Finn Church Aid Climate mainstreaming approach and tools

Summary document

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THE CLIMATE CHALLENGE

Climate change[1] is one of the central challenges facing humanity in the 21st century. In addition to increasing temperatures, climate change entails e.g. changes in rainfall patterns and distribution of disease vectors, modifies the type, frequency and intensity of extreme climatic events, such as tropical cyclones, floods, droughts and heavy precipitation.

Climate change is already having wide-ranging effects on the environment and on sectors with significant socio-economic relevance, including water resources, agriculture and food security, human health, terrestrial ecosystems, forests and biodiversity as well as coastal zones.

The impacts of climate change are not distributed evenly between and within societies. The poorest inhabitants of our planet, being the main beneficiaries of FCA activities, are among the most vulnerable to climate change. Overall, the poor have a great dependence on climate-sensitive sectors such as agriculture, are closer to the level of tolerance to change, often live on marginal land, and their economic structures are fragile.

RATIONAL AND PROCESS 2010-2011

Climate change can seriously affect the outcomes of development initiatives aimed at reducing poverty – in some cases, completely negating their benefits. At the same time, development programmes have the potential – and the obligation – to increase resilience amongst target populations to ensure that all efforts today continue to advance sustainable development even in the face of climate change.

In order to pro-actively address these challenges, FCA has decided to identify and develop approaches and tools that help systematically take climate change aspects into account in all FCA activities i.e. to "mainstream" climate change into FCA activities.[2]

THE FCA CLIMATE MAINSTREAMING APPROACH

Taking note of the FCA strategy, organisational framework, project cycles as well as capacities and needs of FCA staff and in particular local partners, an approach highlighting three building blocks has been prepared, in order to provide i) strategic guidance, ii) country and programming level guidance, and iii) project level guidance that suits FCA and its partners (see Figure 1).

Taking note of FCA's focus areas of sustainable livelihoods, stable societies, human rights and participation, as well as FCA's ambition to work very closely with its local partners, FCA has mul-

[1] The Intergovernmental Panel on Climate Change (IPCC) defines climate change as: "Any change in climate over time, whether due to natural variability or as a result of human activity". This definition encompasses both natural variability and anthropogenic changes.

[2] In this work, Mikko Halonen and Gaia Consulting Oy, through their climate and development expertise have assisted FCA in identifying a suitable mainstreaming approach.

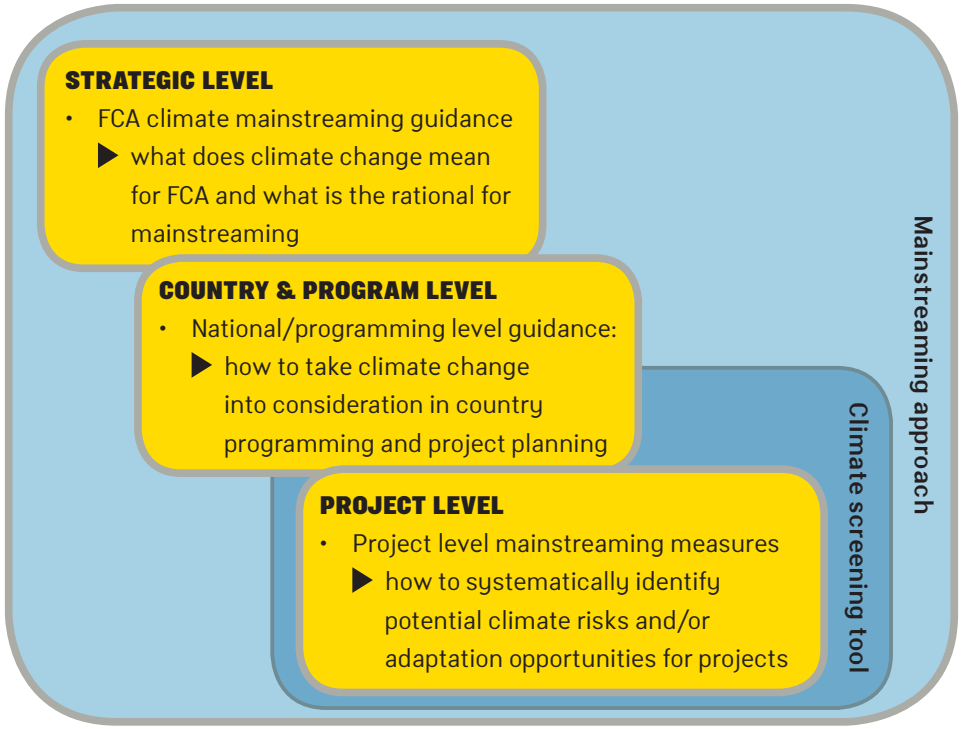

FIGURE 1. FCA climate mainstreaming approach.

tiple opportunities to help its partners deal with current and future climate change. The proposed approach, consisting of three building blocks, is in line with FCA's objectives and the promotion of sustainable and responsible use of natural resources.

On the project level, a variety of climate mainstreaming tools have been developed internationally. With minor modifications, some of these tools can serve FCA project level mainstreaming efforts. Box 1 below highlights some of these initiatives and tools developed by other organisations.

BOX 1. Selected initiatives, approaches and tools by international forerunners in climate mainstreaming.

Many of the tools are accompanied by guidance notes or more extensive support material (adapted from UNDP: Tools and Guidelines to Mainstream Climate Change Adaptation –A Stocktaking Report, 2009)

Tools for assessing ("screening") climate risks	Guidance documents for climate mainstreaming
• CRISTAL (SDC, IISD, SEI, IUCN) • CEDRA, Climate change and Environmental Degradation Risk and Adaptation assessment (Tearfund) • Bread for All (Participatory Tool on Climate & Disaster Risks) • GTZ/GIZ Climate Proofing for Development • ADAPT (WB) • Christian Aid (Adaptation Toolkit & guidance) • Climate-FIRST (ADB) • ORCHID (DFID) • CRISP (DFID) • NAPAssess (SEI) • Adaption Wizard (UK climate Impacts Programme) • Danida Climate change screening matrix	• CARE Climate Vulnerability and Capacity Analysis (Handbook) • USAID Climate Change Adaption Guidance Manual • OECD policy guidance (2009) • Adaption Policy Framework for climate change (UNDP, GEF) • GTZ/GIZ Climate Proofing for Development • Christian Aid (Adaptation Toolkit & guidance) • UNDP Quality Standards for Integrating Climate Change Adaptation (CCA Quality Standards (draft)) • Red Cross/Red Crescent Climate guide • IFAD, Strengthening IFAD's capacity to mainstream climate change adaptation in its operations • Diakonia ("environmental lens")

The pro-active approach taken by FCA ensures that FCA is among the forerunners in integrating, or "mainstreaming," climate change adaptation in poverty reduction projects. It is a way of improving the quality of FCA activities by managing climate related risks and strengthening the capacity of local partners to cope with climate change. It can also help increase the overall sustainability of the development impacts together with FCA local partners, especially in highly sensitive sectors such as water, agriculture and health that are simultaneously facing many other challenges.

Strategic level climate mainstreaming support document

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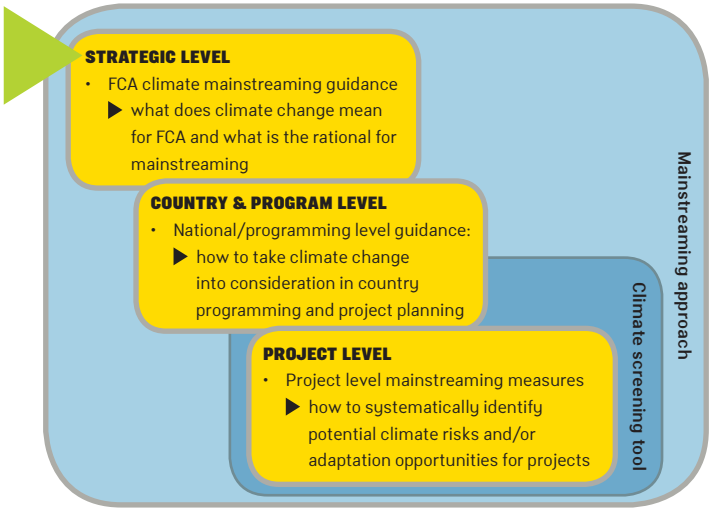
I. INTRODUCTION AND PURPOSE OF THIS DOCUMENT

This strategic level guidance document assists Finn Church Aid as an organisation to understand the challenges posed by climate change and provides guidance for systematically taking climate change aspects into account in all FCA activities, i.e. mainstreaming climate change into FCA activities.

The FCA mainstreaming approach is guided by three complementary building blocks:

- **THE STRATEGIC LEVEL climate mainstreaming support document (building block I, presented here)**
- **THE PARTNER COUNTRY/PROGRAMMING LEVEL** support document (building block II), and
- **PROJECT LEVEL** mainstreaming support document and tools (building block III)

This strategic level guidance document presents the rationale for climate mainstreaming, i.e. why integrating climate considerations into FCA work is crucial and how it supports FCA's overall objectives in reducing poverty and promoting justice. While the focus is on climate adaptation the important interlinkages with mitigation are highlighted. This document can also serve the purposes of internal and external communication with FCA partners. Key terms, additional information as well as links to further sources and support documents are included in the Annexes to this document.



This document sets the framework and provides the overall umbrella for the country and programme level guidance documents (building block II) and project level support documents (building block III), elaborated to assist project managers and local partners to concretely and step-wise integrate climate change considerations into project planning, implementation and monitoring.


Paul Jeffrey/ACT/Kenya

II. CLIMATE CHANGE – A THREAT TO POVERTY REDUCTION AND SUSTAINABLE DEVELOPMENT

Climate change[3] is one of the central challenges facing humanity in the 21st century. In addition to increasing temperatures (often referred to as "global warming"), climate change entails changes in weather patterns with widespread changes in rainfall and increases in droughts and/or heavy rainfall events in some regions. As a direct consequence of warming, also the sea level rises and the snow and ice cover decreases.

While the scientific evidence for human influence on climate change is unequivocal and signs of climate change are already evident, international efforts to curb emissions of greenhouse gases have to date been insufficient. It is clear that in the 2010s and the forthcoming decades all societies will have to adapt to a changing climate (for a more detailed presentation of the science of climate change, main impacts, key terms and concepts, see Annexes 1 and 2).

CLIMATE CHANGE EFFECTS ON DIFFERENT SECTORS AND LIVELIHOODS

Changes in rainfall patterns are likely to lead to severe water shortages and/or flooding. Melting of glaciers can cause flooding and soil erosion. Rising temperatures will cause shifts in crop growing seasons which affects food security, and changes in the distribution of disease vectors putting more people at risk from diseases such as malaria and dengue fever. Temperature increases will potentially severely increase rates of extinction for many habitats and species. As a result of global warming, the type, frequency and intensity of extreme climatic events, such as tropical cyclones (including hurricanes and typhoons), floods, droughts and heavy precipitation, are expected to rise even with relatively small average temperature increases. In summary, climate change will have wide-ranging effects on the environment, and on sectors with significant socio-economic relevance, including:

- **WATER RESOURCES** (e.g. decreasing water availability, water stress & droughts, floods)
- **AGRICULTURE AND FOOD SECURITY** (e.g. reduced crops, exacerbated malnutrition)
- **HUMAN HEALTH** (e.g. increased morbidity and mortality from heat waves, droughts, floods, changed disease vectors)
- **TERRESTRIAL ECOSYSTEMS, FORESTS AND BIODIVERSITY,** (e.g. biodiversity loss through species extinction)
- **COASTAL ZONES** (e.g. increasing damage from floods and storms)

CLIMATE CHANGE EFFECTS ON DIFFERENT GEOGRAPHICAL AREAS

According to the Intergovernmental Panel on Climate Change (IPCC), water stress is increasing in many countries in **Africa** and in ten years (by 2020) up to 200 million people are projected to be exposed to increased water stress due to cli-

[3] The Intergovernmental Panel on Climate Change (IPCC) defines climate change as: "Any change in climate over time, whether due to natural variability or as a result of human activity". This definition encompasses both natural variability and anthropogenic changes.

mate change. Agricultural production is severely compromised, as yields from rain-fed crops could be halved by 2020 in some countries, worsening food insecurity and increasing the number of people at risk from hunger.

In **Asia** tens of millions of people in low-lying coastal areas of South and Southeast Asia are affected by sea level rise and an increase in the intensity of tropical cyclones. Climate change will induce increasing water stress to over a hundred million people due to a decrease of freshwater availability in Central, South, East and Southeast Asia, particularly in large river basins. While agricultural productivity may improve in some northern Asian areas, agriculture and food security will be affected by decreases in crop yields in many parts of Asia putting many millions of people at risk from hunger.[4]

In **Latin America** particularly vulnerable to climate change are the water, agriculture and health sectors, the Andean glaciers the Amazon region. The region has already been experiencing climate-related changes with the frequency and intensity of extreme events, particularly those associated with the ENSO phenomenon. While there are uncertainties over the effects of climate change on rainfall in Latin America, it is predicted that arid and semi-arid areas will receive even less rain under climate change leading to degradation of agricultural land and impacting food security. As well as through extreme events, the main risks of climate change on health and life are from heat stress and transmissible diseases including malaria, dengue and cholera.

In **Small Island States** (SIDS)[5], arable land, water resources and biodiversity are already under pressure from sea level rise. Increases in population and the unsustainable use of available natural resources add further problems. Tropical storms and cyclones cause storm surges, coral bleaching, inundation of land, and coastal and soil erosion with resulting high-cost damages to socio-economic and cultural infrastructure. With climate change water supply in SIDS is likely to be exacerbated. Freshwater lenses are predicted to reduce in size due to increased demand and reduced rainfall. The projected impacts of climate change on agriculture include extended periods of drought, loss of soil fertility and shortening of the growing season which will lead to major economic losses and seriously affect food security.

[4] IPCC fourth assessment report, 2007.

[5] The small island developing States comprise 51 States and Territories spread over the Pacific, Indian and Atlantic Oceans and Caribbean Sea, and are highly vulnerable to the effects of climate change and already feeling its impacts.

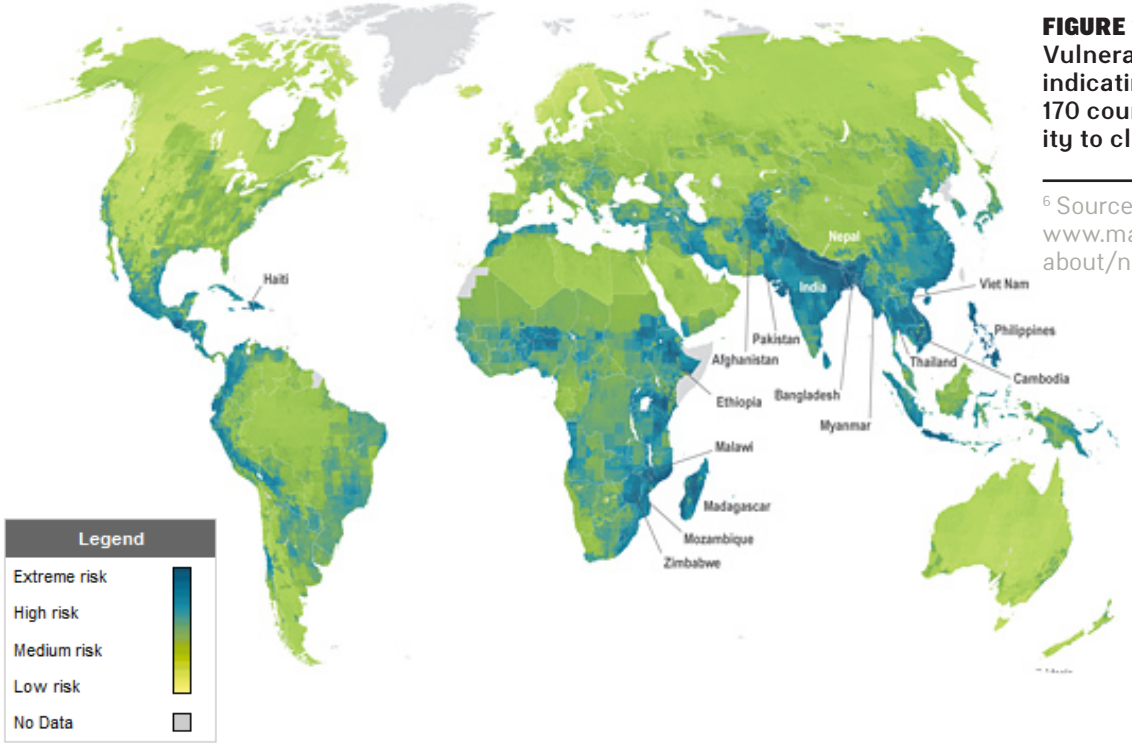


FIGURE 1. **Climate Change Vulnerability Index 2011 indicating one ranking of 170 countries' vulnerability to climate change[6]**

[6] Source: Maplecroft, http://www.maplecroft.com/about/news/ccvi.html

Paul Jeffrey/ACT/Kenya

Annex 1 includes summary tables of climate change impacts and vulnerabilities as well as capacity to adapt (adaptive capacity) for the respective regions. Building further on international climate research, more detailed, national level impact assessments and adaptation plans have been produced for most developing countries in order to guide concrete planning and implementation of adaptation measures that primarily take place at local levels (in Annex 4, links to national assessments and adaptation plans are provided).

CLIMATE CHANGE EFFECTS ON THE POOREST

It is evident that developing and least developed countries are, and will continue to be, greatly affected by climate change. The poorest inhabitants of our planet, being the main beneficiaries of FCA activities, are among the most vulnerable, mainly due to weak economic, environmental and social capabilities to deal with the consequences of climate change and natural hazards (Figure 1).

Overall, the poor who are greatly dependent on climate-sensitive sectors such as agriculture and forestry, are closer to the level of tolerance to change, often live on marginal land, and their economic structures are fragile. It has long been realized that certain regions of the world will be more severely affected by the effects of climate change than others. This aspect of climate justice is important to note, as some of the poorest countries and people that will be hit the hardest by climate change, have historically contributed the least to creating the problem.

