CRiSTAL

Community-based Risk Screening – Adaptation and Livelihoods

USER'S MANUAL

A decision support tool for assessing and enhancing project impacts on local adaptive capacity to climate variability and climate change

Version 3.0

November 2007

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SUMMARY

The impacts of climate variability and climate change must be addressed in community-level projects. One way of addressing these impacts is by strengthening local adaptive capacity, so that communities are able to adjust, moderate or take advantage of climate-induced changes in their settings. Already, community-level projects may be improving adaptive capacity or constraining it. But without a tool to assess the impact of a project on adaptive capacity, it is difficult for project planners and managers to introduce activities that foster adaptation and minimize maladaptation.

CRiSTAL is a decision support tool developed jointly by IISD, IUCN, SEI-US and Intercooperation. Drawing on the Environmental Impact Assessment (EIA) model and the Sustainable Livelihoods Framework (SLF), CRiSTAL aims to provide a logical, user-friendly process to help users better understand the links between climate-related risks, people's livelihoods, and project activities. Specifically, CRiSTAL is intended to help project planners and managers to:

- Systematically understand the links between local livelihoods and climate;
- Assess a project's impact on livelihood resources important to adaptation; and
- Devise adjustments that improve a project's impact on livelihood resources important to adaptation

CRiSTAL is divided into two modules, each containing two framing questions (Figure 1-1):

Module 1

Synthesizing information on climate & livelihoods

Question 1: What is the climate context for the project area?

- What are the anticipated impacts of climate change?
- What are the current climate-related hazards affecting the project area?
- What are the impacts of these hazards?
- What coping strategies are used to deal with these impacts?

Question 2: What is the livelihood context?

- Which resources are important to local livelihoods?
- How are these resources affected by climate-related hazards?
- How important are these resources to coping strategies?

Module 2

Planning and managing projects for adaptation

Question 3: What are the impacts of project activities on...

- Livelihood resources that are vulnerable to climate risks?
- Livelihood resources that are important to coping?

{Are the impacts positive, negative or neutral?}

Question 4: How can project activities be adjusted to reduce vulnerability and enhance adaptive capacity?

- Maximize positive impacts
- Minimize negative impacts
- Identify synergies and barriers to implementing project adjustments

This User's Manual is divided into six sections. The Manual is continually updated as experiences and feedback with using CRiSTAL increase. This version was updated in November 2007.

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1 Introduction

1.1 Livelihoods and Climate Change

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) concluded that the globally averaged surface temperatures increased 0.74 ± .2°C between 1906 and 2005. This trend is expected to persist, with a 1.8 to 4˚C warming predicted for the current century.[1] Warming will vary by region and be accompanied by significant changes in local precipitation, sea level rise and changes in the frequency and intensity of some extreme events. Yet these impacts will not be distributed or felt uniformly, as those "with the least resources have the least capacity to adapt and are the most vulnerable."[2]

Climate change will thus impact natural and human systems to alter the productivity, diversity and functions of many ecosystems and livelihoods around the world. For poor natural resource-dependent communities, climate change may compound existing vulnerabilities. Settlement on marginal or unstable lands already heightens exposure to climate hazards. Heavy dependence on ecosystem services places their welfare at the mercy of environmental conditions. As the availability and quality of natural resources decline, so does the security of their livelihoods. Limited resources and capacities for responding to stresses such as floods and droughts constrain their ability to meet basic needs and move out of poverty.

With climate change impacts already being observed, there is an urgent need for adaptive response measures. For the poor, this must start with actions that reduce current vulnerabilities and increase adaptive capacity so they can face the longer-term impacts of climate change. Reducing current vulnerabilities and increasing adaptive capacities, however, requires an understanding of how livelihoods are conducted and sustained, as the assets and capabilities that comprise peoples' livelihoods often shape vulnerability and the ability to reduce it. By understanding the dynamics of poor peoples' livelihoods, one can begin to understand how they will be affected by climate change impacts, how they might respond with the resources they have, what additional resources may be required and how these conditions can be reflected and built upon for successful adaptation strategies.

1.2 Assessing and enhancing the adaptive capacity of livelihoods with CRiSTAL

Climate variability is one of the many stresses faced by local communities. While it is not always the most important stressor or risk affecting a community, it should nevertheless be considered when designing and implementing a local-level project, particularly in communities characterized by climate-sensitive and/or natural resource-dependent livelihoods. The onset of longer-term climate change, which will compound existing stresses associated with climate variability, provides an added incentive for addressing climate risk in a project.

Most projects, however, are not designed with an explicit consideration of the climate risks in a particular community and how they can affect local livelihoods. Even rarer are projects that take into account the longer-term implications of climate change and how project activities might (a) be affected by the impacts, and/or (b) influence local adaptive capacity. This second point – understanding a project's influence on local adaptive capacity – is the primary focus of CRiSTAL.

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[1] IPCC. 2007. Climate Change 2007: The Physical Science Basis. Summary for Policymakers

[2] IPCC. 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability. Technical Summary. Geneva: IPCC.

As stated, community-level projects influence climate vulnerability and adaptive capacity. For example, projects that encourage dependence on a particular technology or crop species that may be negatively affected by climate change increase local vulnerability. Conversely, projects that promote resilient crop species, diversified livelihood activities, and risk reduction activities (such as seed banks, storage facilities, early warning systems) increase local adaptive capacity. Without a tool to assess the impacts of a project on some of the local determinants of vulnerability and adaptive capacity, it is difficult for project planners and managers to design activities that foster adaptation to climate change.

In response to this identified need, IISD, IUCN, SEI-US and Intercooperation have developed CRiSTAL (**C**ommunity-based **Ri**sk **S**creening **T**ool - **A**daptation & **L**ivelihoods), a decision support tool for local communities, project planners, and project managers.

Figure 1-1: Summary of CRiSTAL

CRiSTAL
Community-based **Ri**sk **S**creening **T**ool - **A**daptation & **L**ivelihoods

Rationale: Community-level projects may improve local adaptive capacity or constrain it, but this link may not be evident to project planners and managers. Need a tool that assesses the impact of a project vis-à-vis climate adaptation to design activities that foster adaptation.

Goal: To promote the integration of risk reduction and climate change adaptation into community-level projects.

Objectives: Help users to…
(a) understand the links between local livelihoods and climate
(b) evaluate a project's impact on community-level adaptive capacity; and
(c) devise project adjustments to reduce vulnerability and enhance adaptive capacity.

Users: Community groups, project planners and project managers

Approach:
(i) Draw from Environmental Impact Assessment (EIA) model;
(ii) Use the Sustainable Livelihoods Framework (SLF) to help users focus on elements of coping and adaptive capacity at the local level;
(iii) Support the strengthening of coping and resilience to current climate risks and stresses as a basis for adaptation to longer-term climate change;
(iv) Promote the use of stakeholder consultations using participatory methods to elicit information on local livelihood and climate contexts; and
(v) Offer the tool as a component of a larger compendium of tools and methodologies for climate change adaptation.

Format:
- Computer: Excel-based program, available online and on CD-ROM
- Hardcopy: CRiSTAL Workbook (to come)
- Language: English, French (to come), Spanish (to come)

1.3 How is CRiSTAL organised?

CRiSTAL is designed to provide a basis for improving community- and project-based decision-making so that adaptation opportunities can be maximized, and maladaptation minimized. It is expected to be relevant in project design as well as project evaluation.

The tool is organised into two modules, each containing a set of framing questions. The first module called, *Synthesising information on climate and livelihoods,* is designed to help users collect and organise information on the climate and livelihood context of the project area, preferably through stakeholder consultations and other participatory methods. The information gathered and organised in Module 1 provides a basis for the analysis undertaken in Module 2.

Figure 1-2: Summary of Module 1

Module 1: Synthesizing Information on Climate and Livelihoods	
Goal	To help collect and organise information on the climate and livelihood context in the project area
Framing Questions	1. What is the climate context of the project? ▪ What are the anticipated impacts of climate change in the project area? ▪ What are the hazards currently affecting local communities? ▪ What are the impacts of these hazards? ▪ What coping strategies are used to deal with the impacts? 2. What is the livelihood context of the project? ▪ What resources are important to livelihoods in the project area? ▪ How are the resources affected by current climate hazards? ▪ How important are these resources to coping strategies?
User(s)	Community groups, project planners, project managers
Methodology	Project planners and managers gather information through stakeholder consultations, participatory workshops, site visits, document review, Internet research, and interviews.
Time Needed	Stakeholder consultations / participatory workshops: 1 – 2 days Document review, Internet research, interviews: As needed

The second module, called *Planning and Managing Projects for Climate Adaptation*, is to be completed by project planners and managers with input from relevant stakeholders. It uses the information from Module 1 to help project planners and managers understand how project activities affect livelihood resources that are either vulnerable to climate risk or important to coping strategies. In doing so, users can try to (re)design project activities so they maximize opportunities for enhancing adaptive capacity.

Module 1 must be completed in order to use Module 2.

Figure 1-3: Summary of Module 2

Module 2: Planning and Managing Projects for Climate Change Adaptation	
Goal	To help analyse the links between planned or ongoing projects and the climate-livelihood context
Framing Questions	3. What are the impacts of project activities on livelihood resources that are… ▪ Vulnerable to climate risks? ▪ Important to coping strategies? 4. How can project activities be adjusted to reduce vulnerability and enhance adaptive capacity in the project community? ▪ Maximize positive project impacts on adaptive capacity ▪ Minimize negative project impacts on adaptive capacity ▪ Identify synergies and barriers to implementing project adjustments
User(s)	Project planners, project managers
Methodology	Project planners and managers carry out analysis individually or through small project staff meetings Users may also rely on additional stakeholder inputs to assist with the analysis, such as community leaders, researchers, partner organizations. At a minimum, users are encouraged to share proposed project adjustments with stakeholders for feedback.
Time Needed	Individual analysis / project meetings: 0.5 – 1 day With stakeholder inputs: As needed

1.4 Using stakeholder consultations when applying CRiSTAL

While project planners and managers may have experience with working in a community or possess different types of detailed information on a project area, this knowledge does not necessarily include detailed information on the local climate and livelihood context. As a result, it is highly recommended that the process of applying CRiSTAL involve local stakeholder consultations.

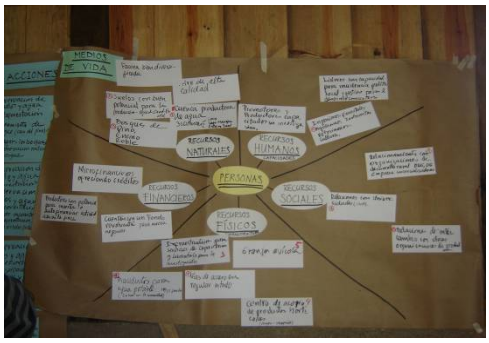
The approach and specific methods selected for engaging local stakeholders in applying CRiSTAL is flexible and generally left to the discretion of the user. Previous experiences with using CRiSTAL have involved different types of stakeholders, as well as approaches / methods for engaging them.

1.4.1 Community consultations

In order to ensure projects are planned, adjusted, and managed according to local priorities, needs and conditions, CRiSTAL users should engage community members through site visits, informal meetings and/or organised workshops. The structure, purpose and duration of these consultations can vary

according to the user's need. Communities can be engaged throughout the entire CRiSTAL analysis (i.e. involved in answering all questions under both Modules) or called upon for certain aspects of the analysis. Some options are described below.

a) ***Gathering information on the local climate and livelihood context*** through impromptu meetings with community members during a site visit, an informal discussion with a selected group of community members, or a formal participatory workshop setting. This approach involves asking community stakeholders the following questions laid out in Module 1 of CRiSTAL:



- What is the climate context of the project?
  - What are the anticipated impacts of climate change in the area?
  - What are the hazards currently affecting your community and livelihood?
  - What are the impacts of these hazards on your lives or livelihoods?
  - What coping strategies do you use to deal with these impacts?
- What is the livelihood context of the project?
  - What resources are important to your livelihood?

The use of visual aids can strengthen consultations, particularly when there are language barriers involved. Finding locally-relevant images of climate conditions or livelihood resources can help to expedite the consultation process. The use of coloured cards, pinboards, flipcharts, etc. is also recommended to maximize participation and interaction.

The photos to the right were taken during an informal community consultation with a rural community in Rajshahi, Bangladesh (top) and a CRiSTAL community workshop in Rio San Juan department, Nicaragua (bottom).

b) ***Discussing the links between the climate and livelihood contexts***: If time allows, consultations can move on to the last two questions of Module 1, which attempt to establish and evaluate the links between the local climate and livelihood contexts:

- How are livelihood resources affected by current climate hazards?
- How important are these resources to coping strategies?

Discussions on climate hazards, impacts, coping strategies and the main livelihood resources in a given community can be lengthy. Early experiences with CRiSTAL showed these discussions as requiring 2-3 hours. As a result, asking stakeholders to stay and evaluate the links between local climate and livelihood contexts can seem overly exhaustive and like an inappropriate demand on peoples' time. It is therefore up to the user to gauge the level of interest and energy among stakeholders and decide if it necessary and appropriate to solicit their participation in subsequent CRiSTAL steps.

Again, the use of visual aids is encouraged when consulting with community groups. This is especially important for demonstrating relationships between different elements of analysis, such as climate hazards, coping strategies and livelihood resources.

