United Nations Development Programme

# A Toolkit for Designing Climate Change Adaptation Initiatives

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**Environment and Energy Group/Environmental Finance**
**Bureau of Development Policy**
**United Nations Development Programme**

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The material for this publication was prepared by Alain Lafontaine, Carolina Vergara and Gaétan Quesne from 'le Groupe-conseil Baastel'.

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Cover image:
*Jacob Otieno, Kenya, Environmentalists in Kenya plant trees in celebration of Earth Day 2009.*

# List of Acronyms

| | |
|---|---|
| APF | Adaptation Policy Framework |
| ALM | Adaptation Learning Mechanism |
| CBOs | Community Based Organizations |
| DAC | Development Assistance Committee |
| DANIDA | Danish International Development Agency |
| DRM | Disaster Risk Management |
| GEF | Global Environment Facility |
| GTZ | German Technical Cooperation |
| IPCC | Intergovernmental Panel on Climate Change |
| ISSD | International Institute on Sustainable Development |
| IISD | International Institute for Sustainable Development |
| IUCN | International Union for Conservation of Nature |
| LDCF | Least Developed Countries Fund |
| M&E | Monitoring and Evaluation |
| NC | National Communication |
| NGO | Non Governmental Organization |
| OECD | Organization for Economic Co-operation and Development |
| OECD/DAC | Organization for Economic Cooperation and Development/Development Assistance |
| PRSP | Poverty Reduction Strategy Paper |
| RBM | Results Based Management |
| SEI | Stockholm Environment Institute |
| SCCF | Special Climate Change Fund |
| UNDP | United Nations Development Programme |
| UNDAF | United Nations Development Assistance Framework |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNITAR | United Nations Institute For Training and Research |
| VIO | Volunteer Involving Organizations |

# Overview

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2007) states unequivocally that the world is warming. The report provides a comprehensive analysis of how climate change is affecting natural and human systems. Concern is increasing about the likely implications of climate change on poverty, economic growth, ecosystem services, livelihood opportunities and overall human development. The poorest populations in developing countries are expected to bear the brunt of the impacts of climate change, with costs in individual sectors (e.g. water or agriculture) expected to exceed billions of dollars in individual countries. In this context, the world's attention is shifting towards adapting to the likelihood of a range of climate change induced effects on ecosystems and economic development.

With the emerging necessity to adapt (highlighted most recently in Copenhagen, Dec 2009), countries and communities have started to design and implement initiatives of various types, scales, and coverage. These initiatives typically seek to manage climate change risks at the national, sub-national and local (community) levels. Many focus on developing system-wide local capacities aimed at analyzing, planning and implementing a range of priority actions that strengthen the resilience of key stakeholders and institutions against anticipated climate change risks. Very often, this entails (a) conducting analysis of the likelihood of associated biophysical and socio-economic implications of long-term climate change risks; (b) preparing strategies to include consideration of climate change risks and opportunities in development plans; (c) reviewing/revising/designing national and sub-national policies (including accompanying legislative adjustments) to take into account climate change risks and opportunities; (d) developing partnerships, tools and practices to incorporate climate resilience into investment decision-making processes; and (e) testing and demonstrating discrete interventions to manage climate risks, particularly at the community-level.

In this context, an emerging challenge is to design initiatives that explicitly addresses a climate change driven problem. Questions arise such as how does one differentiate an "adaptation" initiative from a development initiative that must be undertaken regardless of climate change. What are the key elements that must be considered when developing and designing an adaptation initiative. Operational guidance on these questions are still very nascent.

### Scope of Toolkit

This Toolkit aspires to support all those involved in the design of measurable, verifiable and reportable adaptation initiatives. It provides step-by-step guidance for the design of climate change adaptation projects. As such, it seeks to answer the following question: *What are the basic steps in planning and designing an adaptation project?*

### Linkages to other ongoing sustainable development initiatives

Although adapting to climate change represents a new challenge, linkages exist between "business-as-usual" development strategies and adaptation. In some cases, development orientated results will generate benefits for managing climate change risks. Poverty reduction, improved nutrition, enhanced education, expanded infrastructure and improved health clearly will reduce vulnerability to climate change. At the same time, many of the adaptation financing that is currently available (Special Climate Change Fund, Least Developed Country Fund, The Adaptation Fund etc) stipulate distinguishing between baseline development needs and the value added contribution ( 'additionality') of the proposed results in the context of the climate change problem. This toolkit provides guidance on developing adaptation initiatives that are distinct to baseline development .

*1. OECD/DAC. Policy Guidance on Integrating Climate Change Adaptation into Development Cooperation. Pre-publication version. April 2009. http://www.oecd.org/document/5/0,3343,en_2649_34361_42471301_1_1_1_1,00.html*

# Overview

## Audience

The Toolkit is aimed at a wide audience of practitioners who are called on to support the formulation of adaptation initiatives. This includes: professionals at the national/sub-national levels such as central, regional and local government staff; community-based organizations and local communities (i.e. direct local beneficiaries) who seek to develop proposals for community based adaptation initatives; non-governmental organizations; national and local associations; as well as staff in development agencies who are supporting stakeholders in developing countries and/or other parties interested in the formulation and implementation of adaptation initiatives.

## Organization of the Toolkit

This Toolkit is organized into five sections, each reflecting a key step in the process of formulating and articulating an adaptation initiative. This includes sections on key elements of an adaptation initiative, identification of the problem (in the context of climate change), identifying causes, defining a desired (normative) response, identifying barriers to be overcome, and formulating solutions that address the additional risks and opportunities posed by climate change. Throughout the text there is advice on key information required, relevant sources, critical issues to bear in mind and examples.

## Accompanying Materials

This Toolkit forms the basis for an accompanying training package (Power Point training materials based on the content of this Toolkit and accompanying trainee manuals). The training package is tailored for a training course anchored in the five modules which are modeled after the five sections presented in this Toolkit.

## Main sources of information for this Toolkit

The material presented herein draws heavily from the experiences of UNDP in supporting countries (at both the national and sub-national level) and communities, in the process of designing adaptation initiatives, through projects funded by a wide range of sources (GEF, bilateral donors, etc.). It also captures key lessons and findings of other organizations including: Organisation for Economic Cooperation and Development/ Development Assistance Committee (OECD/DAC), UNFCCC, Intergovernmental Panel on Climate Change (IPCC), United Nations Environment Program (UNEP), United Nations Institute for Training and Research (UNITAR), World Bank, Danish International Development Agency (DANIDA), German Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit -GTZ), International Institute on Sustainable Development (ISSD), International Institute for Environment and Development (IIED), Stockholm Environment Institute (SEI), International Union for Conservation of Nature (IUCN), and OXFAM.

# 1. Making the Case

## *Key principles of adaptation to climate change*

Even if the world immediately stopped emitting greenhouse gases altogether, the effects of climate change are now unavoidable, thereby making adaptation in many parts of the world a necessity. Significant changes in the typology, frequency, intensity, duration and distribution of climate-induced hazards can be expected even under relatively modest scenarios of climate change. According to the recent Stern Review, a warming of 2°C is likely to result in the extinction of 15-40% of all species, a 3°C or 4°C change will result in millions of people being displaced due to flooding, while a warming of
4°C or more is likely to seriously affect global food production.

### Managing climate change challenges on development
### a) Conducting long-term planning exercises

In addition to affecting the distribution, nature, and severity of climate-related hazards (i.e. potentially damaging physical events) across the globe, climate change may result in the emergence of "new" types of hazards that were previously absent or rare. There are also likely to be changes in risk factors (i.e. the probability of harmful consequences). Adaptation efforts will need to be closely linked with strategies for disaster risk management (DRM). DRM strategies, policies and measures, will be a good starting place to address new and more intense and frequent weather-related risks. For example, integrating the findings of climate change risk assessments into planning processes for disaster risk reduction and management, and enhancing existing early warning systems and emergency plans, are all relevant for both adaptation to climate change as well as DRM. However, adaptation is not simply about better risk reduction or coping with a stochastic climate. The extent of vulnerability to climate change is a function of changing risks as well as the levels of exposure, sensitivity, and adaptive capacity to new and emerging hazards. Given the fundamental shifts in economies and ecosystem boundaries that will result from climate change, upgrading existing or new disaster risk reduction measures alone, while necessary, will not be sufficient.

> "A major challenge confronting decision-makers is how to deal with the inherent levels of uncertainty regarding changing long-term climate conditions and their associated impacts."

A major challenge confronting decision-makers is how to deal with the inherent levels of uncertainty regarding changing long-term climate conditions and their associated impacts. Making medium-to long-term decisions today, under conditions of imperfect information, is perhaps one of the greatest challenges. Effective climate change adaptation will require long-term, orientated planning approaches at the national, regional and local levels. Simply reacting to changes in the short-term or medium-term, without attention to changes that will occur and remain over the long-term, will result in poor investment decisions; the costs of which could exceed the direct local costs of warming.

# 1. Making the Case (*Cont.*)

**b) Mainstreaming adaptation into policy and investment decision-making**

Market forces alone are unlikely to lead to efficient adaptation because of inherent uncertainties in the timing and magnitude of climate change, the 'public good' characteristic of a number of adaptation options and the long-term nature of adaptation benefits compared to clear and present adaptation costs. To promote early and planned action, governments will need to:

- provide appropriate information on future climate change;
- set performance standards and establish codes;
- propose criteria to select priority adaptation policies for implementation; these criteria can include cost-benefit ratio but also robustness and flexibility criteria.
- incorporate adaptation concerns into national development policies and public investment plans; and design and implement long-term policies to protect climate sensitive ecosystem services and public goods (water supply, coastal protection, regional political cooperation, etc).

Climate change is a multi-sectoral issue. Promoting increased resilience to the impacts of climate change is closely intertwined with development choices and actions that cover a variety of sectors, such as energy, agriculture, health, water resources and infrastructure. In particular, it is essential to consider both synergies and trade-offs between adaptation and mitigation activities, including possible negative and positive side effects. Focusing too much on isolated adaptation goals, without considering side effects (e.g. cross-sectoral effects) and linkages with other goals, could also lead to missed opportunities. Strong coordinating mechanisms at the national and sub-national levels are therefore required. Such mechanisms are most effective when they are well-integrated into the local organisational and administrative culture, and nested in decentralised systems, where the governance and accountability is geared to respond to the adaptation needs of the poorest and most vulnerable.

> IPCC defines adaptation as "…adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, that moderates harm and exploits beneficial opportunities" and "…a process by which individuals, communities, and countries seek to cope with the consequences of climate change, including variability."

Experience has shown that it is counterproductive to create stand-alone institutions charged with responsibility for climate change risk management. Climate change cannot be the sole responsibility of any single institution, or professional practice. Instead, it is important to strengthen existing systems of governance, including those at the regional level that can promote "bottom-up" effective adaptation. Line ministries responsible for the provision and management of public goods, food production and water management, need to be fully accountable for maximising the efficiency of public goods and services, while minimising the fiscal burden from climatic losses. Fundamentally, the persuasive nature of climate change requires a behavioural shift and the mainstreaming of adaptation into development and investment decision-making processes at all levels of society in the coming decades.

# 1. Making the Case (*Cont.*)

### c) Financing adaptation action

There is little doubt that development will be more costly under changing climatic conditions. While there are many difficulties and limitations in estimating the exact cost of adapting to climate change under various emissions and temperature increase scenarios, all the available indicative estimates suggest that adaptation costs in developing countries will be in the order of tens of billions. In addition to improving the way development is done, through mainstreaming adaptation into development and investment decision-making exercises and adopting a long-term perspective, effective adaptation will require changing the way development is done. The net costs of achieving sustainable development will be higher because of (a) the measures that must be introduced to manage the additional risks and challenges brought about by climate change; (b) the opportunity costs as scarce resources are redirected or lost; and (c) the costs of managing the uncertainty that is inherent with climate change. The amounts needed to adapt to climate change far exceed what is currently available from a variety of funding sources. Decision-makers will need to prioritise adaptation action, reduce the risks of maladaption, "right-size" structural risk reduction measures, and promote adaptation initiatives, which not only reduce climate risks but also generate development co-benefits and develop new financing mechanisms for adaptation.

# 1. Making the Case (*Cont.*)

## Goal

**Securing development benefits that may otherwise be undermined by climate change**

## Objective

Improving adaptive capacity and/or reducing vulnerability of human populations and natural and economic systems on which they depend to climate change and its impacts

Establish/strengthen national/sub-national/local systems to support process of adaptation in a continuous and sustainable way to moderate potential damages, take advantage of opportunities, or manage long -term consequences

## Key Results

⇒ **Enhance technical ability of people** (such as national planners, local officials, technical staff, farmers, coastal settlers, NGO workers, etc.) to manage climate change risks and opportunities.

⇒ **Strengthen capacities (mandate and finances) of institutions** to implement changes and adjustments to policies, laws and development plans for the purpose of better adaptation to climate change.

⇒ **Incorporate climate change risks into various levels of decision- making** and different sectors of the economy

⇒ **Promote and disseminate knowledge and learning** from adaptation initiatives implemented through various organizations and institutions and sharing lessons across multi-stakeholder and south-south exchange fora

# 2. Key Steps

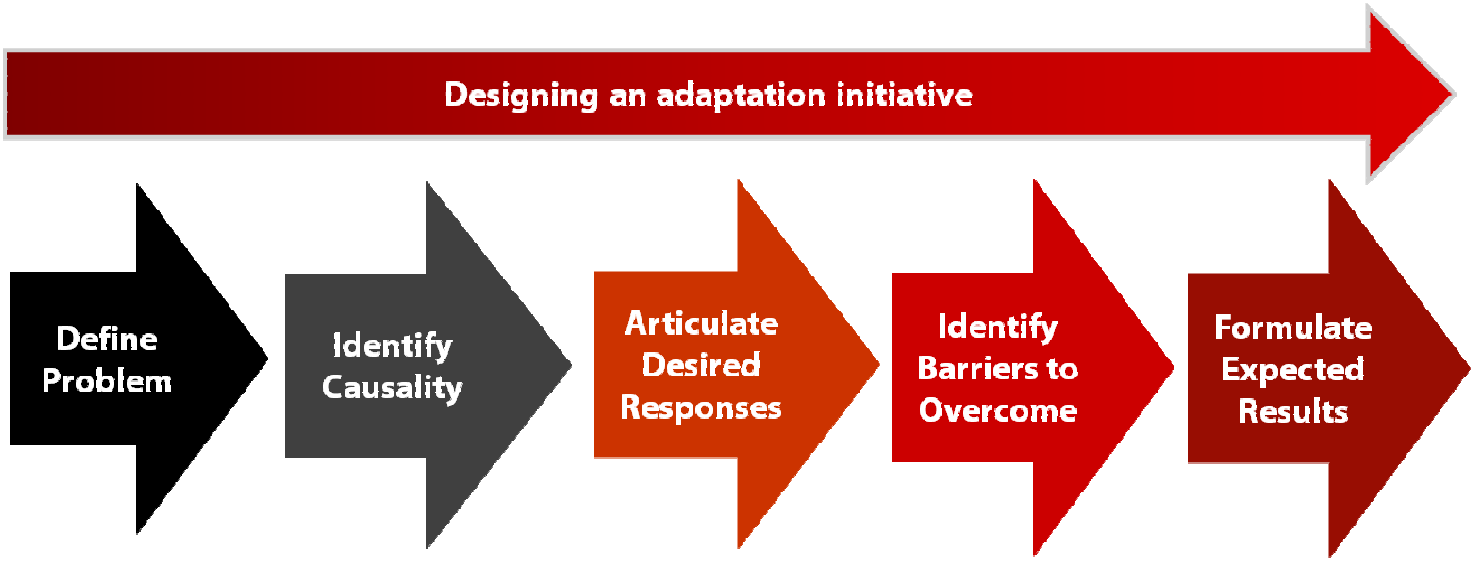
## *Key Components in Designing an Adaptation Initiative*

### 5 STEPS FOR DESIGNING AN ADAPTATION INITIATIVE

The preparation of an adaptation initiative can be made easy by a series of simple but sequential activities. They include :

(1) Defining the problem
(2) Identifying the causes of the problem
(3) Formulating (articulate) the desired situation (*normative solution)*
(4) Identifying key barriers to overcome to reach the desired situation
(5) Designing project responses to achieve the desired solution

These steps represent a minimum set of activities for defining a project with a logical structure. Stakeholder consultation is critical for each activity. A non-linear process should ideally be followed when undertaking these core activities.