In addition to increasing temperatures, climate change entails e.g. changes in rainfall patterns and distribution of disease vectors, modifies the type, frequency and intensity of extreme climatic events, such as tropical cyclones, floods, droughts and heavy precipitation.

The impacts of climate change are not distributed evenly between and within societies. The poorest inhabitants of our planet, being the main beneficiaries of FCA activities, are among the most vulnerable to climate change. Overall, the poor have a great dependence on climate-sensitive sectors such as agriculture and forestry, are closer to the level of tolerance to change, often live on marginal land, and their economic structures are fragile.

III. THE CASE FOR MAINSTREAMING CLIMATE ADAPTATION – SUPPORTING FCA'S CORE OBJECTIVES

The impacts of climate change can already today seriously affect development results, and could in some cases completely reverse any gains that have been made. At the same time, development projects can make a significant contribution to improving the adaptive capacity of target populations – if they are designed to take climate change into account.

The thematic focus areas of FCA, including:

- **SUSTAINABLE LIVELIHOODS** (food security, income)
- **RIGHTS AND PARTICIPATION** (including gender)
- **STABLE SOCIETIES**

are in many ways interlinked with and affected by the impacts of climate change. This demonstrates the importance to integrate climate considerations into all FCA thematic core areas and concrete activities in a systematic manner. For example:

- Disregarding an increasing trend in floods and/or droughts, e.g. by allowing continued deforestation on nearby hillsides, or by planting crops that are not as drought resistant as possible, may jeopardize the livelihoods and food security of the FCA project beneficiaries.

- Women play a critical role In agriculture and in managing household food supplies, but may, without explicit and decisive efforts, lack access to services and control over important resources and decisions affecting food security. As a result, they may become trapped in a vicious cycle, with food insecurity and malnutrition making them more vulnerable to climate change, and climate change exacerbating the risk of food insecurity.

- The impacts of climate change may also contribute to forced migration and in some cases contribute e.g. to increased tensions over land ownership, limited natural and economic resources and security threats.

Addressing the particular climate related challenges, some of which presented above, also helps FCA partners to better cope with natural climate variability (i.e. changes in weather patterns, not linked with climate change) and can simultaneously strengthen the capacity of local partners to cope with different kinds of (natural or manmade) disasters.

In order to efficiently address climate challenges in a holistic manner, it is important to recognize the interlinkages between development and different aspects of climate strategies and interventions (Figure 2). In some cases climate considerations are irrelevant from the respective FCA interventions and should not be "burdened" by a detailed review of climate risks or "add-on" climate project components. However, in some cases FCA activities may need modifications to secure (due to climate risks) the success of the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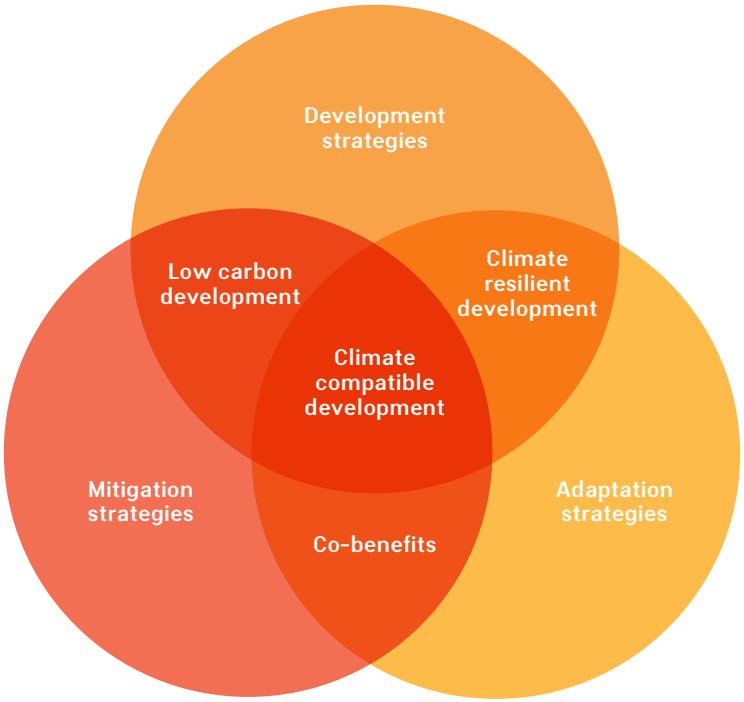
Mitigation is defined by the Intergovernmental Panel on Climate Change (IPCC) as: Implementing policies to reduce greenhouse gas emissions (e.g. using fossil fuels more efficiently, switching to renewable energy) and enhance sinks (e.g. expanding forests to remove greater amounts of carbon dioxide from the atmosphere)



Adaptation is defined by the Intergovernmental Panel on Climate Change (IPCC) as: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities

Important synergies between daptation and mitigation, as well as adaptation and disaster risk reduction (DRR) can be realized e.g. through reforestation in coastal areas and on hill slopes, diversification of local agricultural practices that increase the capacity of the soil to capture and store carbon from the atmosphere thereby reducing greenhouse gas (GHG) emissions

FIGURE 2. Interlinkages and synergies between climate change and development (Climate Compatible Development: adapted from Zadek, 2009)[7]

[7]Zadek, S. (2009) 'Catalyzing Low Carbon Growth and Development'. Presentation available from Project Catalyst and AccountAbility online at: http://www.accountability21.net/uploadedFiles/AccountAbility_Climate_Competitiveness_Brasil_300909.pdf

project, and in some cases FCA activities have the potential to harness important synergies e.g. between improved livelihoods and climate resilient livelihoods, household and individual climate adaptation and gender issues, climate adaptation and improved food security and income diversification, climate adaptation, humanitarian aid, mitigation and disaster risk reduction (DRR).

By understanding these various interlinkages, FCA can in a systematic manner analyse and tailor its interventions from a climate perspective and find synergies with the FCA core objectives of reducing poverty and promoting justice. The FCA approach to climate mainstreaming is presented below. The country and programme level guidance documents (building block II) and project level support documents (building block III) provide concrete and step-by-step guidance to project managers and local partners for integrating climate change considerations into project planning, implementation and monitoring.

The impacts of climate change can seriously affect development results, and could in some cases completely reverse any gains that have been made.

At the same time, development projects can make a significant contribution to improving the adaptive capacity of target populations – if they are designed to take climate change into account.

In summary, the FCA drivers for climate mainstreaming are as follows:

- In order to **reduce the risks posed by climate change to FCA's core activities[8] and stakeholders,** and to actively contribute to pro-poor climate solutions – FCA is mainstreaming climate considerations into all its development cooperation and advocacy activities.
- Simultaneously FCA aims to **proactively build the adaptive capacity of its partners, and hereby reduce the vulnerability** of its partners and beneficiaries to climate change and various (natural or manmade) disasters, which in many cases hamper the overall poverty reduction efforts.

Integrating, or "mainstreaming," climate change adaptation in poverty reduction projects is a way of improving the quality of FCA activities by managing climate related risks and strengthening the capacity of local partners to cope with climate change.

It can also be a way of increasing the overall sustainability of the development impacts together with FCA local partners, especially in highly sensitive sectors such as water, agriculture and health that are simultaneously facing many other challenges.

[8] Often referred to as "climate –proofing". See Annexes to FCA climate mainstreaming support documents.

SUMMARY BOX – WHY MAINSTREAM CLIMATE CHANGE INTO FCA ACTIVITIES?

While understanding that climate change is in many cases only one of the emerging challenges being addressed in the partner countries, there are several reasons for ensuring that climate change adaptation is appropriately integrated (mainstreamed) into development planning, decision making, implementation and monitoring:

1 **THE SCIENTIFIC EVIDENCE** about observed climate variability and change and its challenges already posed in particular to vulnerable populations

2 **THE OVERALL CONSENSUS** about projected future impacts of climate variability and change on natural as well as socioeconomic systems and their regional and societal distribution

3 **THE INCREASING KNOWLEDGE** and wealth of studies on how such impacts may jeopardize the results and impacts of many development efforts and further compromise the achievement of key development goals, including the Millennium Development Goals (MDGs)

4 **THE CONCERN** that development activities may lead to 'maladaptation' – an increase in exposure and/or vulnerability to climate change – either by overlooking climate change impacts, or by undertaking climate change adaptation actions that fail to adequately address the impacts of climate change and

5 **THE RECOGNITION** that development activities targeting and alleviating the root causes of vulnerability, and increasing the adaptive capacity of individuals and societies in general, have positive implications for climate change adaptation – even in cases where climate change has not been explicitly considered. By integrating climate change, the synergies between development and adaptation can be further exploited.

Source: A. Olhoff and C. Schaer (2010). Screening Tools and Guidelines to Support the Mainstreaming of Climate Change into Development Assistance – A Stocktaking Report. UNDP


Antti Pentikäinen/Uganda

IV. THE FCA APPROACH FOR CLIMATE MAINSTREAMING – CLIMATE CHANGE MIGHT BE HERE TO STAY BUT POVERTY CAN GO

While many of FCA's past and on-going activities are addressing the root causes of vulnerability to climate change – in most cases the climate adaptation deficit in developing countries is a development deficit – the climate challenge requires a holistic approach. Local, traditional coping mechanisms will in many cases remain as relevant solutions to short-term changes in climate but the magnitude of impacts, speed of changes as well as geographical scale will require various new adaptation approaches and methods.

While at the same time, taking note of FCA's focus areas of sustainable livelihoods, stable societies and human rights and participation, as well as FCA's ambition to work very closely with its local partners, FCA has multiple opportunities to work with its partners and deal with current and future climate change. In particular, FCA will

- **ADOPT A LONG-TERM VISION** for climate mainstreaming and introduce a systematic approach and mainstreaming tools for use by FCA staff and its partners

- **WITHIN ITS PROJECT PORTFOLIO IDENTIFY CLIMATE SENSITIVE SECTORS AND PROJECT TYPES** (e.g. water, agriculture, livelihoods, health) where it can particularly contribute to reducing its partners vulnerability, build capacity and support "climate proofed" poverty reduction efforts[9]

- **PROMOTE CLIMATE-RESILIENT LIVELIHOODS STRATEGIES** in combination with income diversification (e.g. by reducing dependency on one or few agricultural products, combining farming with livestock, new off-farm incomes) and capacity building for planning and improved risk management

- **TAKE INTO CONSIDERATION GENDER-SPECIFIC IMPACTS** of climate change in the areas of e.g. energy, water, food security, ecosystem services or health, as climate change can make it even more difficult for women and girls to realise their basic rights, and climate change impacts are in many cases exacerbating existing inequalities[10]

- **THROUGH AWARENESS RAISING AND ADVOCACY WORK** encourage government institutions (local, regional, national), private sector, national and international stakeholders to understand and address underlying causes of vulnerability[11] and support adaptation efforts

- **ACTIVELY SEEK SYNERGIES** between adaptation and disaster risk reduction, as well as climate mitigation, with a particular focus on vulnerable households and individuals.

The proposed approach is in line with FCA's objectives and the promotion of sustainable and responsible use of natural resources. With regards to climate mitigation FCA aims to encourage the use of energy forms and technological solutions that conserve natural resources and mitigate the effects of climate change. In practice, this means promoting renewable energy solutions and energy efficiency innovations such as solar panels, wind power, bioenergy and energy efficient stoves.[12]

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[9] Possible measures could include e.g. improved water storage, irrigation, seed stores, tolerant seeds, short cycled crops, more productive and resistant animals, introduction and enhancement of tree growing culture, early warnings, shelter etc.

[10] In developing countries, women in rural areas have the major responsibility for household water supply and energy for cooking and heating, as well as for food security. However, because of their roles, unequal access to resources, information, decision making and limited mobility, women in many contexts are disproportionately affected by climate change and natural disasters, such as droughts, floods, fires, or uncertain rainfall.

[11] Including e.g. poor governance, lack of control over resources, limited access to basic services, discrimination and other social injustices.

[12] As guiding principle, the proposed technologies should do "no-harm", from neither climate perspective (i.e. Any new activities and/or technology interventions will not increase global warming) nor other perspectives.

Country level climate mainstreaming support document

Nepal

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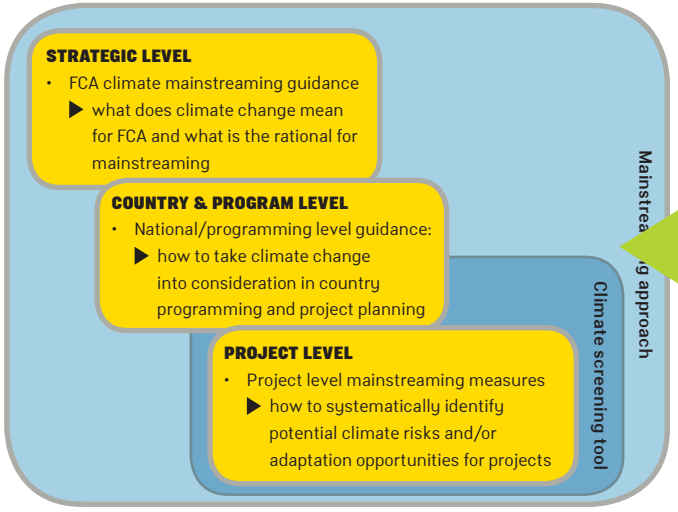


I. INTRODUCTION AND PURPOSE OF THIS DOCUMENT

This document assists Finn Church Aid as an organisation to understand the challenges posed by climate change and provides guidance for systematically taking climate change aspects into account in all FCA activities, i.e. mainstreaming climate into FCA activities.

The FCA mainstreaming approach is guided by three complementary building blocks:

- **THE STRATEGIC LEVEL** climate mainstreaming support document (building block I)
- **THE PARTNER COUNTRY/PROGRAMMING LEVEL support document (building block II, presented here), and**
- **PROJECT LEVEL** mainstreaming support document and tools (building block III)

This partner country/programming level support document shall serve FCA programme people and local partners in taking climate change into consideration in i) national level planning and programming, i.e. understanding the climate change context for all FCA activities in the country (development cooperation, advocacy, disaster relief and disaster risk reduction), and ii) in the preliminary screening of projects. The preliminary screening will assist to identify projects that may require a more detailed assessment of climate risks.

This particular briefing note shall assist FCA programme people and local partners in mainstreaming climate considerations into all FCA activities in Nepal. It presents the Nepalese climate context in a concise manner and sets the stage for systematically integrating climate aspects into FCA planning, implementation as well as monitoring and evaluation (PME) processes.[13]

The country briefing note is part the FCA climate mainstreaming approach and tool kit, to be used

[13] Similar support documents are available for other FCA main partner countries.

Physiographic zone	Ecological belt	Climate	Average annual precipitation	Mean annual temperature
High Himal High mountain	Mountain	Arctic/alpine	Snow/150mm-200mm	<3°C-10°C
Middle mountain	Hill	Cool/warm	275mm-2300mm	10°C-20°C
Siwalik Terai	Terai	Tropical/sub-tropical	1100mm-3000mm	20°C-25°C

TABLE 1. Climate characteristics in different ecological belts of Nepal

together with the strategic level support document (building block I) and in particular in tandem with the detailed project level mainstreaming support documents and tools (building block III).

II. CLIMATE AND NEPAL

THE CLIMATE CHANGE CONTEXT AND OVERALL VULNERABILITY

Nepal is a land-locked country of highly varying climatic conditions, influenced by the Himalayan mountain range and the South Asian monsoon. The climate characteristics vary from tropical to alpine, with the country hosting a high diversity of flora, fauna and abundant water resources.

The climate is characterized by four distinct seasons: pre-monsoon (March-May), monsoon (June-September), post-monsoon (October-November) and winter (December-February), with the average annual rainfall at approximately 1800 mm. The highest rainfall occurs in the central and mid-hill areas around Pokhara and northeast and east of the Katmandu Valley. The winter season is the coldest and the highest temperatures occur during the pre-monsoon period.[14]

While overall institutional capacity to address climate change issues in Nepal is low, there is an increasing recognition of an urgent need for focused, coordinated action to support poor communities to adapt to climate change. The National Adaptation Programme of Action (NAPA, Government of Nepal), finalized in late 2010, is generally considered as one example of this recognition and seen as a solid, commonly accepted guidance document for the priority adaptation measures needed in Nepal.

Nepal is largely an agrarian economy and the Nepalese population highly dependent on agriculture, whereby increased climate variability and climate change will adversely affect the livelihoods and food security of most Nepalese people. Taking note of the low national greenhouse gas emissions, and given the very high vulnerability of Nepal to climate change, the obvious focus in Nepal is on adaptation rather than mitigation[15].

[14] Nepal, NAPA 2010.

[15] With regards to mitigation the focus should be on reduction of energy poverty & low-carbon growth.

OBSERVED CHANGES AND PROJECTED CLIMATE CHANGE IN NEPAL – AVAILABLE CLIMATE DATA

Observed data indicate

- consistent warming and rise in max temperatures (at an annual rate of 0.04–0.06 °C), with more pronounced warming in high altitudes.
- a general decline in pre-monsoon precipitation in far- and mid-western Nepal but a general increase in the rest of the country, with the exception of a few regions.
- general declining trends in monsoon precipitation in the mid-western and southern parts of western Nepal. In the rest of the country monsoon precipitation has generally increased.
- increasing trends in post-monsoon precipitation in most of themed-western and the southern parts of eastern and central/ western Nepal, however, a general declining trend in most of the far-western and northern parts of western, central and eastern Nepal.
- an overall increasing trend in winter precipitation with a few exceptions.
- Himalayan glacier melt and retreat has been increasing as assessed through remote sensing.

With regards to projected climate

- Scenarios depict mean annual temperature increases above 1 °C by 2030. Estimates for temperature increases in 2050–2100 range between approx 2–5 °C and in general projections show higher increases during winter as compared to the monsoon seasons. Increases in the frequency of hot days and nights are projected.
- Precipitation projections show no change in western and up to 5–10 % increase in eastern Nepal during winter. During summer months precipitations are projected to increase for the whole country in the range of 15–20 %. However, with regards to mean annual precipitation the models do not give any clear trends and the large inter-annual variations are attributed to natural cycles.