As depicted in the photos to the left, the CRiSTAL template was recreated using coloured cards and paper. These helped community members to keep track of their answers and see the links between the different issues being discussed.

c) ***Assessing project activities against key livelihood resources:*** Upon gathering information on the local climate and livelihood context, the next step is to analyse this information against project activities. The questions guiding this step are the first half of Module 2:

- What are the impacts of project activities on livelihood resources that are…
  - Vulnerable to climate risks?
  - Important to coping strategies?

This step in the analysis depends more on the informed judgement of the user – i.e. project planner or manager – since they are most familiar with the project's stated goals, objectives, approach, and specific activites. However, users may decide to include community stakeholders in completing this part of the CRiSTAL analysis in order to raise their awareness about the project (and its link to climate and livelihoods) and/or solicit their inputs in assessing project activities.

d) ***Devising adjustments to projects:*** Finally, after assessing the impact of project activities on key livelihood resources, the CRiSTAL user is prompted to devise concrete adjustments in order to minimize vulnerability and enhance adaptive capacity. Upon devising these adjustments, the user is then encouraged to consider them within a broader set of social, economic, political and environmental conditions. Specifically, the user should think about whether the proposed project adjustments are feasible in terms of:

- Local priorities/needs – i.e are the proposed project adjustements appropriate to local circumstances, will people accept and take ownership of them?
- Project finances – i.e. can you afford to implement the proposed adjustments?
- Institutional capacity – i.e. does your organisation and your partners have the capacity to implement, manage and monitor the proposed adjustments?
- Supportive policy framework – i.e. what are the national/local policies that will support or hinder the implementation of the proposed project adjustments?
- Risks associated with future climate change – i.e. how will future climate change impacts affect the sustainability of the proposed project adjustments?

To ensure local-ownership and sustainability of projects – and their CRiSTAL-generated adjustments – it would be useful to discuss these issues with beneficiary groups/communities. Users can be either devise adjustments with beneficiary communities, or get feedback on proposed adjustments.

This can be done through informal consultations or formal workshops, and involve participatory activities such as ranking or valuation exercises, brainstorming, etc.

e) ***Consulting with different social groups within a community:*** As we know, communities are not homogenous. They are complex and dynamic. In undertaking local stakeholder consultations, CRiSTAL users may want to undertake seperate consultations with different social groups in a community. These social groups can be categorized according to gender, age, livelihood, and other criteria.

Conducting a number of different consultations allows the CRiSTAL user to appreciate the broad range or perspectives, priorities and needs within a project community. For example, during CRiSTAL testing, women's groups tended to emphasize household health and food security. For different livelihood groups, such as farmers, herders, fishers, and small business operators, the answers to questions on climate and livelihood contexts were very different.

The photos to the left were taken during consultations with different social groups. The photo on the top is from a workshop in Sri Lanka (July 2006), where invited participants were members of the local IUCN Biodiversity Task Force. The photo on the bottom was from an informal discussion in Zambia (March 2007), where participants were from the local women's group.

Obviously, the more consultations a user undertakes within a community, the more time it will take to use CRiSTAL. Again, it is up to the user to decide how much information they need to complete the CRiSTAL analysis, and whether it is feasible and/or appropriate to organize multiple consultations within a community.

1.4.2 Background research with experts and partners

In order to supplement the community consultations, users are also encouraged to organise meetings with researchers, academics, NGOs and government representatives on:

- regional and local climate conditions/forecasts
- local livelihood conditions in the project area
- other relevant environmental and socio-economic trends affecting the project area and communities

This can be either formal or informal, but the main objective is to raise awarnenss of CRiSTAL among relevant experts and partners (perhaps offering to share results with them) and gather additional information to complete the CRiSTAL analysis.

1.5 Getting Started

CRiSTAL is programmed in Microsoft Excel and should be compatible with all versions of Microsoft Office. Once CRiSTAL has been successfully opened on your computer, the screen shown in Figure 1-4 will appear. This is the 'Background' page of CRiSTAL. This initial page has introductory information regarding livelihoods and climate change, providing a bit of context to the CRiSTAL analysis.

Figure 1-4: CRiSTAL Background

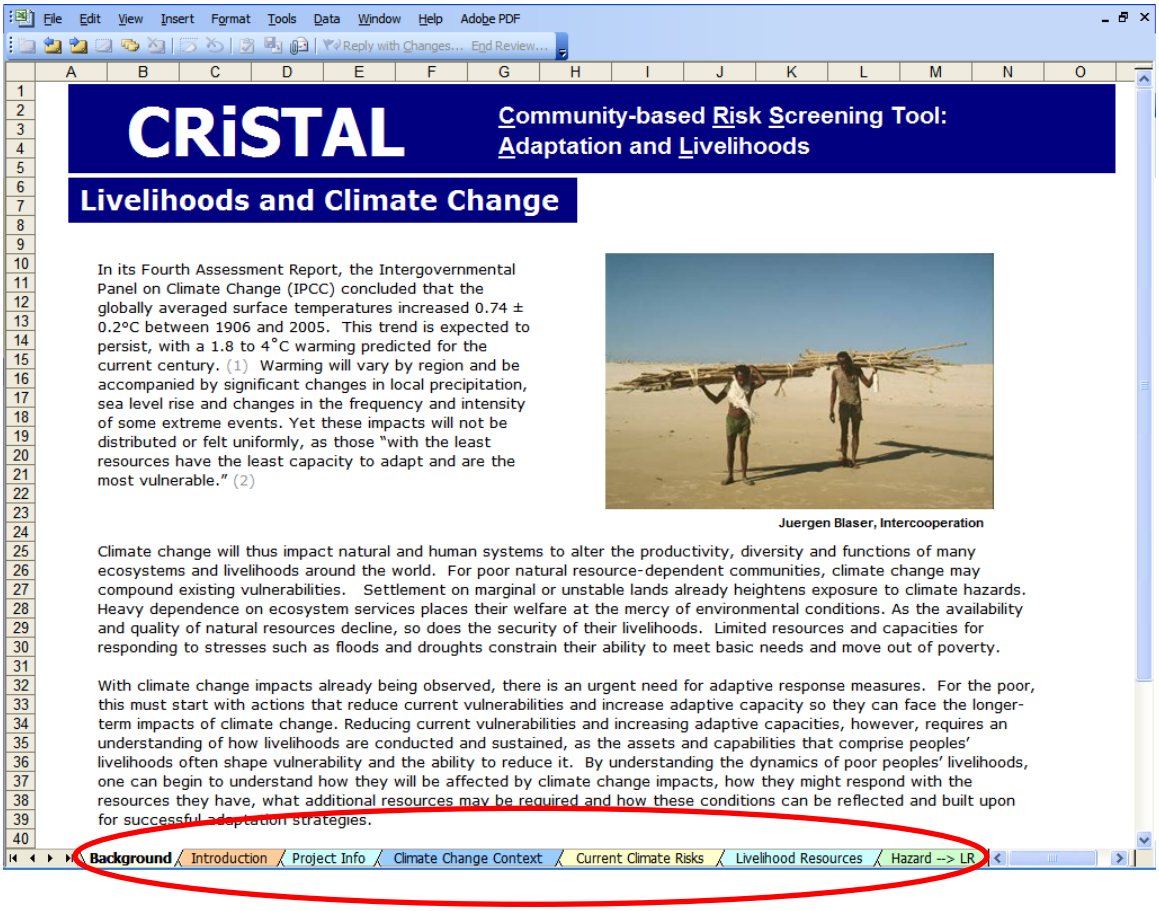
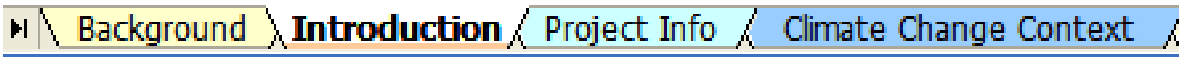


Figure 1-4: Navigation tabs

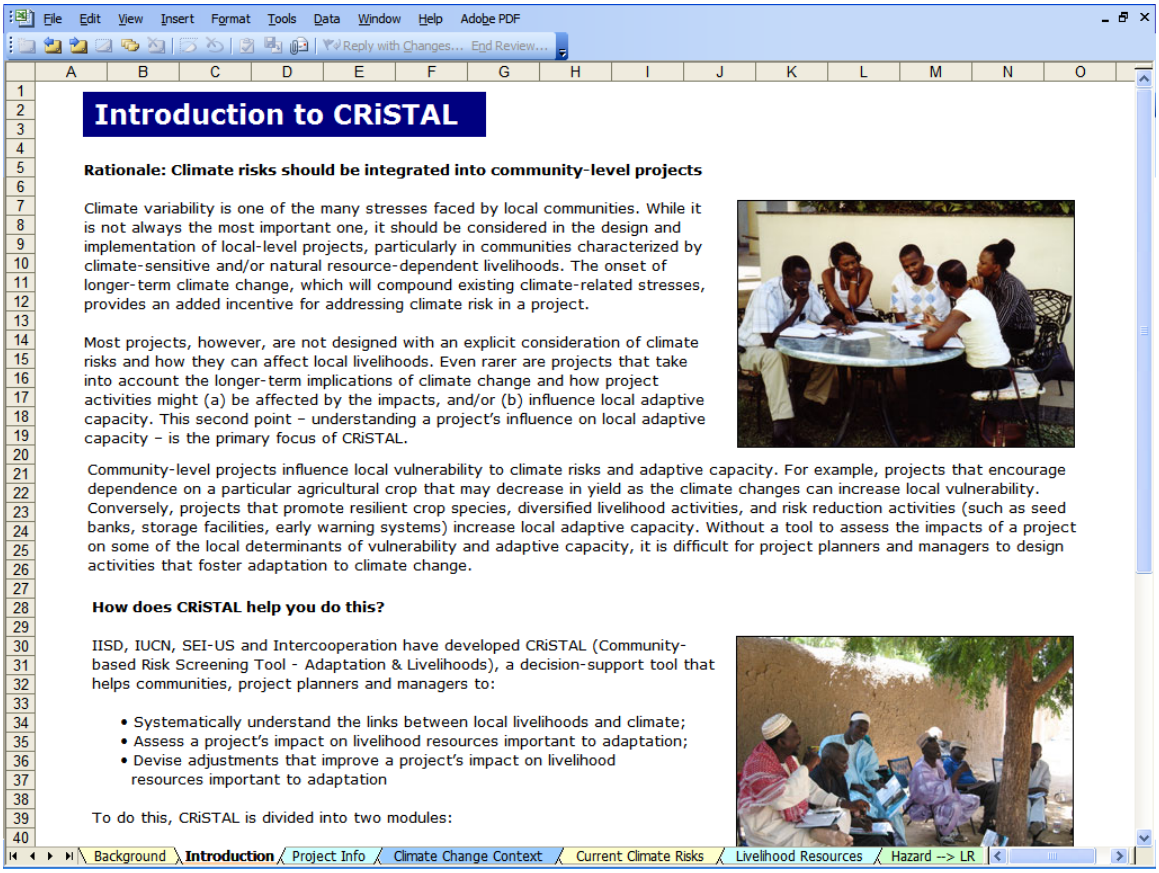


You can navigate the different steps of the CRiSTAL process by using the colored tabs at the bottom of the screen. You can move back and forth between the different worksheets throughout the process, updating or changing information as needed

Your CRiSTAL analysis should be saved as a Excel spreadsheet – i.e. File > Save As > Yourproject.xls

The next tab to the right of 'Background' will take you to a worksheet called, 'Introduction', which explains the rationale, purpose and objectives of using CRiSTAL, as well as its organizational structure.

Figure 1-6: Introduction to CRiSTAL



The page only provides a general introduction – more detailed instructions are provided in this User's Manual.

Once you feel you are familiar enough with the CRiSTAL process and how to use the program, you can begin to enter information for the analysis.