# 2. Key Steps (*Cont.*)

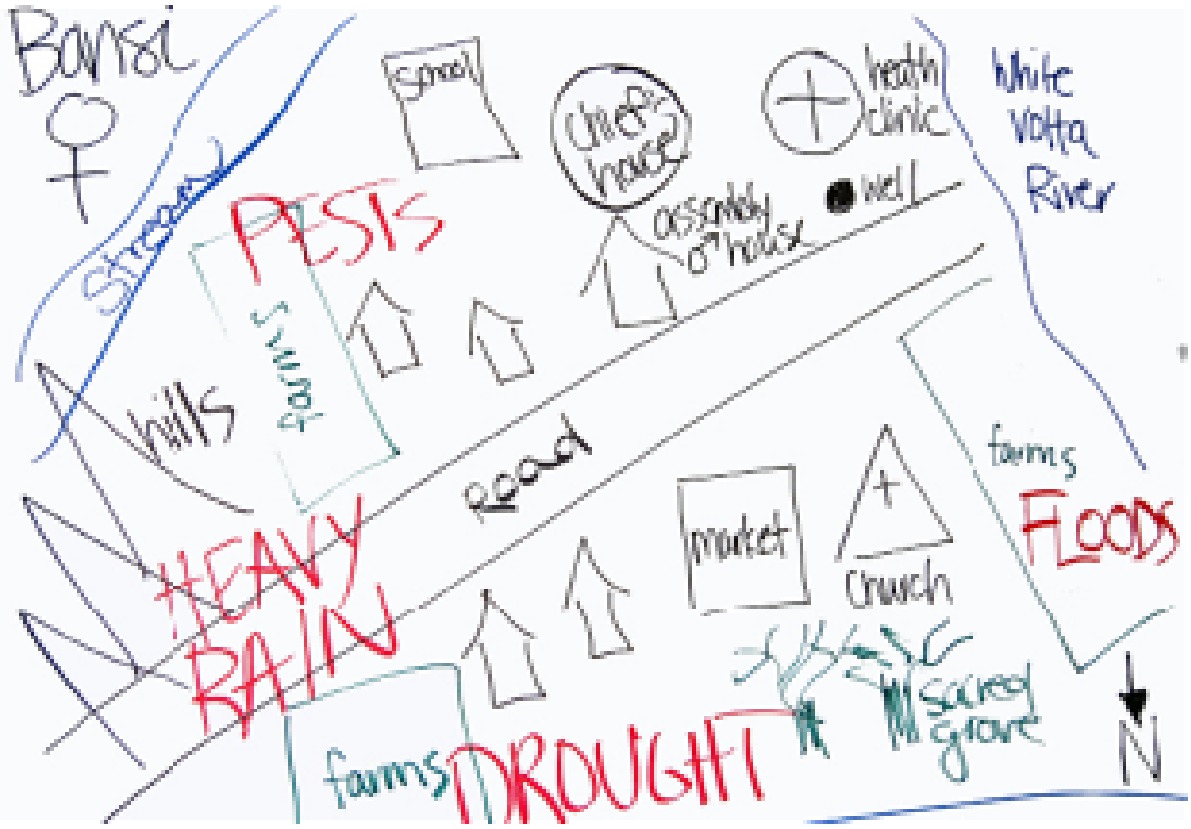
**(1) Define the problem**
This step involves describing the climate change-induced problem that underlies a proposed adaptation initiative.

**(2) Identify causes of the problem**
This step involves identifying the reason(s) for the climate change-induced problem. Analysis of the causes will involve examining development stresses upon which the *additional* climate change stress is superimposed. An examination of why the climate change–induced problem is not currently addressed in some shape or form may be required. There are likely to be a range of non-climate related factors that are also at the heart of the problem. An understanding of the causes of the problem is critical for formulating a targeted adaptation initiative.

**(3) Formulate (articulate) the desired situation**
Articulate the long-term desired situation with respect to managing the problem. This is commonly referred to as the normative situation. It describes the preferred solution/situation to address/manage the identified underlying problem. Several inputs including *inter alia* a) results of climate change risk assessments, b) findings from technical assessments including those from applied research, c) technical expertise (local, sub-national, national and, where relevant, international), and d) political considerations need to be brought to bear to formulate the desired situation.

**(4) Identify key barriers to overcome to reach the desired situation**
The underlying logic is to identify the reasons why, if a given situation is preferred, it has not already been put into practice or implemented. Once the desired situation has been articulated, the next step involves identifying the set of barriers that must be overcome for the desired situation to be met. That is, a comprehensive mapping is required of all critical barriers that need to be removed in order for the desired situation to be reached. This mapping exercise is necessary, among other reasons, to determine a) the results that are sought and b) linkages to other ongoing initiatives. This exercise builds upon the identification of the causes behind a given problem as it will enable project developers to determine the most appropriate level for an intervention. It is important to realize that the project/initiative will (typically) be able to contribute to the resolution of some, but not all barriers. Resolving entire all barriers is usually not feasible through any single project.

**(5) Design project responses to achieve the desired solution**
Once steps (1)-(4) have been completed, there is likely to be sufficient information to design a clear, well articulated adaptation initiative. The project design will benefit from an appropriate framework for organizing a) expected results of the project, b) tangible products/services that the project will deliver, and c) activities and inputs that are required to achieve the key results and products/services. Financing, monitoring and other reporting requirements (as specified by the donor concerned) are usually defined at this stage.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Chief's house
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White Volta River
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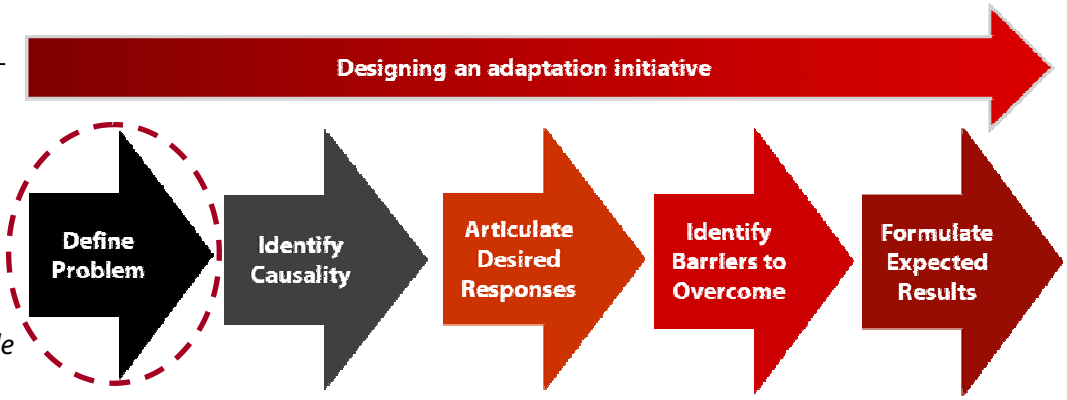
# 3. Define the Climate Change Problem

## *Key Components in Designing an Adaptation Initiative*

### STEP 1. DEFINE PROBLEM

The first step in designing an adaptation initiative is to articulate the climate change driven problem.




Example 1 (for a national/sub-national level initiative): *Country X's farmers are vulnerable to variations in climatic conditions as well as anticipated long-term climate change.*

Example 2 (for a Local/Community level initiative)*:* Intensified and frequent coastal flooding adversely affects community livelihood opportunities.

### UNDERSTANDING THE TASK

Stakeholder consultations and a review of existing analytical assessments (both those published as well as unpublished) will be necessary to clearly define the underlying problem.

A robust climate risk analysis may need to be undertaken in order to determine the climate change-induced problem(s). In this context, information on the near– and long-term state of climatological and socio-economic factors is critical. This includes a thorough analysis and quantification of the likely implications of anticipated climate change, including extreme events, on key socio-economic factors of concern. Knowledge of the risk is a necessary first-step in understanding the likelihood that the perceived problems will occur (be it at the national, sub-national or local level). It is also necessary to identify the range of impacts that are likely to manifest. Together, the information is critical for informing decisions that can minimize anticipated adverse impacts.

### APPROACHING THE TASK

1. Review the existing literature on climate change impacts on key sectors and regions within the country. Identify key findings that can be the starting point for discussions with key stakeholders.
2. Organize and conduct a series of stakeholder consultations to articulate and validate the problem that needs to be addressed. Consult with professional experts in your country.

The process of identifying the climate change driven problem will most likely entail a series of consultations with key stakeholders.

(a) *Initial consultation*: Ensure all relevant stakeholders are informed of the context for discussing the problem statement. This could, for example, include an opportunity to programme resources from a specific donor for adaptation. In such a case, it is important to establish the expected scope, policy objectives and anticipated budgetary envelop so that discussions can be grounded on what is likely to

# 3. Define the Problem (*Cont.*)

**APPROACHING THE TASK (Cont)**

be feasible. This would be good opportunity to brainstorm about potential climate change related problems in particular, what is already known or has been identified through various ongoing processes.

(b) *Second consultation*: Having reviewed available critical information (see section on sources of information) and consulted broadly, present the findings of what is believed to be the problem that needs addressing. If necessary, a detailed climate risk assessment may need to be undertaken, if one has not been. Typically, there is likely to be a range of problems that require attention. This consultation could therefore be used as an opportunity to prioritize a specific problem that will be the focus of the adaptation initiative. Additional primary or secondary information may need to be collected once there is some agreement on the scope of the problem to be tackled.

(c) *Third consultation:* To validate and vet the problem statement. Ensure that the baseline context is accurately defined. This is relevant as the discussion turns to other key components in formulating and adaptation project.

**INFORMATION AND RESOURCES TO UNDERTAKE THE TASK**

⇒ National Communications Reports submitted to the United Frameworks Convention on Climate Change;

⇒ National Adaptation Programmes of Action (or equivalent);

⇒ Field notes from visits to sites where there is a manifestation of a particular climate-related problem that one expects to worsen or be indicative of what is likely to be case in the not too distant future;

⇒ Information on the current institutional, policy and capacity context. This includes information on national/sub-national as well as sectoral policies and strategies, including ongoing and planned initiatives of relevance. This is critical information to establish the baseline for the project.

⇒ Results from consultations with community level stakeholders on current development and/or climate relate issues (this is critical information for establishing the project baseline);

⇒ Minutes/notes from meetings with experts such as economists, agronomists, climatologists, hydrologists, finance experts, planners in central government, sub-national level institutions, academia, private sector and civil society. This information is necessary to fully appreciate the dynamics and complexities of the underlying problem.

There are a number of information sources for defining a specific problem statement can be found. Search engines on the internet can be used for identifying and accessing documents that will provide relevant information.

Websites to review in order to commence a search for relevant documentation, from which additional sources can be identified, include:

⇒ UNDP's Adaptation Learning Mechanism (www.adaptationlearning.net);

⇒ United Nations Frameworks Convention on Climate Change; (http://unfccc.int/national_reports/items/1408.php)

⇒ National Adaptation Plans of Action (http://unfccc.int/cooperation_support/least_developed_countries_portalitems/4751.php)

⇒ National Communications to the UNFCCC (http://unfccc.int/national_reports/non-annex_i_natcom/items/2716.php);

⇒ National Capacity Self-Assessment (NCSA-http://ncsa.undp.org/);

⇒ UNDP's Human Development Report (http://hdr.undp.org/en/);

⇒ World Bank Database on Research Findings (http://econ.worldbank.org);

# 3. Define the Problem (*Cont.*)

**ADDITIONAL CONSIDERATIONS**

1. Define a clear and precise problem statement, preferably without jargon.
2. In the context of defining an adaptation initiative (with clear expected results to be achieved), it is not helpful to state that climate change is the problem. The problem statement should be of a much lower-order; typically an issue that is within the ability of one adaptation initiative to tackle. Start, at the very least, with the problem defined in terms of the implications of climate change on a key sector be it at the national, sub-national or local level.
3. Avoid the temptation to describe the causes of the problem in the problem statement itself. For example: Intensified and frequent coastal flooding *due to climate change* adversely affects community livelihood opportunities. The reason this distinction is important is because it is highly unlikely that there is only one type of cause for the problem. Causes are discussed under section 4 of this toolkit.
4. Climate data from the Intergovernmental Panel on Climate Change (IPCC - http://www.ipcc.ch/), from regional models and other sources is now readily available. It is consequently not critical that new analyses be undertaken to determine the climate change-related problem. By using a variety of sources to assess the type, number and complexity of existing problems, the information obtained from these sources can then be triangulated to identify and prioritize the problem(s) to be addressed by the climate change adaptation initiative that you are designing. The preparation of these documents will entail a detailed analysis of the added contribution that climate change presents for a variety of vulnerabilities.
5. Ensure that baseline conditions viz-á-viz national/sub-national policies and strategies including ongoing and planned programmes and projects are defined.

***Next: Think about what the causes of the perceived climate change related problem are***

# 3. Define the Problem (*Cont.*)

**MULTIPLE APPROACHES FOR ANALYZING THE PROBLEM**

UNDP's Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures (APF) suggests a variety of approaches to analyze the climate change related problem in a rigorous manner. The four major types of approaches are:

Hazards-based approach: The problem can be identified and assessed based on current vulnerability and current risks. Climate change scenarios are then used in conjunction with other information to examine how vulnerability and risks are likely to change over time and space.

