisory committee consisting of stakeholders from various civil society organisations, academic institutions, government departments. – Teaching adult learners and children about the causes and implications of global warming and climate change and the things that each individual, family and community can do to avoid or reduce its impact (eg conserve water, practise sustainable integrated agriculture/agroforestry, etc). Other advocacy options relating to specific impacts are suggested below.

	Likely impacts of climate change and environmental degradation	Adaptation option
Water	**Worsening access to fresh water – general** ☐ Cyclones (hurricanes / typhoons) and flooding (as a result of climate change or environmental degradation) can damage pumps, pipes and submerge wells, and affect other water infrastructure, affecting availability and quality of water. ☐ Increased workload and vulnerability, especially for women and children. ☐ Increased illness and mortality, especially for most vulnerable, eg people living with HIV and AIDS.	**Fresh water conservation options – general** ☐ Street drama about community water resource management. ☐ Government water transfer programmes. ☐ Advocacy: securing rights of access to water supplies for small-scale farmers. ☐ Public health / hygiene campaigns on water collection, conservation, non-contamination and coping with drought. ☐ Install hand pumps on raised platforms above anticipated flood levels. ☐ Site pumping stations on higher ground, away from the coast. ☐ Design water and sanitation infrastructure to withstand earthquakes.
Water	**Less fresh water availability** ☐ Increased water demands / water shortages, eg as a result of temperature rises and drought / melting glaciers / sea level rises / disasters such as floods / building dams or diverting rivers upstream / overabstraction of water for industry, for example. ☐ Shortage of water for use in enterprises such as agriculture, laundries and bakeries.	**Conserving fresh water availability** ☐ Integrated Water Resource Management and Water Basin Management. ☐ Conserve and reduce run-off, eg dykes, re-use grey water. ☐ Maximise water capture and storage including rainwater harvesting, eg using roof tops and tanks. ☐ Fixation points (including well points). ☐ Train health workers and others to respond to crises such as drought.
Water	**Less fresh water quality** ☐ Surface or groundwater quality affected by lower water flows, concentrating pollutants, or high water flows (eg flooding or intense rain contaminating groundwater supply). ☐ Salinisation of fresh water systems, soils, wetlands and estuaries due to flooding, tidal surge, erosion and sea level rise: affects drinking water, flora and fauna.	**Conserving fresh water quality** ☐ Protect water sources and communal water points from pollution. Water plans. ☐ Desalination systems. ☐ Monitor groundwater salinity and abstraction. Overabstraction can cause salinisation.

	Likely impacts of climate change and environmental degradation	Adaptation option
Land	**Worsening land productivity – general** ☐ Poverty and increased vulnerabilities due to failure of agricultural livelihoods and food shortages. ☐ Salinisation of soil and irrigation water due to flooding and sea level rise.	**Food security options – general** ☐ Land tenure rights advocacy. ☐ Demonstrate year-round homestead vegetable gardening. ☐ Involve children and young people in community discussions related to disaster risk reduction and in impact avoidance or reduction activities such as planting trees and introducing new agroforestry techniques. ☐ Support the diversification of income-generating measures. ☐ Sustainable Natural Resource Management. ☐ Encourage the use of sustainable agriculture techniques to improve food security during dry periods. ☐ Encourage the development of enterprises that are more tolerant of worsening land productivity, drought etc. ☐ Create seed banks to allow replanting if crops fail, are damaged or destroyed. ☐ Build strength of local organisations to adapt to climate change and environmental degradation; build capacity within community to manage activities and finance. ☐ Mainstream adaptation into local community management plans.
Land	**Land degradation** ☐ Desertification eg due to overgrazing, overintensive farming, extensive logging. ☐ Soil erosion eg caused by overintensive farming and grazing. ☐ Land degradation due to growth or movement of populations. ☐ Deforestation eg due to logging, land clearance – including through burning forest and shrubs. ☐ Land degradation can result in choking water run-off channels and flooding. ☐ Loss of biodiversity eg due to overintensive farming or changes in climate resulting in changes in breeding or migratory routes for flora and fauna.	**Maximise biodiversity, soil fertility and appropriate land use** ☐ Floating gardens. ☐ Crop rotation to maintain soil quality, minimise erosion (reducing the risk of desertification) and plant less water-dependant crops in drier years (rotate legumes and other crops). ☐ Community forest management and reforestation.