1.6 Entering project information

Moving to the next worksheet tab, 'Project Info', you are asked to enter some basic information about the project you wish to 'screen' against livelihood and climate information. This information includes:

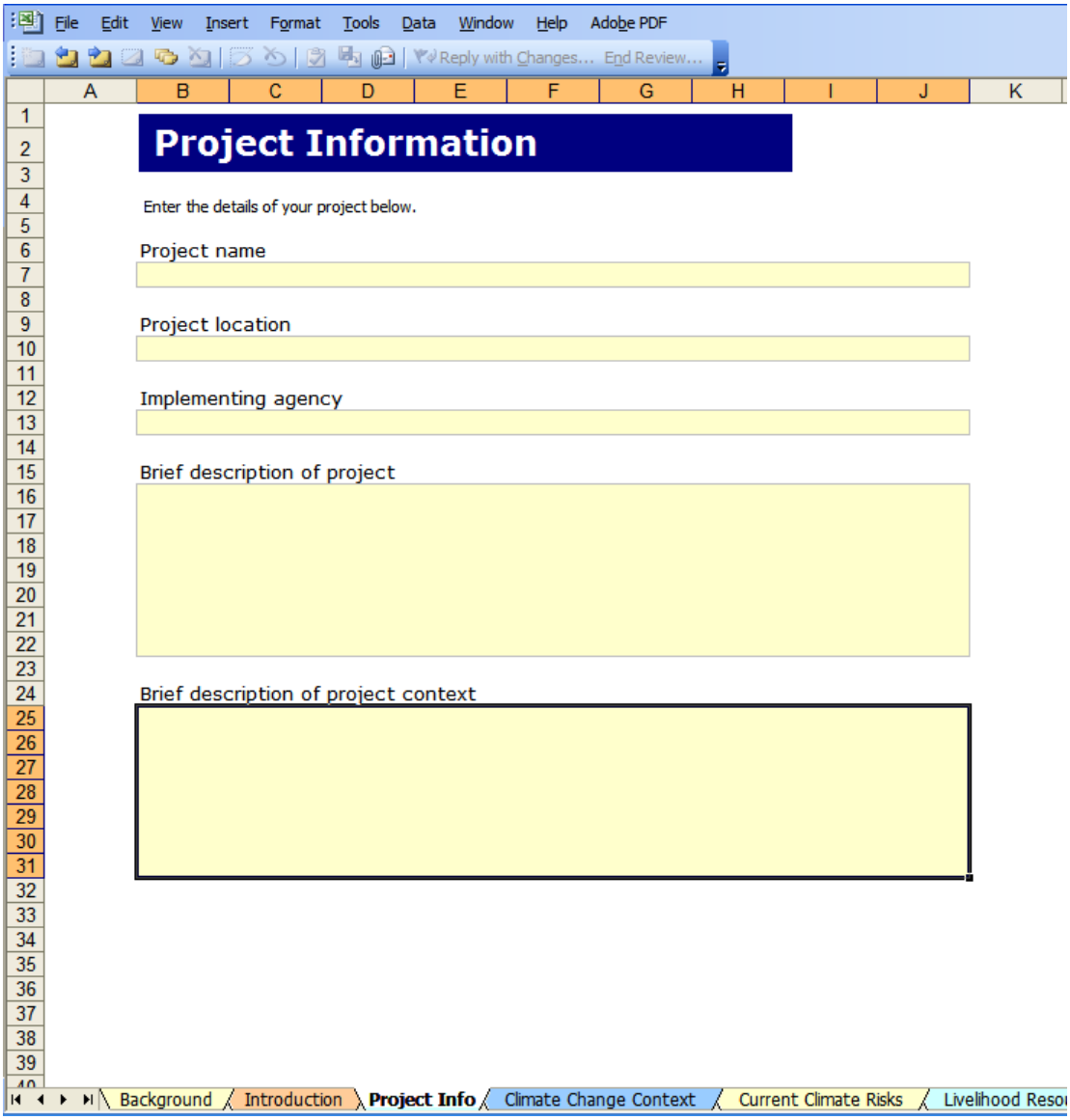
- **Name**: Name or title of the project being screened
- **Location**: Geographical location of the project (i.e. village, town, parish, district, province, country, etc.)
- **Implementing agency**: Name of the organization or institution implementing the project
- **Project Description**: Brief description on:
  - Type of project (e.g. forest landscape restoration, disaster risk reduction, etc.)
  - Project duration (number of months, start date, anticipated end date)

- Project goals, objectives
- Other relevant information (total budget, funder, target beneficiaries, number of beneficiaries)

Project Context: Brief description of the socio-economic context of the project including:

- Additional geographic information (e.g. rapidly converted tropical rainforest ecosystem; low-lying coastal area; surrounded by barrier reefs, etc.
- Political information (e.g. post-conflict setting, recent local government elections)
- Cultural considerations (e.g. gender issues, role of religious leaders, traditional livelihoods, food preferences, etc)
- Other socio-economic trends (e.g. legacy of previous aid projects; change in income generating activities; proliferation of micro-lending schemes, etc.)

Figure 1-7: Project Information



You can now proceed to Module 1 of CRiSTAL.

2 SETTING THE CLIMATE CONTEXT

Once you have entered your project information you are ready to begin step one of Module 1 – setting the climate context. Doing so requires answering the following questions, through consultations with the appropriate stakeholders:

1. What are the potential climate change impacts in the project area?
2. What are the current climate hazards in the project area?
3. What are the impacts of these climate hazards?
4. What strategies to people use to cope with these impacts?

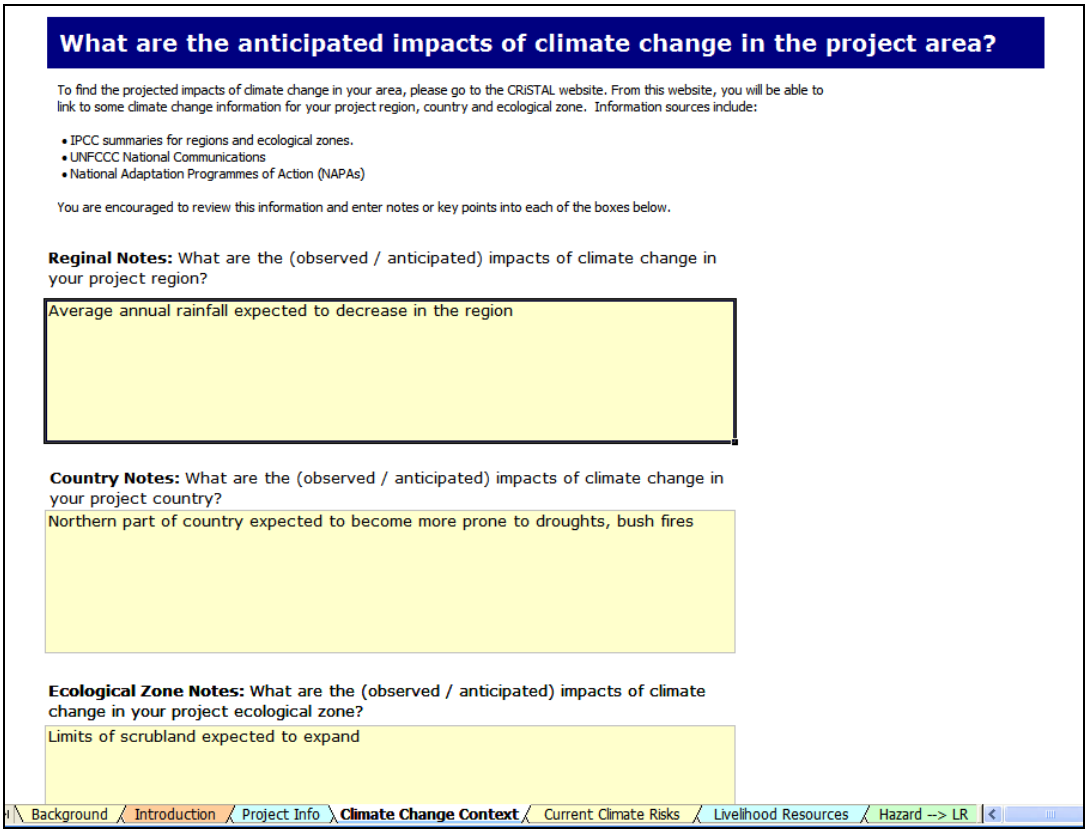
Information for answering these questions should be gathered both through community participation and document reviews/internet research.

You may wish to go through this step several times for different social groups – i.e. according to gender, age, ethnicity, livelihood strategy, etc. This would provide a better understanding of how climate risks affect different segments of a community, and the various strategies used to cope with climate impacts.

2.1 Understanding the impacts of climate change in your project area

By clicking on the worksheet tab, 'Climate Change Context', you will come to the worksheet depicted in Figure 2-1.

Figure 2-1: Climate Change Context worksheet



The first task of setting the climate context involves finding the projected impacts of climate change in the project area. You are prompted to link to the CRiSTAL website (under construction) to access available information on your geographic region, country, and ecological zone. For the moment, the main sources for information on this are:

- **Intergovernmental Panel on Climate Change (IPCC) summaries for regions and ecological zones**
  - Providing scientific review of the historical / observed trends in temperature and precipitation for your project region
  - Information on the anticipated changes in temperature and precipitation for your region
  - Information on the observed and anticipated impacts of these changes in your region
  - Summaries can be accessed at: http://www.ipcc.ch/ipccreports/ar4-wg2.htm
- **United Nations Framework Convention on Climate Change (UNFCCC) National Communications**
  - These are documents prepared by each of the countries who are parties to the UNFCCC, communicating the results of national assessments of greenhouse gas emissions, as well as information on vulnerability, impacts, and adaptation. Observed and anticipated trends and impacts of climate change for your country can be drawn from these documents.
  - Annex I (industrial) country reports can be accessed at: http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/3625.php
  - Non-Annex I (developing country reports can be accessed at: http://unfccc.int/national_reports/non-annex_i_natcom /items/2979.php

- **National Adaptation Programmes of Action (NAPAs)**
  - These are documents prepared by the Least Developed Country (LDC) countries who are parties to the UNFCCC. They are prepared with the purpose of communicating the urgent and immediate needs and concerns of LDCs relating to adaptation to the adverse effects of climate change. NAPAs identify priority activities for adaptation.
  - NAPAs can be accessed at: http://unfccc.int/adaptation/napas/items/2679.php

Users are encouraged to review this information and enter notes and key points within the text boxes provided. You do not need to enter detailed information on climate change for this step – just enough information to give you a general idea of what climate trends are already being observed, what is expected in the future, and how this might affect different sectors, populations, ecosystems relevant to your project area.

NOTE:

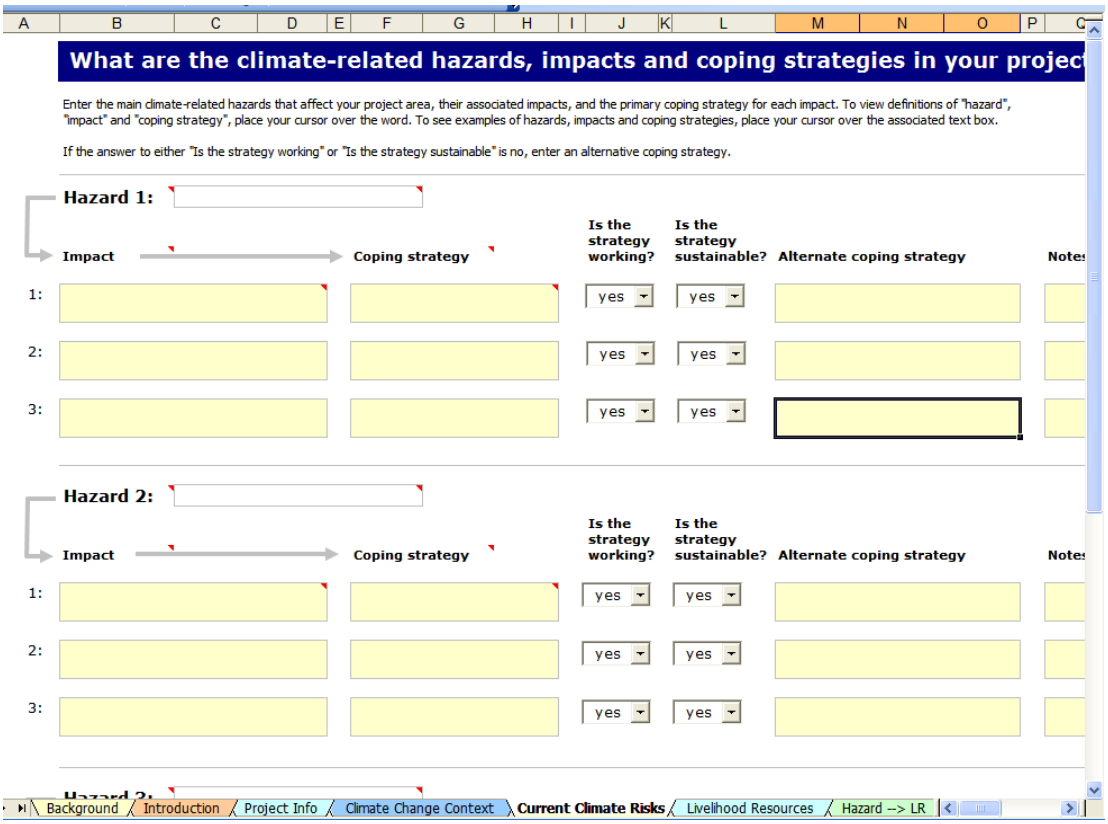
In Figure 2-1, you will note that we have entered very simple information such as, 'Average annual rainfall is expected to decrease in the region' or 'Northern part of the country is expected to become drier, while the southern part will experience more droughts.' Although very general, even this type of information will be useful in helping you to apply a climate change 'lens' to your work. Although more specific information is ideal – i.e. increase in temperature of X°C over Y years – in many cases, this level of detail is not available or not deemed accurate or reliable enough for decision making. As the science improves, this type of detailed climate information will hopefully become more readily available, but for the moment in many cases general trends and less-than-certain projections are the basis upon which we you will need to make decisions.

Once you have entered this climate change information, you can proceed to the next step / worksheet, 'Current Climate Risks' (Figure 2-2).

2.2 Understanding the current climate context

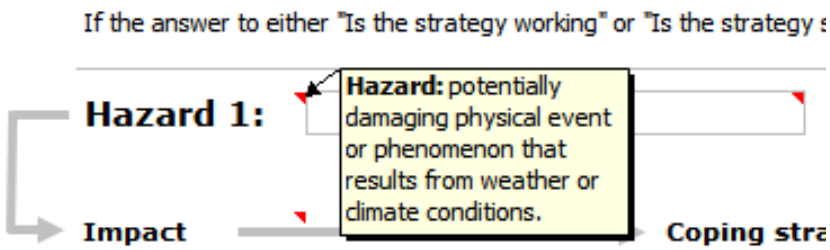
In this stage of setting the climate context, you will move from understanding projected impacts of climate change to identifying the current climate hazards which affect the project area, the impacts associated with those hazards, and the primary coping strategies employed to deal with each impact.