Vulnerability-based approach: The problem can be identified based on an assessment of how likely the critical thresholds of vulnerability (viewed as a combination of development conditions and sensitivity to climate change) will be exceeded under alternative climate change scenarios.

Adaptive-capacity-based approach: The problem can be assessed by examining the current adaptive capacity of a system and determining weaknesses in the context of emerging risks and opportunities under a range of climate change scenarios.

Policy-based approach: In this case, the climate change problem is assessed based on whether an existing or new policy is robust under climate change. A number of qualitative and quantitative techniques can be employed to test whether the policy is robust to a range of anticipated risks under climate change.

**IS DETAILED CLIMATE SPECIFIC DATA NECESSARY TO ARTICULATE THE PROBLEM?**

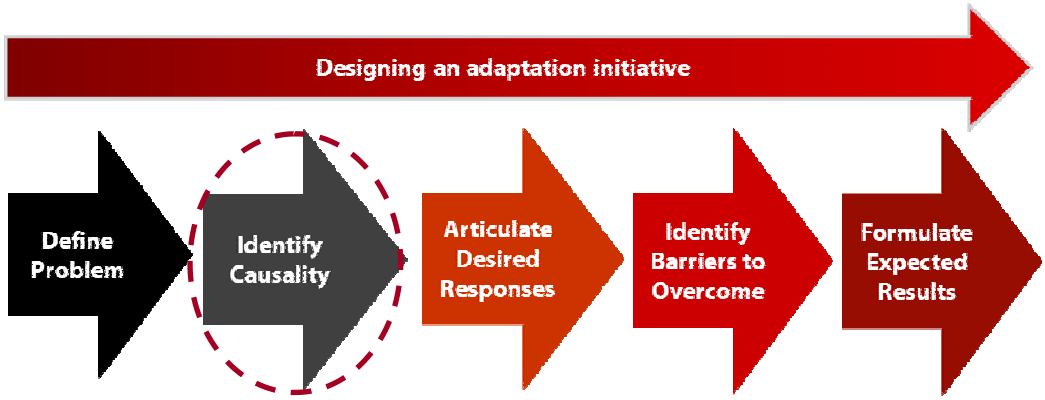
The question often arises whether detailed climate change data (typically time-series meteorological data of various interval periods (e.g. daily, monthly, seasonal, annual, decadal, etc.)) is necessary in order to articulate a climate change problem. Typically, such information, while useful, is not sufficient. The articulation of a climate change problem requires more than data. Rather, the problem analysis is concerned with examining the implications of observed and anticipated long-term trends in climate on a key sector.

As such, it is likely to be more efficient to spend time searching for analytical products (e.g. peer-reviewed scientific papers, reports in the grey literature, and summaries of interviews with different types of stakeholders such as rural farmers or government officials) that may provide a more complete understanding of the climate change driven problem rather than for detailed climate data.

# 4. Identify Causes

## *Key Components in Designing an Adaptation Initiative*

### STEP 2. IDENTIFY CAUSES




The second step in designing an adaptation initiative is to identify a range of causes for the identified problem.

In this toolkit, drivers of the climate change problem are referred to as "*causes*". This includes those factors that are context specific and time-bound (e.g. absence of a qualified person(s), shortage of specific resources), institutional drivers (such as policies, laws, systems, etc.), attitudinal and behavioral drivers. Both climatic and non-climatic drivers need to be identify and analyze taking into account the different levels (immediate, underlying and root) as macro-level barriers often cannot be resolved through a single project.

Once the climate change problem has been identified and validated (see previous section), it is critical that the full range and levels of causes are analyzed and understood. This is a necessary step towards defining what needs to be done to avoid or reduce the problem. If the most relevant causes are not identified correctly, it is likely that the design of the adaptation initiative will be misaligned with the problem and the preferred response (i.e. *normative solution,* see next section). If this were to occur, anticipated outcomes from the eventual project that is designed and implemented are unlikely to be realized. At its worst, it could lead to potentially maladapted results (i.e. a result that is more disruptive than or damaging than the status quo).

### LEVELS OF CAUSES

Basically, there are three levels of causes as is illustrated in example 3.1 and figure on page 21):

#### Immediate causes

Immediate causes (sometimes known as primary causes) are usually the direct technical causes of the problem.

#### Underlying causes

Underlying causes contribute to the immediate causes. Usually these causes are the result of resource uses and practices, and related social and economic drivers. Examples include land and water use, and damaging or unsustainable practices. For their part, social and economic causes can include increased sectoral development, economic incentives, and land tenure issues. It helps in identifying these underlying causes if the sector under which they operate is understood (e.g. within agriculture or transport), as well as the respective governance framework. Linkages between sectors should be explored because causes and impacts are usually not limited to a single sector.

# 4. Identify Causes (*Cont.*)

**Root causes**

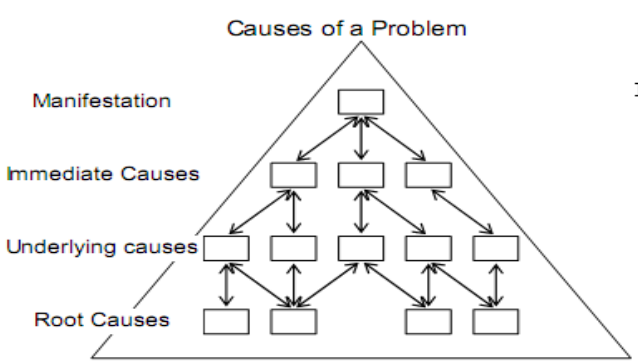
Beyond the underlying social and economic causes and sectoral pressures are root causes. These correspond to system-level aspects such as macro-economic policies, demographic trends, consumption patterns, access to information and democratic processes. Most of these are beyond the scope of single project, they need to be identified in so as to understand the context of a given problem.

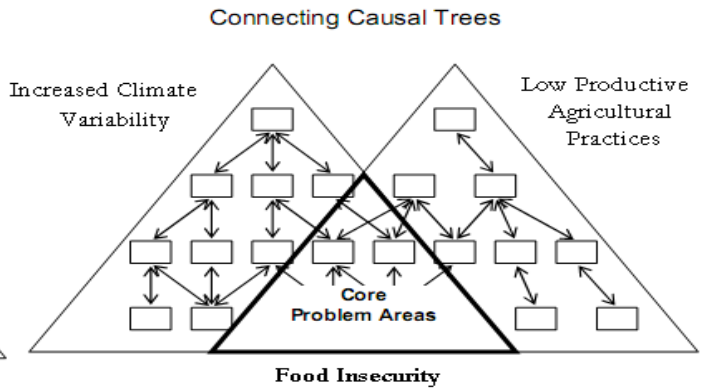
**UNDERSTANDING THE TASK**

There are a variety of pragmatic ways of identifying causes. The question that needs to be asked repeatedly in order to link the causes of a problem with its effect is, "why and what is the cause?" Asking "why" repeatedly each time a response is typically a practical step to get to the heart of the problem. There are a number of tools available to assist in this process. One such tool is highlighted below.

## Problem Tree (Modified from the Diagram in the UNDAF Guidelines)

The United Nation Development Assistance Framework (UNDAF) guidelines, as well as in the European Commission's Project Cycle Management Guidelines highlights the use of an analytical framework based on Problem Tree approach to assist with identifying key drivers of a problem. The approach relies on visually representing the main cause and effects of a specific issue. It helps with identifying the manifestation of the problem – or its effect on people – and it's *immediate, underlying* and *root* causes. It also emphasizes the importance of disaggregating the causes as much as possible by sex, age, geographic area, ethnicity, disability, and other criteria. Some underlying or root causes may be relevant for different development challenges. It is important to flesh these types of issues out so that they can be dealt with directly.




Source: *European Commission. Aid Delivery Methods. Project Cycle Management Guidelines. Volume 1. March 2004. http://ec.europa.eu/europeaid/multimedia/publications/index_en.htm*

# 4. Identify Causes (*Cont.*)

## *An Example*

**NOTE OF CAUTION:** The following is an example to illustrate key principles in formulating a project. It should be not be read as anything more than that, including as UNDP's support towards specific types of interventions.

**The Problem**

Example 3.1 (for a national/sub-national level initiative):
The majority of farmers in Country/Region/Community X are without the necessary technical capacity, physical resources and financial resources to adapt to and overcome worsening climatic conditions.

**Here one category of causes underlying the absence of technical capacity (part of the problem) is outlined below**

Box 3.1a Causes for the absence of technical capacities

(1) Rural school children do not receive the necessary education at a primary and tertiary level. *Why*? Among many reasons,

- ⇒ Transport to schools is often not available. *Why?*
  - ⇒ In part, transport to schools is often not available due to poor road infrastructure.
- ⇒ The standard of teaching in schools and universities is frequently low. *Why?*
  - ⇒ …..…..[*add as necessary*]
- ⇒ Political mandates to make the necessary increases to education budgets have not been adopted by relevant ministries.
- ⇒ …..…..[*add as necessary*]

*As a consequence of the low level of education of the rural population, agricultural and financial management skills are limited.*

(2) Rural school children that do receive a education tend not to return to rural areas and rather settle in cities.

*As a consequence, the problem of a lack of technical skills in rural areas is exacerbated.*

(3) The agricultural education that is available in the country does not address the impending impacts of climate change on the agricultural sector. *Why*?

- ⇒ Curricula have not been adjusted to cater to needs of emerging climate change pressures.
- ⇒ Appropriately trained teachers are not available.
- ⇒ …..[*add as necessary*]

*As a result, educated students are not equipped to implement or develop adaptation solutions.*

(4) The government extension service that can potentially provide advice on adaptation technologies is limited in size and does not reach the majority of rural farmers. *Why?*

- ⇒ Investment by government in the agricultural sector is small relative to other sectors.
- ⇒ There are relatively limited education opportunities within the country.

(5) The government extension service is not trained to manage climate change impacts and develop innovative adaptation solutions.

(6) …..…..[*add as necessary*]

# 4. Identify Causes (*Cont.*)

## *An Example*

Causes underlying the absence physical capacities are outlined below

Box 3.1b Causes for the absence of physical resources

(1) Over the past two decades the cost of fertilizer relative to income has more than doubled. *Why?*

⇒ This is largely due to rising international oil prices.

(2) Government fertilizer and seed delivery programmes have also become progressively less reliable? *Why*?

⇒ Mal-administration of the programmes

⇒ Mismanagement of funds.

*In consequence, poor reliability often results in farmers not having seeds and fertilizers at the start of the growing season.*

(3) Small land areas available to single farmers (e.g. <2 hectares per farmer in many regions). *Why?*

⇒ High population density in rural areas

(4) The degradation of land. *Why?*

⇒ Unsuitable farming practices (e.g. inappropriate ploughing, insufficient liming of soils, and over-irrigation leading to salinisation)

*The area of productive land available is reduced as a result.*

(5) Infrastructure such as grain storage facilities, irrigation equipment and rail/road networks are either non-existent in rural areas or poorly maintained. *Why?*

⇒ Insufficient government budgets and/or lack of technical capacity to construct/maintain the infrastructure.

(6) The infrastructure that is available to rural farmers is often not appropriate for impending climate change impacts such as floods and droughts. *Why?*

⇒ Long-term climate change risks have not been factored into their design and maintenance plans.

# 4. Identify Causes (*Cont.*)

## *An Example*

**Causes underlying the absence of financial capacities are outlined below**

Box 3.1c Causes for the absence of financial resources

(1) A large proportion of the population are employed within the informal sector and consequently do not pay taxes. This makes government budgets extremely limited relative to developed countries where most of the population is employed in the formal sector. Need to explore *Why*?

(2) Governance and financial management issues reduce the amount and efficacy of government expenditure in the agricultural sector. Need to explore *Why*?

(3) Absence of political will to channel additional government resources to the agricultural sector. At present only 5% of the annual budget is spent on the agricultural sector, despite the fact that more than 60% of the population derives their livelihood from agriculture. Need to explore *Why*?

(4) The government budget that is allocated to the agricultural sector has not been tailored to address climate change impacts. Need to explore *Why*?
*As a result, many agricultural investments will not yield large returns under a changed climate, and therefore represent a poor allocation of resources.*

(5) Government strategies, policies and legislation in the agricultural sector do not take cognizance of the predicted climate change impacts and do not promote or facilitate investment in climate change sensitive technologies and practices.

(5) Most rural farmers do not have strong security of land tenure, and consequently cannot use their land as collateral to develop their farming enterprises.

(6) Establishing a formal agricultural business is fraught with administrative delays, and consequently farmers tend to opt for the informal market which ultimately hinders the development of large commercial enterprises. This prevents the entrepreneurial activities that generate financial resources in rural communities from flourishing.

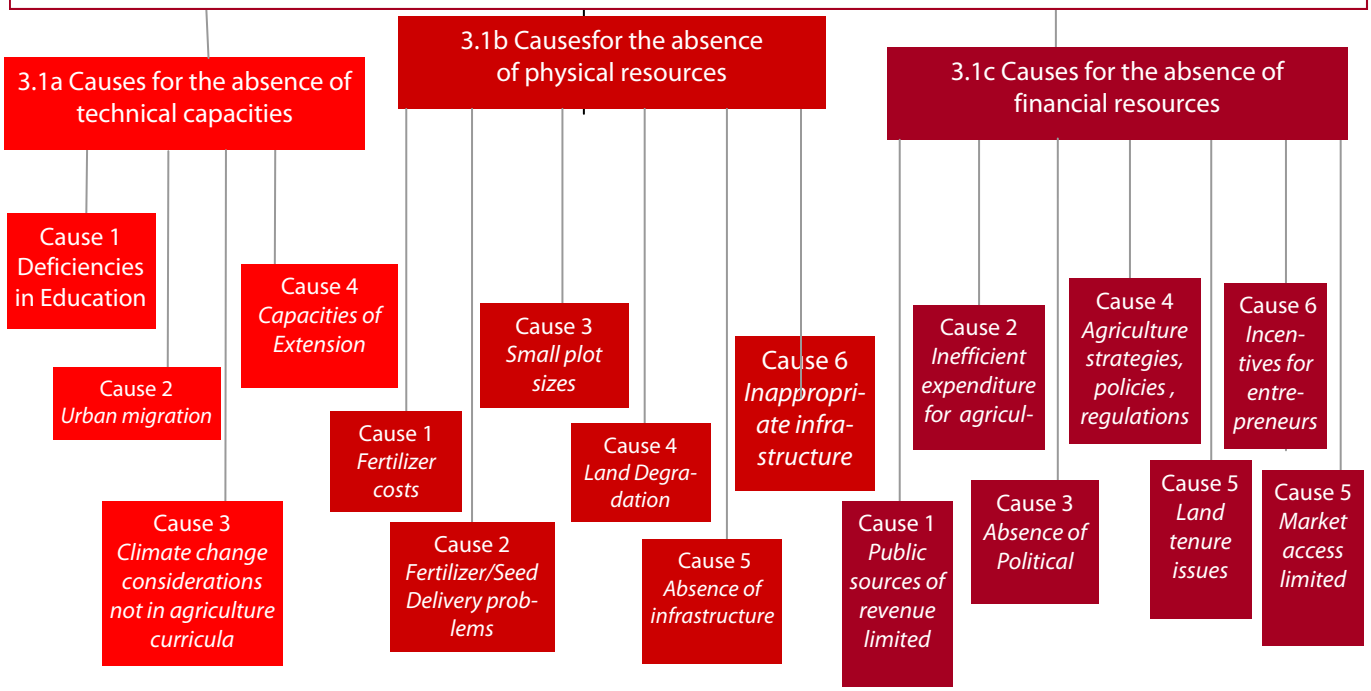
(7) Farmers frequently cannot generate cash reserves. *Why?*
⇒ Unable to reach markets (largely due to poor transport networks).