	Likely impacts of climate change and environmental degradation	Adaptation option
Land	**Crop damage and failure** ☐ Crops can be damaged by increased rainfall or unpredictable distribution and intensity of rainfall. ☐ Crop damage and failure result in lack of seed for the next planting season. ☐ Reduced crop yields due to disease, pests, soil degradation, lack of water for irrigation, overuse of chemical fertilisers.	**Maximise crop yields** ☐ Ask farmers to report on invasive species and changes in growing patterns. ☐ Advance sowing dates; workshops with farmers. Seasonal climate change projections reviewed, decisions taken. ☐ Crop diversification and crop mixing; mix of crops and trees in agroforestry systems to spread risk and increase biodiversity; animals can also be integrated into these systems allowing effective recycling of manure and providing a valuable source of protein. ☐ Introduce drought-, flood- or salt-resistant crops. ☐ Use 'closed loop' agricultural technique, to maximise crop use and soil quality at all stages.
Land	**Too little irrigation water, or too much water (due to intense rainfall or flooding)** ☐ Lack of water eg due to drought, hotter seasons, dams upstream or rivers being diverted upstream. ☐ Flooding and sea level rise mean land cannot be used or crops fail or are lost. ☐ Increased inability to cultivate land due to waterlogging of soils.	**Maximise irrigation water availability** ☐ Work with communities to develop strategies for water harvesting ☐ Minimise wastage of water used in irrigation by introducing more efficient techniques (eg drip-feed rather than flood). ☐ Maintain grass waterways – to conserve run-off or drain floods. ☐ Use agricultural techniques such as contour bunding [1] and check dams [2] to delay the flow of rainwater and improve infiltration. ☐ Treat wastewater for re-use in agriculture. ☐ Protect and reforest water catchment areas to improve groundwater resources.
Land	**Landslides, mudslides, sea level rise, destruction to coast lines** ☐ Loss of trees and agricultural land due to landslides. ☐ Coastal land used for agricultural purposes is lost to the sea as sea levels rise, impacting livelihoods and food security.	**Prevent & protect from landslides, mudslides, coastal erosion, sea level rise** ☐ Protect and / or re-establish mangroves in coastal areas to provide a natural barrier between the sea and land. ☐ Protect and / or plant trees and other vegetation along river / lake / lagoon banks to protect them from erosion.

1 Contour bunding involves constructing low mounds, embankments or 'bunds' of earth or stones along the contour of a field to catch the rain when it falls so that it has time to soak into the ground rather than run off and be lost. The bunds may be planted with vegetation to help fix them, as well as to help delay the rainwater. The bunds can also help prevent valuable soil being washed away.

2 Check dams are small, stone or concrete dams usually constructed across watercourses to delay the flow of rainwater so it has time to soak into the earth and replenish the groundwater table while keeping adjacent land moist.

	Likely impacts of climate change and environmental degradation	Adaptation option
Livestock	**Worsening availability and quality of livestock** ☐ Reduced livestock production and loss of livestock because of disease, pests and lack of water and feed. ☐ Land degradation means reduced land for grazing. ☐ Loss of livestock may add to people's vulnerabilities by taking away or damaging livelihoods.	**Protecting and improving livestock** ☐ Community strategies of grain distribution, livestock replenishment and diversification. ☐ Pasture land development. ☐ Community-based animal health; training selected people as vets who can provide their services in rural villages and sell drugs to earn a livelihood. See above for how to improve the land for grazing.
Fishstock	**Worsening availability and quality of fish stocks** ☐ Fish breeding grounds such as coral reefs and mangrove swamps are damaged by rising sea temperatures and levels. ☐ Reduction and degradation of fish habitats (eg mangroves and coral reefs) and salinisation of fresh water affects fish stocks. ☐ Loss of navigability of rivers and canals affects fishing and also marketing of produce in some areas. ☐ Pollution of water can kill fish. ☐ Food deficiencies among communities reliant on coastal fishing leading to increased poverty, illness, mortality.	**Protecting and improving fish stock** ☐ Encourage communities to conserve coastal mangroves and other vegetation to reduce rate of erosion and protect fish breeding grounds. ☐ Look at options for sustainable aquaculture such as fish farming in ponds using crop by-products for feed and integrated livestock-fish farming to improve the supply of protein-rich food in the area.