Overall, it is likely that the projected changes in climate will include i) significant warming, particularly at higher elevations leading to reductions in snow and ice coverage, ii) increased frequency of extreme events, including floods and droughts[16], and iii) overall increase in precipitation during the wet season while decrease in the mid-hills.

[16] Flood and drought vulnerability maps are presented in the appendix to this country level document.

CLIMATE CHANGE IMPACTS IN DIFFERENT SECTORS, MAIN VULNERABILITIES AND ADAPTATION OPTIONS

The 2010 National Adaptation Programme of Action (NAPA, Government of Nepal) analyses the climate vulnerabilities in six thematic areas, central for Nepalese development aspirations. It also proposes adaptation options in the same areas as a response to the increasing awareness of Nepal's vulnerability to climate change. Many of the adaptation options have already been implemented. The six thematic areas and the climate vulnerabilities and adaptation options related to them are presented in Table 2.

The NAPA analysis also covers gender differentiated climate change effects and provides guidance for gender sensitive adaptation measures. Many of the identified adaptation options are interlinked, representing various synergies and supporting the improvement of local livelihoods. A more detailed list of potential adaptation measures in Nepal is presented in the appendix to this document.

TABLE 2. Climate vulnerabilities and adaptation options in Nepal.

Thematic areas/sectors	Main vulnerabilities	Adaptation options
Agriculture and food security	E.g. local communities have already identified changes in climate as being largely responsible for declining crop and livestock production	E.g. drought resistant crops, improved forest fire control, reforestation/afforestation activities, provision of insurance, livelihood diversification, weather forecasting, mirco-irrigation, water-harvesting, introduction of short maturing and hardy crops & cropping techniques etc.
Water resources and energy	E.g. too much/little water (at changed times) affect directly agriculture, human health and sanitation, human settlements, infrastructure and complicate energy provision (including hydro, solar, biomass)	E.g. develop and implement integrated watershed management policies, climate change adaptation/water conservation education/ awareness raising, develop cost effective micro, small and medium hydropower, promote wind and solar energy etc.
Climate induced disasters	E.g. the amount of people annually susceptible to climate-induced disasters (floods, landslides, droughts) is more than one million in Nepal	E.g. hazard mapping and risk zoning, resettlement of vulnerable communities, community-level disaster preparedness programs, early warning systems, implementation of improved building codes, improvement of degraded land, promotion of proper agriculture practice etc.
Forests and biodiversity	E.g. increased temperature and rainfall have already resulted into shifts in agro-ecological zones, prolonged dry spells and higher incidents of pests and diseases	E.g. ecosystem management, protection of water sources from landslides and erosion, wetland conservation, forest management plans with local communities, promotion of upstream-downstream communities interaction and collaboration, awareness building, forestry policies in support of mitigation & adaptation (multibenefit)
Public health	E.g. the low level (lack for major parts of population) of primary health care will be further challenged by climate change (through malnutrition effects, changes in vector and water borne infectious disease) being an additional stress factor to public health	E.g. integration of health impacts of climate change into broader development plans, strengthening the health system, promotion of appropriate local adaptive knowledge, awareness raising and capacity building etc.
Urban settlements and infrastructure	E.g. climate induced disasters affect roads, bridges, community building, schools, energy and water provision etc with (partly climate induced) rural-urban migration posing additional challenges	E.g. demarcation of territories, water ways and buffer zones, enforcement of building codes incorporating climate change dimensions, conservation of water and reuse of waste water, early warning systems for flood, rehabilitation of traditional ponds, on site sanitation at community where city level systems doesn´t exist etc.

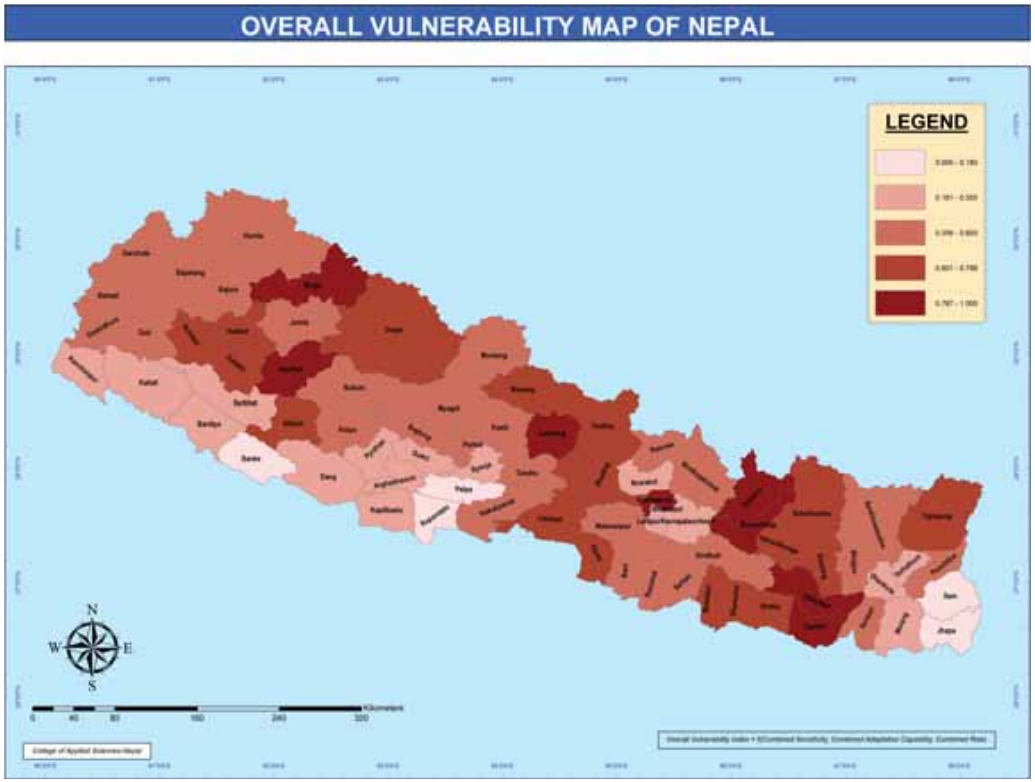
CLIMATE CHANGE IMPACTS IN DIFFERENT PARTS OF THE COUNTRY

From the point of view of Finn Church Aid's activities in Nepal, in addition to the sector vulnerabilities it is possible to identify regional climate vulnerabilities that must be taken into consideration when mainstreaming climate into FCA'a planning and implementing activities in the field. With regards to regional characteristics, districts ranking high on the NAPA vulnerability index are shown in map 1 and listed in table 3.

Districts particularly prone to certain climate change impacts (such as floods, glacial lake outbursts, droughts) are presented in the appendix.

When analyzing climate vulnerabilities it is important to identify which i) sectors and livelihoods, ii) regions and districts are most at risk, and if possible which iii) particular climate parameters pose the most pressing threats in order to identify the priority adaptation needs and measures.

The info box at the end of this document (Case: Flood mitigation through bio-engineering and conservation) presents an example of an adaptation project implemented in Nepal, serving as case for comparison for the mainstreaming processes to be conducted in Nepal.



MAP 1. Overall vulnerability map of Nepal

TABLE 3. Nepal districts ranked according to an overall climate vulnerability index[17]

Vulnerability Ranking	Districts
Very High (0.787-1.000)	Kathmandu, Ramechhap, Udayapur, Lamjung, Mugu, Bhaktapur, Dolakha, Saptari, Jajarkot
High (0.601-0.786)	Mahottari, Dhading, Taplejung, Siraha, Gorkha, Solukhumbu, Chitwan, Okhaldhunga, Achham, Manang, Dolpa, Kalikot, Khotang, Dhanusha, Dailekh, Parsa, Salyan
Moderate (0.356-0.600)	Sankhuwasabha, Baglung, Sindhuli, Bhojpur, Jumla, Mustang, Rolpa, Bajahang, Rukum, Rautahat, Panchthar, Parbat, Dadeldhura, Sunsari, Doti, Tanahu, Makwanpur, Myagdi, Humla, Bajura, Baitadi, Bara, Rasuwa, Nawalparasi, Sarlahi, Sindhupalchok, Darchula, Kaski
Low (0.181-0.355)	Nuwakot, Dhankuta, Kanchanpur, Bardiya, Kapilbastu, Terhathum, Gulmi, Pyuthan, Surkhet, Arghakhanchi, Morang, Dang, Lalitpur, Kailali, Syanja, Kavrepalanchowk
Very Low (0.000-0.180)	Ilam, Jhapa, Banke, Palpa, Rupandehi

[17] MoE/NAPA project (2010).

INFO BOX: ADAPTATION IN ACTION

Example Case: Flood mitigation through bio-engineering and conservation[18]

The project seeks to reduce the devastating effects of recurrent flash floods in the Biring River in the east of the country by planting local trees and grasses and other land protection technologies and by encouraging the natural regeneration of vegetation. The planting of mature stems of bamboo is increasing and also the use of bamboo mesh.

The project works in partnership with the people affected by river erosion. It sensitizes communities to how they can protect their land and livelihoods from devastating flooding. Disaster management committees have been formed in the areas where communities are most at risk from water-induced disasters. River erosion has caused huge difficulties for the people who live close to the Biring River.

The process of desertification due to river erosion has now been slowed down significantly. Natural vegetation has begun to return and cover the "wasteland". The river width is getting narrower and the destructive effects of flash floods have been reduced. The micro-climate of the area has also improved. Formerly, at the end of each summer most of the water sources close to the riverbasin dried up. Until two years ago the river was almost empty because of the low volume of water in the river. This was compounded by underground water spreading over a wide area and the evaporation of water due to the openness of the river basin. This has now improved.

ACT funding and implementing member:
Lutheran World Federation Nepal
Location: Eastern Development Region, Jhapa District, Arjundhara and Khudunabari Village Development Committees.
Coverage: 2,912 people in 550 families

[18] Source: ACT Alliance: Tackling Climate Change Communities Making a Difference http://www.actalliance.org/resources/policies-and-guidelines/policies-group-a/forFILES_climateFull_low.pdf

Nepal: Project locations highlighted in red

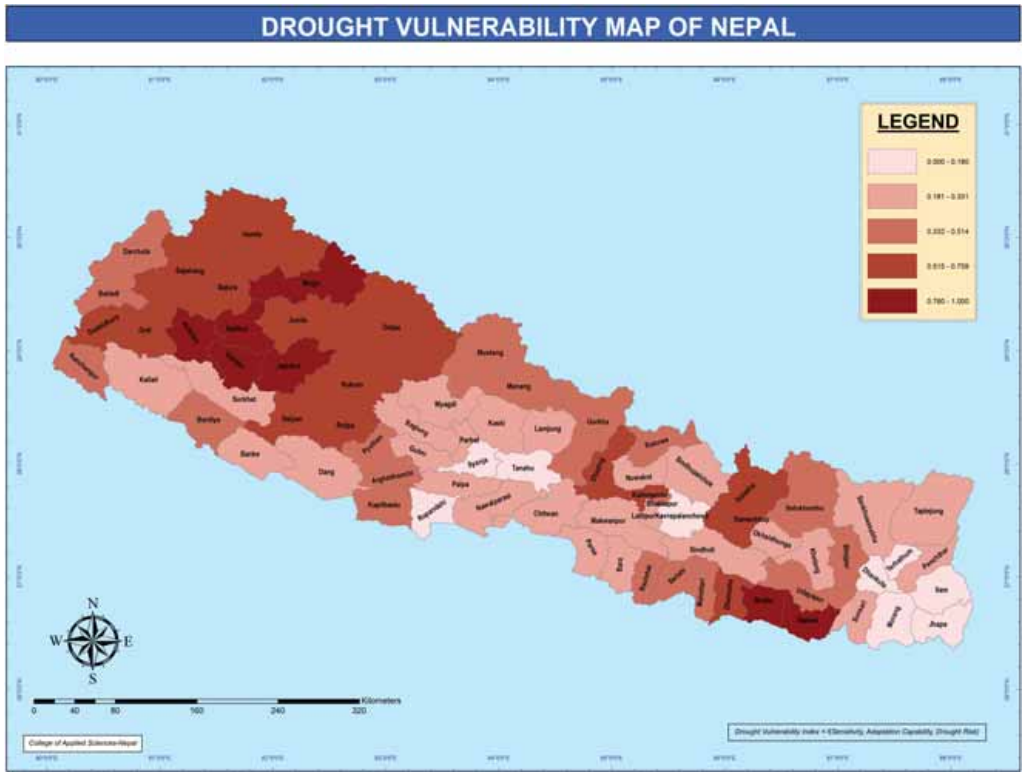

Spurs (use of stones and gibbon wire and plantation) seen near a river in eastern Nepal as a measure against floods. ©LWF Nepal

River embankment, using bioengineering in eastern Nepal, working area of LWF Nepal. ©LWF Nepal

APPENDIX
CLIMATE CHANGE IMPACTS IN DIFFERENT PARTS OF NEPAL

This appendix compiles addition al information about the climate change impacts in different parts of Nepal, to support FCA climate main-streaming efforts. In particular, the more detailed and downscaled information allows assessing the relevance of climate change for the respective FCA project.

This appendix includes Nepal vulnerability maps: droughts, floods, landslides, glacial lake outburst floods (GLOF).



District ranking-Drought Vulnerability Index

Flood Vulnerability	Districts
Very High (0.760-1.000)	Jajarkot, Mugu, Kalikot, Dailekh, Saptari, Achham, Siraha
High (0.515-0.759)	Dolpa, Humla, Kathmandu, Jumla, Dadeldhura, Bajura, Bajahang, Rukum, Salyan, Dolakha, Rolpa, Ramechhap, Doti, Dhanusha, Dhading
Moderate (0.332-0.514)	Baitadi, Sarlahi, Bardiya, Pyuthan, Rasuwa, Manang, Kanchanpur, Mustang, Bhaktapur, Gorkha, Mahottari, Udayapur, Kapilbastu, Darchula, Rautahat, Bhojpur, Solukhumbu, Arghakhanchi
Low (0.181-0.331)	Sindhuli, Parsa, Dang, Banke, Kailali, Gulmi, Taplejung, Sindhupalchok, Lalitpur, Makwanpur, Panchthar, Nuwakot, Chitwan, Baglung, Surkhet, Sankhuwasabha, Kaski, Palpa, Khotang, Nawalparasi, Bara, Myagdi, Parbat, Okhaldhunga
Very Low (0.000-0.180)	Lamjung, Sunsari, Rupandehi, Tanahu, Kavrepalanchowk, Ilam, Terhathum, Morang, Syangja, Dhankuta, Jhapa

FLOOD VULNERABILITY MAP OF NEPAL - Terai Ecological Zone

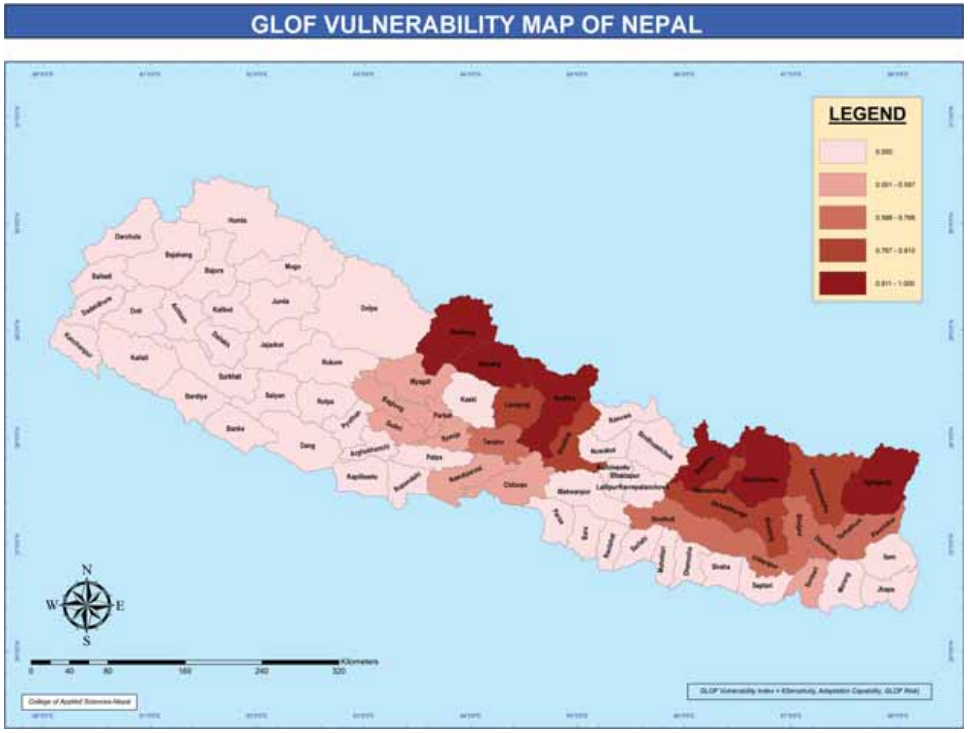
District ranking-Flood Vulnerability Index

Flood Vulnerability	Districts
Very High (0.788-1.000)	Mahottari
High (0.534-0.787)	Rautahat, Chitwan, Parsa, Saptari, Siraha, Sunsari, Dhanusha, Bara
Moderate (0.337-0.533)	Sarlahi, Nawalparasi, Kailali, Jhapa, Morang, Kanchanpur, Bardiya
Low (0.001-0.336)	Banke, Kapilbastu, Rupandehi
Very Low (0.000)	Achham, Arghakhanchi, Baglung, Baitadi, Bajahang, Bajura, Bhaktapur, Bhojpur, Dadeldhura, Dailekh, Dang, Darchula, Dhading, Dhankuta, Dolakha, Dolpa, Doti, Gorkha, Gulmi, Humla, Ilam, Jajarkot, Jumla, Kalikot, Kaski, Kathmandu, Kavrepalanchowk, Khotang, Lalitpur, Lamjung, Makwanpur, Manang, Mugu, Mustang, Myagdi, Nuwakot, Okhaldhunga, Palpa, Panchthar, Parbat, Pyuthan, Ramechhap, Rasuwa, Rolpa, Rukum, Salyan, Sankhuwasabha, Sindhuli, Sindhupalchok, Solukhumbu, Surkhet, Syangja, Tanahu, Taplejung, Terhathum, Udayapur