Figure 2-2: Current Climate Risks worksheet



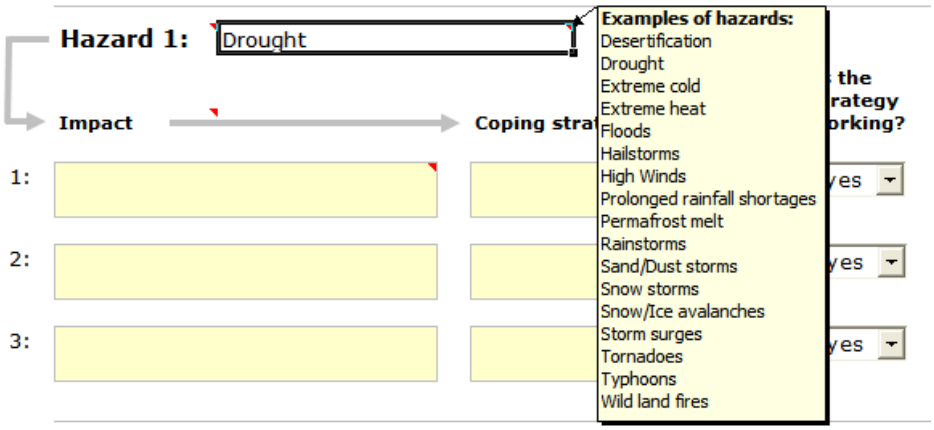
You can start by entering the main climate-related hazards affecting the project area. By **hazard**, we refer to *potentially damaging physical events or phenomena that result from weather or climate conditions*. You can see the definition of hazard by placing your cursor over the small red triangle to the upper right of the word (Figure 2-3).

Figure 2-3: Definition of 'Hazard'



Examples of hazards are provided by placing your cursor over the text box beside 'Hazard' (Figure 2-4). Examples include drought, floods and desertification. Up to three hazards can be entered per session; to enter more than three, you will have to run additional sessions.

Figure 2-4: Examples of climate-related hazards



Using a hypothetical example, we have chosen drought our climate-related hazard. For each hazard, you will now identify up to three associated impacts, and the primary coping strategy used to deal with each. **Impacts** refer to *the consequences of hazards on natural and human systems*, and can include crop damage, income losses and reduced soil fertility. Again, definitions and examples are provided by placing your cursor over the associated word / text box (Figure 2-5, 2-6).

Figure 2-5: Definition of Impact

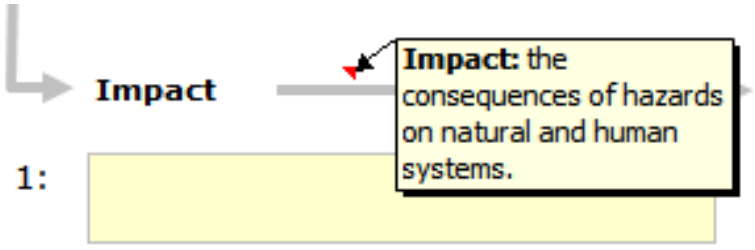
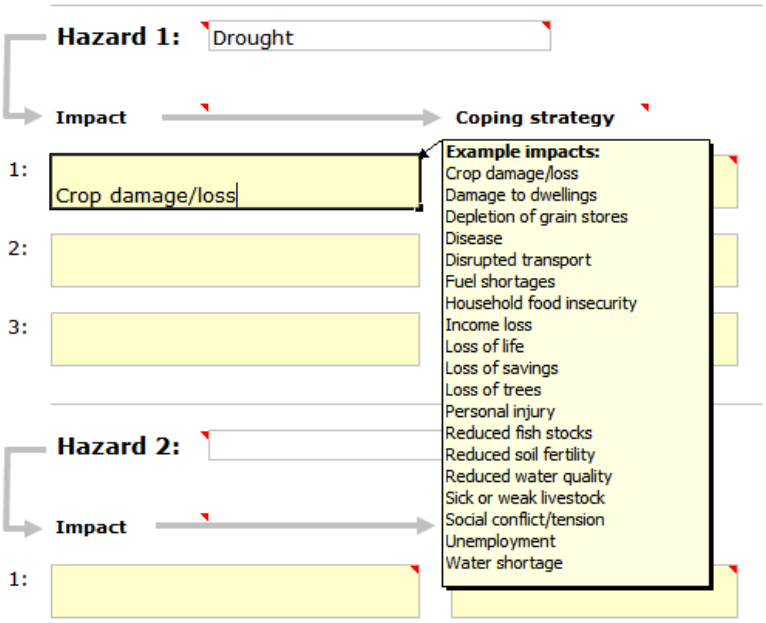


Figure 2-6: Examples of Impacts



Coping strategies refer to *methods for using existing resources to achieve beneficial ends during abnormal or adverse conditions*. Examples include asset liquidation, food storage, and rural-urban migration. Again, you can view definitions and examples by placing your cursor over the associated work / text box (Figure 2-7, 2-8)

Figure 2-7: Definition of Coping Strategy

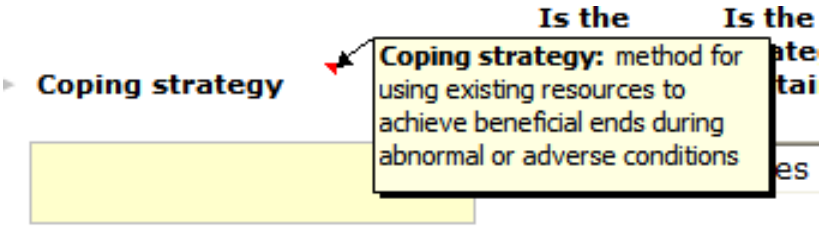
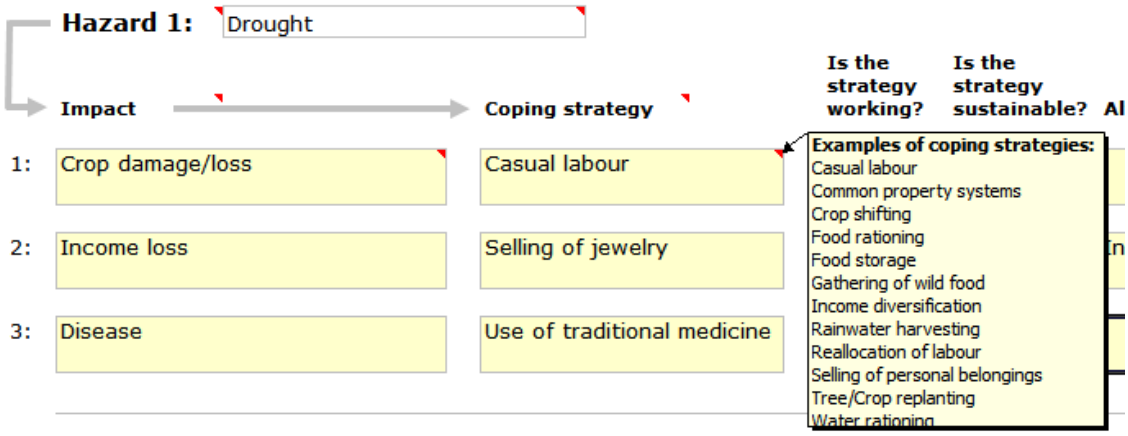


Figure 2-8: Examples of Coping Strategies



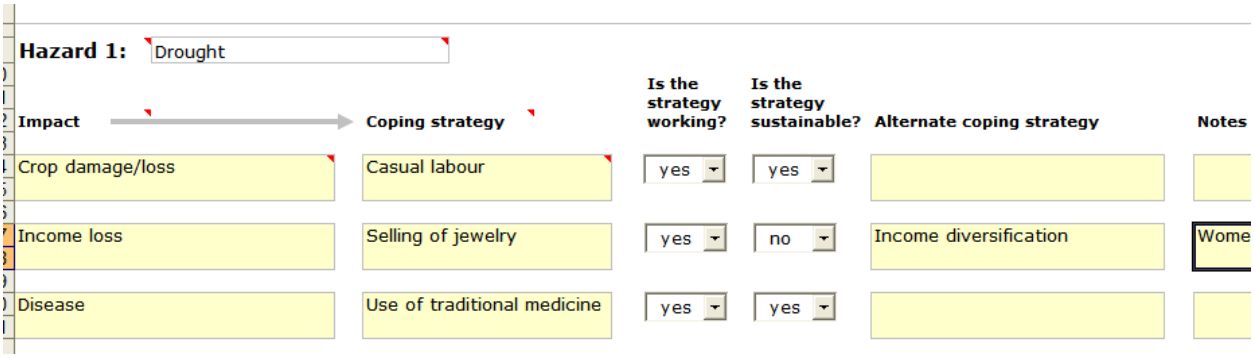
You can enter up to 3 impacts and for each hazard, and a primary coping strategy for each hazard. For the hypothetical example above, 'Crop damage/loss', 'Income loss' and 'Disease' were identified as the main impacts. The primary coping strategy for each were 'casual labour', 'selling of jewelry' and 'use of traditional medicine', respectively.

After entering the coping strategy, you are asked **if this strategy is 'working'** – in other words, is it actually helping communities 'achieve beneficial ends' during times of stress? The reason for asking this question is that sometimes communities will employ coping strategies that are not even helping them to survive or get through stressful circumstances – then can end up worse off afterwards.

The next box then asks **if the identified coping strategy is sustainable**. This question is asked both in terms of sustainable development and climate change. If a coping strategy depletes economic assets, degrades the environment, or further marginalizes people, then it is not sustainable. Also, if the coping strategy is not viable with longer-term climate change, it is not sustainable.

If you answer no to either of these questions, you are asked to enter an alternate coping strategy (Figure 2-9).

Figure 2-9: Alternate Coping Strategies



For the hypothetical case in Figure 2-9, 'selling of jewelry' was identified as an unsustainable coping strategy for dealing with income loss resulting from a drought. While it is 'working' – i.e. giving households extra income during droughts – it depletes their financial (and personal) assets that are in limited supply. Over the longer-term, these households will not have jewelry to sell. As a result, an alternate coping strategy of 'income diversification' is identified. Continuing with the hypothetical example, this can mean households starting small businesses or offering specialized services in their communities during periods of drought, or throughout the year. The end result is that households are not entirely dependent on one source of income, and are able to reduce (or avoid) losses during periods of stress or shock.

Any additional information brought out in the consultations, such as additional coping strategies, seasonal variations in impacts and coping strategies, or the impact of long-term climate change, can be entered in the text boxes on the right (Figure 2-10).

Figure 2-10: Notes on current climate risks

Coping strategy	Is the strategy working?	Is the strategy sustainable?	Alternate coping strategy	Notes
Casual labour	yes	yes		
Selling of jewelry	yes	no	Income diversification	Women gather wild fruit to sell;
Use of traditional medicine	yes	yes		

In our hypothetical example, 'women gathering wild fruit to sell' is identified as an additional coping strategy to deal with income loss.

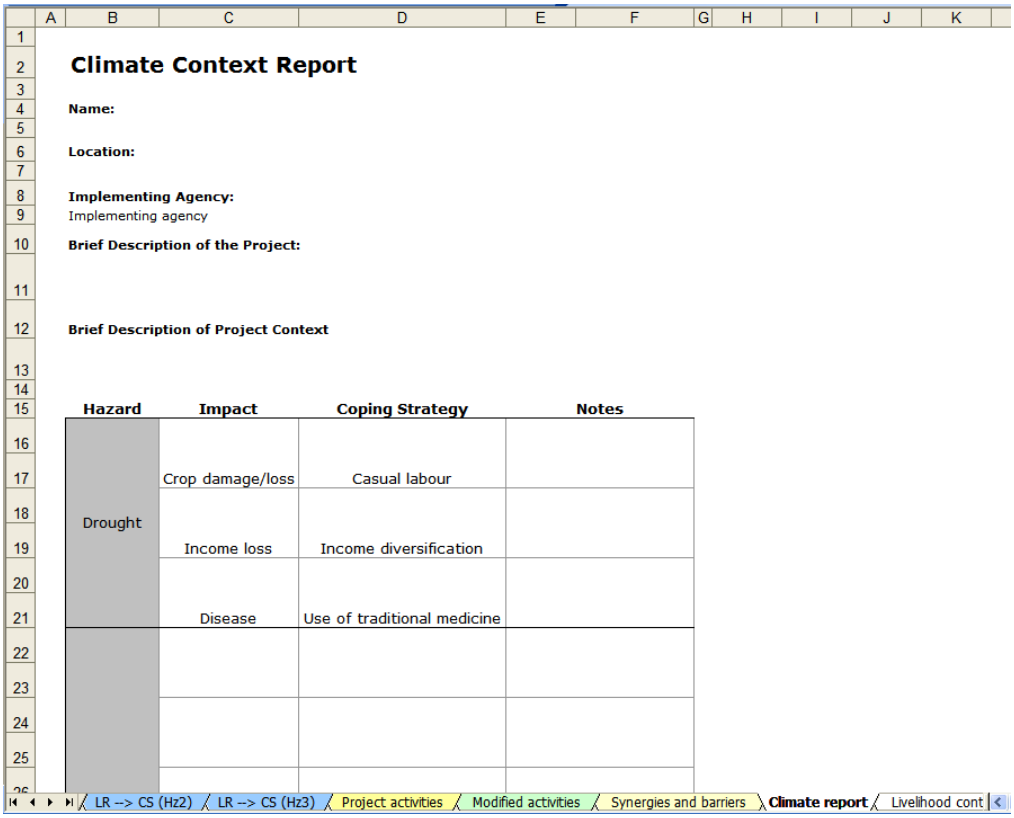
NOTE:

The CRiSTAL program is flexible, and you can modify – revise, update, elaborate – entered information at any point in the process. It is important that the date you enter is understandable and useful to you in conducting your analysis. The level of detail and language you use is entirely up to you.