Health

Likely impacts of climate change and environmental degradation	Adaptation option
Worsening levels of health, nutrition and well-being – general ☐ Less availability and quality of water and food supply lead to malnutrition, sickness, famine and increased mortality. ☐ Children in particular become malnourished which makes them more susceptible to illness. ☐ Polluted waters and lack of access to safe water for drinking and washing results in the rapid spread of waterborne diseases such as dysentery and cholera. ☐ Lack of water for sanitation adds to the discomfort of people living with AIDS, for example. ☐ Increased acid rain caused by pollution affecting health. ☐ Increased smog caused by pollution affecting health.	**Protecting and improving health, nutrition and well-being – general** ☐ Ensure that communities understand the new or increased health risks and how to reduce them, eg by sleeping under mosquito nets, planting more trees for shade, and cooking food thoroughly. ☐ Awareness raising among health professionals about the impacts of climate change, pollution and other changes in the environment on increased spread of disease. ☐ Support participatory preventative measures, eg washing hands, reducing open water containers that breed mosquitoes. ☐ Support improved services in the health areas affected. ☐ Encourage churches and community groups to care for and serve the poor and marginalised in their societies, including families affected by HIV and AIDS. ☐ Feeding programmes to boost infant nutrition may be required. ☐ Work with communities to draw up 'risk' maps of areas most prone to disasters, as well as more slow-onset risks such as land degradation. From these maps develop a strategy for reducing or avoiding the risks, or adapting to them.

Health

Likely impacts of climate change and environmental degradation	Adaptation option
Increased health risks from climate change impacts ☐ Higher temperatures or droughts can result in: – higher prevalence of flies and other insects that can spread disease; – exposure to higher levels of UV light leading to increased deaths from skin cancer and an increase in cataracts; – increased risk of food-borne infections such as salmonellosis; – increased risk of infections, skin diseases and respiratory infections, eg as a result of changes in intensity of rainfall; – malnutrition and famine; – increased heat-related mortality. ☐ Floods can result in: – standing water that becomes a breeding ground for mosquitoes and other insects which spread vector-borne diseases such as malaria and dengue fever; – a shortage of food due to the loss of crops, livestock and food stocks and the disruption of transport systems; – damage to sewage systems resulting in widespread contamination of floodwater and water sources, posing a severe threat to human health; – flood or storm damage to toxic waste sites may result in severe illness due to chemical pollution; – rodents to migrate, potentially spreading disease.	**Reducing health risks from climate change related disasters** ☐ Use basic education and literacy programmes to teach people how to respond to disasters such as cyclones and floods including evacuation procedures and health protection measures. Ensure this includes teaching vulnerable people such as children or people living with HIV and AIDS. ☐ Train health workers and others in how to respond to illnesses and injuries caused by climate or environment-related disaster. ☐ Help the community to prepare by: building storm shelters; creating stores of non-perishable food and emergency equipment in a safe place; building raised embankments to act as escape routes during a flood; setting up early warning systems including community radio; developing emergency evacuation plans and health protection measures. ☐ Ensure that strategies to help the most vulnerable in the community (children, people who are elderly or infirm) are built into any evacuation plan: – The needs of children include feeding, registering and caring for separated children, creating safe spaces for them and quickly stabilising schools. – The needs of HIV and AIDS patients include the provision of stretchers and other medical equipment and safe places to rest. ☐ In cyclone and flood-prone areas, health workers should have access to boats and emergency medical equipment so they can form part of the relief effort and reach those in greatest need. ☐ Consider training groups of volunteers in disaster preparedness (including first aid). In the event of a climate- or environment-induced (or any) disaster, these people are responsible for early warning and evacuation, management of boats, resource mobilisation and care of the most vulnerable people.