# 4. Identify Causes (*Cont.*)

## *An Example*

**The Problem Tree**

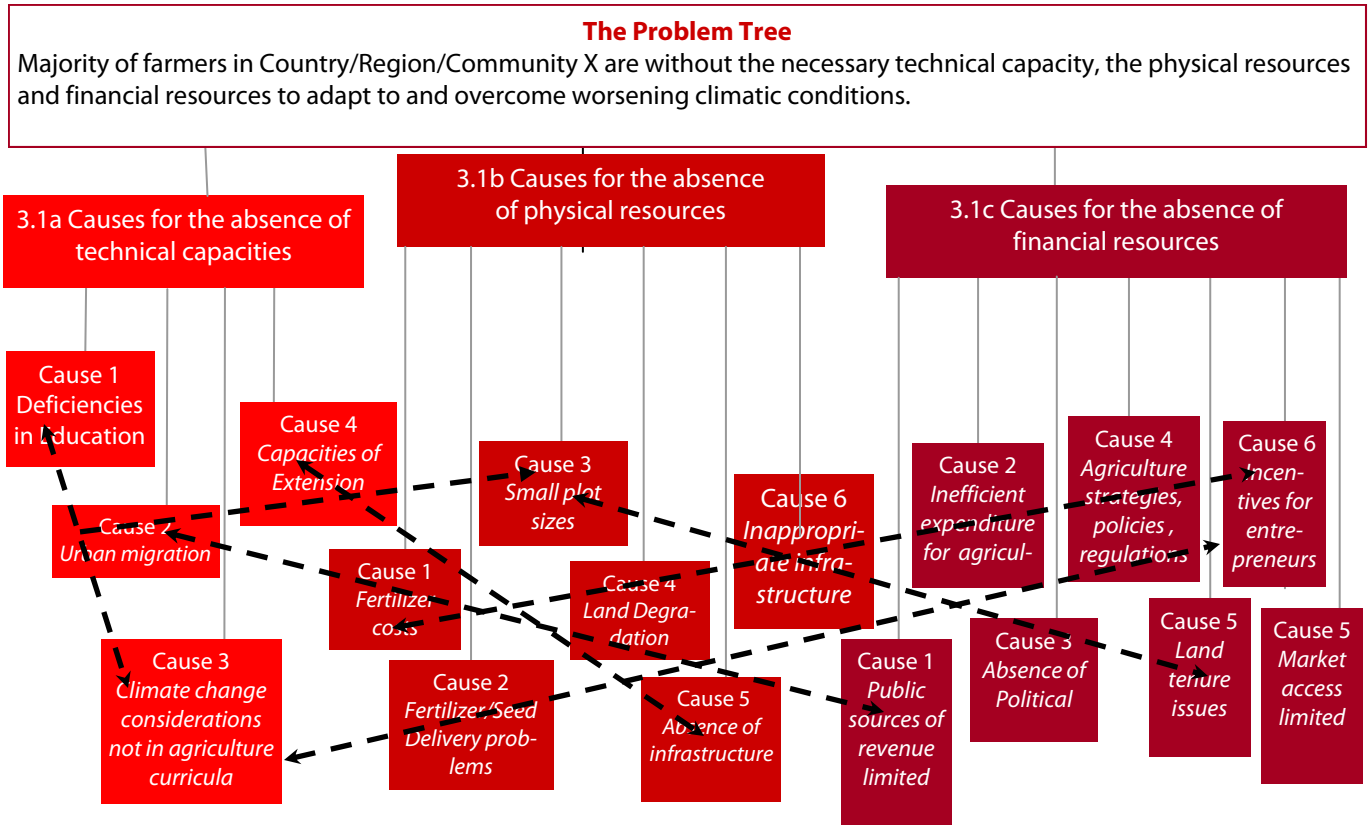
Majority of farmers in Country/Region/Community X are without the necessary technical capacity, the physical resources and financial resources to adapt to and overcome worsening climatic conditions.



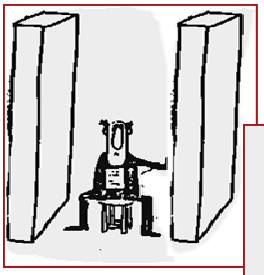

NOTE OF CAUTION! The figure above is for exposition purposes of key principles. Rarely will causes be linear or fit neatly into boxes. In reality, as is evident from the figure above, there will be a number of interlinked, cross-cutting issues. These must be explicitly recognized and factored into the ensuing discussions on desired responses, barriers to achieving the desired responses and key results expected from an intervention.

# 4. Identify Causes (*Cont.*)

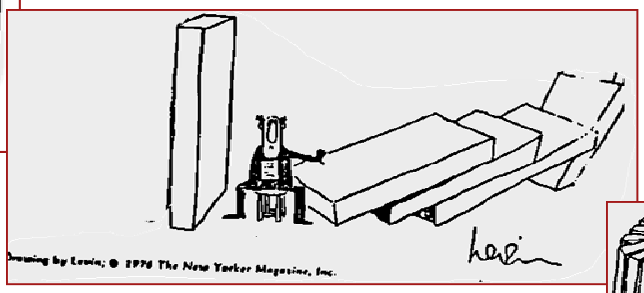
**Bear in mind inter-linkages between different causes!**



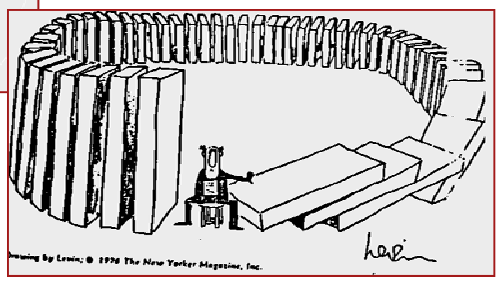

Understanding an issue as completely as possible is important because intervening in one point of a system….



….may have feedbacks & lagged effects...



….and result in unintended consequences!



*Source: From Deenapanray (2009)*

# 4. Identify Causes (*Cont.*)

**KEY ISSUES FOR CONSIDERATION**

1. Outline the full range of causes in the context of the problem.
2. Causes is likely to be context specific. It is critical that they are articulated in a clear and detailed manner.
3. Causes in the context of a climate change-related problem often include both climatic and non-climatic factors. In this context, both non-climate (baseline) and climate change specific causes should be identified. For example, in Box 3.1a, cause (1) and (2) are issues that will apply whether or climate change occurs or not. In contrast, cause (3), (4) and (5) are more closely aligned with climate change specific needs. Similarly, in Box 3.1b, causes (1), (2), (3), (4), (5) and (7) apply regardless of climate change. Cause (6) is directly relevant in the context of climate change.
4. Question the causes — ask yourself: "Is this problem arising because of climate change?" It may be useful to engage in brainstorming with colleagues as opposed to solely relying on reading of documents/notes.
5. Recognize cross-cutting and interlinked causes.
6. The process of outlining causes must be stakeholder driven and is a very iterative process. Critical analytical processes should ideally be used.
7. Please do not assume that causes is in anyway implied to be linear or can be neatly articulated into specific boxes. In reality, issues are complicated as we all know!
8. Avoid fictionalization or speculation that will dilute the facts by ensuring wide stakeholder consultations. Document relevant findings outlined in reports, peer-reviewed papers, expert judgments (who said what and where) for future reference and cross-checking.
9. Avoid the temptation to dwell on solutions or think ahead of what the project should do. A thorough stock take of all relevant core causes is necessary at this stage of formulating an adaptation project. What the project will eventually help to achieve (in terms of results) has its place for discussion, but that is after the desired response (normative solution) has been formulated (see next section).

## INFORMATION AND RESOURCES TO UNDERTAKE THE TASK

A thorough cause analysis in the context of a problem that is related to adapting to long-term climate change will require a specific suite of information, namely:
Information on key vulnerabilities related to business-as-usual development (under current climate).
Information outlining vulnerabilities in the context of a range of possible future climate change scenarios. Be sure to consult more than simply data on climate change projections
Information regarding ongoing or existing investments, strategies, programs or interventions that seek to address existing vulnerabilities"

The sources of information required for the analysis of underlying causes (causal chain analysis) is similar that which has already been lined in Section 3, Step 1. However, the most substantive progress typically is made during a structured discussion and debate with all relevant stakeholders. The following sources are highlighted from Step1 as they are likely to provide targeted material that is directly relevant for the discussions that lead to a thorough causal chain analysis.

⇒ Minutes/notes from meetings with experts such as economists, agronomists, climatologists, hydrologists,

# 4. Identify Causes (*Cont.*)

finance experts, planners in central government, sub-national level institutions, academia, private sector and civil society. Refer to section 8 on *Building Consensus* and *Engaging Stakeholders.*

⇒ Peer-reviewed published and non-published articles on biophysical and socio-economic impacts of climate change.

⇒ Field notes from visits to sites where there is a manifestation of a particular climate-related problem.

**Guiding Questions for Vulnerability Assessments**

As the evidence for the existence of human-induced climate change is now undisputed, it is imperative that we understand what effects climate change will have on our environment and society. This is important so that strategies, plans and measures to reduce adverse impacts – or capitalize on opportunities - can be designed and introduced appropriately. In order to understand vulnerability at national, sub-national or local (community level), recognition and understanding of three key components (exposure, sensitivity, and adaptive capacity ) is required. The following types of questions can help on to start that process.

What are the projected hazards and perturbations under climate change?

⇒ What is likely to happen to temperature patterns (average and variance) in the future?

⇒ What is likely to happen to rainfall events (average and variance) in the future?

⇒ Are extreme events likely to increase in frequency and/or magnitude?

What is the sensitivity to the projected hazards and perturbations?

⇒ How will existing sectors of society (population, agriculture, water, energy, tourism, fisheries, health, and biodiversity) be affected by these hazards and perturbations?

⇒ Are there current socio-economic trends that interact with these sensitivities (and in particular run the risk of amplifying them)?

What is the level of adaptive capacity?

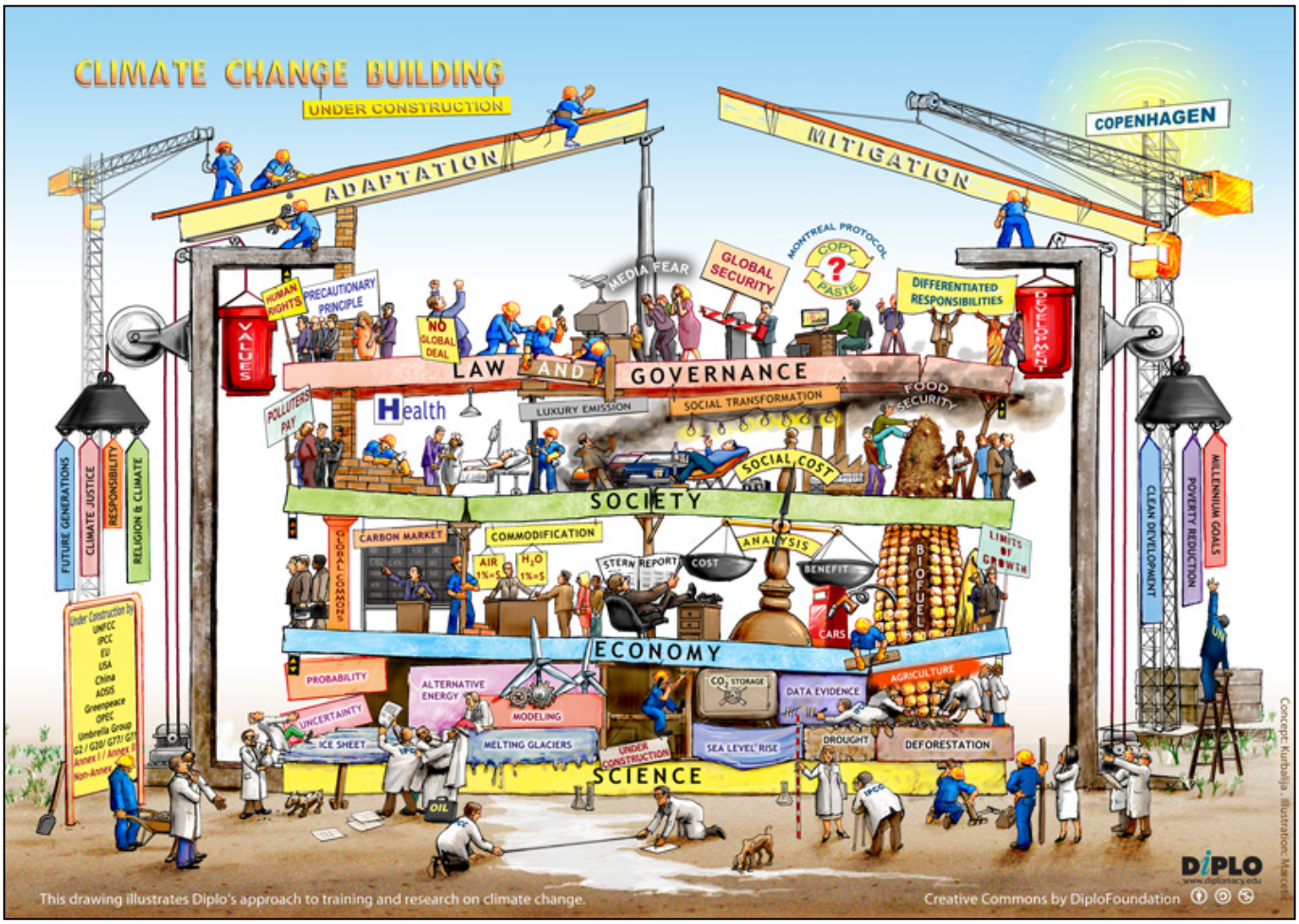
⇒ How will society be able to cope with and manage these changes? Will they be able to make changes through policies and activities that minimize adverse impacts (or make the most of the opportunities presented)? Or will the expected changes increase their vulnerability?