LANDSLIDE VULNERABILITY MAP OF NEPAL - Hill and Mountain Ecological Zone

District ranking-Landslide Vulnerability Index

Landslide Vulnerability	Districts
Very High (0.787-1.000)	Udayapur, Kathmandu, Mugu, Lamjung
High (0.630-0.786)	Darchula, Baglung, Rolpa, Achham, Makwanpur, Dolpa, Parbat, Taplejung, Ramechhap, Gorkha, Salyan, Doti, Bajahang, Sindhuli, Bhaktapur, Solukhumbu, Baitadi, Kaski, Rasuwa, Sindhupalchok, Jajarkot, Rukum, Nuwakot, Dhading, Myagdi
Moderate (0.47-0.629)	Bajura, Bhojpur, Okhaldhunga, Sankhuwasabha, Syangja, Dailekh, Arghakhanchi, Tanahu, Kalikot, Kavrepalanchowk, Dolakha, Khotang, Dang, Surkhet, Humla, Gulmi, Jumla, Panchthar, Pyuthan
Low (0.001-0.476)	Ilam, Manang, Dadeldhura, Mustang, Palpa, Terhathum, Lalitpur, Dhankuta
Very Low (0.000)	Saptari, Siraha, Chitwan, Mahottari, Sunsari, Dhanusha, Nawalparasi, Rautahat, Sarlahi, Bara, Kanchanpur, Parsa, Morang, Kailali, Jhapa, Banke, Kapilbastu, Rupandehi, Bardiya



District ranking-GLOF Vulnerability Index

GLOF Vulnerability	Districts
Very High (0.911-1.000)	Dolakha, Solukhumbu, Manang, Mustang, Taplejung, Gorkha
High (0.767-0.910)	Khotang, Sankhuwasabha, Lamjung, Okhaldhunga, Ramechhap, Dhading
Moderate (0.598-0.766)	Bhojpur, Panchthar, Udayapur, Tanahu, Terhathum, Sindhuli, Dhankuta
Low (0.001-0.597)	Baglung, Chitwan, Parbat, Myagdi, Nawalparasi, Sunsari, Gulmi, Syangja
Very Low (0.000)	Jajarkot, Mugu, Kalikot, Dailekh, Saptari, Achham, Siraha, Dolpa, Humla, Kathmandu, Jumla, Dadeldhura, Bajura, Bajahang, Rukum, Salyan, Rolpa, Doti, Dhanusha, Baitadi, Sarlahi, Bardiya, Pyuthan, Rasuwa, Kanchanpur, Bhaktapur, Mahottari, Kapilbastu, Darchula, Rautahat, Arghakhanchi, Parsa, Dang, Banke, Kailali, Sindhupalchok, Lalitpur, Makwanpur, Nuwakot, Surkhet, Kaski, Palpa, Bara, Rupandehi, Kavrepalanchowk, Ilam, Morang, Jhapa

Appendix N2[19] Adaptation options in different sectors in Nepal

List of priority adaptation options for agriculture and food security in Nepal

Climate change effect/ Impacts	Adaptation options
Increases in intense rainfall/ Epidemics	Awareness raising
	Provision of the food/clean drinking water
	Promotion of Community level waste management
	Provision of emergency health care
Reduced rainfall & increased of temperature/ Drought	Identification of Potential drought prone area
	Forecasting
	Livelihood diversification
	Distribution of drought resistant crops species
	Provision of food aid
Reduced rainfall & increased of temperature/ Forest fire	Awareness raising
	Conservation/promotion of afforestation reforestation programme
	Forest fire control
Increased temperatures/ GLOF and avalanche	GLOF/Avalanche mitigation
	Awareness Raising
	Early warning system and forecasting
Increased temperatures/ Heatwave	Awareness raising
	Reforestation/Afforestation
Other/ Coldwave	Awareness raising
	Provision of the warm clothes
Other/ Hailstorm/Windstorm and Thunderbolt	Provision of Insurance
	Community based fund
	Livelihood diversification
	Weather forecasting

[19] Source: Nepal, NAPA 2010.

List of priority adaptation options for the water sector in Nepal

Themes within the water sector	Climate adaptation relevant programmes
Water Induced Disasters	Water-related Disaster Management Policy and Program
	Risk/Vulnerability Mapping and Zoning Program
	Disaster Networking and Information System Improvement Program
	Community-level disaster preparedness program
	Relief and Rehabilitation Measures
	Activation of Inundation Committee
	Flood, Drought, Landslides/Debris Flow, GLOF and Avalanche Adaptation Program
Environmental Action Plan on Management of Watersheds and Aquatic Ecosystems	Improve Environmental Database System
	Map Climatically Sensitive Watersheds and Aquatic Ecosystems
	Develop Water and Wastewater Quality Standards and Regulations
	Implement Climate Change Adaptation/ Water Conservation/ Education/Awareness Program
	Implement climatically sensitive Watersheds and Aquatic Ecosystems Protection, Rehabilitation and Management Programs
	Promote Community Participation in the Management of Watersheds and Aquatic Ecosystems to enhance climate change adaptation
	Enhance Institutional Capacity and Coordination
	Develop Watershed Management Policy
Water Supply, Sanitation and Hygiene	Accelerated Stand-Alone Sanitation Improvement Program (ASASIP)
	Rural Water Supply and Sanitation Program (RWSSP)
	Small Towns Water Supply and Sanitation Program (STWSSP
	Kathmandu Valley Water Supply and Sanitation Program (KVWSSP)
	Major Towns Water Supply and Sanitation Program (MTWSSP)
	Water Supply and Sanitation Institutional Strengthening Program (WSSISP)
Irrigation for Agriculture	Integrated Program for Irrigated Agriculture
	Improved Management of Existing Irrigation Schemes
	Improved Planning and Implementation of New Irrigation Systems
	Strengthening of Capacity Building of Local Level Institutions in Planning and Project Implementation

Themes within the water sector	Climate adaptation relevant programmes
Hydropower Development	Program to develop cost-effective micro, small, and medium hydropower
	Program to enhance rural electrification
	Program to Improve Power System Planning
	Program for Power and Energy Sector Reform and Development
Water-related Information Systems (Decision Support	Management of existing hydrological and meteorological network at DHM
System for River Basin Planning	Extension of hydrological and meteorological networks of DHM
and Management)	Funding and management of hydrological and meteorological networks of DHM
Regional Cooperation Frameworks	Program to appraise and understand the water-related needs of neighboring countries
	Program to pursue confidence-building measures with neighbors
	Programs to implement mutually beneficial development activities
Policy and Legal Frameworks	Policy and Legislation related to water resources management reviewed, amended and harmonized in the context of climate change
Institutional Mechanisms	Restructure and activate central planning organization
	Institutional Capacity Building of Government Agencies at Central and Local Level
	Central Level Institutional Setup for Study, Research & Development on Climate Change Prediction, Policy Mainstreaming, and Adaptation
	Set up institutional framework for coordinated and integrated development at the basin level

List of priority adaptation options for the energy sector in Nepal

Themes within the water sector	Climate adaptation relevant programmes
Formulate National Energy Strategy (NES) and National Energy Plan (NEP)	Formulate National Energy Strategy and National Energy Plan taking into consideration of climate change based on the doctrines of integration, coordination, decentralization, popular participation and implementation of energy programs within the framework of good governance, equitable distribution and sustainable development
	Afforestation Programs to maintain the balance between Annual Fuel Wood demand and Supply for Rural Household Energy
Promote Alternative Energy Technologies	Scaling up of biomass energy technologies (quantity, quality, and coverage) for less fuel wood consumption
	Develop and promote solar energy technologies
	Develop wind energy
	Up scaling the Development of improved water mills
	Research and Development Bio-fuels
Utilization of Gravity Energy	Promotion for utilization of gravitational energy
Energy Switch Over	Promote electrical Vehicles
	Promote energy efficiency
	Promote use of electrical appliance at the households
	Promotion of Solar energy in public lighting
	Promote blended fuels
	Promote the use of natural gas source available within the country
Monitoring and Evaluation of	Monitoring the performance of alternative energy technologies
Alternative Energy Technologies	Monitoring and evaluation of the social, socio-economic and health indicators of the users of alternative energy
	Policy and Legislation related to energy management reviewed, amended and harmonized
Institutional Mechanisms	Restructure and activate central planning organization
	Restructure and strengthen government ministries and departments
	Maintain clear separation of roles between policy, operation and regulation/monitoring
	Strengthening institutions involved in alternative energy equipment manufacturing and supply
	Supporting the NGOs, CBOs and Private sectors for promotion of bi-fuels use in the communities
	Support to Academic and Research institutions
	Set up institutional framework for coordinated and integrated development at the VDC, District and central level

List of priority adaptation options to address climate induced disasters in Nepal

Climate change effect/ Impacts	Adaptation options
Increases in intense rainfall/	Enhance the capacity of all the water-induced disaster related institutions
Floods	Strengthen early warning system and forecasting
	Promotion of reforestation/afforestation programme
	Implementation of structural measures
	Conservation of Churia/Siwalik regions
	Strengthen the capacity and coordination of GO, CBOs, NGOs, INGOs, local authorities, professional societies for disaster management networking
	Hazard/vulnerability mapping and zoning
	Discouraging and restricting settlements in high risks-areas
	Establishment and management of emergency supply ware house
	Making preparations for emergency response, relief and rehabilitation measures
	Activation of inundation committee
	Clearing water logging
	Resettlement of vulnerable community
	Provision of transport and access to market
	Designs of the islands for the villagers to be used during the flood
	Implementation of the building codes
Increases in intense rainfall/	Hazard mapping and Risk zoning
Landslides	Awareness raising
	Discouraging and restricting people living in high risk areas
	Resettlement of the vulnerable community
	Promotion of afforestation /reforestation programme and bioengineering technique
	Implementation of structural measures
	Inventory on landslides
	Implementation and promotion of water harvesting system and conservation ponds
	Improvement of the degraded land
	Promotion of proper agriculture practice

List of priority adaptation options for forests and biodiversity in Nepal

Areas for climate change effect/ impacts	Adaptation responses
Community based forest fire control	Capacity building programme for forest managers, awareness building programme for communities, fire prevention programme for forest managers, as well as policy reform for effective and easy implementation.
Programmes of forest pathogen control	Identification of pathogens, study of life cycle of pathogens, developing appropriate mechanism, training to the forest managers.
Control of invasive species	Research to control invasive species (Michenia), control mechanism dissemination.
Integrated forest management for water	Management of vegetation which results increase in infiltration and decrease in evapo-transpiration
	Management of vegetations which result less evapo-transpiration.
	Increase ground water recharge through conservation pond (reservoirs) and contour ditches
	Protection of water source from landslides, erosion and other disturbances.
	Protection of forest water canals from excessive loss
Integrated Watershed Management in context of climate change	Vegetation management, conservation farming, improving recharge through conservation ponds and other mechanisms.
Watershed conservation in Mustang	Identification and implementation of wind erosion control activities such as shelterbelts, buffer strips, control of water erosion activities, promotion of water conservation measures through vegetation and land management.
Wildlife management in relation to climate stress	Identification of wildlife impacted by high temperature and drought, habitat improvement, development and implementation of conservation plans.
Vulnerable species conservation	Identification of species, preparing and implementing management plan
High altitude rangeland conservation	Identification of the management area, preparing rangeland management plan, training to local communities.
Management in Landscape level	Identification of threatened flora and fauna, establishment of corridors and connectivity, identification of activities for their movement and dispersal, preparing and implementation of landscape level conservation plan.
Management of Wetlands	Preparation and implementation of wetland conservation plans with involvement of local communities.
Management of Herbs for Poverty Reduction	Identification of risk region, species at risk, preparing and implementing management plan with involvement of local and indigenous communities.
Conservation of riverine forest	Identification of appropriate forest types, preparing and implementing management plans with participation of local communities.
Trees outside the forests or Agro-forestry in communal and private land	Identification of empty land owned by household and communities, promoting appropriate species according to need of local communities, awareness building for promotion of trees in private and community owned land.
Private Land Conservation Forestry	Identification of proper area for promoting private forestry, training land owners in tree plantation and management, providing subsidy for private forest promotion.
Collection and Maintenance of Biodiversity Database	Selection of pilot area, preparation of biodiversity database in the region.
Payment of Environmental Services	Establishment of forum for upstream and downstream communities interaction, conservation of resources in upstream, implementation of upstream conservation measures. Initiation of discussion among up-steam and downstream communities for payment of environmental services.
Awareness and Capacity Building of Stakeholders	Awareness building to local communities and other local stakeholder in the potential climate hazards in the area, training local communities to combat potential hazards.
Policy Reform	Incorporation of climate friendly policies in forest sector policy for climate adaptation and mitigation, joining sector adaptation activities also for mitigation.
Research and Development for adaptation	Identification of research issues, conducting research with involvement of vulnerable local communities.

List of priority adaptation options for public health in Nepal

Need for climate adaptation	Adaptation responses
Reduce the impacts of climate change on human health	Strengthening health system.
	Awareness raising and capacity building,
	Promotion of appropriate local adaptive knowledge,
	Coordination among concerned stakeholders,
	Integration of health impacts of climate change into broader development plans and related activities.
	Research on climate change and health for evidence based planning.

Project level climate mainstreaming support document – climate screening & proofing of FCA projects

Paul Jeffrey/ACT/Kenya

FINN CHURCH AID
actalliance


Minna Elo/Honduras

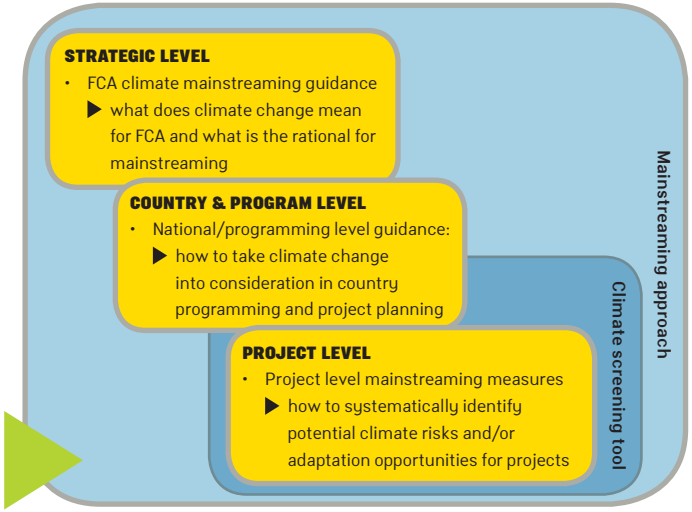
I. INTRODUCTION AND PURPOSE OF THIS DOCUMENT

This document assists Finn Church Aid as an organisation to understand the challenges posed by climate change and provides guidance for systematically taking climate change aspects into account in all FCA activities, i.e. mainstreaming climate into FCA activities.

The FCA mainstreaming approach is guided by three complementary building blocks:

- **THE STRATEGIC LEVEL** climate mainstreaming support document (building block I)
- **THE PARTNER COUNTRY/PROGRAMMING LEVEL** support document (building block II), and
- **PROJECT LEVEL mainstreaming support document and tools (building block III, presented here)**

This project level mainstreaming support document provides guidance for the climate screening and proofing of FCA projects. It presents the key questions to be addressed during project planning, highlights modifications to FCA planning processes and PME documents[20], and introduces suitable tools for FCA, in case in-depth climate risk assessment and proofing is required.



[20] Including modifications to Project Planning Format (PPF) as well as the Assessment Grid for projects funded by FCA. At this stage modifications to Project Planning Guidelines for Finn Church Aid funded project proposals (Pilot version January 2009), are not suggested as these climate mainstreaming documents provide the necessary guidance.

The country/programming level support documents (prepared for all key FCA partner countries), shall serve as important input and source of relevant climate information in the project level mainstreaming exercise described below.

II. FCA PROJECT CLIMATE SCREENING AND PROOFING APPROACH AND CONCRETE STEPS

APPROACH

This document shall assist FCA's programme and project managers as well as FCA's local partners in taking climate change aspects concretely into consideration when planning, implementing and monitoring FCA's projects in the partner countries.

Firstly, the FCA project screening and proofing approach **builds on the existing FCA project**

cycles and management documents, which currently guide the PME (planning, monitoring, and evaluation) processes and serve as obvious entry points for integrating climate considerations into FCA project cycles. The PME documents have been reviewed and amended with climate specific questions and guidance notes in order to support systematic climate mainstreaming of all FCA projects.

Secondly, taking note of FCA's ambition to strengthen and build the capacity of its partners – with sometimes limited capacity to address climate change – the approach builds on **shared mainstreaming responsibilities between FCA staff, field offices and local partners**. This approach is necessary in order to ensure that climate considerations are taken systematically and seriously into account but to avoid hindering projects and/or over-burdening local partners. However, climate mainstreaming through participatory processes is also a possibility to empower women and vulnerable groups, build awareness and the capacity of local partners to deal with climate change in the short as well as longer term. The flow chart (Figure 1, next page), suggests a preliminary share of tasks between program staff, partners, project developers, managers and coordinators.

Thirdly, **the approach is built on a step-by-step approach**, with a particular focus on different livelihoods as drivers of sustainable poverty reduction. A preliminary climate screening and context analysis (making use of the country climate profile/guidance document) indicates whether climate aspects are particularly relevant for the project or not. Thereafter, projects flagged out for further analysis can be screened making use of the climate specific questions introduced (see Box 1) into FCA planning documents.[21]

Finally, it introduces **tools for in-depth climate risk screening and identification of adaptation measures for projects that have been identified as highly vulnerable to climate change,** and for projects that have high potential to build adaptive capacity and reduce climate vulnerability.