After entering information about the current climate context in your project area, the information can be viewed in a summary report called the, 'Climate Context Report.' The report simply displays the information in a more readable format and can be reviewed for accuracy and updated as necessary. The Climate Context Report can be accessed by clicking on the 'Climate Report' tab located towards the far right hand side (you will have to scroll through a number of worksheet tabs to see it).

An example of a Climate Context Report is provided in figure 2-11.

Figure 2-11: Climate Context Report sample



Climate Context Report

Name:

Location:

Implementing Agency:
Implementing agency

Brief Description of the Project:

Brief Description of Project Context

Hazard	Impact	Coping Strategy	Notes
Drought	Crop damage/loss	Casual labour	
	Income loss	Income diversification	
	Disease	Use of traditional medicine	

LR --> CS (Hz2) | LR --> CS (Hz3) | Project activities | Modified activities | Synergies and barriers | **Climate report** | Livelihood cont

3 SETTING & ANALYSING THE LIVELIHOOD CONTEXT

Once the climate context has been defined, you will move on to the second part of Module 1: Setting the livelihood context for the project area. This step is designed to help you collect and organise information on local livelihoods. Part of this analysis includes highlighting livelihood resources that have a strong relationship to the climate hazards and coping strategies.

Setting the livelihood context involves answering the following questions:

1. What resources are important to peoples' livelihoods in the project area?
2. To what extent are these resources negatively affected by current climate hazards identified in the previous step?
3. To what extent do these resources influence current coping strategies, also identified in the previous step?

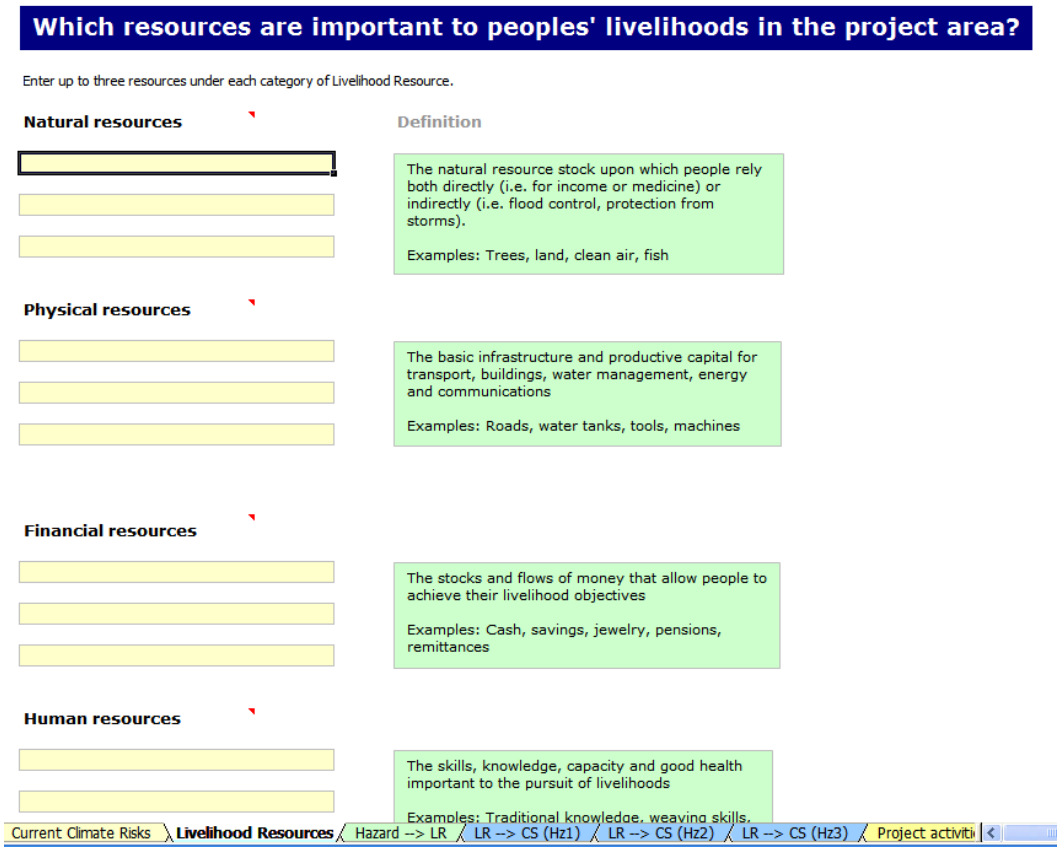
If you completed the previous step several times for different social groups, you should do so for this step as well.

To start setting the livelihood context, you should click on the worksheet tab, 'Livelihood resources' to access the appropriate worksheet in the CRiSTAL program (Figure 3-1).

3.1 Identifying important livelihood resources

On the 'Livelihood Resources' worksheet, you are asked to identify the main resources that are important to peoples' livelihoods in the project area.

Figure 3-1: Livelihood Resources worksheet

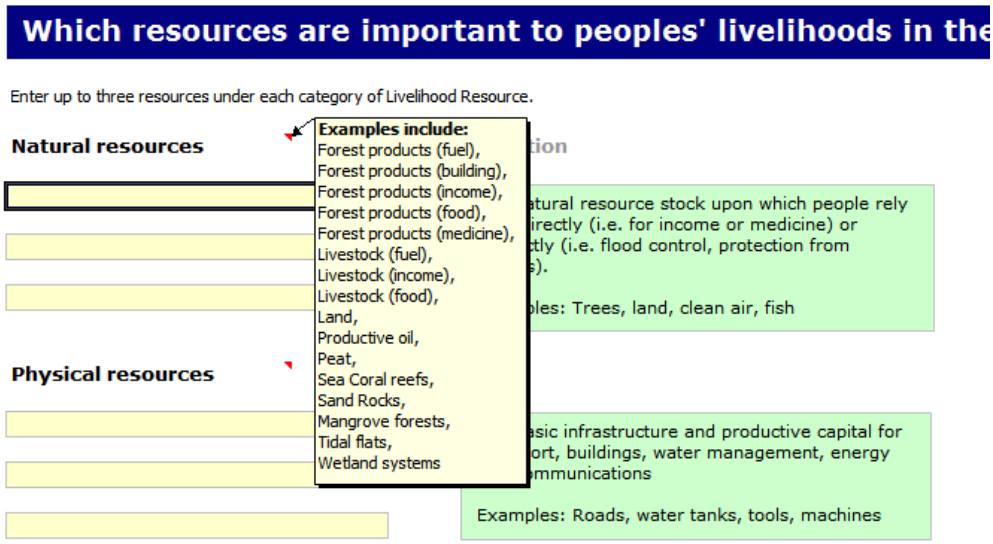


Resources are divided into five categories: natural, physical, financial, human and social. The definitions for these categories are:

- **Natural resources**: The natural resource stock upon which people rely both directly (i.e. for income or medicine) or indirectly (i.e. flood control, protection from storms).
- **Physical resources**: The basic infrastructure and productive capital for transport, buildings, water management, energy and communications.
- **Financial resources**: The stocks and flows of money that allow people to achieve their livelihood objectives.
- **Human resources**: The skills, knowledge, capacity and good health important to the pursuit of livelihoods.
- **Social resources**: The formal and informal social relationships and institutions from which people draw in pursuit of their livelihoods.

Definitions and examples of each are provided in the green text boxes to the right, while examples are offered by placing your cursor over the red triangle to the upper right of each of the resource category names (Figure 3-2).

Figure 3-2: Definitions and examples of livelihood resources



You are asked to enter up to three resources under each category; you may use the examples provided or enter in your own text.

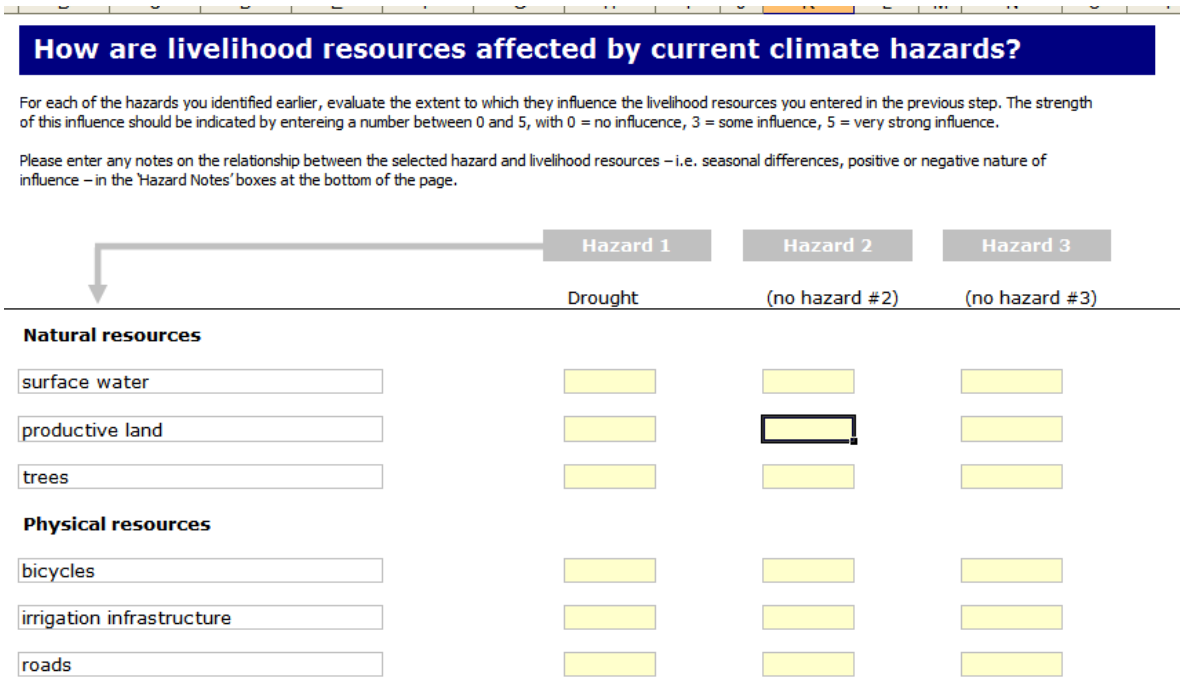
Once you have entered the livelihood resources relevant to the group in the project area, you will be asked to evaluate the extent to which your selected climate hazards influence these livelihood resources. To do so, you should click on the next tab to the right, 'Hazard → LR.'

Resources are divided into five categories: natural, physical, financial, human and social.

3.2 Evaluating the influence of climate hazards on livelihood resources

By clicking on the worksheet tab, 'Hazard → LR', you will have the screen presented in Figure 3-3.

Figure 3-3: Influence of Hazards on Livelihood Resources worksheet

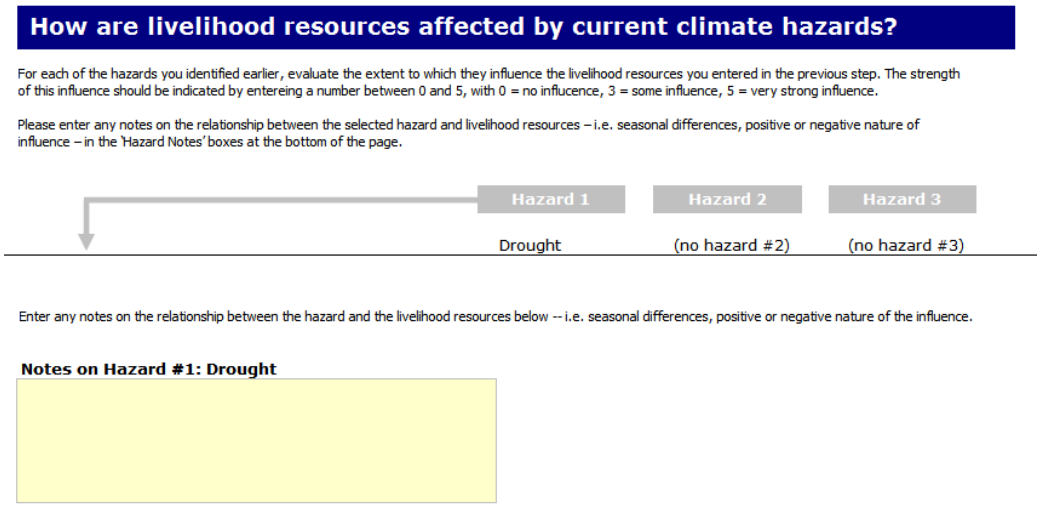


The climate hazards identified on the 'Current Climate Risks' worksheet will now appear in the top of each column (in our example, drought). The livelihood resources you entered on the ''Livelihood Resources' worksheet are listed down the column on the left of the screen. Moving down the column, you must now select a value denoting the extent to which each hazard influences your livelihood resources. To do so, you must enter a number between 0 and 5:

- **0** = Hazard has no influence over the livelihood resource
- **1** = Hazard has minimal influence over the livelihood resource
- **3** = Hazard has some influence over the livelihood resource
- **5** = Hazard has a very strong influence on the livelihood resource.