⇒ Can adaptation take place at sector level, or is there a need for more structural changes within society (e.g. economic diversification)?

For additional details, refer to an upcoming UNDP Publication on *Guidebook for planners on mapping climate change vulnerability and impacts scenarios at the sub-national level.*

***Next: Think about what the desired response should be in the context of identified causalities***

**An illustration of the inter-related issues pertaining to managing climate change risks and opportunities.**

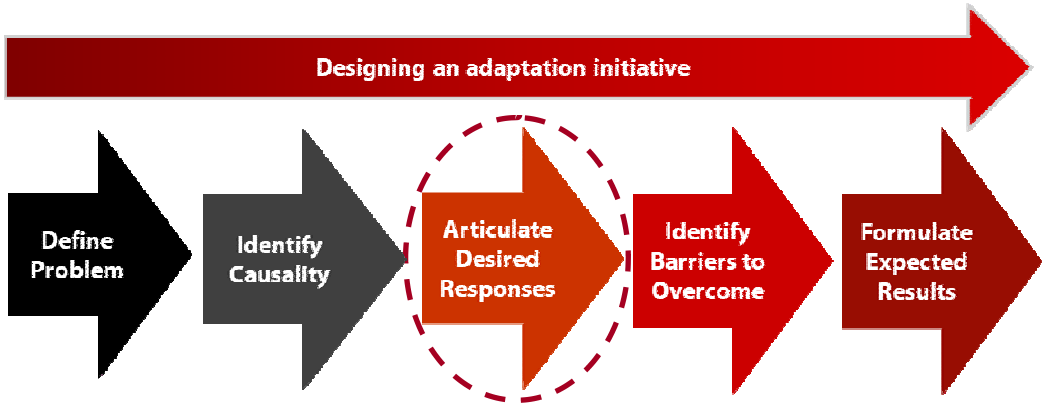



*Source: http://www.diplomacy.edu/climate/*

# 5. Articulate Desired Response

## *Key Components in Designing an Adaptation Initiative*

### STEP 3. Identify Desired (Normative) Response




The next step in the process of formulating an adaptation initiative is to articulate the long-term desired situation with respect to managing the problem in the context of the causes that have been identified. This is commonly referred to as the normative situation. It describes the preferred solution/situation to address/manage the identified underlying problem .

### UNDERSTANDING THE TASK

1. Conduct a stakeholder consultation to review the results of the causal chain analysis.
2. Discuss with stakeholders what the ideal (normative) response should be. That is, irrespective of what can be done through a single initiative, map out the ideal response in the in the context of the problem and the immediate, underlying and root causes that were previously identified.
3. Identify responses that must be made irrespective of climate change (business-as-usual development) and responses that must be made to manage climate change related issues.
4. Recognize that a number of responses may potentially be outside of the scope of a single initiative to implement. At this point of the process of designing an adaptation initiative it is more important to map out what is required as a response than worrying about which response can be implemented through a single initiative (the next section covers this aspect).
5. Determine further information that is necessary in order to prioritize among the identified responses (see next section).
6. Expect to engage with a wide range of stakeholders in an iterative dialogue in order to establish the desired (normative) response.

### INFORMATION AND RESOURCES TO UNDERTAKE THE TASK

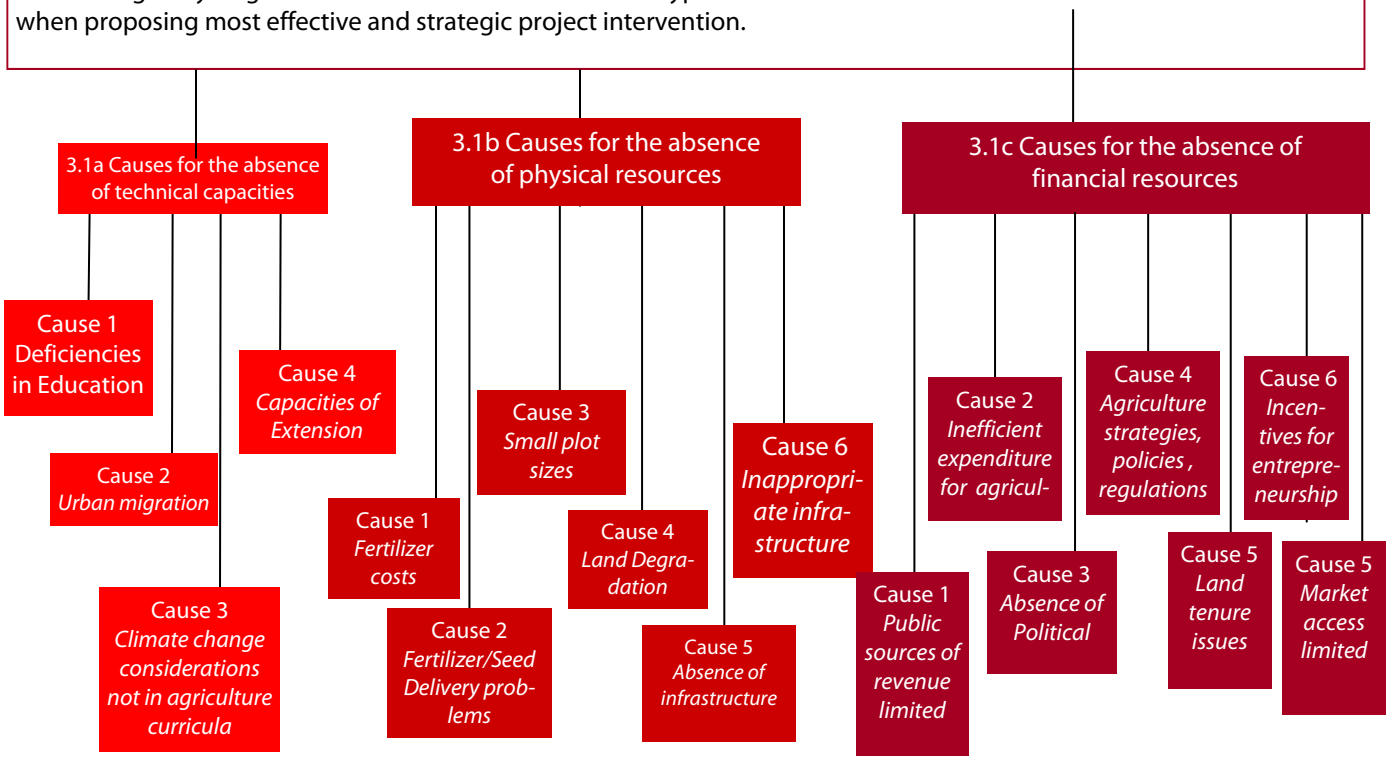
Several inputs including inter alia a) results of climate change risk assessments, b) findings from technical assessments including those from applied research, c) technical expertise (local, sub-national, national and, where relevant, international), and d) political considerations need to be brought to bear to formulate the desired situation.

Written products that are relevant for identifying the desired (normative) situation are similar to those outlined in previous sections. The adaptation chapters of the Vulnerability and Adaptation section of the National Communications and National Adaptation Programmes of Action are obvious places to start.

# 5. Articulate Desired Response (Cont)

**The Problem Tree**

Majority of farmers in Country/Region/Community X are without the necessary technical capacity, the physical resources and financial resources to adapt to and overcome worsening climatic conditions. The provided example is of linear nature. Linkages/ synergies and trade offs between different types of causes at the various levels need to be considered when proposing most effective and strategic project intervention.




## The Normative Response

The preferred solution for addressing the lack of technical capacity would see:

(1) school children and adults receiving a high level of education in agronomy and adaptation to climate change;

(2) a highly functional Meteorological Services providing forecast information to farmers to assist with planning of agricultural activities and responding to emergencies such as floods, and;

(3) government investing in and expanding an agricultural extension service highly skilled in implementing adaptation to

The preferred solution for addressing the lack of physical resources would see government:

(1) investing a considerably larger portion of the annual budget in the agricultural sector than is presently allocated;

(2) implementing highly efficient fertilizer and seed distribution programmes;
(3) supporting the development of large -scale commercial farms that improve economies of scale,;

(4) identifying successful adaptation interventions in the agricultural sector and investing in upscaling such interventions, and

(5) taking climate change into account when investing in infrastructure for the

The preferred solution for addressing the lack of financial resources would see:

(1) government investing in the agricultural sector (see above points);

(2) government providing secure land tenure and reducing the number of administrative hurdles for starting businesses, to enable entrepreneurs to develop large agricultural enterprises;

(3) rural populations actively engaged in alternative livelihoods that are not totally reliant on agricultural production, and;

(4) agricultural productivity per unit land area increased across the country.

***Next: Think about what is preventing these preferred responses from being implemented***

# 5. Articulate Desired Response (Cont)

## ADDITIONAL CONSIDERATIONS

⇒ Which of the Normative Responses should be achieved irrespective of climate change (i.e. baseline development) and which are necessary only because of the likely risks and opportunities of climate change. This is important to make the case for why the value-added contribution of the initiative in the context of the climate change-driven problem (see page 38);

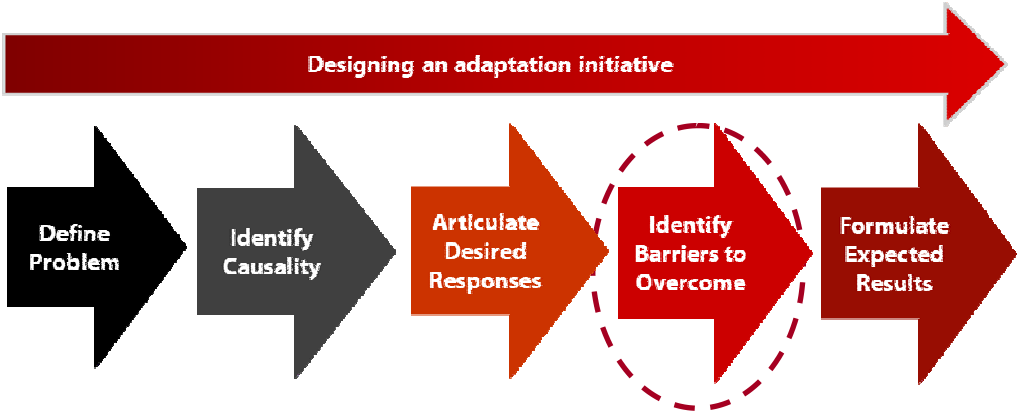
⇒ How is the Normative Response and/or proposed intervention embedded in and builds upon existing policies, strategies, investments. This is important to ensure the adaptation initiative is not a stand-alone one, but rather is anchored within ongoing baseline development efforts. The response to this could also identify potential co-financing opportunities and/or linkages that should be tangibly made to ongoing and/or planned programmes and projects;

⇒ Who/what entity is best placed and has the capacity, either locally or internationally, (i.e. has the comparative advantage) to provide support with implementing the identified normative responses.

# 6. Identify Barriers to Overcome

## *Key Components in Designing an Adaptation Initiative*

### STEP 4. Identify Barriers




Once the desired situation has been articulated, the next step involves identifying the set of barriers that will need to be overcome in order for the desired response to be met. That is, a comprehensive mapping is required of all critical barriers that need to be removed in order for the desired situation to be reached. This mapping exercise is necessary, among other reasons, to determine a) what the adaptation initiative specifically will seek to achieve; and b) linkages to other ongoing initiatives , strategies, and interventions. This baseline is what the project will build upon. Moreover it is important to realize that the project will (typically) be able to contribute to the resolution of some, but not all barriers. Resolving entire macro-level barriers is usually not feasible through any single project.

### UNDERSTANDING THE TASK

Barriers can be identified through (a) *focus group discussions* with relevant stakeholders as well as (b) a *review of relevant documentation* (published and unpublished). It is critical that different points of view are captured. Local expertise should be drawn on to the extent possible. For example, when speaking with national government officials regarding local district adaptation measures against sea level rise, they might describe the barrier as being the lack of motivation of local officials to implement measures described in new policy reforms. However, when discussing the same issues with local officials, they might describe the barrier as being a low awareness caused by a lack of training of government officials or experts, and the lack of training due in turn to lack of an adequate budget.

When identifying barriers, it is important to discuss and determine those barriers that a specific adaptation initiative can address/overcome and those that may be better or more appropriate addressed through other parallel initiatives. Some of such parallel initiatives which may not even necessarily be motivated by climate change but are nevertheless necessary. In this context, developing partnerships as well as leveraging and factoring in other initiatives in the design of the adaptation-focused initiative are critical.

### TYPOLOGY OF BARRIERS

Barriers can be a combination of information constraints, institutional failures, capacity constraints, economic constraints and political factors. They will be specific to context to the local, sub-national and national level. Some examples simply to provide a flavor of the typology of barriers that are likely to emerge in the context of discussions with stakeholders include:

# 6. Identify Barriers to Overcome (*Cont.*)

**TYPOLOGY OF BARRIERS (Cont)**

⇒ Weak institutional capacity of relevant public and private entities to support/facilitate necessary behavioral adjustments;
⇒ Rapid turnover in Ministries, Directorates and others;
⇒ Weak governance and shortage of staff with relevant skills and necessary mandates;
⇒ Political will to act;
⇒ Absence of necessary climate-resilient development strategies and supportive policies
⇒ Unreliable/inadequate information to support necessary decision-making (from basic data to results of policy relevant analytical and feasibility assessments);
⇒ Financial constraints to support implementation;
⇒ Overlapping responsibilities between institutions leading to inefficient and ineffective implementation of adaptation measures;
⇒ Local communities' limited awareness regarding the issues, limited access to information/knowledge; and
⇒ Enforcement difficulties for policies that have been designed and introduced.

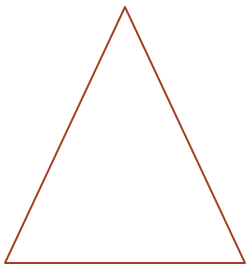
**INFORMATION AND RESOURCES TO UNDERTAKE THE TASK**

(1) Organize a discussion with stakeholders on the perceived challenges and opportunities that exist in realizing the normative (preferred) responses that have previously been identified;
(2) Initially, prepare an inventory of key items as they emerge with a plan to organize them structurally at a later time;
(3) Ensure that the discussion on barriers is contextualized to issues at the local, sub-national, and national.
(4) Bear in mind that it is not likely to be possible for any one initiative to tackle all barriers in one initiative. However, for purposes of completeness it is necessary that they are all listed before a selection is made of which specific barriers will be tackled either by one initiative or a combination of initiatives.

It is also important to triangulate the information on key barriers as they emerge from (a) stakeholder discussions, (b) 1-1 interviews with targeted stakeholders (in public/private institutions, academia, NGOs and civil society) as well as technical and non-technical experts; and (c) findings from scientific documentation, risk/economic assessments and/or other technical assessments.