CONCRETE STEPS TO GUIDE PROJECT LEVEL CLIMATE MAINSTREAMING

The key mainstreaming questions will be addressed by making use of the country climate profile/programming level support document, the updated FCA project planning documents, and in case needed, the proposed tools for in-depth climate screening and proofing. While several different approaches and tools have been analysed and served as a basis for tailoring a suitable approach for FCA, in particular the CRiSTAL approach has been used as a basis for FCA's approach.[22]

Preliminary climate screening (Steps 1 and 2)

In practice the following two steps should be taken by FCA staff, in collaboration with its local partners, in order to conduct the preliminary climate screening. Optimally these steps should be taken in tandem (parallel), to avoid unnecessary work and make use of synergies (key stakeholders required are the same).

This preliminary screening will establish the climate context and identify the potential climate –related risks. Even if FCA local partners have other PME procedures or project documentation formats, these questions should be shared and answered in the respective planning phases and documents.

[21] FCA projects vary considerably in size and type, with small-scale projects (budget below 50-100 000 USD) and rather short time-spans typical of the current project portfolio. For this reason a phased approach, with shared responsibilities for climate mainstreaming seems most suitable for FCA and its partners.

[22] The components build on a selection of internationally piloted approaches (such as. Danida, OECD, DFID, GIZ approaches), the approaches by Bread for All, Care, Tearfund, Christian Aid, and in particular CRiSTAL (Communitybased Risk Screening Tool – Adaptation and Livelihoods), which is a decision support tool for assessing and enhancing project impacts on local adaptive capacity to climate variability and climate change. Further information on CRiSTAL tool is provided at the end of this document.

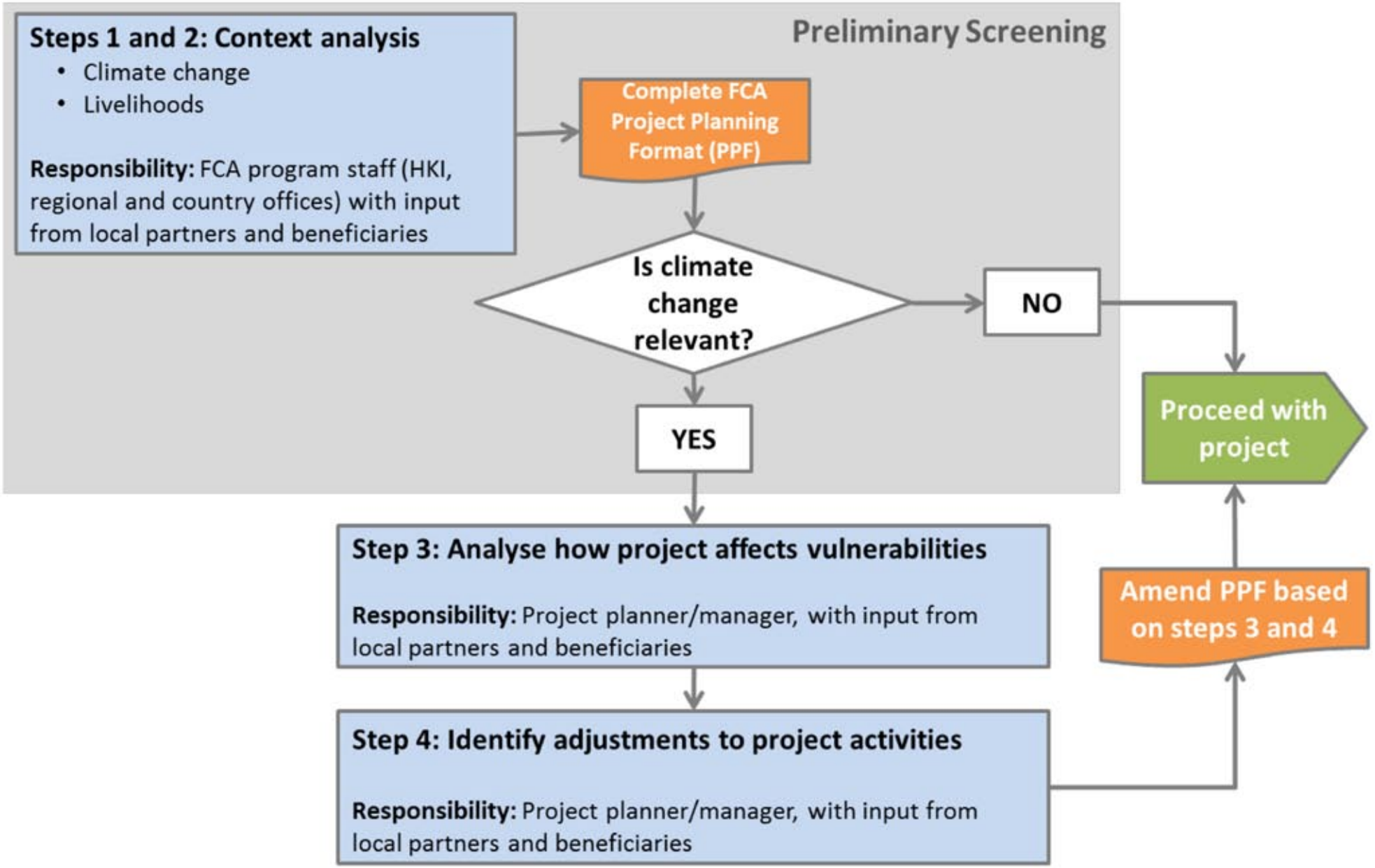


FIGURE 1. FCA project level mainstreaming approach with main steps, tasks and responsibilities

1. Analyse the climate context of the project

1.1. What are the climate-related hazards currently affecting the local community?

- **CHOOSE (NONE, ONE OR MORE):** floods, droughts, desertification, extreme heat, extreme cold, prolonged rainfall shortage, prolonged rainfall periods, rainstorms, hailstorms, sand storms, snow storms, high winds, storm surges, tornados, wild land fires, other)

1.2. What are the anticipated impacts of climate change in the project area?

- **CHOOSE (NONE, ONE OR MORE):** floods, droughts, desertification, extreme heat, extreme cold, prolonged rainfall shortage, prolonged rainfall periods, rainstorms, hailstorms, sand storms, snow storms, high winds, storm surges, tornados, wild land fires, other)

1.3. What are the impacts of these hazards and how severe are they?

- **EXAMPLES OF IMPACTS:** crop damage, damage to dwellings, depletion of grain stores, disease, disrupted transport, household food insecurity, fuel shortages, income losses, loss of life, loss of savings, loss of trees, personal injury, reduced soil fertility, reduced fish stocks, reduced water quality, water shortage, more weak/loss of livestock, unemployment, social tension

1.4. What coping strategies are currently used (crop shifting, food rationing, water rationing, food storage, income diversification, rainwater harvesting, gathering of wild food, tree replanting, etc.) to deal with the impacts and how well are they minimising the identified impacts?

- **MORE EXAMPLES** for different sectors are presented in the country document and in Annex 3

GUIDANCE:

- Make use of FCA country level support document (other material and links listed in guidance document annexes), which provide input/back-up for answering questions 1.1–1.3.

- The participatory stakeholder consultations provide critical input, in particular for answering questions 1.1-1.4 but in particular 1.3–1.4. As input, also make use of the country document, which presents a variety of national adaptation priorities and options that have already been identified in the respective country. A list of more generic adaptation measures, which can serve in answering question 1.4, is presented in the guidance document annex 3.

- Based on available material (in response to the above questions) gathered by project planners and managers and participatory stakeholder consultations with the beneficiaries, complete the updated FCA Project Planning Format as well as possible.

  - You do not need to enter detailed information on climate change for this step of preliminary screening. The aim is to establish the climate context, and create a general idea of what climate trends are already being observed, what is expected in the future, and how this might affect different sectors, populations, ecosystems relevant to your project area.

  - In the Project Planning Format, (PPF) take note of the amendments included in parts 2 Situation analysis and 6 Methodology.


Binyan Mengesha/ACT Ethiopia

2. Analyse the livelihoods context of the project

2.1. What resources are important to livelihoods in the FCA project area?
In your answer, make use of the livelihoods groupings/examples below:

- **NATURAL:** such as reliable water source, productive land, clean air, trees
- **HUMAN:** such as traditional knowledge, knowledge of climate risks, conservation agriculture skills, weaving skills, good health to enable labour
- **SOCIAL:** such as women's savings and loans groups, farmer-based organizations, political organizations, community groups
- **PHYSICAL:** such as irrigation infrastructure, roads, seed and grain storage facilities, machines
- **FINANCIAL RESOURCES:** such as cash, savings, micro-insurance, diversified income sources

2.2. How are the key resources affected by current climate hazards?

2.3. How important are these resources to coping strategies, i.e. in adapting and dealing with the climate change impacts?

GUIDANCE:

- Make use of FCA country level support document (other material & links listed in guidance document annexes), which usually identify main climate vulnerabilities (by hazards, by sectors and/or geographical regions) in the respective country.
- One of the most important factors shaping the adaptive capacity of individuals, households and communities is their access to and control over different resources. In order to support systematic analysis of climate risk, vulnerability and adaptive capacity and to identify optimal adaptation measures, these livelihoods resources are often grouped into
  - **NATURAL:** such as reliable water source, productive land, clean air, trees
  - **HUMAN:** such as traditional knowledge, knowledge of climate risks, conservation agriculture skills, weaving skills, good health to enable labour
  - **SOCIAL:** such as women's savings and loans groups, farmer-based organizations, political organisations
  - **PHYSICAL:** such as irrigation infrastructure, roads, seed and grain storage facilities, machines
  - **FINANCIAL RESOURCES:** such as cash, savings, micro-insurance, diversified income sources
- Build further on answers 1.1-1.4 when answering to questions 2.2 and 2.3. Based on available material gathered by project planners and managers and stakeholder consultations, complete the updated FCA Project Planning Format as well as possible.
  - You do not need to enter detailed information on climate change for this step of preliminary screening.

The aim is to establish the climate context, and create a general idea of what impacts on livelihoods are already being observed, what is expected in the future, and how this might affect your project area.

- In the Project Planning Format, (PPF) take note of the amendment included in part 9 Risk assessment and risk management, in case risks to the livelihoods of the project beneficiaries and/or local community are being identified. Based on the preliminary screening complete also PPF part 10 Sustainability, about the positive and/or negative impacts of project activities on adaptive capacity of beneficiaries.

The climate risks CAN be considered relevant if:

- current and/or anticipated impacts of climate change is threatening one or several of the key livelihoods, AND
- the existing coping strategies to deal with already experienced climate change or anticipated impacts of climate change are insufficient

Paul Jeffrey/ACT/Kenya

If this preliminary climate screening reveals that the climate change is NOT relevant within the framework of the FCA project, and climate change does not pose any major risks to the livelihoods of the project beneficiaries and/or local community, no in-depth analysis of risks or potential project modifications are needed. However, if considerable climate risks are identified during the preliminary climate screening – and the answers to the above two questions/criteria are positive, a more detailed analysis is recommended. In this case, based on the outcomes of the steps 1 and 2 above, subsequently an assessment of required adaptation measures and modifications to project planning and implementation (so called "proofing" against the climate risks) is to follow (see steps 3 and 4 below). Additionally, in order to strengthen the synergies to mitigation and DRR, all projects both with and without considerable climate risks should also answer to question 4.3.


Paul Jeffrey/ACT/Kenya

In-depth climate screening and proofing (Steps 3 and 4)

If considerable climate risks are identified, move on to complete steps 3 and 4 below (to be conducted in parallel, as much as possible). In order to guide these steps it is suggested that already available and piloted climate screening and proofing tools are used. These tools could be used under the guidance of FCA climate advisor and/or in collaboration with experts familiar with the respective tools. The steps below follow the approach in the CRiSTAL tool, which has served as basis for a variety of applications, e.g the tool currently used by Bread for All.

3. Analyse how project activities influence the livelihoods resources that are

3.1. Vulnerable to climate risks

Focus your answer on the livelihoods resources that are affected by climate change impacts (as identified during steps 1-2). Make use of the livelihoods groupings/examples below:

- **NATURAL:** such as reliable water source, productive land, clean air, trees
- **HUMAN:** such as traditional knowledge, knowledge of climate risks, conservation agriculture skills, weaving skills, good health to enable labour
- **SOCIAL:** such as women's savings and loans groups, farmer-based organizations, political organizations, community groups
- **PHYSICAL:** such as irrigation infrastructure, roads, seed and grain storage facilities, machines
- **FINANCIAL RESOURCES:** such as cash, savings, micro-insurance, diversified income sources

3.2 Important to local coping strategies

Focus your answer on the livelihoods resources that are important for coping with the identified climate impacts. Make use of the livelihoods groupings/examples provided.

GUIDANCE:

- The project planner and/or manager, who is familiar with the project's stated goals, objectives, approach, and specific activities, should be primarily responsible for this assessment. However, users may decide to include community stakeholders in completing this part of the analysis in order to raise their awareness about the project (and its link to climate and livelihoods) and/or solicit their inputs in assessing project activities.

- Make use of FCA country level support document, which identifies various adaptation options in different sectors of the country. A list of more generic adaptation measures is presented in Annex 3 with links to further case studies and material listed in Annex 4.

4. Analyse how project activities can be adjusted to reduce identified vulnerability and enhance adaptive capacity in the project community

4.1. Maximize positive project impacts on adaptive capacity

Make use of the livelihoods groupings/examples below, which have been identified as key to adapting to climate change:

- **NATURAL:** such as reliable water source, productive land, clean air, trees
- **HUMAN:** such as traditional knowledge, knowledge of climate risks, conservation agriculture skills, weaving skills, good health to enable labour
- **SOCIAL:** such as women's savings and loans groups, farmer-based organizations, political organizations, community groups
- **PHYSICAL:** such as irrigation infrastructure, roads, seed and grain storage facilities, machines
- **FINANCIAL RESOURCES:** such as cash, savings, micro-insurance, diversified income sources

4.2. Minimize negative project impacts on adaptive capacity

In line with question 4.1, assess whether the project actually contributes negatively to any of the key adaptation capacities?

4.3. Identify potential synergies with adaptation and mitigation, and adaptation and DRR.

Assess whether the project increases greenhouse gas emissions (e.g. by encouraging use of coal and other fossil fuels, or cutting of trees, or removal of natural carbon sinks) and thereby contributes to climate change (if yes, consider measures to improve a projects' impact on GHGs by promoting more sustainable energy options and land-use practices)?

Assess whether the project has potential to also improve preparedness for other natural or manmade disasters?

GUIDANCE:

- The project planner and/or manager should be primarily responsible for this assessment. However, to ensure local ownership and build awareness, it is recommended that consultations with local partners are conducted.

- When assessing and prioritising the options for adjusting and modifying the project activities to strengthen management of climate risks and adaptive capacity, a combination of the following criteria (to be agreed upon with the local partners) can be used to select appropriate adaptation options:

- Cost-effectiveness and budget limitations
- Time-frame (project span, future climate change effects on the sustainability of the proposed project adjustments)
- Number of people helped and effectiveness in building capacity of vulnerable people
- Extent to which it helps prevent population displacement
- Effectiveness in increasing resilience to climate changes and environmental degradation
- Compatibility with national adaptation objectives (national/ local policies that will support or hinder the implementation of the proposed project adjustments)
- Culturally and socially compatible
- Practicality of the option – is it achievable? Do FCA and its partners have the technical skills, resources and organisational capacity to deliver it?

▶ Complete the updated FCA Project Planning Format as well as possible.

- In the Project Planning Format, (PPF) based on the climate screening make necessary amendments to relevant project activities in particular in part 5 *Project Specific Objective, Results and Activities and part 8 Monitoring and evaluation* (modified activities and objectives influence monitoring and evaluation requirements)

INFO BOX.
FOR FURTHER INFORMATION AND GUIDANCE CONCERNING CRISTAL

CRiSTAL is a decision support tool developed jointly by the International Institute for Sustainable Development (IISD), the International Union for Conservation of Nature (IUCN), the Stockholm Environment Institute in Boston (SEI-US) and the Swiss Foundation for Development and International Cooperation (Intercooperation). Drawing on the Environmental Impact Assessment (EIA) model and the Sustainable Livelihoods Framework (SLF), CRiSTAL aims to provide a logical, userfriendly process to help users better understand the links between climate-related risks, people's livelihoods, and project activities. Specifically, CRiSTAL is intended to help project planners and managers to:

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

Users can follow this process through a Microsoft Excel interface or by reading the accompanying document (User's manual). http://www.cristaltool.org/content/download.aspx

Other tools are presented in the annexes to the FCA climate mainstreaming documents.

Annexes to FCA climate mainstreaming support documents

Paul Jeffrey/ACT

FINN CHURCH AID
actalliance

This document contains summarized background information that shall complement the FCA climate mainstreaming documents. In particular, it contains an introduction to climate science, i.e. what does climate change mean, what are the reasons behind climate change and what kinds of consequences does it have. The key terms and concepts related to climate change as well as means to address climate change are presented and shortly explained. In addition, examples of different options to adapt to climate change are presented and links to further information on climate change and climate mainstreaming.

CONTENTS:

NOTE: the material has been constructed into packages in a manner that should allow for easy usage as well as inclusion and linking on FCA intranet/web based solutions.

Annex 1 The science of climate change[24]

CLIMATE SCIENCE

Climate change refers to changes in the Earth's climate that are persistent and often large scale. These changes can be caused by either natural processes or they can be caused by human activities. In this Annex 1, climate change will primarily refer to changes that are man-made unless noted otherwise. Different human activities affect the climate including energy production from combustion of fossil fuel, coal, and wood and land-use changes. The mechanism by which these activities affect the global climate is called the greenhouse effect.

The Earth receives energy from the sun in the form of visible light and loses energy in the form of invisible, thermal radiation (heat) to space (see Figure 1). Greenhouse gases block some of

[24] Main sources for this summary are the IPCC reports. In addition, material produced by Bread for All has served as input for this annex.