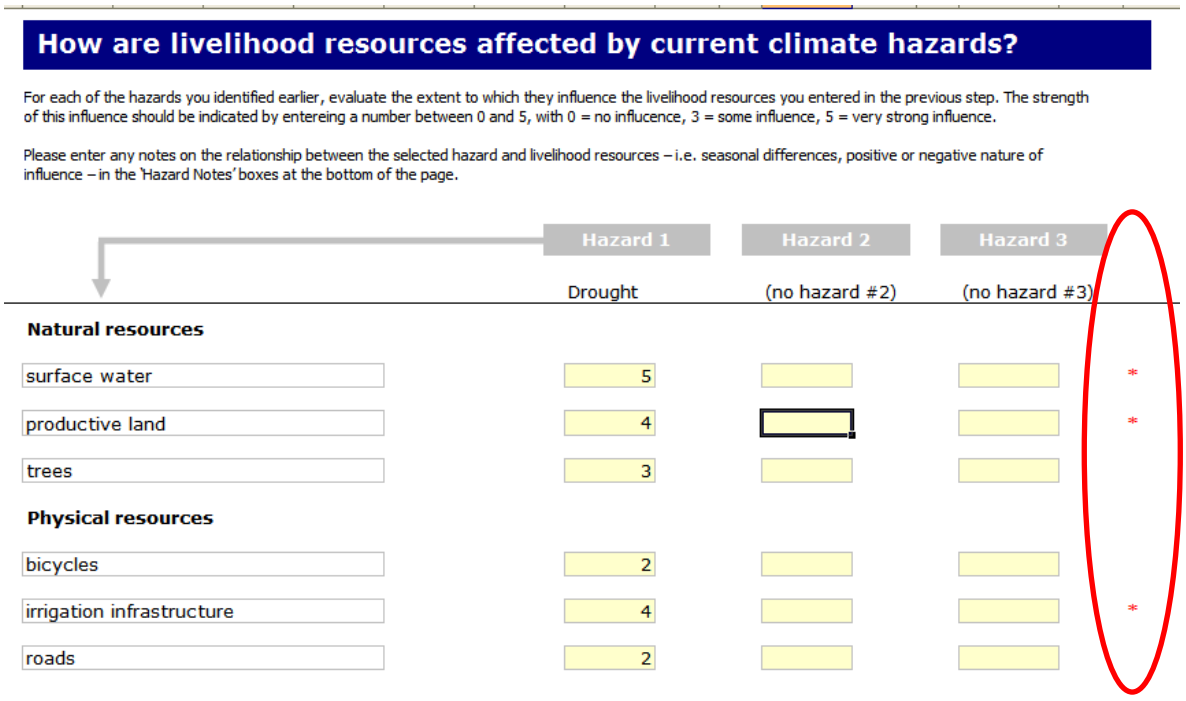
Any additional notes you may have on the relationship between the selected hazard and the livelihood resources – i.e. if the influence is positive – can be entered in the 'Notes on Hazard' text boxes at the bottom of the worksheet (Figure 3-4)

Figure 3-4: Notes on Hazard text boxes



Livelihood resources that are strongly influenced by a hazard will be marked with a small red star on the right hand side of the page – as depicted in Figure 3-5.

Figure 3-5: Livelihood Resources strongly influenced by hazard (circled in red)

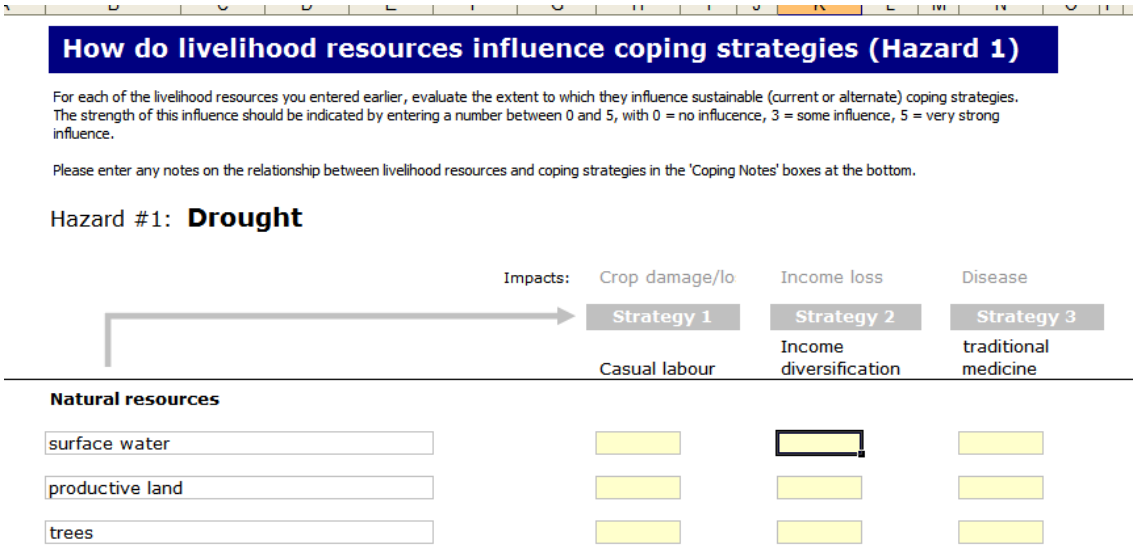


For the above example, drought has a very strong influence on surface water, productive land, irrigation infrastructure and good health (not pictured).

3.3 Evaluating the influence of livelihood resources on coping strategies

Next, you are asked to evaluate the extent to which livelihood resources in the project area influence the identified coping strategies for each hazard. To do so, click on the tab 'LR → CS(Hz1)', which will take you to a worksheet that lists all of the livelihood assets in a column on the left, and the main impacts and coping strategies for Hazard 1 along the top row (Figure 3-5).

Figure 3-5: Influence of livelihood resources on coping strategies (Hazard 1) worksheet

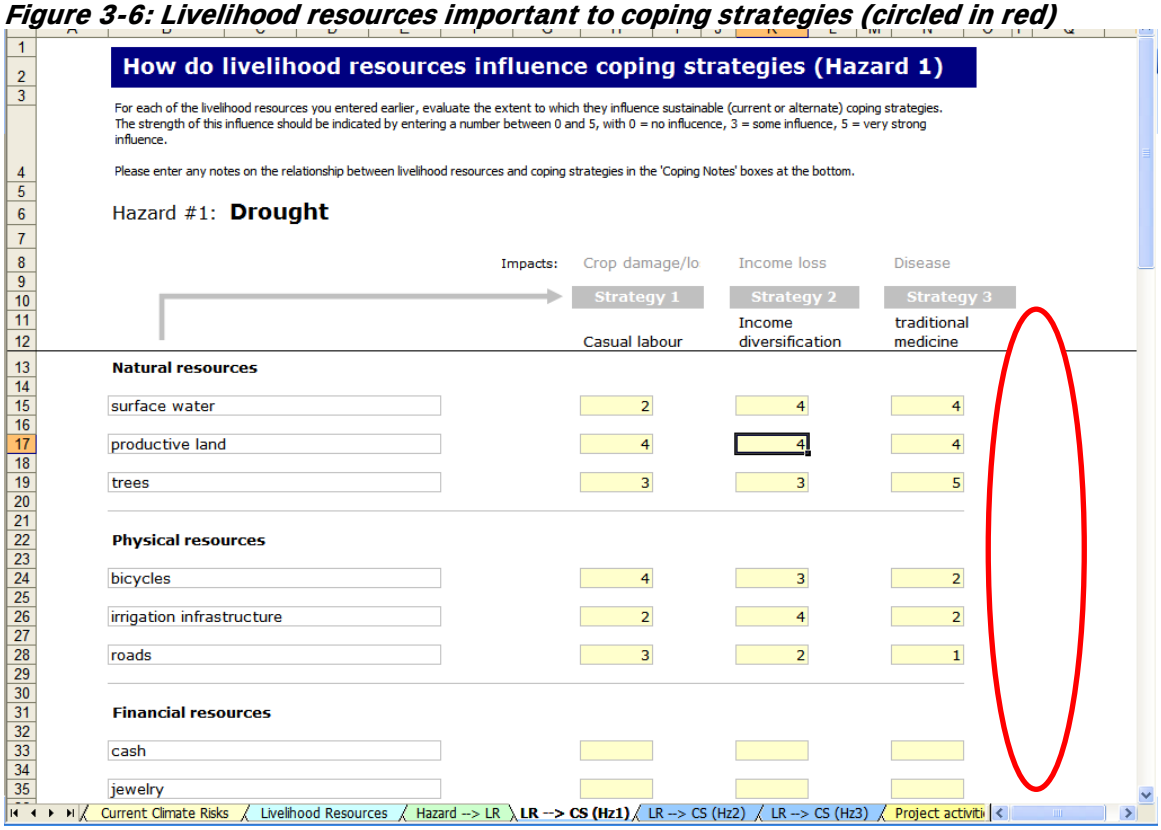


You are asked to assess the influence of livelihood resources on identified coping strategies using a number between 0 and 5. Again,

- **0** = Livelihood resource has no influence on the coping strategy
- **1** = Livelihood resource has minimal influence on the coping strategy
- **3** = Livelihood resource has some influence on the coping strategy
- **5** = Livelihood resource has a very strong influence on the coping strategy

Resources that are deemed important to coping strategies will be flagged with a red star on the right hand side of the page (Figure 3-6).

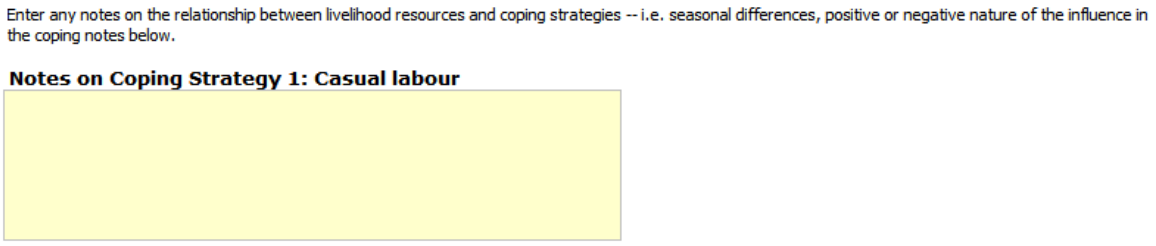
Figure 3-6: Livelihood resources important to coping strategies (circled in red)



In our hypothetical example above, surface water, productive land, trees, bicycles and irrigation infrastructure were all assessed as important to the coping strategies associated with drought impacts.

Any additional notes on the relationship between livelihood resources and coping strategies – again, specifying if the relationship is positive or negative – can be entered into the text boxes at the bottom of each column (Figure 3-7).

Figure 3-7: Notes on Coping Strategy



There are 3 worksheets for this analysis – one for each hazard entered. If you only entered one hazard (as with our example – i.e. drought), then you will only need to complete one sheet. If you entered more than one hazard, you will need to complete sheets 'LR → CS(Hz2)' and 'LR → CS(Hz3).'

After entering information about the current livelihood context in your project area and assessing its relationship with the climate context, the results can be viewed in a summary report called the, 'Livelihood Context Report' (Figure 3-8).

Figure 3-8: Livelihood Context Report

Livelihood Context Report

Name:

Location:

Implementing Agency:

Brief description of the project:

Brief Description of project context:

Extent to which livelihood resources are influenced by climate hazards identified in the climate context (*0 = no influence, 5 = very strong influence*):

	Hazards:	Drought																					
	Resources	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5				
Natural resources	surface water						X																
	productive land					X																	
	trees				X																		
Physical Resources	bicycles			X																			
	irrigation infrastructure					X																	
	roads			X																			
Financial Resources	cash		X																				
	jewlery	X																					

LR --> CS (Hz3) | Project activities | Modified activities | Synergies and barriers | Climate report | **Livelihood context rep**

The report simply displays the information in a more readable format and can be reviewed for accuracy and updated as necessary. The Livelihood Context Report can be accessed by clicking on the 'Livelihood context report' tab located towards the far right hand side (you will have to scroll through a number of worksheet tabs to see it).