**Triangulation of Findings**

*Multi-Stakeholder Workshops*



*1-1 Interviews*

*Technical/ Feasibility Assessments*

# 6. Identify Barriers to Overcome (*Cont.*)

## *An Example*

*The following is a continuation of an example from page 29. Please refer back to refresh your mind on the context.*

### The Normative Response

The preferred solution for addressing technical capacity needs including:

(1) school children and adults receiving a high level of education in agronomy and adaptation to climate change;

(2) a highly functional Meteorological Services providing forecast information to farmers to assist with planning of agricultural activities and responding to emergencies such as floods; and

(3) government investing in and expanding an agricultural extension service highly skilled in implementing adaptation to climate change measures.

The preferred solution for addressing the need of physical resources would see government:

(1) investing a considerably larger portion of the annual budget in the agricultural sector than is presently allocated;

(2) implementing highly efficient fertilizer and seed distribution programmes;

(3) supporting the development of large-scale commercial farms that improve economies of scale;

(4) identifying successful adaptation interventions in the agricultural sector and investing in up-scaling such interventions; and

(5) taking climate change into account when investing in infrastructure for the agricultural sector.

The preferred solution for addressing the lack of financial resources would see:

(1) government investing in the agricultural sector (see above points);

(2) government providing secure land tenure and reducing the number of administrative hurdles for starting businesses, to enable entrepreneurs to develop large agricultural enterprises;

(3) rural populations actively engaged in alternative livelihoods that are not totally reliant on agricultural production; and

(4) agricultural productivity per unit land area increased across the country.

### Key Barriers to overcome

**Key Barriers:**

Relevant public authority(ies) is (are)

(1) not sensitized to the educational needs of the agricultural sector;
(2) not aware of the likely economic impacts of climate change on the agricultural sector;
(3) do not have the skills for developing seasonal forecasts and implementing an early warning system (EWS);
(4) do not have necessary technical skills for supporting climate-resilient policy formulation.

**Key Barriers:**

(1) Absence of political will to increase investments in the agricultural sector and to address climate change impacts;
(2) Government strategies, policies and legislation in the agricultural sector do not take climate change into account;
(3) Limited scientific demonstration of successful adaptation interventions in the agricultural sector.

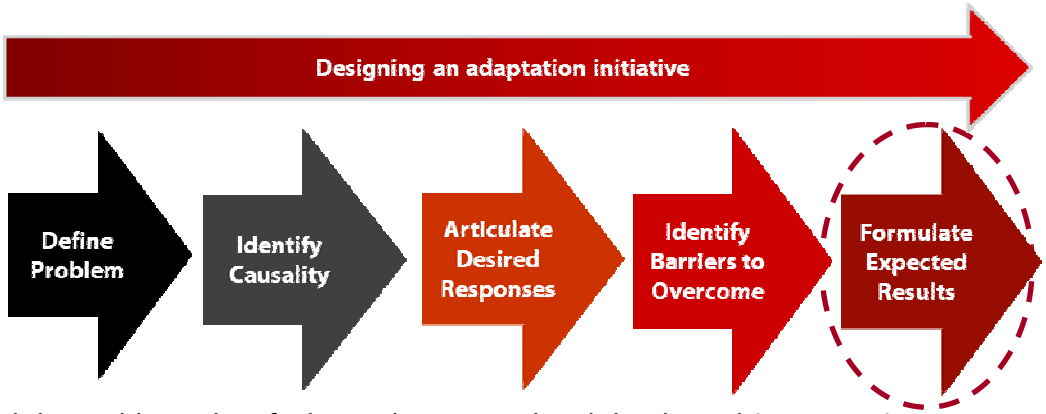
**Key Barriers:**

(1) Alternative livelihoods are largely untested and consequently rural populations are hesitant to take the risk of establishing new businesses;
(2) Rural farmers are not trained in marketing, accounting and general management of new businesses;
(3) Rural populations have a culture of subsistence farming and do not necessarily seize new business opportunities as a result;
(4) Legislation on land tenure and establishment of climate resilient business ventures is not under revision;
(5) Methods for increasing agricultural production per unit land area are not tried and tested in rural areas.

***Next: Think about the ideal scope of the initiative that you wish to implement***

# 7. Formulate Expected Results

## *Key Components in Designing an Adaptation Initiative*




### STEP 5. FORMULATE EXPECTED RESULTS

If the process outlined in this toolkit has been followed, adequate information should now be at hand to start articulating what a structured adaptation initiative will seek to achieve. Having defined the problem, identified causalities, articulated the desired (normative) response and identified barriers that need to be overcome, the next step is to outline the key results that the initiative will achieve. This implicitly means that a single adaptation initiative cannot, on its own, expect to solve the entire underlying climate change induced problem. Depending on the underlying budgetary envelop for the initiative, intended scope and context, a single adaptation initiative is more likely to make inroads towards addressing the underlying climate change induced problem. As such, it is important that expected results from the initiative are clearly articulated, with sound indicators for measuring success. In this context, linkages to other initiatives that are motivated by climate change concerns or baseline development concerns. should also be borne in mind in order that value-added results are formulated.

### UNDERSTANDING THE TASK

1. In the context of the identified barriers preventing the desired response to the climate change driven problem, discuss with stakeholders overarching key results that need to be achieved in order for the identified barriers to be overcome.
2. With all stakeholders, prioritize the expected key results in consideration of a range of factors including (a) funding is not unlimited; (b) there is a defined time-line for implementation; and (c) there are likely to be other ongoing/planned initiatives of relevance to the one being designed. Prioritization can be based using several generic tools (appropriately amended) such as Multi-Criteria-Analysis.
3. Once the key results are agreed, start articulating tangible *products and services* that must be realized in order to deliver the expected results. In this vein, also start sketching the likely *inputs* that are required for the products and services to be delivered including their associated costs.
4. The process of identifying key Outcomes, tangible outputs and services, is likely to require a lengthy discussion, often requiring one to revisit and question previously made decisions. In addition to this it is necessary to also consider key inputs including budgetary considerations and the implementation time-line.
5. This is typically necessary and sufficient time should be allocated for a detailed discussion to take place. Often, the input of a independent moderator/facilitator, without any vested interest or stake in the initiative is useful to guide and manage the discussions.
6. Use a standard description of a logical flow with a clear delineation of a hierarchy of key results, outputs, activities and inputs to guide the discussion. If stakeholders are clear about this hierarchy from the onset, the discussions are more likely to be focused and productive.
7. Consider an institution (or group of institutions) that may be required to play a prominent role during im-

# 7. Formulate Expected Results (*Cont.*)

## UNDERSTANDING THE TASK (Cont)

plementation. Assign one as a lead institution and define their terms of reference for implementation including, among others, monitoring and reporting on results.

8. Define an appropriate monitoring and evaluation framework for the initiative. This is a critical part of project design and implementation and adequate budgetary resources should be allocated for this. A rule-of-thumb estimate is 5-7% of the overall budget for the initiative.

## ADDITIONAL CONSIDERATIONS

Be clear about how the results to be achieved with adaptation financing are different to the baseline. This is necessary to avoid duplication and parallel interventions, and to maximize the potential for the adaptation funding to catalyze value-added changes. Very often, it will be necessary to define in a narrative what is likely to occur without an intervention (i.e. baseline development) as well as the value-added benefits of the adaptation interventions.

The results to be achieved should ideally be developed taking into account documented evidence of what has worked/hasn't worked in the past and why, to avoid making mistakes of the past.
Spend enough time to design an initiative such that pilot interventions generate adaptation learning. Adaptation learning will benefit from the following:
Quantification of cost-effectiveness of the intervention: how far did the intervention reduce the effects of climate variability on the vulnerability of the project beneficiaries (this will require monitoring of a control group to effectively attribute changes in vulnerability to project interventions).

⇒ Economic evidence of the returns to different adaptation investments will help governments work out where they should invest their marginal adaptation dollar.
⇒ Returns on adaptation investments in natural capital and built capital to help governments work out where they should invest their marginal adaptation dollar.
⇒ Role of the private sector in servicing/supplying adaptation solutions
⇒ Role of Government in providing policy, regulatory or financial support to replicate interventions.

The initiative should be financially, socially, and environmentally feasible and cost-effective. Different types of costs/benefits of the proposed responses should be ascertained in order to arrive at a realistic work-plan for the project.
When articulating key results, avoid the tendency to focus discussions on activities or inputs. While these are important, and must be discussed and agreed to given budgetary and other operational implications, it will be more effective to discuss such matters in the context of expected results that much be achieved.

# 7. Formulate Expected Results (*Cont.*)

## ADDITIONAL CONSIDERATIONS (Cont.)

Key indicators, risks and assumptions

⇒ Provide a narrative of the impact and performance indicators, risks and assumptions underlying the initiative. The risks should also be accompanied by a risk reduction plan should any materialize.

Cost-effectiveness

⇒ Outline the cost-effectiveness of the proposed outcomes. This can include the results of a financial feasibility assessment, a cost-effectiveness analysis and/or a cost-benefit analysis.

Sustainability

⇒ Describe the main factors affecting financial sustainability of the project beyond the duration of the adaptation grant.

⇒ Describe how the proposed initiative ensures continuation of benefits after completion of project implementation, covering: environmental, social, institutional and financial sustainability.

⇒ Describe how this problem affects national development ambitions/Millennium Development Goals and/or relate to national plans/programmes including those on Disaster-Risk Reduction.

⇒ Describe the exit strategy. What will happen when the financial support (presumably from a grant) ends? Does the project simply end and benefits cease to flow?

Replicability

⇒ Explain how the project is potentially replicable. Describe the proposed approach to knowledge transfer (e.g., dissemination of lessons, training workshops, information exchange, national and regional forum, etc) and provide the budget associated with these efforts.

Include a stakeholder involvement plan

⇒ The plan should briefly describe the following:

⇒ Stakeholder identification -- list of stakeholder groups and the types of their involvement in the proposed project

⇒ Information dissemination, consultation, and similar activities that occurred during preparation phase

⇒ Activities planned during implementation and evaluation, including topics, groups involved, and outcomes

⇒ Stakeholder participation -- long-term involvement in decision making and implementation; and finalize the roles and responsibilities of relevant stakeholders in project implementation,

⇒ Social issues -- impacts on beneficiaries and vulnerable groups, especially indigenous communities, women, and displaced households. Describe how the marginal groups are going to be involved in the project implementation.

# 7. Formulate Expected Results (*Cont.*)

### What is "Additionality" in the context of Climate Change Adaptation?

Within Decision 3 of the 11th Conference of the Parties, the UNFCCC defined the additional costs of climate change as the costs imposed on vulnerable countries to meet their immediate adaptation needs. Currently operationalized adaptation funds such as those of the UNFCCC's Least Developed Country Fund (LDCF) and Special Climate Change Fund (both managed by the Global Environment Facility) provide resources to meet the 'additional costs' of adapting to climate change. The UNFCCC's newly emerging Adaptation Fund also adopts this principle (AFB/B.7/4, August 31, 2009) and defines an adaptation initiative as including: "a set of activities aimed at addressing the adverse impacts of and risks posed by climate change".

The "additional costs" of managing climate change risks/opportunities, "additionality of climate change adaptation", "additional cost reasoning", or "adaptation alternatives" effectively refer to the fundamental idea that is reflected in Decision 3, COP 11. The articulation of "additionality" involves a 2-step process. In the first step, a "baseline scenario" is established. This is defined as business-as-usual development with no consideration of long-term climate change. In the second step, an "alternative scenario" is defined, where key results (outcomes or expected changes to be effected by a set of interventions (activities) that explicitly address climate change concerns. This includes, as the operational guidelines of the UNFCCC's Adaptation Fund outlines, an "altered plan to build adaptive capacity/increase resilience".

| **An Example of a Results-Based Management Structure**<br>The following is an example of a Results-Based Management structure employed by Development Agencies when programming resources from the Least Developed Country Fund or Special Climate Change Fund. | |
|---|---|
| **Goal** | The *goal* is aligned with an overarching strategy (e.g. PRSP) and/or programme. It is a higher-order purpose to which a number of distinct initiatives contribute towards. Implicit in the articulation of a goal is the pursuit of long-term benefits. |
| **Objective** | The *objective* is essentially an articulation of the overall intent/impact of a single initiative. It is usually expressed as a overarching purpose that can be achieved by the initiative on its own. Benefits accrue to target beneficiaries when outcomes (see below) are realized. Ideally, each initiative should have a single well defined objective that is achievable and measurable. |
| **Outcomes** | The *outcomes* are defined as the key components (thematic foci) of a single initiative. Outcomes reflect changes in development conditions that the initiative on its own can realize. |
| **Outputs** | Described the tangible products and services that the initiative will produce. These are the direct result of inputs/activities. |

# 8. Building Consensus

## *Key Components in Designing an Adaptation Initiative*

**Key topics covered in this section**

- Stakeholder Involvement
- Interdisciplinary expert team to formulate an adaptation initiative
- Critical data and Information Required

### ENGAGING STAKEHOLDERS

Stakeholder consultation is integral to designing and implementing an adaptation initiative. The purpose of the stakeholder consultation is to define the problem, identify causes, articulate the desired (normative) preferred situation (vis-à-vis the problem), identify key barriers to overcome in reaching the desired situation, and design appropriate responses that will achieve the desired solution.

At a very fundamental level, stakeholder involvement is critical for strengthening ownership and ensuring relevance to local priority needs. Stakeholder involvement is necessary so as *not to duplicate efforts* already underway, to *maximize on synergies* in the overall purpose through *coordination,* and/or to ensure that *lessons* from failed or less successful past efforts are taken into account. Further, given the nature of adaptation and its intrinsic link to core development, stakeholder involvement is required to effectively pinpoint where synergies with other national/sub-national programmes or projects (including those funded by local or international development partners) can be promoted.

### GETTING STARTED!

#### STEP 1: Set up an interdisciplinary team

A critical step in the stakeholder analysis process is establishing an effective design team that is interdisciplinary and includes scientific experts as well as policy and socio-economic experts.

The team should be amenable to encouraging the active participation of various stakeholders (including community leaders). The teams need to provide varying degrees of experience from different fields of expertise and institutions. This will permit **an optimal analysis of the problem** at hand from a variety of viewpoints.