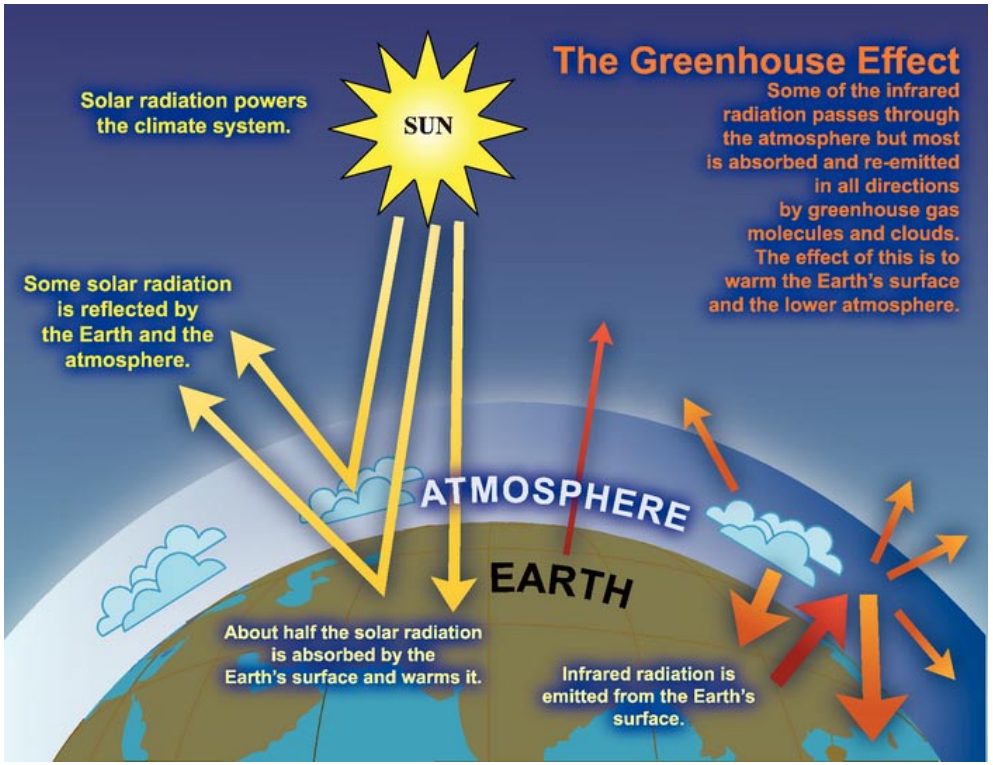


FIGURE 1: An idealized model of the greenhouse effect (IPCC, 2007)

the infrared radiation from escaping to space, thus heating the atmosphere and the surface of the Earth. One can think of greenhouse gases as a blanket that you use during the night to keep the body from cooling. Adding greenhouse gases to the atmosphere corresponds to using a thicker blanket, with the consequence that your body heats up.

The most important greenhouse gas is water vapour that occurs naturally. Without water vapour in the atmosphere, the Earth would be completely frozen. Other important greenhouse gases are carbon dioxide, methane, and nitrous oxide. Human activities such as combustion of fossil fuels, deforestation (carbon dioxide), and agricultural activities (methane and nitrous oxide) add greenhouse gases to the atmosphere, where these gases spread out globally, accumulate, and warm the atmosphere and surface of the Earth.

When looking at the temperature evolution during the last 400000 years, we find a strong correlation between the amount of carbon dioxide in the atmosphere and temperature. Carbon dioxide concentrations increased from 280 parts per million (ppm) in preindustrial times to 379 ppm in 2005. During the same period, global temperatures have increased by 0.8° C. Most of the observed warming happened in the last 50 years.

If we further emit greenhouse gases at present rates, global warming continues at about 0.2° C per decade. If we stopped emitting greenhouse gases now, however, global temperatures would still continue to rise by about 0.1° C per decade due to the inertia of the climate system. The world is warming now and it will keep warming in the future.

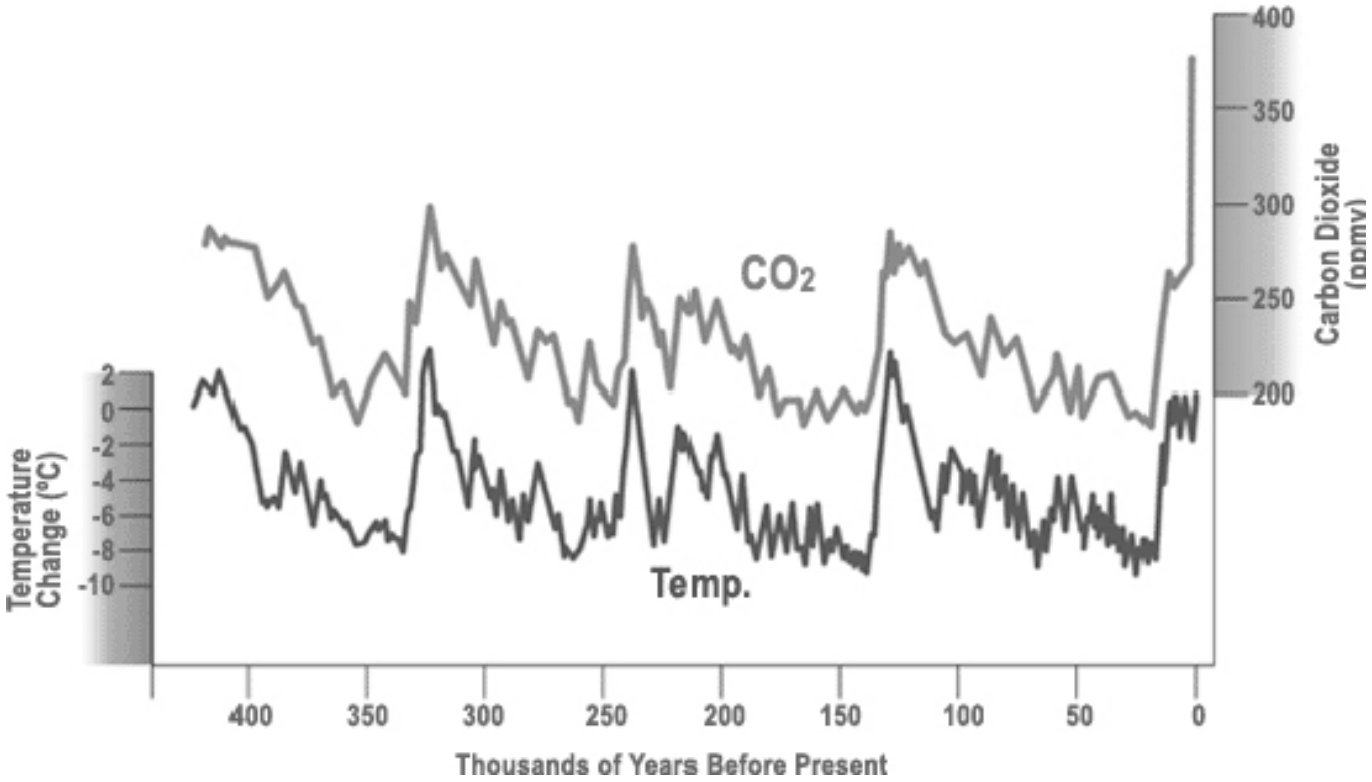


FIGURE 2. **Carbon dioxide concentration and temperature anomalies during the past 400'000 years (www.architecture2030.org)**

Global warming, however, is just the most obvious and best understood aspect of climate change. Many more aspects of global and regional climate have been found to change as well. As a direct consequence of warming, the sea level rises and the snow and ice cover decreases. Furthermore, the weather patterns change with widespread changes in rainfall and increases in droughts and/or heavy rainfall events in some regions (IPCC, 2007). Figure 3 presents some of the main climate change processes, characteristics and threats.

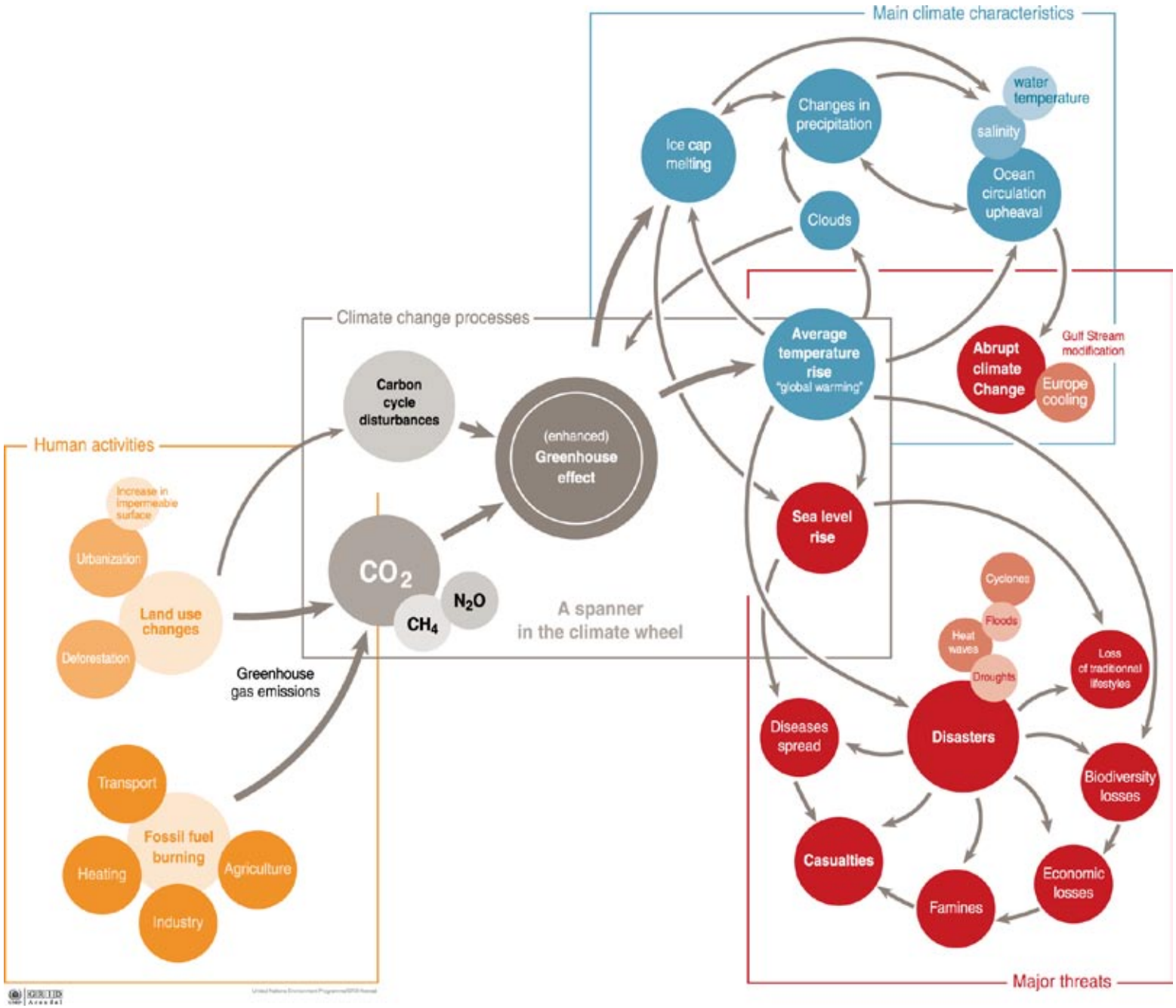


FIGURE 3. Climate change: processes, characteristics and threats Source: UNEP/GRID–Arendal, 'Climate change: processes, characteristics and threats', designed by Philippe Rekacewicz, UNEP/GRID–Arendal Maps and Graphics Library, 2005, <http://maps.grida.no/go/graphic/climate_change_processes_characteristics_and_threats> (Last accessed 10 October 2007)

EXAMPLES OF IMPACTS

These changes have severe socio-economic and environmental consequences. Hundreds of millions of people suffer from water shortage, floods in coastal low-land areas, heat waves, droughts, and increases in cardio-respiratory and infectious diseases due to climate change. Furthermore, thousands of species will die out and agricultural yields may severely decrease in some regions (Figure 4). The impacts of climate change already affect hundreds of millions of people today and in the next twenty years the number of people seriously affected by climate change is likely to double.

These harmful effects of climate change cannot be avoided completely. Thus, we have to be prepared to cope with the changing climate. In the long run, global warming can be slowed down or maybe even stopped, if the international community manages to drastically reduce the emission of greenhouse gases and enhance sinks (e.g. expanding forests to remove greater amounts of carbon dioxide from the atmosphere).

With regards to different regions, the impacts will vary considerable and must be taken into account when identifying options to adapt to the changes. The tables 1-4 below present a summary of main impacts and vulnerabilities to climate change in Africa, Asia, Latin America and Small Island Developing States (SIDS).[25]

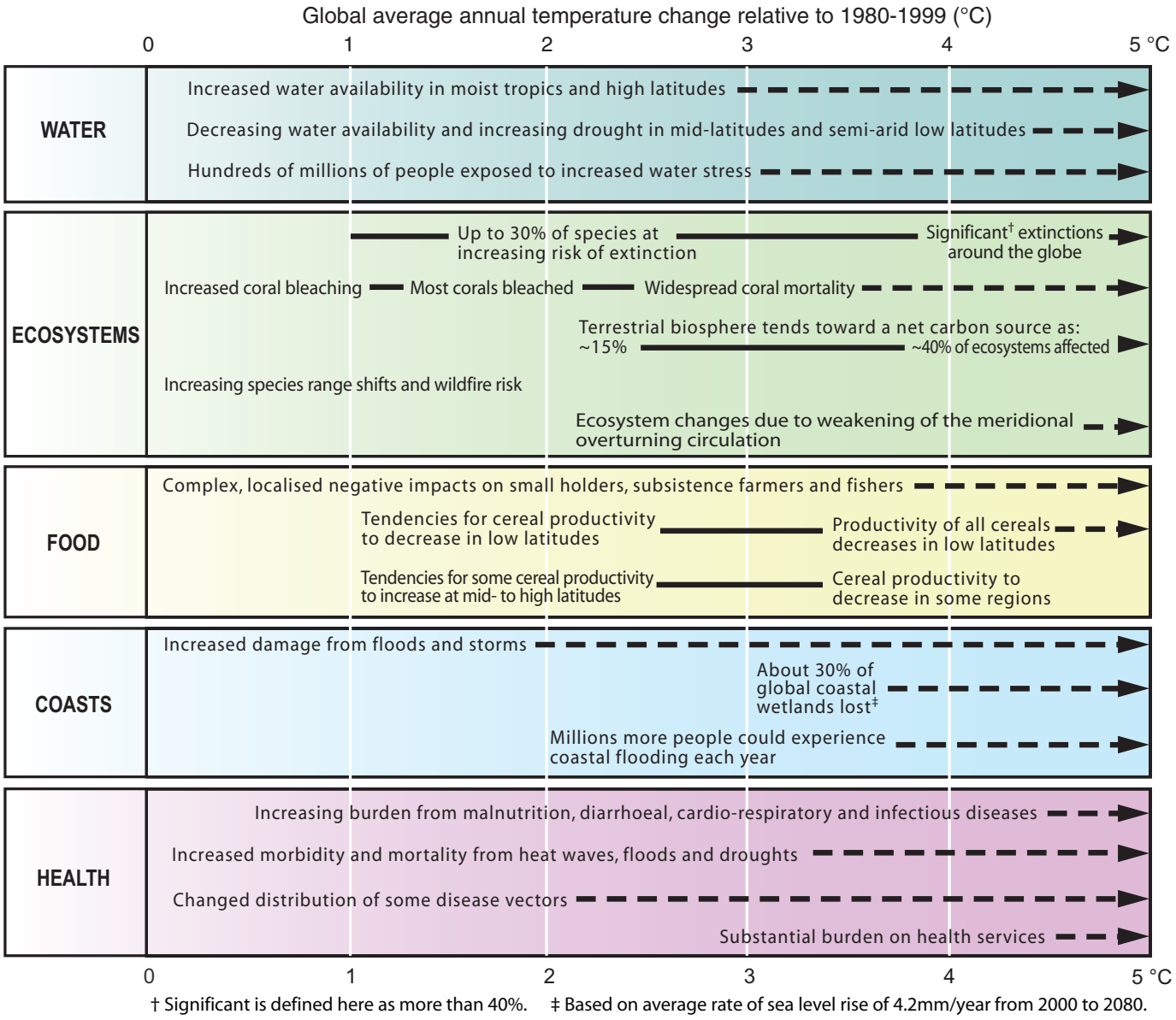


FIGURE 4. Impacts as average global temperatures increase. Source IPCC 4th Assessment report 2007.

[25] UNFCCC: CLIMATE CHANGE: IMPACTS, VULNERABILITIES AND ADAPTATION IN DEVELOPING COUNTRIES, 2007.