Health

Likely impacts of climate change and environmental degradation	Adaptation option
Increased health risks from climate change impacts (continued) ☐ Severe weather events or climate change related disasters including floods can result in: – damage to health services and disruption to normal health service activities; – children becoming easily disoriented and separated from their families; – the disruption of social networks, loss of family members and friends and loss of property and jobs which can have a severe psychological effect on people, sometimes leading to depression and suicide; – increased risk of death and injuries; – increased displacement-related health effects.	**Reducing health risks from climate change related disasters (continued** ☐ Local authorities should be trained to coordinate relief activities including making the best use of local resources and properly managing national and international relief assistance. This should include: initiatives to ensure water quality, food safety, sanitation and hygiene; precautions during clean-up activities; immunisation when appropriate; protective measures against potential vector-borne diseases and chemical hazards; measures to ensure mental health and well-being, such as stress reduction and counselling for both the victims and those who respond to the emergency. ☐ Both during and after floods, it is very important to carry out monitoring and surveillance of flood-related diseases, to map potential risks and to estimate the vulnerability of communities in order to ensure an appropriate response. ☐ Help the community to prepare for earthquakes by: checking for hazards in the home such as heavy objects on high shelves and faulty electrical wiring; ensuring that everyone knows what to do in the event of an earthquake (eg crouch down under sturdy furniture, stay away from windows and, in the open, stay away from buildings and overhead power lines); teaching people what to do if they are trapped under debris (eg avoid kicking up dust, cover the mouth with material, tap or whistle to attract the attention of rescuers); creating stores of non-perishable food and emergency equipment in a safe place.

Infrastructure and buildings

Likely impacts of climate change and environmental degradation	Adaptation option
Infrastructure and buildings including homes ☐ Pressure on urban and rural infrastructure such as roads, bridges, water systems such as pumps and pipes, and electricity systems, eg due to increased rainfall, wildfires, cyclones and floods. ☐ Disruption of settlements, commerce, transport and societies. ☐ Transport disruptions leading to problems in obtaining inputs from outside the region and the exportation of products. ☐ Damage to schools and materials. ☐ Loss of homes due to eg flooding, increased rainfall, cyclones and storm surges. ☐ Heavy rainfall and flooding can result in destructive mudslides, particularly where trees and other vegetation have been removed, exposing the topsoil to the elements.	**Protecting and improving infrastructure and buildings including homes** ☐ Site buildings and workshops well above past flood levels and not on or near steep slopes that might destabilise during heavy rains. ☐ Wherever possible, design buildings to withstand strong winds. ☐ Where possible, earthquake-resistant designs for buildings and infrastructure such as bridges should be used. ☐ 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. ☐ Work with coastal communities to develop strategies and action plans to help them adapt to rising sea levels. These may include relocation of the most vulnerable homes, protection / establishment of mangroves and other vegetation to protect coastlines and the building of bunds or other defences. ☐ Change architecture of buildings, eg building houses on stilts to avoid flood damage. ☐ Establish new building codes. ☐ Construct dykes and dams, sea walls. ☐ Relocate threatened buildings. ☐ Demarcate certain zones as off-limits. ☐ Build storm shelters.

Other

Likely impacts of climate change and environmental degradation	Adaptation option
Other likely impacts of climate change and environmental degradation include ☐ Increased risk of wildfires. ☐ Increased displacement. ☐ Worsening education levels, for example, children are too sick to attend school, or are needed more at home, eg to collect water, carry out agricultural work or care for sick family members. ☐ Increased violence and social unrest, eg due to conflicts over water and other natural resources. ☐ Declining tourism that may take a long time to recover as the natural beauty, biodiversity and stability of the area are affected.	**General adaptation options** ☐ By addressing the likely impacts of climate change and environmental degradation (eg through conserving fresh water, maximising crop yields etc) we can prevent many of the other impacts of climate change. ☐ Undertake disaster risk reduction work; work with the community to be prepared. ☐ Put plans into place that protect the most vulnerable people. ☐ Include the most vulnerable people in planning and in education programmes by choosing locations and timings of events to coincide with times when those people are more likely to be available. ☐ Conflict sensitivity and / or peace building work. ☐ Building good governance.