4 PROJECT ACTIVITY SCREENING & REVISION

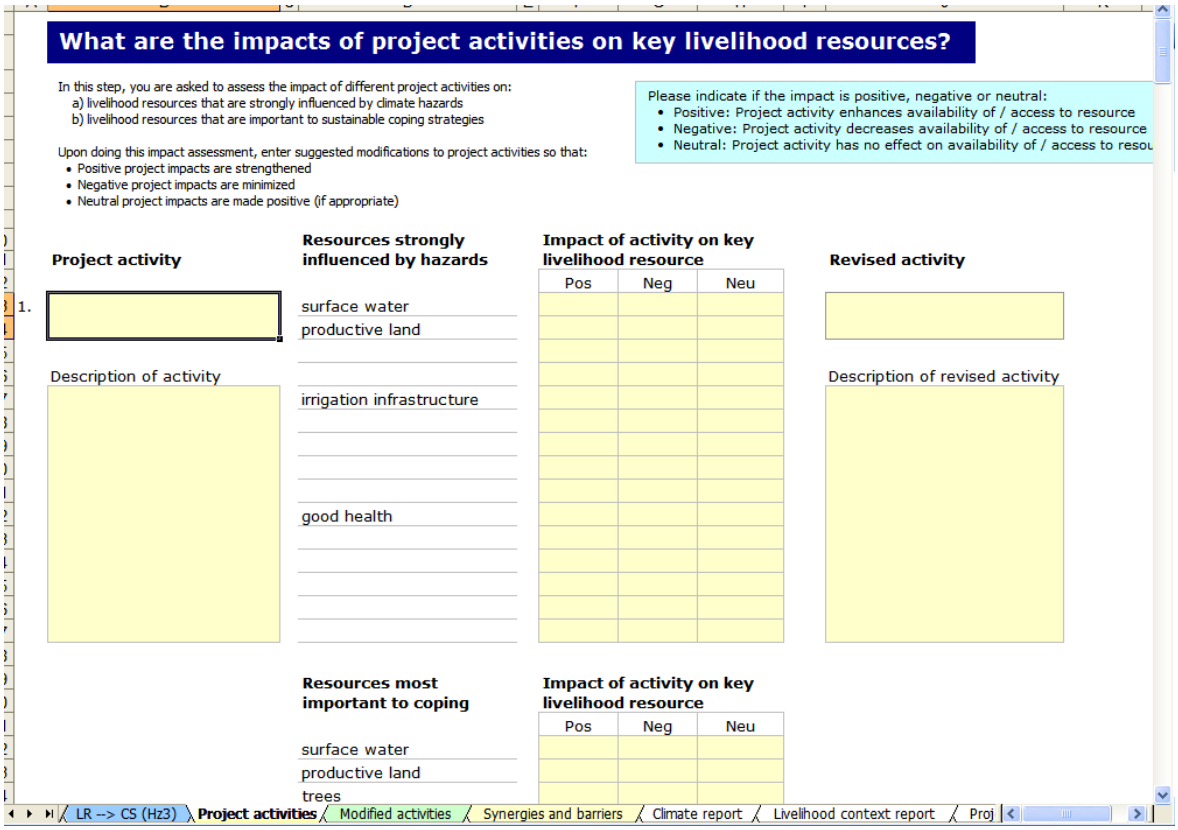
Once you complete Module 1, you can proceed to Module two, 'Planning and Managing Projects for Climate Change Adaptation.'

This module is designed to help you analyse how project activities are directly linked to climate vulnerability and adaptive capacity. Livelihood resources that were identified as: a) strongly influenced by selected climate hazards, and b) important to coping strategies, will serve as the basis for evaluating project impacts. Impacts can be positive, negative or neutral.

Analysis can be carried out individually, or through small project meetings. You may rely on stakeholder inputs to assist with the analysis, and are encouraged to share proposed project adjustments with community stakeholders for their feedback.

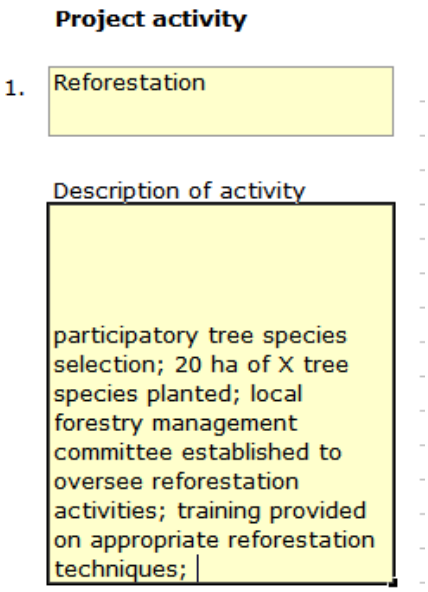
You can start Module 2 by clicking on the worksheet tab, 'Project activities,' where you will be presented with the worksheet depicted in Figure 4-1.

Figure 4-1: Project Activity Screening worksheet



You are **first asked to enter a project activity** on the right hand box – there is not much room in the text box, so be as concise but descriptive as possible. Details about the project activity can be entered into the larger text box below (Figure 4-2). You can enter up to 10 project activities.

Figure 4-2: Entering project activities



In our hypothetical example, 'reforestation' is the project activity entered. Some details about this activity are provided in the box below under the heading 'Description of activity.'

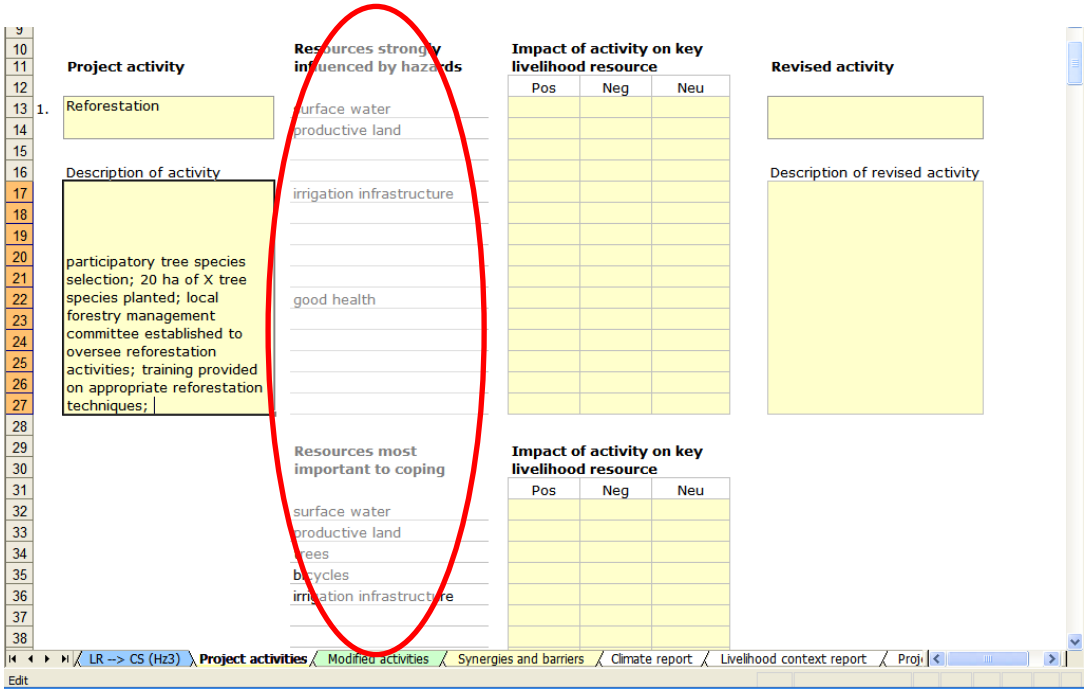
4.1 Evaluating the impact of project activities on key livelihood resources

Once you have entered your project activities, you can assess the impacts of project activities on:

a) the livelihood resources identified as being strongly influenced by climate hazards
b) the livelihood resources identified as being important to coping strategies

These 'key' livelihood resources are listed in the column to the right of the project activity text boxes. The top half of the list consists of livelihood resources that are strongly influenced by climate hazards, while the bottom half is livelihood resources most important to coping strategies (Figure 4-3).

Figure 4-3: Key livelihood resources (circled in red)

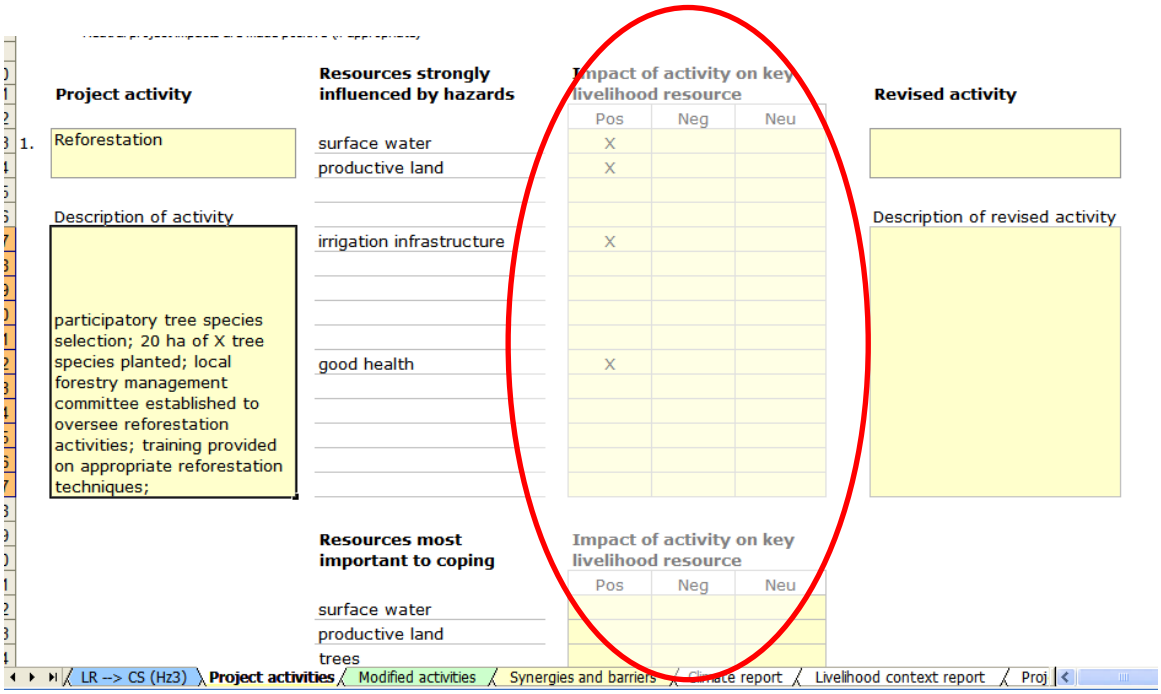


Next, you must indicate if the impact of the project activity you entered on these key livelihood resources. The impact can be positive, negative or neutral:

- **Positive**: The project activity increased or strengthened the availability of / access to the key livelihood resource
- **Negative**: The project activity reduced or weakened the availability of / access to the key livelihood resource
- **Neutral**: The project activity did not affect the availability of or access to key livelihood resources.

Enter an 'x' in the appropriate box (Figure 4-4).

Figure 4-4: Indicating activity impacts (circled in red)



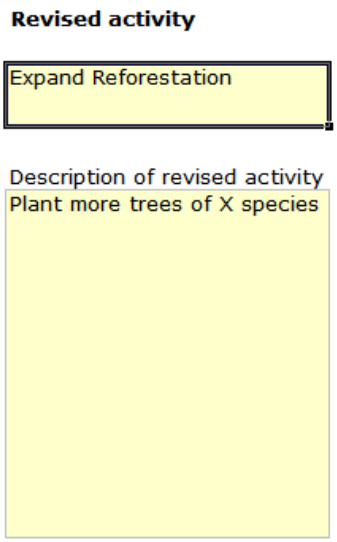
4.2 Revising project impacts to enhance adaptive capacity

Upon assessing the impacts of activities on key livelihood resources, enter a revised activity to support adaptive capacity. That is, project activities are adjusted so that:

- Positive project impacts on key livelihood resources are strengthened or expanded
- Negative project impacts on key livelihood resources are minimized
- Neutral project impacts on key livelihood resources are made positive (if appropriate)

Adjustments should be entered in the boxes on the right hand side of the worksheet. Again, the small box should have a very concise description of the project adjustment, while the larger text box below can be used to provide a more detailed description of the adjustment (Figure 5-4).

Figure 4-5: Entering modified activities

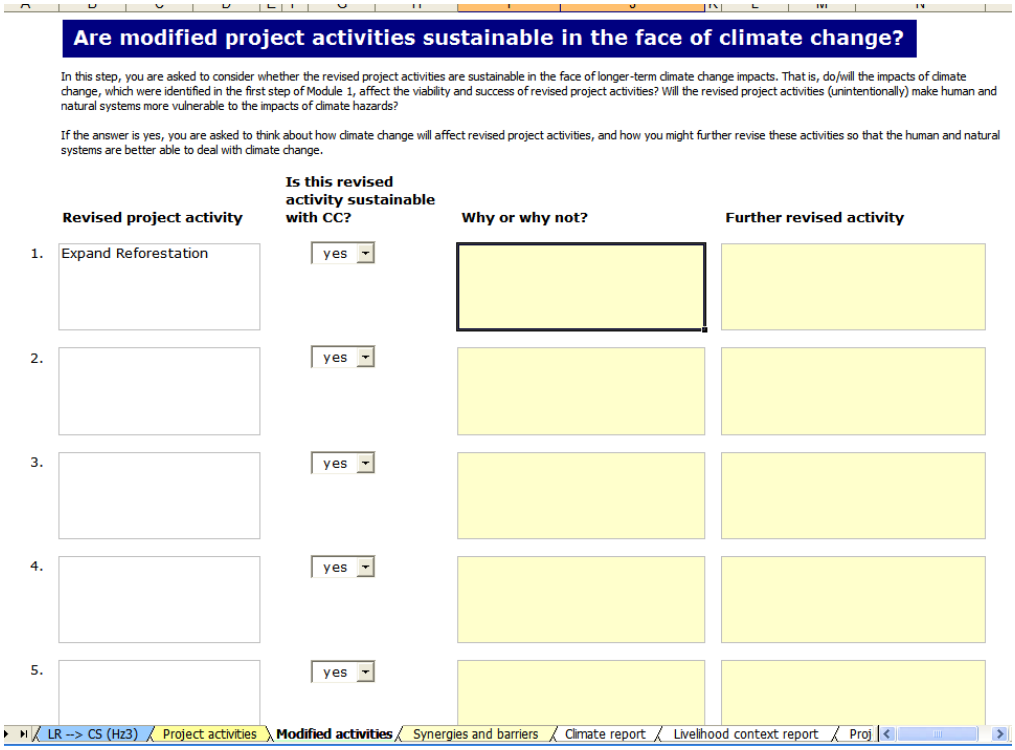


In our hypothetical example, reforestation was found to have a positive impact on all of the key livelihood resources affected by drought. Because of this positive impact, the adjustment was to expand reforestation activities. The additional information provided on this adjustment was the species to be planted.