TABLE 1. Regional Impacts and Vulnerabilities to Climate Change in Africa

Impacts	Sectoral vulnerabilities	Adaptive Capacity
Temperature • Higher warming (x1.5) throughout the continent and in all seasons compared with global average. • Drier subtropical regions may become warmer than the moister tropics. **Precipitation** • Decrease in annual rainfall in much of Mediterranean Africa and the northern Sahara, with a greater likelihood of decreasing rainfall as the Mediterranean coast is approached. • Decrease in rainfall in southern Africa in much of the winter rainfall region and western margins. • Increase in annual mean rainfall in East Africa. • Increase in rainfall in the dry Sahel may be counteracted through evaporation. **Extreme Events** • Increase in frequency and intensity of extreme events, including droughts and floods, as well as events occurring in new areas.	**Water** • Increasing water stress for many countries. • 75–220 million people face more severe water shortages by 2020. **Agriculture and food security** • Agricultural production severely compromised due to loss of land, shorter growing seasons, more un-certainty about what and when to plant. • Worsening of food insecurity and increase in the number of people at risk from hunger. • Yields from rain-fed crops could be halved by 2020 in some countries. Net revenues from crops could fall by 90% by 2100. • Already compromised fish stocks depleted further by rising water temperatures. **Health** • Alteration of spatial and temporal transmission of disease vectors, including malaria, dengue fever, meningitis, cholera, etc. **Terrestrial Ecosystems** • Drying and desertification in many areas particularly the Sahel and Southern Africa. • Deforestation and forest fires. • Degradation of grasslands. • 25–40% of animal species in national parks in sub-Saharan Africa expected to become endangered. **Coastal Zones** • Threat of inundation along coasts in eastern Africa and coastal deltas, such as the Nile delta and in many major cities due to sea level rise, coastal erosion and extreme events. • Degradation of marine ecosystems including coral reefs off the East African coast. • Cost of adaptation to sea level rise could amount to at least 5–10% GDP.	Africa has a low adaptive capacity to both climate variability and climate change exacerbated by existing developmental challenges including: • low GDP per capita • widespread, endemic poverty • weak institutions • low levels of education • low levels of primary health care • little consideration of women and gender balance in policy planning • limited access to capital, including markets, infrastructure and technology • ecosystems degradation • complex disasters • conflicts

TABLE 2. Regional Impacts and Vulnerabilities to Climate Change in Asia

Impacts	Sectoral vulnerabilities	Adaptive Capacity
Temperature • Warming above the global mean in central Asia, the Tibetan Plateau, northern, eastern and southern Asia. Warming similar to the global mean in Southeast Asia. • Fewer very cold days in East Asia and South Asia. **Precipitation, snow and ice** • Increase in precipitation in most of Asia. Decrease in precipitation in central Asia in Summer. • Increase in the frequency of intense precipitation events in parts of South Asia, and in East Asia. • Increasing reduction in snow and ice in Himalayan and Tibetan Plateau glaciers. **Extreme Events** Increasing frequency and intensity of extreme events particularly: • droughts during the summer months and El Niño events; • increase in extreme rainfall and winds associated with tropical cyclones in East Asia, Southeast Asia and South Asia; • intense rainfall events causing landslides and severe floods; • heat waves/hot spells in summer of longer duration, more intense and more frequent, particularly in East Asia.	**Water** • Increasing water stress to over a hundred million people due to decrease of freshwater availability in Central, South, East and Southeast Asia, particularly in large river basins such as Changjiang. • Increase in the number and severity of glacial melt-related floods, slope destabilization followed by decrease in river flows as glaciers disappear. **Agriculture and food security** • Decreases in crop yield for many parts of Asia putting many millions of people at risk from hunger. • Reduced soil moisture and evapotranspiration may increase land degradation and desertification. • Agriculture may expand in productivity in northern areas. **Health** • Heat stress and changing patterns in the occurrence of disease vectors affecting health. • Increases in endemic morbidity and mortality due to diarrhoeal disease in south and Southeast Asia. • Increase in the abundance and/or toxicity of cholera in south Asia. **Terrestrial Ecosystems** • Increased risk of extinction for many species due to the synergistic effects of climate change and habitat fragmentation. • Northward shift in the extent of boreal forest in north Asia, although likely increase in frequency and extent of forest fires could limit forest expansion. **Coastal Zones** • Tens of millions of people in low-lying coastal areas of south and Southeast Asia affected by sea level rise and an increase in the intensity of tropical cyclones. • Coastal inundation is likely to seriously affect the aquaculture industry and infrastructure particularly in heavily-populated megadeltas. • Stability of wetlands, mangroves, and coral reefs increasingly threatened.	Adaptive capacity varies between countries depending on social structure, culture, economic capacity, geography and level of environmental degradation. Capacity is increasing in some parts of Asia, for example the success of early warning systems for extreme weather events in Bangladesh and the Philippines. However, capacity is still constrained due to poor resource bases, inequalities in income, weak institutions and limited technology.

TABLE 3. Regional Impacts and Vulnerabilities to Climate Change in Latin America.

Impacts	Sectoral vulnerabilities	Adaptive Capacity
Temperature • Warming above the global mean is predicted in most of Latin America. • In southern South America warming similar to global mean. **Precipitation, snow and ice** • Decrease in annual precipitation in most of Central America and in the southern Andes, although large local variability in mountainous areas. • Increase in winter precipitation in Tierra del Fuego. • Increase in summer precipitation in south-eastern South America. • Uncertain rainfall changes over northern South America, including the Amazon forest. • Increasing reduction and disappearance of Andean glaciers. **Extreme events** Increasing frequency and intensity of extreme events, many related to ENSO, particularly: • intense rainfall events causing landslides and severe floods; • dry spells and drought, such as in northeast Brazil; • heat waves, with particularly major effects in megacities due to heat island effects; • Increase in intensity of tropical cyclones in the Caribbean basin.	**Water** • Increase in the number of people experiencing water stress – likely to be 7–77 million by the 2020s. • Runoff and water supply in many areas compromised due to loss and retreat of glaciers. • Reduction in water quality in some areas due to an increase in floods and droughts. **Agriculture and food security** • Reductions of crop yields in some areas, although other areas may see increases in yields. • By the 2050s, 50% of agricultural lands are very likely to be subjected to desertification and salinization in some areas. • Food security a problem in dry areas where agricultural land subject to salinization and erosion reducing crop yields and livestock productivity. **Health** • Risks to life due to increases in the intensity of tropical cyclones. • Heat stress and changing patterns in the occurrence of disease vectors risk to health. **Terrestrial Ecosystems** • Significant habitat loss and species extinctions in many areas of tropical Latin America, including tropical forests, due to higher temperatures and loss of groundwater with effects on indigenous communities. **Coastal Zones** • Impacts on low lying areas, such as the La Plata estuary, coastal cities and coastal morphology, coral reefs and mangroves, location of fish stocks, availability of drinking water and tourism due to sea level rise and extreme events.	The lack of modern observation equipment and climate monitoring hinders the quality of forecasts lowering public trust in climate records and applied meteorological services. This has a negative impact on the quality of the early warning and alert advisory services. Some social indicators have improved in recent decades including life expectancy, adult literacy and freshwater access. However, adaptive capacity is limited by high infant mortality, low secondary school enrolment and high levels of inequality both in income and in access to fresh water and health care as well as gender inequalities.

TABLE 4. Regional Impacts and Vulnerabilities to Climate Change in Small Island Developing States (SIDS).

Impacts	Sectoral vulnerabilities	Adaptive Capacity
Temperature • All Caribbean, Indian Ocean and North and South Pacific small island States will experience warming. Warming will be lower than the global average. **Precipitation** • Decrease in summer rainfall in the Caribbean in the vicinity of the Greater Antilles. • Increase in annual rainfall in the equatorial Pacific and in the northern Indian Ocean, in the Seychelles and the Maldives. • Decrease in rainfall in the vicinity of Mauritius, in the Indian Ocean, and east of French Polynesia, in the Pacific. **Extreme events** • Increasing intensity of tropical cyclones, storm surge, coral bleaching and land inundation. **Water** • Water sources seriously compromised due to rising sea level, changes in rainfall and increased evapotranspiration, e.g. in the Pacific, a 10 % reduction in average rainfall (by 2050) would lead to a twenty percent reduction in the size of the freshwater lens on the Tarawa Atoll, Kiribati.	**Water** • Water sources seriously compromised due to rising sea level, changes in rainfall and increased evapotranspiration, e.g. in the Pacific, a 10 % reduction in average rainfall (by 2050) would lead to a twenty percent reduction in the size of the freshwater lens on the Tarawa Atoll, Kiribati. **Agriculture and food security** • Agricultural land and thus food security affected by sea-level rise, inundation, soil salinization, seawater intrusion into freshwater lenses, and decline in freshwater supply. • All agricultural production affected by extreme events. • Fisheries affected by increasing sea surface temperature, rising sea level and damage from tropical cyclones. **Health** • Increases in the intensity of tropical cyclones increase risks to life. • Heat stress and changing patterns in the occurrence of disease vectors and climate sensitive diseases affect health. **Terrestrial Ecosystems** • Replacement of local species and colonization by non-indigenous species. • Forests affected by extreme events are slow to regenerate. **Coastal Zones** • Most infrastructure, settlements and facilities located on or near the shore and will be affected by sea-level rise, coastal erosion and other coastal hazards, compromising the socio-economic well-being of island communities and states. • Accelerated beach erosion, degradation of coral reefs and bleaching will all have impacts on incomes from fishing and tourism. • Habitability and thus sovereignty of some states threatened due to reduction in island size or complete inundation.	Small islands, whether located in the tropics or higher latitudes are especially vulnerable to the effects of climate change, sea level rise and extreme events. Characteristics such as limited size, proneness to natural hazards and external shocks enhance the vulnerability of islands to climate change. In most cases they have low adaptive capacity, and adaptation costs are high relative to GDP.

Annex 2 Key terms and concepts

The definitions used by the Intergovernmental Panel on Climate Change (IPCC) serve as the basis for definitions utilized in FCA mainstreaming documents. When needed, other sources and explanations are given.

CLIMATE CHANGE

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as: *Any change in climate over time, whether due to natural variability or as a result of human activity.*

This definition encompasses both natural variability and anthropogenic changes. While it is important to understand the different drivers of climate change, it is not always necessary to separate "climate change" caused by humans from natural "climate variability", from the perspective of reducing vulnerability.

VULNERABILITY TO CLIMATE CHANGE

The IPCC defines vulnerability to climate change has been defined as: *The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.*

Exposure to climate variation is primarily a function of geography. For example, coastal communities will have higher exposure to sea level rise and cyclones, while communities in semi-arid areas may be most exposed to drought. Sensitivity is the degree to which the community is affected by climatic stresses. A community dependent on rain-fed agriculture is much more sensitive than one where the main livelihood strategy is labour in a mining facility, for instance.

ADAPTATION TO CLIMATE CHANGE

The IPCC defines climate adaptation as: *Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.*

In order to reduce vulnerability to climate change, it is important to build adaptive capacity, particularly of the most vulnerable people; and, in some cases, to reduce exposure or sensitivity to climate impacts. It is simultaneously important to ensure that development initiatives don't inadvertently increase vulnerability. These processes can jointly be called adaptation.

ADAPTIVE CAPACITY

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


Mari Paajanen/Myanmar

One of the most important factors shaping the adaptive capacity of individuals, households and communities is their access to and control over different resources. In order to support systematic analysis of climate risk, vulnerability and adaptive capacity and to identify optimal adaptation measures, these livelihoods resources are often grouped into

- **NATURAL:** such as reliable water source, productive land, clean air, trees
- **HUMAN:** e.g. traditional knowledge, knowledge of climate risks, conservation agriculture skills, weaving skills, good health to enable labour
- **SOCIAL:** e.g. women's savings and loans groups, farmer-based organizations, political organisations
- **PHYSICAL:** e.g. irrigation infrastructure, roads, seed and grain storage facilities, machines
- **FINANCIAL RESOURCES:** such as cash, savings, micro-insurance, diversified income sources

RESILIENCE

Resilience can be defined as: *The ability of a community to resist, absorb, and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions and identity.*[26]

Resilience is a familiar concept in the context of disaster risk reduction (DRR), and is increasingly being discussed in the realm of adaptation. A resilient community is well-placed to manage hazards to minimize their effects and/or to recover quickly from any negative impacts, resulting in a similar or improved state as compared to before the hazard occurred. There are strong linkages between resilience and adaptive capacity; consequently, resilience also varies greatly for different groups within a community.

HAZARD

In the context of disaster risk reduction, a hazard is defined as:[27] *A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.*

Within FCA climate mainstreaming context hazards refer to both rapid onset shocks, such as droughts or floods, and to slow onset stresses, such as changing rainfall patterns. It is important to distinguish between the hazard - for example a flood, and the effects of the hazard - for example death of livestock. Some effects, such as food shortages, may be the result of a combination of hazards, including climate shocks and stresses, declining soil fertility, and insecure access to markets.

CLIMATE SCREENING (CLIMATE CHANGE SCREENING, CLIMATE RISK SCREENING)

Climate screening can be defined as: *A systematic process of examining activities, outputs and programmes in order to identify their vulnerability to climate change, including assessment of the extent to which vulnerability is being or could be addressed.*

However, while the concept of 'climate change screening' is frequently used in the relevant literature, a number of definitions are still available (in addition to the one proposed by Danida, above). More generally, there is consensus in the literature that climate change screening (often simply termed climate screening) is a way of establishing information on the impacts of climate change on development activities, and of how

[26] Adapted from: UNISDR, 2009. Terminology: Basic terms of disaster risk reduction as well as Community – based Risk Screening – Adaptation and Livelihoods (CRiSTAL) User's Manual, Version 4.0, May 2009.

[27] UNISDR, 2009. Terminology: Basic terms of disaster risk reduction.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these linkages are or can be taken into account in development activities as well as in the national planning and decision-making processes.

With regards to "climate risk screening" ADB has proposed a definition as "analyzing project concepts, with a view to identifying: i) whether climate risks have been taken into consideration, ii) whether [concepts are] vulnerable to climate change, iii) whether plans could lead to increased vulnerability, and iv) what steps taken in project design are needed to reduce risks and associated costs." It could be noted that the climate change screening and climate risk screening definitions above are quite broad and give limited guidance on how to conduct screenings in practice.[28]

CLIMATE PROOFING

Climate proofing can be defined as: *Ensuring that climate risks are taken into account for all affected or relevant development co-operation activities, in order to protect development investments and outcomes from the impacts of climate change.*

While the concept of climate proofing, as climate screening above, is still known through various definitions, climate proofing generally involves ensuring that climate risks are reduced to acceptable levels through long-lasting and environmentally sound, economically viable, and socially acceptable changes to the intervention. The changes can be implemented at one or more of the following stages in the project cycle: planning, design, construction, operation, and decommissioning. Climate proofing increases the sustainability of projects by analysing the risks posed by climate change to project activities, stakeholders and results, and then modifying and/or adjusting project designs or implementation plans to mitigate those risks. For example, an increase in the frequency and severity of floods may require water pumps to be built at a higher level to ensure that people can access safe water during and after flood events.

[28] A. Olhoff and C. Schaer (2010). Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report. UNDP

CLIMATE MITIGATION

Mitigation is defined by the Intergovernmental Panel on Climate Change (IPCC) as: *Implementing policies to reduce greenhouse gas emissions (e.g. using fossil fuels more efficiently, switching to renewable energy) and enhance sinks (e.g. expanding forests to remove greater amounts of carbon dioxide from the atmosphere).*

From the point of view of Finn Church Aid it is important to note that the main FCA partners contribute only in a very limited manner to green house gas (GHG) emissions. However, in many cases energy poverty is one part of the poverty challenge that should be solved, as an integral part of FCA interventions. Optimally, the solutions proposed by FCA together with its partners should be low-carbon solutions, i.e. energy solutions that do not contribute to further GHG emissions.

Annex 3 Examples of various adaptation options[29]

I. OPTIONS FOR PROGRAMMING CLIMATE CHANGE-RELATED SUPPORT TO ADAPTATION AND MITIGATION

The examples below are organised into three main sections:

1. Sector-specific examples (both adaptation and mitigation), sectors in alphabetic order A-Z
2. Cross-cutting and general issues
3. Capacity development at international/ regional/national and partly local levels

Where possible and relevant the examples are categorised as to whether they mainly lead to adaptation benefits (A), mitigation benefits (M) or meeting both objectives (A, M).

1. SECTOR-LEVEL EXAMPLES

All sectors

- Support the inclusion of climate change risks and opportunities (including opportunities for climate finance) within sector policy work and major program e.g. by use of Strategic Environmental Assessments (SEAs). (A, M)
- Undertake dialogue on climate change risks and opportunities with sector partners. (A, M)
- Ensure integration of adaptation and targeted sector-specific adaptation support within sectors such as water, agriculture, forestry, health, infrastructure, urban, education, governance and energy. Special focus on securing ecosystem services as a key part of adaptation planning. (A)
- Support the integration of mitigation, including technology transfer and access to climate funds into sector plans (in particular energy, transport, forestry, urban development and agriculture) (M)

Agriculture

- Improve farmers' access to short-, medium- and long term climate related information and its expected impacts on crops and markets. (A, M)
- Improve knowledge on sustainable agriculture methods at all levels (A,M)
- Support a shift in policies governing agricultural production and food security building on sustainable agriculture and local production (A,M)
- Support application of soil and water conservation techniques e.g. economising with nutrients and increasing the soils capacity of holding nutrients, carbon (reduced tillage or no tillage) and water through incorporation of organic matter, less water-demanding techniques, and by making efforts to increase water availability, catch water where it falls and prevent runoff. (A, M)
- Support development of stable and democratic land planning and management institutions, and adopting land reforms that promote sustainable land management and resilient societies (e.g. by clarifying and securing private or collective property and use rights, promoting secure access to land for women and vulnerable groups). (A, M)
- Support diversification of the income base for farmers in the most vulnerable regions and encourage regional trade to ensure food security. (A)
- Support diversification of agricultural production e.g. growing a mix of different crops and different varieties of each crop, and where appropriate integrating animals and trees into the agricultural system. (A)
- Facilitate the shift to heat and drought resistant livestock/crops to withstand climate

[29] The annex builds on in-puts from Sida's Expert Function for Environmental Economics at the University of Gothenburg. Information is derived from various sources including the previous Guidance issued for the Swedish Climate Change Initative, March 2009, EC "Sector scripts for climate change and environment", the World Bank "Climate change adaptation and mitigation in development programs" and sector examples from Policy Specialists from various Teams at Sida/Policy.

change e.g. through information and research at regional or national level. (A)

- Improve the diffusion of methods for growing rice that keep down methane emissions. (M)

- Promote development of bio fuel crops where this can be done sustainably and without adversely affecting food production, ecosystems and land rights, and invest in the development of 'second-generation' bio fuels, which will rely on improved conversion technologies and on a wider range of biomass resources (e.g. crop residues, forestry by-products) thus reducing pressures on food production and ecosystems compared to 'first-generation' biofuels. (M).