Appendix A Glossary

Please note, the following definitions are made in the context of climate change and environmental degradation vulnerability risk assessments and adaptation.

Acid rain	Rain that is acidic due to pollution
Adaptation	Taking action to adjust to climate change and environmental degradation
Aquifer	Underground water source
Arid	When an area has a severe lack of water, causing the land to be unproductive
Avalanche	A mass of snow suddenly falling down a mountainside
Awareness raising	Raising knowledge in the general population about risks and how people can act to reduce their vulnerability to risks
Biodiversity	The variety of plant and animal life in an area
Capacity	A combination of strengths, attributes and resources available to anticipate, resist or recover from hazards
Climate	The average weather in an area, including temperature, air pressure, humidity, precipitation, sunshine, cloudiness and winds
Climate change (CC)	Any long-term significant change in the climate over time, caused by nature or human activities
Climate change adaptation (CCA)	Taking action to adjust to climate change
Climate forecast / Climate predictions / Climate projections	How scientists project the climate will change in the future
Climate variability	Short-term changes in the climate, often varying from season to season
Coastal erosion	Waves, tides and currents reducing the shoreline
Coastal protection	Reduction of coastal erosion. For example mangroves and coral reefs offer natural protection to the coast from erosion and flooding
Community vulnerability and capacity assessments	A range of tools that exist to help communities understand the hazards that affect them and take appropriate measures to minimise their potential impact
Cyclone	see Tropical cyclone
Deforestation	The conversion of forest land to non-forest land by humans or natural processes, eg human causes could include logging to sell wood and land clearance including through burning forest and shrubs
Desertification	The persistent degradation of land in dry areas resulting from climatic and human activities. Possible human causes are overgrazing, over intensive farming and extensive logging

Disaster	When a hazard impacts on a vulnerable community, causing widespread damage to life, property and livelihoods which the community cannot cope with using its own resources
Disaster risk reduction (DRR)	Measures taken to curb losses from a disaster, ie reducing exposure to hazards, reducing vulnerability of the community and increasing their capacity
Drought	An extended period of time when a region does not have enough water
Ecology	The whole web of interactions between animals, plants and the environment
Environment	Physical and natural surroundings, also meaning human or social environment
Environmental degradation (ED)	The reduction of the capacity of the natural environment to meet social and ecological requirements and needs
Environmental degradation adaptation (EDA)	Taking action to adjust to environmental degradation
Evaluation	An assessment carried out at, or after, the end of a project or programme to show its impact
Fauna	Animal life
Flooding	An expanse of water overflows and submerges land
Flora	Plant life
Global warming	The rise in average temperature of the atmosphere due to the greenhouse gas effect (see Greenhouse gas)
Governance	The process of governing a country, local area, organisation, system or process
Greenhouse gas (GHG)	A gas that causes the earth to grow warmer when pollution adds the gas to the earth's atmosphere and helps cause the sun's rays to be trapped in our planet. This greenhouse effect contributes to climate change. Greenhouse gases include CO2, methane, nitrous oxide, ozone and water vapour
Groundwater	Water located or sourced from beneath the ground
Gullying	The process of rainwater run-off forming large ditches or small valleys (gullies) that carry eroded soil away, reducing the productivity of the land
Hazard	A natural or man-made event or situation which could lead to danger, loss or injury
Hurricane	see Tropical Cyclone
Land degradation	The process of land becoming less productive. Possible human causes include deforestation including through using fires, overabstraction of minerals, overintensive farming and grazing causing soil erosion, overuse of chemical fertilisers and growth or movement of populations
Landslides	The sliding of a mass of land down a slope
Maladaptation	Project designs that unwittingly create or worsen a problem related to climate change and environmental degradation
Mainstream	To consider an issue in all activities and let it influence the way things are done