#### STEP 2: Engage stakeholders early!

Early engagement of relevant stakeholders is critical to any adaptation initiative in order to ensure commitment and ownership of the process, i.e. "buy-in". This is especially true at the community level, where many

# 8. Building Consensus (*Cont.*)

autonomous adaptation measures are already taking place and where a wealth of traditional knowledge provides a basis from where adaptation measures can be designed. Wide stakeholder engagement helps with understanding both the context of the problem and the perceptions about causes of that problem. Building upon this basis, both the identification of desired situations – with regards to managing the identified problem – and the identification of barriers, facilitate agreement on important elements of the eventual response strategy (including priority areas for action). Through a participatory process that includes stakeholder engagement in the decision-making process from the onset, it is more likely that participants will agree with, and be more committed to successful implementation of the initiative. In addition, the entire process fosters knowledge-sharing and can help build adaptive capacity as stakeholders are no longer mere recipients of a prescriptive solution that is imposed on them from some place else. Early engagement can help improve the likelihood of equity in decision-making and help foster positive conflict resolution.

### STEP 3: Pursue inter-sectoral engagement

An inter-sectoral engagement, including the participation of the national focal point to the United Nations Framework Convention on Climate Change (UNFCCC) and the relevant focal points from key line Ministries (including National Planning and Finance) is recommended to be part of this process. Key stakeholders (from government, the private sector, civil society, non-governmental organizations, academia, as well as international development organizations of relevance) should ideally be involved in the process.

### STEP 4: Manage the number of stakeholders

The number and span of stakeholders will vary depending on the size of the adaptation initiative. A judicious balance must be found in engaging stakeholders at different levels. An initial bottom-up approach is predicated (involving the direct beneficiaries first and foremost), but it is also important to incite the interest and commitment of government agencies and other actors from civil society, key research institutions and non-governmental organizations, especially for more programmatic-based approaches.

# 8. Building Consensus (*Cont.*)

## *Tasks and Activities to Scope and Design an Adaptation Initiative*

| TASKS | ACTIVITIES |
|---|---|
| Scope project and define objectives | Define the stakeholder context (who needs to be involved for what purposes given the objective of designing an adaptation initiative)<br>Review the effectiveness, opportunities and gaps for key governance and institutional systems to facilitate adaptation<br>Review the existing enabling environment and policy formulation and implementation process for entry points for promoting adaptation<br>Define the project objectives and expected outcomes<br>Develop a communication plan |
| Establish project team | Select an inter-disciplinary team to design the intervention |
| Review and synthesize existing information on vulnerability and adaptation | Review and synthesize existing information on vulnerability and climate change risk, based on previous studies, expert opinion, and policy context<br>Describe policies and measures in place that influence the ability to successfully cope with climate variability as well as manage likely implications of long-term climate change<br>Identify indicators of vulnerability and adaptive capacity |
| Design project for adaptation | Select approach and method for formulating an adaptation initiative that is operational and financially viable<br>Describe process for integrating findings of assessments of future vulnerability and adaptation, and for implementing options and recommendations into the design of the adaptation initiative<br>Develop monitoring and evaluation plan for the initiative<br>Develop terms of reference for project implementation |

Source: Adapted from *Tasks and Activities to Scope and Design an Adaptation Initiative (Source: APF, Technical Paper 1, p. 37)*

# 8. Building Consensus (*Cont.*)

**Potential questions that can be used to identify key stakeholders for an adaptation initiative**

When there is uncertainty as to *who* the key stakeholders need to be for designing and implementing an adaptation initiative, the questions listed below could serve as a guide to identifying appropriate persons.

(1) Who is directly affected by climate change, including variability?
(2) Who might already have experiences in this domain?
(3) Who could be the potential leaders in this initiative?
(4) Who might have access to the funds necessary to make this initiative possible?
(5) Who can help inform the discussion on problem identification based on a thorough understanding of the issues?
(6) Who can help inform the discussion on potential response measures to manage the short-, medium-, and long-term implications of climate change, including variability?
(7) Who is in a position to effect policy adjustments to support adaptation in the context of the identified problem?
(8) Who can advise on the governance, institutional, policy, economic and other systems required to ensure that the response measures deliver long-term results and benefits?
(9) Who can provide assistance in preparing a monitoring system for measuring the effectiveness of response measures?

| Level/Scale of the Initiative | Examples of Types of Stakeholders |
|---|---|
| **National Level** | Central government entities (e.g. line ministries)<br>Ministerial departments and directorates<br>Research councils, climate change and sustainable development think tanks, academic institutions<br>International aid and development organizations (bilateral, multilateral)<br>International and national NGOs<br>Private sector entities with national reach |
| **Sub-National Level** | Decentralized and regional governments (e.g. province/district authorities)<br>Multilateral and bilateral international aid organizations<br>NGOs/CBOs with regional offices<br>Private sector entities with regional range<br>Volunteer involving organizations (VIOs) |
| **Local Level** | Community-based organizations (CBOs)<br>Local NGOs<br>Private sector enterprises<br>Direct beneficiaries (e.g. households)<br>Traditional and religious leaders, village elders<br>Volunteer involving organizations (VIOs) |

# 8. Building Consensus (*Cont.*)

## WAYS IN WHICH TO ENGAGE STAKEHOLDERS

There are a variety of ways in which planners can consult and engage stakeholders at all levels. It is important to keep in mind that depending on the type of stakeholder, **the techniques used will vary**.

⇒ **Focus group discussions/group work**: Focus group discussions can lead to the identification of autonomous adaptation efforts that are already ongoing, as well as evident adaptation needs that require more systematic interventions and investments. Focus group discussions are usually guided by a **series of open -ended questions** to foster discussion. Information obtained from focus groups can be greatly affected by the dynamics of the particular group (e.g. gender relations, local hierarchies, power relationships, etc). **Women and children** have been identified as being among the most vulnerable groups affected by climate change meaning that these stakeholder groups should be involved from the very beginning. Gender -specific focus groups might be necessary. Also, facilitator-group dynamics will need to be taken into consideration. For example, a male facilitator would not necessarily illicit the same responses from an all female focus group, as a woman facilitator would.

## WHAT NEXT?

1. **Prepare a list of critical persons** who need to be consulted in designing an adaptation project. The guiding questions above may be useful.
2. **Validate this list with other partners** involved in the design of the initiative. This includes those who may be funding the initiative, the UNFCCC Focal Point of the country and likely institutions/organizations who may be involved in carrying out day-to-day work
3. **Organize a series of consultations** (in appropriate format; with independent facilitators) to discuss:
   - ⇒ The problem to be addressed (**see Section 3**)
   - ⇒ Likely causes (**see Section 4**)
   - ⇒ Preferred responses (**see Section 5**)
   - ⇒ Barriers that need to be overcome (**see Section 6**)
   - ⇒ What the project will try to achieve by way of key results. (**see Section 7**)
4. **Review and validate findings** of technical experts entrusted with preparing the project design including implementation arrangements. A series of consultations/engagements with key stakeholders will be required until consensus is reached on the scope of the initiative.

# 8. Building Consensus (*Cont.*)

⇒ **Awareness-raising campaigns**: The objective of awareness raising campaigns is to engage local stakeholders and build sufficient momentum at community level for new adaptation initiatives. Such campaigns include tangible communication activities that explain the links between local priorities (which might very well not be explicitly linked to climate change) and the impacts of climate change. Local stakeholders such as households, local organizations, influential leaders and educators should be involved in these campaigns. They should explain how communal risk contexts are changing, how this will affect individual households and livelihood groups, and what can potentially be done to increase preparation and protection from climate-induced shocks and stresses. Materials should be translated into local dialects and should use a variety of appropriate communication tools (e.g. local radio, drama, flyers, posters, video screenings, etc.). Figure 3 is an example of how visual art was used to communicate the potential impacts of climate change in a community in a country. It includes an interpretation of current coping strategies and how they may be changed in the future. It should be noted that awareness raising campaigns can not only increase awareness, but also expectations. Ideally, such campaigns should therefore take place with a concrete follow-up or investment perspective for tangible risk reduction activities.

**The Participatory Rural Appraisal Tool**

Participatory Rural Appraisal (PRA) emerged from Rapid Rural Appraisal as a method utilized to gain input from local beneficiaries. PRA allows for initiative practitioners to plan for context-appropriate interventions.

It promotes information sharing, analysis and action among stakeholders through group animation and exercises. The key premise is that local populations are capable of making their own appraisal, plans and analysis of needs. PRA primarily focuses on the collection of qualitative data and reflects a combination of techniques that are particular to each development intervention context..
Hence, PRA is not prescriptive nor should it be interpreted as a blueprint. The PRA team should be as interdisciplinary as possible to represent a mixed group of local beneficiaries and should include national representatives and expatriates, who have a diverse educational backgrounds and experiences. Additionally, PRA is based on transparent procedures. Some common tools used include:

⇒ Semi-structured interviewing;
⇒ Focus group discussions;
⇒ Preference ranking;
⇒ Mapping and modeling; and
⇒ Seasonal and historical diagramming.

# 9. Checklist

## *Key Components in Designing an Adaptation Initiative*

**Have all critical elements of an adaptation initiative been addressed in its design?**

This checklist is provided for project developers to follow the different steps associated with the design of an adaptation initiative.

| Activities to be done | | Yes/No | Comments |
|---|---|---|---|
| Making the case | | | |
| 1 | Key stakeholders properly identified and consulted | | |
| 2 | Decision makers or local community leaders consulted | | |
| 3 | Stakeholder consultation table developed | | |
| 4 | Potential roles, responsibilities and contacts of key stakeholders identified | | |
| 5 | National Communications to the UNFCCC and other relevant reports referenced and consulted | | |
| 6 | National and sectoral, regional and local development plans consulted | | |
| 7 | Hard historical climate data consulted and analyzed | | |
| 8 | Climate change problem clearly identified and stated | | |
| 9 | Non climate change problem identified | | |
| 10 | Immediate, underlying and root causes identified | | |
| 11 | Vulnerable groups, areas or sectors identified | | |
| 12 | Level of vulnerability assessed | | |
| 13 | The preferred situation formulated | | |
| 14 | Barriers to the preferred situation identified | | |
| 15 | Responses identified | | |
| Designing the initiative | | | |
| 17 | Specific attitudes and priorities of key stakeholders assessed | | |
| 18 | One objective of the initiative identified | | |
| 19 | Outcomes of the initiative identified | | |
| 20 | Outputs of the initiative identified | | |
| 21 | Outcomes and outputs prioritized | | |
| 22 | Justifications provided (e.g. baseline and alternative scenario for the selected outcomes described) | | |
| 23 | Feasibility of the selected outcomes assessed | | |
| 24 | Logica Framework Analysis established | | |
| 25 | Indicators, risks and assumptions for each outcomes/outputs identified | | |
| 26 | Indicators are S.M.A.R.T. | | |
| 27 | Risk Analysis Matrix developed | | |
| 28 | Strategy to mitigate identified risks developed | | |
| 29 | Cost of selected outcomes and outputs identified | | |

# 9. Checklist (*Cont.*)

| | | | |
|---|---|---|---|
| 30 | Co-financing identified | | |
| 31 | Funding plan established | | |
| 32 | Corresponding budget established | | |
| Ownership, sectoral linkages, sustainability and replicability | | | |
| 33 | Linkages between the initiative concept and national, sub-national and/or local development plans, strategies and policies established | | |
| 34 | Ownership assessed and stated | | |
| 35 | Outcomes and outputs sustainability and replicability assessed | | |
| 36 | Potential benefits detailed | | |
| Monitoring and Evaluation | | | |
| 31 | M&E requirements budgeted | | |
| 32 | Indicators clearly identified | | |
| 33 | Relevant and illustrative baseline information provided | | |
| 34 | Targets, milestones, sources of data, frequency and responsibility clearly identified | | |
| 35 | Types and number of reports identified | | |
| 36 | Evaluations identified | | |
| 37 | Framework for learning and knowledge sharing presented | | |
| Institutional arrangements | | | |
| 38 | Capacity of institutions potentially involved assessed | | |
| 39 | Capacity development plan provided | | |
| 40 | Management arrangements clearly presented | | |
| 41 | Links between central institutions and sub-national ones stated | | |
| 42 | Management diagram provided | | |

# 10. Tools and Methodologies

## *Key Components in Designing an Adaptation Initiative*

This section outlines a list of Tools and Methods to Evaluate Impacts of, and Vulnerability and Adaptation to Climate Change that are readily available for use in . Please note that the list below does not indicate UNDP's endorsement of any specific tool.

| No. | Tools | Links to websites |
|---|---|---|
| **Complete Frameworks and Supporting Toolkits**<br>*Interests: The complete frameworks and associated toolkits presented in this chapter, span a broad range of approaches. The IPCC Technical Guidelines and the U.S. Country Studies Program represent examples of first generation approaches to the assessment of vulnerability and adaptation. They have an analytical thrust, and focus on an approach that emphasizes the identification and quantification of impacts. The APF is a second-generation assessment and places the assessment of vulnerability at the center of the process. The AIACC approach (technically a collection of projects rather than an explicit framework) incorporates elements of both first generation and second-generation assessments. The NAPA Guidelines provide some conceptual and procedural oversight for the process of producing a document that identifies national priorities for adaptation. The UKCIP report provides guidance to those engaged in decision-making and policy processes. It lays out an approach to integrating climate adaptation decisions and more generally climate influenced decisions into the broader context of institutional decision-making. The UKCIP framework is distinctive in that it casts the assessment process in risk and decision under uncertainty terms* | | |
| 1 | IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations | http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm |
| 2 | U.S. Country Studies Program (USCSP) | http://www.gcrio.org/CSP/webpage.html |
| 3 | UNDP Adaptation Policy Framework (APF) | http://www.undp.org/climatechange/adapt/apf.html |
| 4 | Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC) | http://www.aiaccproject.org/ |
| 5 | Guidelines for the Preparation of National Adaptation Programmes of Action (NAPA) | http://unfccc.int/files/cooperation_and_support/ldc/application/pdf/annguide.pdf |
| 6 | United Kingdom Climate Impacts Programme (UKCIP) Climate Adaptation: Risk, Uncertainty and Decision Making | http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=62 |
| **Cross-Cutting Issues and Multi-sector Approaches**<br>*Interest: The tools presented in this part encompass a broad range of applications. Some groups of tools address important cross-cutting themes such as use of climate or socioeconomic scenario data. Others such as decision analysis provide more detail on tools that might be most applicable to a particular step of the vulnerability and adaptation assessment process. Others still, such as stakeholder analysis, encompass not only a set of tools but also, in some instances, a partial framework that prescribes a process or an approach to undertaking several steps of a complete assessment.* | | |
| **Development and Application of Scenarios**<br>*The documents and techniques presented here address the development and use of scenario data in the vulnerability and adaptation assessment process.* | | |
| **General tools** | | |
| 7 | IPCC-TGCIA Guidelines on the Use of Scenario Data for Climate Impact and Adaptation Assessment | http://www.ipcc-data.org/guidelines/TGICA_guidance_sdciaa_v2_final.pdf |