4.3 Making sure proposed project revisions are sustainable with climate change

Once you have finished entering revised project activities, you can move to the next worksheet tab, 'Modified activities.' (Figure 4-6).

Figure 4-6: Modified activities worksheet

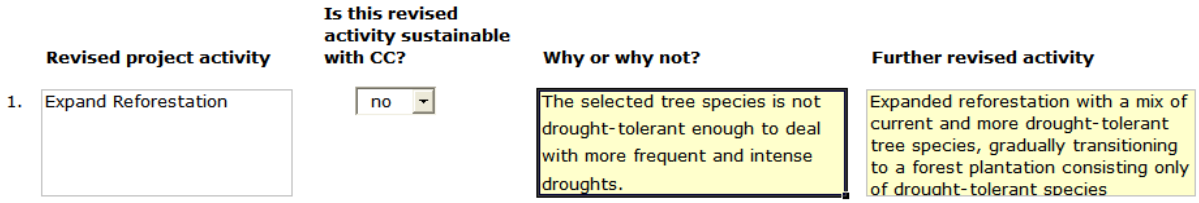


On this 'Modified activities' worksheet, you must consider whether the revised project activities are sustainable in the face of climate change. That is:

- Do/will the impacts of climate change, which were identified in the first step of Module 1, affect the viability and success of revised project activities?
- Will the revised project activities (unintentionally) make human and natural systems more vulnerable to the impacts of climate change?

If the answer to either of these specific questions is yes, then the suggested project revision is not sustainable in the face of climate change. You must select 'no' as your answer, explain why this is the case, and suggest a further revised project activity (Figure 4-7).

Figure 4-7: Sustainability of revised project activities in the face of climate change



Continuing with our hypothetical example, we have indicated that the revised project activity of 'expand reforestation' is not sustainable with climate change. The reason given is that the tree species that will be used in reforestation is not a very drought-tolerant species – not drought-tolerant enough to deal with more frequent and prolonged droughts. As a result, the project activity has been further revised to incorporate a mix of currently used tree species with more drought-tolerant tree species, transitioning to a forest plantation consisting entirely of drought-tolerant tree species.

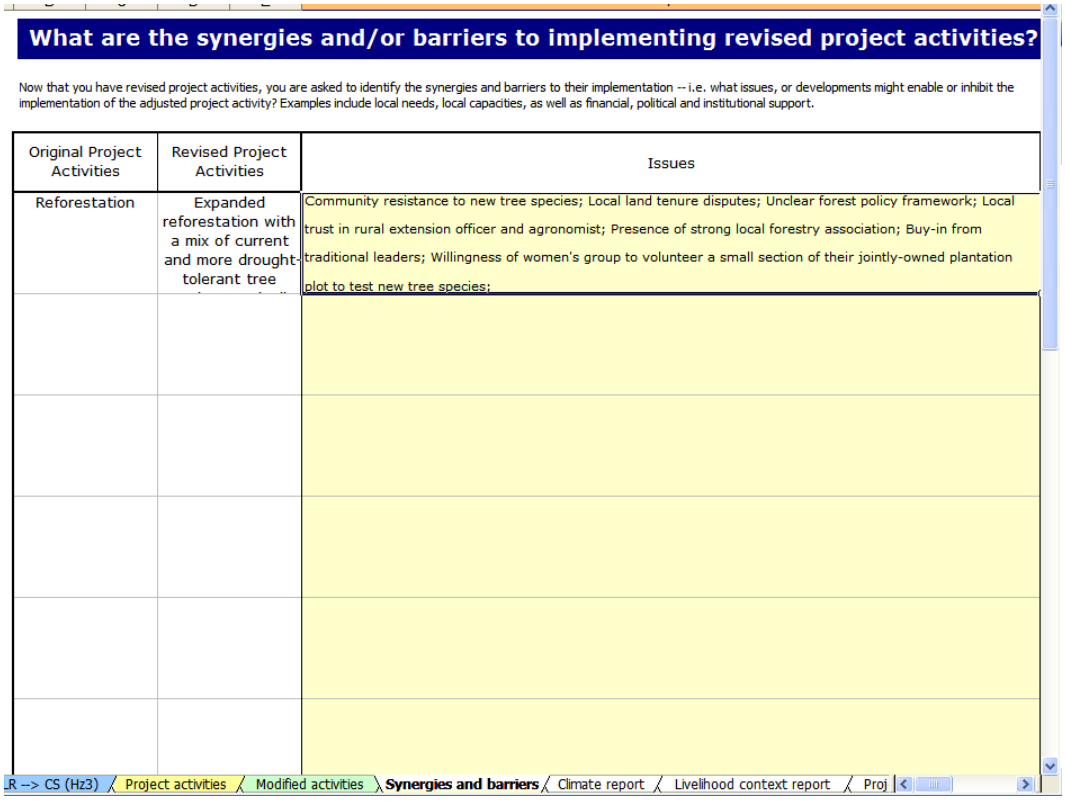
You have now identified a project activity that decreases peoples' vulnerability to climate-related hazards, builds their capacity to cope with climate-related stresses, and is sustainable over the longer-term with climate change.

4.4 Identifying the synergies and/or barriers to implementing revised project activities

Once you have developed a list of revised project activities, you can move to the next worksheet, 'Synergies and barriers.' In this step, you are prompted to think about the feasibility and sustainability in implementing the project adjustments you devised using CRiSTAL – i.e. a type of 'reality check' at the end of the screening process.

You will be taken to a screen represented in Figure 4-8, a simple table listing the original project activity and the CRiSTAL-derived project adjustments down the far left columns, and some text boxes beside for entering information.

Figure 4-8: Synergies and barriers to implementing revised project activities



Examples of issues you might want to consider during this assessment include:

- **Local needs**: Do the proposed project adjustments address local priorities, identified needs or goals?
- **Local capacity**: Is there local capacity to plan, implement, monitor and essentially take ownership to help ensure the sustainability of the proposed project adjustments?
- **Financial support**: Are there sufficient financial resources to implement the proposed project adjustment? If not, what are the options for securing this support?
- **Political support**: Is there political awareness and support – at all levels – of the proposed project adjustments? E.g. traditional leaders, district authorities, etc.
- **Institutional support**: Are there local / regional / national institutions (Community-based organizations; NGOs, schools/universities, government departments, etc.) that could provide technical and social support in implementing the proposed adjustments?
- **Future climate conditions**: Are the proposed project adjustments sustainable in the face of future climate change impacts?

These are only examples and there may be other additional criteria / conditions you may want to consider during this analysis.

Figure 4-9 illustrates some examples of synergies and barriers for our revised project activity of expanding reforestation using a mix of currently-harvested and new, drought-tolerant tree species.

Figure 4-9: Synergies and barriers to implementing expanded reforestation activity

Revised Project Activities	Issues
Expanded reforestation with a mix of current and more drought-tolerant tree	Community resistance to new tree species; Local land tenure disputes; Unclear forest policy framework; Local trust in rural extension officer and agronomist; Presence of strong local forestry association; Buy-in from traditional leaders; Willingness of women's group to volunteer a small section of their jointly-owned plantation plot to test new tree species;

The example in Figure 4-9 identifies the following issues:

- Synergies to implementing expanded reforestation activity:
    - Local trust in rural extension officer and agronomist
    - Presence of strong local forestry association
    - Buy-in from traditional leaders
    - Willingness of women's group to volunteer a small section of their jointly-owned plantation plot to test new tree species

- Barriers to implementing expanded reforestation activity:
    - Community resistance to new tree species
    - Local land tenure disputes
    - Unclear forest policy framework

While the revised project activities you have developed using CRiSTAL can contribute to local-level adaptation, the feasibility or success of these activities will be ensured by addressing the synergies and barriers such as those listed above. Project planners and managers should take these into account when preparing the final project document / plan.

CONGRATULATIONS

You have now finished the CRiSTAL process. You should now have a better understanding of:

- The climate risks – both current and future – in your project area
- The livelihood resources that are important to communities in your project area
- The links between climate risks and key livelihood resources in your project area, namely:
    - Livelihood resources that are strongly influenced by climate hazards
    - Livelihood resources that are important to coping strategies
- How planned / ongoing project activities influence these key livelihood resources
- How project activities might be adjusted to reduce vulnerability and enhance adaptive capacity (minimize negative influences and maximize positive influences of project activities on key livelihood resources)
- The different socio-economic, environmental and other conditions that might affect the feasibility and sustainability of proposed project adjustments.

5 ANNEXES

5.1 Glossary

Adaptation: The actions that people take in response to, or in anticipation of projected or actual changes in climate, to reduce adverse impacts or take advantage of the opportunities posed by climate change. (Tompkins and Adger, 2003)

Adaptive capacity: The ability of a system to adjust to climate change, including climate variability and extremes, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. (IPCC, 2001)

Climate change: Statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). (IPCC, 2001)

Climate hazard: The physical manifestations of climatic variability or change, such as droughts floods, storms, episodes of heavy rainfall, long-term changes in the mean values of climatic variables, potential future shifts in climatic regimes and so on. (Brooks, N., 2003)

Climate impacts: Consequences of climate change on natural and human systems.

Climate variability: Variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. (IPCC, 2001)

Coping strategy: Methods for using existing resources to achieve beneficial ends during abnormal or adverse conditions.

Extreme weather event: An event that is rare within its statistical reference distribution at a particular place. (IPCC, 2001)

Financial resources: The resources – such as savings, credit, regular remittances, pensions, and insurance – that are available to people and provide them with different livelihood options

Hazards: Potentially damaging physical events or phenomena that result from weather or climate conditions

Hazard impacts: The consequences of hazards on natural and human systems

Human resources: The skills, knowledge, capacity and good health important to the pursuit of livelihoods

Livelihood: A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living.

Natural resources: The natural resource stock from which resource flows useful to livelihoods are derived

Physical capital: The basic infrastructure and productive capital (tools, machines) for transport, buildings, water management, energy and communications

Resilience: The capacity of a system to absorb disturbance, undergo change and still retain essentially the same function, structure, identity and feedbacks.

Social capital: The set of social relationships from which people draw in pursuit of their livelihood.

Sustainable livelihood: A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

Vulnerability to climate change: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity. (IPCC, 2001)

5.2 Additional resources

Climate Change:

The Intergovernmental Panel on Climate Change (IPCC), **http://www.ipcc.ch**

The Intergovernmental Panel on Climate Change (IPCC), Climate Change 2007. Working Group II: Impacts, Adaptation and Vulnerability:
http://www.ipcc.ch/ipccreports/ar4-wg2.htm

Working Group II Summary for Policymakers:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf

Executive summaries for regional chapters on impacts, adaptation and vulnerability. Africa:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter9.pdf

Asia:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter10.pdf

Australia and New Zealand:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter11.pdf

Europe:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter12.pdf

Latin America:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter13.pdf

North America:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter14.pdf

Polar Regions:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter15.pdf

Small Islands:
http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter16.pdf

United Nations Framework Convention on Climate Change

Annex I National Communications:
http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/1395.php

Non-Annex I National Communications : **http://unfccc.int/national_reports/non-annex_i_natcom/submitted_natcom/items/653.php**

National Adaptation Programmes of Action (NAPAs) :
http://unfccc.int/adaptation/napas/items/2679.php

Sustainable Livelihoods:

Overview of DFID's sustainable livelihoods (SL) approach:
http://www.livelihoods.org/info/guidance_sheets_pdfs/section1.pdf

Sustainable livelihoods glossary:
http://www.livelihoods.org/info/guidance_sheets_pdfs/sect8glo.pdf

More detailed guidance on the SL approach can be downloaded from:
http://www.livelihoods.org/info/info_guidancesheets.html#7

5.3 References

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O'Brien, Karen, Siri Eriksen, Ane Schjolden, Lynn Nygaard. 2004. What's in a word? Conflicting interpretations of vulnerability in climate change research. *CICERO Working Paper* 2004:04.

Resilience Alliance: see **http://www.resalliance.org**

Tomkins, Emma L. and W. Neil Adger. 2003. Building resilience to climate change through adaptive management of natural resources. *Tyndall Working Paper 27*.

Watson, Robert et al. "Summary for Policymakers - The Regional Impacts of Climate Change: An Assessment of Vulnerability." A special Report of IPCC Working Group II, Intergovernmental Panel on Climate Change. 47 (November, 1997).