Mitigation	Climate change adaptation definition: Measures taken to prevent or reduce a hazard, eg reducing greenhouse gas emissions to reduce climate change
Mitigation	Disaster Risk Reduction (DRR) definition: Measures taken to reduce the potential impact of a hazard
Monsoon	Substantial increase in rainfall lasting weeks in tropical and subtropical regions
Networking	Obtaining or communicating information through social or professional contacts and links
Overabstraction	Taking too much of a resource such as water or a fossil fuel, such that it cannot be renewed through natural processes
Overgrazing	Livestock grazing goes on for too long or without sufficient recovery periods, making land less useful and contributing to desertification and erosion
Overintensive farming	Farming that makes land less productive through: farming for too long or without sufficient recovery periods; over-use of chemical fertilisers and pesticides; or removal of too many natural protective barriers in order to farm extensively
Participation	The involvement of people in the decisions and processes that affect them
Participatory tools	Activities which enable people to express and analyse the realities of their daily lives
Pollution	Making dirty, or contaminating, an environment or natural resource, eg from industry, sewage, solid waste, farming or chemicals
Precipitation	Rain, snow or hail
Pressures / stresses	Actions and processes that cause vulnerability
Prevention	Measures taken to prevent or reduce a hazard, eg reducing greenhouse gas emissions to reduce climate change. In the climate change adaptation field, this is also called mitigation.
Project cycle management	The process of planning and managing projects, programmes and organisations. This process can be drawn as a cycle, and each phase of the project (identification, design, implementation and evaluation) leads to the next
Resilience	Capacity to face hazards and continue to function
Retrofitting	Adding new forms of technology to older systems, eg strengthening an existing building to make it resistant to flooding
Rilling	Formation of rills (narrow, shallow incisions in the soil) caused by soil erosion from water run-off
Risk	The chance of something bad happening Risk = Hazard x Vulnerability ÷ Capacity
Run-off	See Surface run-off
Salinisation	Increasing concentration of salt (in soil or water)
Salt water intrusion	Increase of salinity (salt concentration) in soil or groundwater located close to the coast. This can be caused by excessive withdrawal of water from the freshwater source (aquifer) or by sea level rise or coastal erosion
Scientific	Information collected by expert scientists following rules laid down in exact science

Scientific modeling	Scientists creating artificial models of the earth and the earth's atmosphere and calculating what is likely to happen when they increase greenhouse gases in line with various projections
Sea level rise	An increase in the average level of the sea or ocean
Sedimentation	Settlement of suspended solids (small particles, eg soil) from water
Semi-arid	(also called Steppe) When a region experiences low annual rainfall resulting in reduction in natural vegetation (ie it could get water reserves from snowmelt or aquifers and therefore not be arid)
Smog	Any form of air pollutants reacting with fog
Soil degradation	Human actions causing soil to become less productive
Soil erosion	Displacement of soil, usually through the movement of water
Stakeholder	A person or group with an interest in, or concern for, a project or activity that an organisation carries out
Steppe	see Semi-arid
Storm surge / tidal surge	An offshore rise of water, usually associated with a tropical cyclone
Stresses	See Pressures
Subsidence	The settlement of an area of land, or of a natural or man-made structure on the land, downwards
Subtropics	Regions of the Earth found north and south of the Tropics. Subtropical weather conditions are usually hot in summer and warm in winter – rarely seeing snow or ice
Surface run-off	The flow of water from rain, snowmelt or other sources over the surface of land
Sustainability	When the benefits of a project continue without external intervention
Tidal surge	See storm surge
Tropical cyclone	A violent, rotating storm with heavy wind and rain. Also called a hurricane or typhoon
Tropics	A region of the earth centered on the equator. Conditions usually referred to as tropical are wet and hot, with lush vegetation
Tundra	Mountain area, above the tree line
Typhoon	See Tropical cyclone
Vector-borne disease	A disease transmitted by an insect or other organism (the vector), eg malaria and dengue carried by mosquitoes
Vulnerability	The ability to be harmed
Water run-off	See Surface run-off
Water table	The level of the surface of the groundwater relative to ground level