# 10. Tools and Methodologies (*Cont.*)

| | | |
|---|---|---|
| 8 | IPCC-TGCIA Guidelines on the Use of Scenario Data for Climate Impact and Adaptation As- | http://www.ipcc-data.org/guidelines/TGICA_guidance_sdciaa_v2_final.pdf |
| 9 | The Climate Impacts LINK Project | http://badc.nerc.ac.uk/data/link/ |
| 10 | NCEP Global Ocean Data Assimilation System (GODAS) | http://www.cpc.ncep.noaa.gov/products/GODAS/ |
| 11 | RClimDex | http://cccma.seos.uvic.ca/etccdi/ |
| 12 | SimCLIM | http://www.climsystems.com/ |
| 13 | UKCIP02 Climate Change Scenarios | http://www.ukcip.org.uk/index.php?id=161&option=com_content&task=view |
| 14 | Climate Information and Prediction Services (CLIPS) Project and Regional Climate Outlook Forums (RCOFs) | http://www.wmo.int/pages/prog/wcp/wcasp/clips/outlooks/climate_forecasts.html |
| **Climate downscaling techniques** | | |
| 15 | Statistical DownScaling Model (SDSM) | https://co-public.lboro.ac.uk/cocwd/SDSM/ |
| 16 | MAGICC/SCENGEN | http://www.cru.uea.ac.uk/~mikeh/software/ |
| 17 | COSMIC2 (COuntry Specific Model for Intertemporal Climate Vers. 2) | Request at: ljwillia@epri.com |
| 18 | PRECIS (Providing REgional Climates for Impacts Studies) | http://precis.metoffice.com/other_links.html |
| **Decision Tools**<br>*The tools* described *in this section assist analysts in making choices between adaptation options* | | |
| 19 | Tool for Environmental Assessment and Management (TEAM) | http://www.epa.gov/eims/global/team1.pdf |
| 20 | UKCIP Adaptation Wizard | http://www.ukcip.org.uk/index.php?Itemid=273&id=147&option=com_content&task=view |
| 21 | Adaptation Actions | http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=286 |
| 22 | Business Area Climate Impacts Assessment Tool (BACLIAT) | http://www.ukcip.org.uk/index.php?id=82&option=com_content&task=view |
| 23 | Community-based Risk Screening Tool – Adaptation & Livelihoods (CRiSTAL) | http://www.cristaltool.org/ |
| **Stakeholder Approaches**<br>*Stakeholder* approaches *in general emphasize the importance of ensuring that the decisions to be analyzed, how they are analyzed, and the actions taken as a result of this analysis are driven by those who are affected by climate change and those who would be involved in the implementation of adaptations. The stakeholder approaches presented here represent a way of analyzing the institutional and organizational context of the adaptation strategy planning process more than they do specific tools to be applied to an assessment.* | | |
| 24 | Community-Based Disaster Risk Management Field Practitioners' Handbook | http://www.adpc.net/pdr-sea/publications/12Handbk.pdf |
| 25 | Guidelines on Climate Watches | www.proventionconsortium.org/toolkit.htm |
| 26 | Natural Disaster Mitigation in Drinking Water and Sewerage Systems: Guidelines for Vulnerability Analysis | http://www.paho.org/English/DD/PED/natureng.htm |

# 10. Tools and Methodologies (*Cont.*)

| | | |
|---|---|---|
| **Sector-Specific Tools**<br>*Interest: The tools described in this section of the compendium are examples of tools that an analyst might consider employing within a given sector and tend to be applicable to only one sector. The following sectors are included: agriculture, water, coastal resources, and human health.* | | |
| **Agriculture Sector Tools**<br>*The agricultural sector tools presented here range from sector-wide economic analyses to farm-level crop models.* | | |
| 27 | APSIM (Agricultural Production Systems sIMulator) | http://www.apsim.info/apsim/Publish/Docs/Documentation.xml |
| 28 | WOFOST | http://ecobas.org/www-server/rem/mdb/wofost.html |
| 29 | ACRU (Agricultural Catchments Research Unit) | http://www.beeh.unp.ac.za/acru |
| 30 | Process Soil and Crop Models: CENTURY | http://www.nrel.colostate.edu/projects/century5/ |
| 31 | Information and Decision Support System for Climate Change Studies in South East South America (IDSS-SESA Climate Change) | http://sedac.ciesin.columbia.edu/aiacc/methods.html |
| 32 | Decision Support Systems Linking Agro-Climatic Indices with GCM-Originated Climate Change Scenarios | http://cres.anu.edu.au/outputs/anusplin.php#1 |
| 33 | AgroMetShell | http://www.hoefsloot.com/agrometshell.htm |
| 34 | Agroclimatic Water Stress Mapping | http://www.fao.org/nr/climpag/hot_2_en.asp |
| 35 | Local Climate Estimator (New_LocClim) | http://www.fao.org/nr/climpag/pub/en3_051002_en.asp |
| 36 | FAOClim 2.0 | http://www.fao.org/nr/climpag/pub/en1102_en.asp |
| 37 | CLIMWAT 2.0 | http://www.fao.org/nr/water/infores_databases_cropwat.html |
| 38 | CM Box | http://www.fao.org/nr/climpag/aw_6_en.asp |
| 39 | CLOUD (Climate Outlooks and Agent-based Simulation of Adaptation in Africa) | http://www.geog.cam.ac.uk |
| 40 | CRAM (Canadian Regional Agriculture Model) | http://www.gams.com/docs/document.htm |
| 41 | Process Crop Models: Decision Support System for Agrotechnology Transfer (DSSAT) developed under the International Consortium for Agricultural Systems Applications (ICASA) | http://www.icasa.net/ |
| 42 | Irrigation Model: CROPWAT | http://www.fao.org/nr/water/infores_databases_cropwat.html |
| 43 | Process Crop Models: Alfalfa 1.4 | http://www.ipm.ucdavis.edu/IPMPROJECT/order.html |
| 44 | Process Crop Models: GLYCIM | http://eco.wiz.uni-kassel.de/model_db/mdb/glycim.html |

# 10. Tools and Methodologies (*Cont.*)

| | | |
|---|---|---|
| 45 | Economic Models: Input-Output Modeling (with IMPLAN) | http://www.implan.com/ |
| **Water Sector Tools**<br>*The water sector tools presented here are mathematical models for assessing water resource adaptations to climate change, focusing on regional water supply and demand analysis of managed water systems.* | | |
| 46 | WaterWare | http://www.ess.co.at/WATERWARE/ |
| 47 | Water Evaluation and Planning System (WEAP) | http://www.weap21.org/ |
| 48 | RiverWare | http://cadswes.colorado.edu/riverware/ |
| 49 | Aquarius | http://www.fs.fed.us/rm/value/aquariusdwnld.html |
| 50 | RIBASIM | http://www.wldelft.nl/soft/ribasim/doc/index.html |
| 51 | MIKE BASIN | http://www.dhigroup.com/Software/Training/CourseTopics/WaterResources.aspx |
| 52 | Spatial Tools for River Basins and Environment and Analysis of Management Options (STREAM) | http://www.geo.vu.nl/users/ivmstream/ |
| 53 | CALVIN (CALifornia Value Integrated Network) | http://cee.engr.ucdavis.edu/faculty/lund/CALVIN/ |
| 54 | European Flood Alert System (EFAS) | http://efas.jrc.it |
| **Coastal Resources Tools**<br>*The coastal resources tools presented are tools and methods applied globally to support vulnerability assessments and adaptation for coastal zones* | | |
| 55 | UNEP Handbook Methodology | http://www.falw.vu.nl/images_upload/151E6515-C473-459C-85C59441A0F3FB49.pdf |
| 56 | SURVAS | http://www.survas.mdx.ac.uk/sitemap.htm |
| 57 | DIVA and DINAS-COAST | http://diva.demis.nl/ |
| 58 | CoastClim of Simulator of Climate Change Risks and Adaptation Initiatives (SimClim) | http://www.climsystems.com/site/home/ |
| 59 | Shoreline Management Planning (SMP) | http://www.defra.gov.uk/environ/fcd/pubs/smp/revisedsmpguidancefinal.pdf |
| 60 | ReefResilience Toolkit | www.reefresilience.org |
| **Human Health Sector Tools**<br>*The health tools presented here differ significantly in their scope and application. Some facilitate the investigation of multiple or overall disease burden and how this burden responds to a number of environmental stressors, including climate change. Others are more narrowly focused and model the health impacts or transmission dynamics of particular diseases* | | |
| 61 | MIASMA (Modeling Framework for the Health Impact Assessment of Man-Induced Atmospheric Changes) | http://www.m.rivm.nl/usr/miasma/miasma.htm |
| 62 | Environmental Burden of Disease Assessment | http://www.who.int/quantifying_ehimpacts/publications/en/9241546204chap1.pdf |

# 10. Tools and Methodologies (*Cont.*)

| | | |
|---|---|---|
| 63 | UNFCCC Guidelines: Methods of Assessing Human Health Vulnerability and Public Health Adaptation to Climate Change | http://www.euro.who.int/document/e81923.pdf |
| 64 | Mapping Malaria Risk in Africa (MARA) Low-end Information Tool (LITe) | http://www.mara.org.za/lite/download.htm |
| **Terrestrial Vegetation Sector Tools**<br>*The terrestrial vegetation models presented here represent a broad sample of the sorts of models that might be useful in considering the impacts of climate change as well as the potential for adaptation* | | |
| 65 | LPJ (Lund-Postdam-Jena Model) | http://www.pik-potsdam.de/lpj/lpj_researchvt1.html#furtherinfo |
| 66 | IBIS (Integrated Blosphere Simulator) | http://www.sage.wisc.edu/download/IBIS/ibis.html |
| 67 | CENTURY | http://www.nrel.colostate.edu/projects/century5/ |
| 68 | MC1 | http://www.fsl.orst.edu/dgvm/mcgtr508.pdf |
| 69 | IMAGE (Integrated Model to Assess the Greenhouse Effect) | http://sedac.ciesin.columbia.edu/mva/image-2.0/image-2.0-toc.html |
| 70 | AEZ (Agro-ecological Zones) Methodology | http://www.iiasa.ac.at/Research/LUC/GAEZ/index.htm?sb = 6 |
| 71 | CASA (Carnegie-Ames-Stanford Approach) Model | http://geo.arc.nasa.gov/sge/casa/index4.html |
| 72 | TEM (Terrestrial Ecosystem Model) | http://www.mbl.edu/eco42/ |

**ADDITIONAL SECTIONS TO BE ADDED IN 2010**

This toolkit is presented as an organic document. Additional lessons are likely to emerge from UNDP's own efforts as well as those of other development agencies and institutions. Many are likely to emerge from initiatives at the local level. Provision is made therefore to systematically, and continuously update the toolkit on a bi-annual basis.

At the same time, there are other related issues which are of relevance to those embarking on designing an adaptation initiative. UNDP will be preparing the following add-on sections to this toolkit over the coming year.

FORMULATING A WORKPLAN USING RESULTS-BASED MANAGEMENT

METHODOLOGICES TO ASSESS THE RISKS AND ASSUMPTION OF IDENTIFIED OUTCOMES

PROGRAMME-BASED VS. PROJECT-BASED APPROACHES TO ADAPTATION

MONITORING AND EVALUATION

BEST PRACTICES FOR EFFECTIVE INSTITUTIONAL ARRANGEMENTS

If you are interested in making contributions to this toolkit, please contact the UNDP adaptation team at adaptation@undp.org.

**End.**

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**Strategic Priority on Adaptation (SPA) Project Concepts**

Project Concept, Niger Development of sustainable agricultural techniques for adapting to climate change in three villages in the municipality of Roumbou, Department of Dakoro

Sady Shakirov Project Concept, Kazakhstan Autumn/winter irrigation as an adaptive mechanism for efficient use of water resources in Southern Kazakhstan

Shymkent Project Concept, Kazakhstan: Forest Protection Belts to Combat Increasing Aridity in Shyrkyn Village

CBA Fasitootai, Samoa: Reducing Climate Change-driven erosion through protection and conservation of Mangroves and Coral Reefs

CBA Gagaemauga, Samoa: Community-based Adaptation for Gagaemauga 3 District

**UNDP LDCF/SCCF Project Documents**

Bangladesh/LCDF Full Size Project (FSP) *Community-based Adaptation to Climate Change through Coastal Afforestation in Bangladesh*
Bhutan/LCDF FSP *Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys*
Burkina Faso LCDF FSP *Strengthening Adaptation Capacities and Reducing the Vulnerability to Climate Change in Burkina Faso*
Ecuador/SCCF FSP *Adaptation to Climate Change through Effective Water Governance in Ecuador*

Ethiopia/SCCF FSP *Coping with Drought and Climate Change*

Tanzania SCCF FSP *Incorporating Climate Change in integrated Water Resources Management in Pangani River Basin (Tanzania)*

Zimbabwe/SCCF FSP *Coping with Drought and Climate Change*

Cambodia/LCDF FSP *Promoting Climate-Resilient Water Management and Agricultural Practices in Rural Cambodia*

Samoa/LCDF FSP *Integrating Climate Change Risks in the Agriculture and Health Sectors in Samoa (ICCRA&HSS)*

Niger/LCDF FSP *Implementing NAPA priority interventions to build resilience and adaptive capacity of the agriculture sector to climate change in Niger*

Mozambique/SCCF Medium Size Project *Coping with Drought and Climate Change*

Pacific/SCCF FSP *Pacific Islands Adaptation to Climate Change*

**Africa Adaptation Programme Project Documents**

Ghana Project Document *Developing capacity and financing options for mainstreaming climate change adaptation in Ghana, with a focus on early warning systems*

Namibia Project Document *Building the foundation for a national approach to CCA in Namibia*

Burkina Faso Project Document *Strengthening capacity to address climate change adaptation concerns in the preparation and implementation of development plans, programmes and projects*

Project Document : *Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa: Inter-Regional Technical Support Component*

Niger Project Document *Mainstreaming climate change adaptation in Niger*

Mozambique Project Document *Adaptation Action and Mainstreaming in Mozambique*

Senegal Project Document *Mainstreaming climate change adaptation into sustainable development in Senegal: with a focus on climate change impacts on coastal zones and agriculture.*

**Additional websites:**

**Adaptation Learning Mechanism (ALM)**
http://www.adaptationlearning.net/

**UNFCCC Adaptation Fund**
http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/3659.php
http://unfccc.int/files/press/releases/application/pdf/af_board_press_release.pdf
http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/4768.php

**Participation and Civic Engagement Tools and Methods**
http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALDEVELOPMENT/EXTPCENG/0,,contentMDK:20509330~menuPK:1278210~pagePK:148956~piPK:216618~theSitePK:410306,00.html

**Social and Human Sciences-Best Practices on Indigenous Knowledge**

http://www.unesco.org/most/bpik19-2.htm

**Raised Beds and Waru Waru Cultivation**

http://www.oas.org/dsd/publications/Unit/oea59e/ch27.htm

**CRiSTAL Tool** http://www.cristaltool.org/