Appendix B Useful resources

- Blackman R (2003) *ROOTS 5: Project Cycle Management*, Tearfund UK. Order from roots@tearfund.org or download from www.tearfund.org/tilz
- Burton I, Diringer E, Smith J (2006) *Adaptation to Climate Change: International Policy Options*, Pew Centre on Global Climate Change www.unece.org/env/water/meetings/Water.and.Climate/first.meet/PEW_Adaptation.pdf
- Clarke S, Blackman R and Carter I (2004) *Facilitation skills workbook*, Tearfund UK. Order from roots@tearfund.org or download from www.tearfund.org/tilz
- Ehrhart C, Thow A, de Blois M, Warhurst A (2008) *Humanitarian Implications of Climate Change: Mapping emerging trends and risk hotspots*, Cooperative for Assistance and Relief Everywhere (CARE). Download from https://www.care.dk/21185/recompiled
- GEF and UNDP website Adaptation Learning Mechanism www.adaptationlearning.net
- IDS *ORCHID tool: Assessing and Addressing Adaptation – Opportunities and Risks from Climate Change and Disasters* www.ids.ac.uk/UserFiles/File/poverty_team/climate_change/orchidfinal.pdf
- IFRC (2007) *Red Cross / Red Crescent Climate Guide* International Federation of Red Cross and Red Crescent Societies www.climatecentre.org
- IISD *CRiSTAL tool (Community-based Risk Screening Tool – Adaptation & Livelihoods)* www.iisd.org/security/es/resilience/climate_phase2.asp
- IISD Task Force on Climate Change, Vulnerable Communities and Adaptation (2003) *Livelihoods and Climate Change: Combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty* www.iisd.org/pdf/2003/natres_livelihoods_cc.pdf
- Kelly C, Khinmaung J (2007) *Prepare to Live: Strengthening the resilience of communities to manage food insecurity in the Sahel region*, Tearfund UK. Download from www.tearfund.org/tilz
- La Trobe S, Faleiro (2007) *Why Advocate for Disaster Risk Reduction?* Tearfund UK. Download from www.tearfund.org/tilz
- Practical Action website – click on the left-hand menus, on 'Technical enquiries' then 'Adaptation to Climate Change' for some examples of adaptation options on the website http://practicalaction.org/
- Provention Consortium *Community Risk Assessment Methodologies and Case Studies* www.proventionconsortium.org/?pageid=43
- UNFCCC (2007) *Climate Change: Impacts, Vulnerabilities and Adaptation to Climate Change in Developing Countries* http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/txt/pub_07_impacts.pdf
- UNISDR (2009) *UN International Strategy for Disaster Reduction Terminology on Disaster Risk Reduction* www.unisdr.org/eng/library/UNISDR-terminology-2009-eng.pdf

- USAID (2007) *Adapting to Climate Variability and Change: A Guidance Manual for Development Planning* www.usaid.gov/our_work/environment/climate/docs/reports/cc_vamanual.pdf
- Venton P, Hansford B (2006) *ROOTS 9: Reducing risk of disaster in our communities*, Tearfund UK. Order from roots@tearfund.org or download from www.tearfund.org/tilz
- Venton P, La Trobe S (2008) *Linking climate change adaptation and disaster risk reduction*, Tearfund UK. Download from www.tearfund.org/tilz
- Wiggins S, Wiggins M and Collins J (2008) *ROOTS 13: Environmental Sustainability*, Tearfund UK. Order from roots@tearfund.org or download from www.tearfund.org/tilz
- World Bank (2008) *Climate Resilient Cities – A Primer on Reducing Vulnerabilities to Disasters* (a self-assessment tool for cities) www.worldbank.org/eap/climatecities
- World Bank (2008) *Climate Change Portal* http://sdwebx.worldbank.org/climateportal/

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