Coastal Zone Protection

- Support conservation of coastal ecosystems like mangroves, coral reefs, sea grass beds and tidal mudflats to reduce impacts of hurricanes and storm surges on people's livelihoods and the resilience of ecosystems. (A, M)

- Improve access to short-, medium- and long term climate related information and its expected impacts on habitats and development. (A)

- Improve flood control measures (e.g. closing of estuaries, building of dikes and sea defences) – with due consideration for the potential social and environmental impacts of such measures.(A)

- Spatial planning for human settlement and infrastructure development in coastal areas, including recommendations for more flood secure housing construction. (A)

Energy

- Increase supply security of energy services through regional cooperation, and improved, decentralised capacity to manage and regulate energy delivery systems. (A,M)

- Improve watershed management in connection to dams and other energy infrastructure to withstand and manage the increased uncertainty in water flows and increased frequency of extreme weather events. (A)

- Support measures to increase energy efficiency such as tariff reform, capacity building, and information campaigns. (M)

- Improve access to short-, medium- and long term climate related information and its expected impacts on the sector (risks and opportunities) and funding opportunities for clean energy and energy savings including clean development mechanism (CDM) projects. (M)

- Promote increased generation capacity from modern renewable sources such as wind, solar and hydropower through dialogue, legal and institutional reforms, capacity development and catalytic investments. (M)

- Support the development of an enabling environment for investments in clean energy. (M)

Education

- Promote awareness-raising on sustainable development including climate change impacts, risks and opportunities in school curricula at the different levels of education. (A, M)

- Support vocational training to generate in-country capacities necessary to implement national adaptation and mitigation plans or strategies. (A, M)

- Promote the development of national or regional post-graduate studies to build capacity on climate change adaptation and mitigation including expertise in climate-related negotiations in international forums. (A, M)

- Support non-formal education and awareness raising on climate change adaptation and mitigation by civil society and the private sector. (A,M)

- Support the development of informal learning opportunities on climate change adaptation and mitigation i.e. via media. (A,M)

Fisheries

- Support the protection of fish breeding areas such as mangroves and coral reef and more generally, protecting coastal ecosystems (especially wetlands). (A)

- Improve fishermen's access to short-, medium- and long term climate related information and its expected impacts on fisheries, aquaculture and development. Information should consider impacts for fishing communities both short term (e.g. increased frequency of severe events) and long-term (e.g. reduced productivity of aquatic ecosystems). (A)

- Promote mapping of changes in the range and abundance of fish species, strengthening the monitoring and surveillance systems of fish stocks and the implementation of policies aimed at keeping fishing fleets and fish catches within sustainable limits, including reduction of excess fishing capacity. (A)

- Support investment and capacity development on improved meteorological forecasting especially for small scale fishermen; early warning systems; safer harbours and landings; and safety at sea and integrated coastal area management. (A)

- Support the development of stable and democratic natural resource planning and governance institutions, and tenure reforms that promote sustainable forest management (e.g. by clarifying and securing private or collective property and use rights). (A, M)

Minna Elo/Honduras

Forestry

- Support capacity development and improve sector access to short-, medium- and long term climate related information and its expected impacts on and opportunities for forest-based ecosystems and forest-based land use. (A, M)

- Support the development of stable and democratic natural resource planning and governance institutions, and tenure reforms that promote sustainable forest management (e.g. by clarifying and securing private or collective property and use rights). (A, M)

- Support decentralised forest governance and the strengthening of local and indigenous people's rights and systems for a sustainable and long term management of forest resources. This may include support to the establishment of institutions for conflict management or other recourse mechanisms where claims can be handled in a fair way. (A, M)

- Support afforestation and reforestation efforts e.g. by utilising resilient, native species from the natural seed bank or other sources. (A, M)

- Promote adoption of management and harvesting techniques that reduce soil erosion and exposure to wildfires, retain water and reduces downstream flash flood risk, and

promote the conservation of biodiversity (e g keeping a wide diversity of species with different uses). (A, M)

- Support efforts to control corruption and illegal large scale trade with forest products (which is a driver of deforestation). (A,M)

Health[30]

- Support capacity development and improve sector access to short-, medium- and long term climate related information and its expected impacts on public health and health infrastructure. Specific attention to vulnerable groups, the spread of malaria and other communicable diseases, likely to increase due to changed combinations of temperature and humidity, increased frequency of extreme weather events, and food insecurity. (A)

- Developing or enhancing systems for monitoring safe and potable drinking water, sanitation, food and air quality – and enforcing quality standards. (A)

- Strengthening food safety regulations in line with international guidelines, notably in terms of microbiological quality, avoidance of contact with pest species, conservation duration and conservation temperatures. (A)

- Assess cost efficient opportunities to reduce health sector emissions e.g. energy savings. (M)

- Promote better use of nationally, regionally or globally available early warning information on climate variability extremes e.g. flooding, drought, storms, heatwaves, seasonal rainfall patterns, to aid public health decision-making and preparedness for the state sector as well as the non-state sector, at all levels but especially down to the community level. (A)

- Focus surveillance efforts at areas predicted to be at particularly high risk for changing patterns of disease. (A)

- Where appropriate, invest in win-win solutions that reduce greenhouse gas emissions as well as improve public health. (A, M)

- Take health risks into account when planning adaptation measures and ensure the health sector is at the table when planning climate change adaptation in other sectors. (A)

- When planning cities, take into account the urban heat island effect, ensure availability of shaded spaces and green areas, ensure that water and sanitation infrastructure is resilient to extremes of precipitation, and facilitate modes of transport that contribute to public health and reduce greenhouse gas emissions. (A, M)

Urban Development (partly Infrastructure and Transport)

- Support capacity development among city authorities to address both adaptation and mitigation issues. (A,M)

- Improve sector access to short-, medium- and long term climate related information and its expected impacts on urban development including migration, frequency of natural disasters etc. (A, M)

- Support development of local based indicator systems that fulfils criteria of being available, up to date, and able to be reported annually; relevant for public policy decision making; cost effective to collect; understandable and not too complex; clear as to whether changes in indicators are good or bad. (A, M)

- Promote integrated urban management and planning to increase resilience to climate generated changes through strategic city planning and identification of climate change related indicators. Strategic environmental assessments and different guides on strategic planning may be considered as useful tools. (A, M)

- Support actions to address problems of vulnerable population groups living in slums located in areas unsuitable from a hazards point of view (low laying areas, riverbeds and ravines coastal plains, wetlands, steep hills etc). (A)

[30] Many of the examples for this sector is based on the report by the Commission on Climate Change and Development, "Climate Change and Health", April 2009.

- Support development and adoption of appropriate standards and building norms that reflect rising temperatures, sea level rise adverse weather conditions and natural disasters. (A, M)

- Support the development of efficient public building design, construction and maintenance. (M)

- Support adaptation of selected existing rural and urban infrastructure (water, transport and energy systems and cultural heritage) to make them more resilient to locally prevailing hazards, incl. expected changes in e.g. floods and sea level rise. (A)

- Support city planning (including zoning and development controls) for low carbon growth - e.g. planning for land use and public transportation systems, mobility management and renewable fuels, appropriate building codes to build more energy efficient construction (building material, cooling/ heating, lighting) - and ensure that these considerations are included at the start of the planning and design process. Use of environmental impact assessment (EIA) and strategic environmental assessment (SEA) including climate change aspects when appropriate. (M)

Rural development (see also agriculture, forestry, water and sanitation)

- Support monitoring, information sharing, seasonal climate forecasting and early warning systems (e.g. for droughts, floods, storms, pest outbreaks, environmental changes and consequences such as impending famine). (A)

- Promote diversification of farmers' income and access to markets and financial services, including insurance or other forms of risk sharing. (A)

- Support appropriate defences around food storage and transportation systems including human settlements (e.g. dykes, seawalls, embankments, dunes or overflow routes against floods, "green barriers" against desertification, vegetation-cleared fire lines against wildfires). (A)

Water resources and water & sanitation

- Support effective water demand management arrangements across sectors; investing in irrigation technologies, changing crop varieties to more water-efficient strains and agriculture techniques, upgrading infrastructure to enhance water-use efficiency and productivity, re-designing tariff structures, and improved coordination between land and water policies. (A, M)

- Support conservation and rehabilitation of wetlands and protection of watersheds to prevent land degradation and desertification and control floods. (A, M)

- Support capacity development and improve sector access (from farmers to planners) to short-, medium- and long term climate related information and its expected impacts on water availability, water quality and water and sanitation infrastructure in both rural and urban settings. (A)

- Support use of Integrated Water Resource Management (IWRM) tools and methods taking full account of climate variability and change. Recognize IWRM principles as an effective framework through which to address climate change adaptation and strengthen links between water and other sectors including disaster risk reduction authorities. (A)

- Promote monitoring and management of hydrological and meteorological data for decision making on impacts of climate change (possible synergy for early warning systems or agrometeo information systems). (A)

- Promote rainwater harvesting and other water conservation and storage techniques in areas with water stress, especially where it is anticipated to increase due to climate change. Ensure that risks of increasing the spread of vector borne diseases are considered. (A)

- Increase the capacity for planning, especially in informal urban settlements with strong focus on water related infrastructure e.g. drainage and sewerage, and in coastal areas safeguarding marine ecosystems. (A)


Lauri Soini/Kambodzha

- Developing institutional capacity and conflict-resolution mechanisms in water allocation schemes. (A)

Waste Management, Industry and Private sector development

- Support capacity development and improve access to short-, medium- and long term climate related information and its expected impacts on infrastructure (e.g. landfills, industrial sites, transportation) and markets/ business opportunities and risks. (A, M)

- Improve planning of location of landfills, industrial sites etc to ensure that climate change (changed rainfall regimes, sea-level rise etc) does not increase risks of e.g. leakage and dispersal of harmful substances. (A)

- Reduce emissions of methane from landfills and support production of biogas. (M)

- Promote waste management including recycling, controlled anaerobic composting and energy recovery. (M)

- Support capacity development on funding opportunities and technology transfer e.g. for energy efficiency, renewable energy technology and improved waste management. (M)

Annex 4 Links to further information and mainstreaming approaches & tools

GENERAL INFORMATION ON CLIMATE CHANGE

ADAPTATION LEARNING MECHANISM is a collaborative knowledge-sharing platform. Adaptation to climate change is a growing priority for development agencies, governments and vulnerable communities. However, capacity and awareness are often limited, and experiences have yet to be widely shared. The ALM project will draw from experiences on the ground, featuring tools and practical guidance to meet the needs of developing countries. Funding agencies include the GEF, UNDP, UNEP. http://www.adaptationlearning.net/

ELDIS CLIMATE CHANGE ADAPTATION provides a summary of current thinking on climate adaptation issues with access to relevant, up-to-date resources and publications for researchers, practitioners, and policy formers. The guide is divided into four sections: an introduction to climate change adaptation; organisations working on climate adaptation issues; documents and publications related to seven themes in climate adaptation; adaptation resources organised by region of focus. http://www.eldis.org/go/topics/dossiers/climate-change-adaptation

Eldis also runs the Community-Based Adaptation Exchange to share online resources and bring together and grow the CBA community. (http://community.eldis.org/.59b70e3d)

FAO has a series of fact sheets on climate change related to natural resources and food production looking at expected impacts, risks and opportunities. Below is the link to the overall page as well as direct links to the respective factsheets. http://www.fao.org/climatechange/49537/en/

GRANTHAM INSTITUTE FOR CLIMATE CHANGE has a mission is to drive climate-related research and translate it into real-world impact, using research to shape policy and provide climate information to the wider public audience. http://www3.imperial.ac.uk/climatechange

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) site has download links for the 4th IPCC Assessment Report (2007), a comprehensive assessment of the physical science basis (Working Group 1), impacts, adaptation and vulnerability (Working Group 2) and mitigation of climate change (Working Group 3). http://www.ipcc.ch/


Paul Jeffrey/Chad

NATURE CONSERVANCY'S CLIMATE WIZARD
http://www.climatewizard.org/

PEW CENTRE ON GLOBAL CLIMATE CHANGE in the US, has an approach based on sound science, straight talk, and a belief that we can work together to protect the climate while sustaining economic growth. The International page links to global issues. http://www.pewclimate.org/

POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH, based in Germany, addresses scientific questions on global change, climate impacts and sustainable impact. The Research page links through to reports and publications.
http://www.pik-potsdam.de/

REALCLIMATE is a commentary site on climate science by climate scientists for the interested public and journalists. The 'Start Here' page aims to provide a one-stop link for various levels of interest and detail on climate change.
http://www.realclimate.org/

THE RED CROSS / RED CRESCENT CLIMATE CENTRE is the reference centre on climate change of the Red Cross / Red Crescent family.
http://www.climatecentre.org/

THE ROYAL SOCIETY provides guidance on climate science. http://royalsociety.org/climate-change

UK MET OFFICE CLIMATE CHANGE: Useful information on climate science. http://www.metoffice.gov.uk/climate-change

UNDP ADAPTATION TO CLIMATE CHANGE website
http://www.undp.org/climatechange/adapt/

UNITED NATIONS INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (UNISDR) provides helpful information on disaster trends and disaster risk reduction. http://www.unisdr.org/

UP IN SMOKE? Reports produced by the Working Group on Climate Change and Development, a unique and diverse network of development and environment organisations. Its central message is that solving poverty and tackling climate change are intimately linked and equally vital, not either/or. http://www.upinsmokecoalition.org/

WEADAPT website is a collaborative knowledge platform that provides climate change adaptation guidance by pooling expertise from a wide range of organisations that contribute to adaptation science and practice. The weADAPT platform includes a suite of new and innovative tools and methods, datasets and experiences that is a resource for strengthening the capacity of those tasked with undertaking adaptation.
http://www.weadapt.org/

WORLD BANK CLIMATE CHANGE DATA PORTAL
http://sdwebx.worldbank.org/climateportal/

LOCATION- AND TOPIC-SPECIFIC INFORMATION

AFRICAADAPT is an independent bilingual network (French/English) that seeks to facilitate the flow of climate change adaptation knowledge for sustainable livelihoods in Africa. It is for researchers, policy makers, civil society organisations and communities who are vulnerable to climate variability and change across the continent.
http://www.africa-adapt.net/AA/

BREAD FOR ALL AND HEKS CLIMATE CHANGE COUNTRY GUIDES http://www.brotfueralle.ch/de/english/development-politics/climate-change/climate-mainstreaming/

- **EHIOPIA**
  BFA/HEKS, Oktober 2009, english (pdf)
- **HAITI**
  BFA/HEKS, November 2009, french (pdf)
- **HONDURAS**
  BFA/HEKS, Mai 2009, spanish (pdf)
- **INDONESIA**
  BFA/m21, January 2011, english (pdf)
  BFA/m21, January 2011, indonesian (pdf)
- **NIGER**
  BFA/HEKS, October 2009, french (pdf)
- **PHILIPPINES**
  BFA/FO, June 2010, english (pdf)
- **ZIMBABWE**
  BFA/HEKS, September 2010, english (pdf)

CARE'S ADAPTATION, GENDER AND WOMEN'S EMPOWERMENT brief http://www.careclimatechange.org/files/toolkit/CARE_Gender_Brief_2010.pdf

GENDER CLIMATE CHANGE PLATFORM offers information, knowledge, and networking on gender and climate change. http://www.gendercc.net/

WEDO Women's Environment and Development Organization platform http://www.wedo.org/

HUMAN RIGHTS AND CLIMATE CHANGE publication from the International Council on Human Rights seeks to pinpoint areas where climate change will have direct and indirect human rights impacts, and where human rights principles might sharpen policy-making on climate change, including in the two core policy areas of adaptation (preparing for the unavoidable and foreseeable effects of climate change) and mitigation (reducing GHG emissions in order to curb climate change). http://www.ichrp.org/en/zoom-in/climate_change_new_report

PREVENTIONWEB has information on relevant disaster risks, policies and organisations working in disaster risk reduction for each country. http://www.preventionweb.net

CLIMATE SERVICES AND NATIONAL HURRICANE CENTRE WEBSITES (US) http://www.nhc.noaa.gov/

FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET) provides information on food security (including weekly climate and 6 day precipitation forecasts) for West, East and Southern Africa, Central America, the Caribbean and Afghanistan. http://www.fews.net/Pages/default.aspx

THE NEPAL CLIMATE CHANGE AND DEVELOPMENT PORTAL – a portal collaboratively managed by the Ministry of Environment and the climate change community of practice in Nepal. This portal provides climate change practitioners a platform to conduct research, network, discuss, and share climate change knowledge. http://www.climatenepal.org.np/main/

UNDP CLIMATE CHANGE COUNTRY PROFILES: Fifty-two country-level climate data summaries intended to address the climate change information gap for developing countries by making use of existing climate data to generate a series of country-level studies of climate observations. Each report contains a set of maps and diagrams demonstrating the observed and projected climates of that country as country average time series as well as maps depicting changes on a 2.5° grid and summary tables of the data. A narrative summarises the data in the figures, and places it in the context of the country's general climate. http://ncsp.undp.org/news/undp-country-profiles

UNFCCC LOCAL COPING STRATEGIES DATABASE http://maindb.unfccc.int/public/adaptation/

UNFCCC NATIONAL ADAPTATION PROGRAMMES OF ACTION (NAPAs) are issued by all Least Developed Countries (LDCs) that are members to the United Nations Framework Convention on Climate Change. These are documents prepared by the Least Developed Country (LDC) countries who are parties to the UNFCCC. The NAPAs are prepared with the purpose of communicating the urgent needs and concerns of LDCs relating to adaptation to the adverse effects of climate change. NAPAs identify priority activities for adaptation. http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php

UNFCCC NATIONAL COMMUNICATIONS
These are documents prepared by each of the countries who are parties to the UNFCCC, communicating the results of national assessments of greenhouse gas emissions, as well as information on vulnerability, impacts, and adaptation. Observed and anticipated trends and impacts of climate change for your country can be drawn from these documents. Non-Annex I (developing country reports can be accessed at: http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php

US NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION
http://www.climate.gov/#dataServices

TOOLS AND METHODOLOGIES

ADAPT (Assessment and Design for Adaptation to Climate Change) by the World Bank: A Prototype Tool – This multi-sector computer-based tool conducts a sensitivity analysis for specific projects, and is targeted to development practitioners. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCC/0,,contentMDK:21315054~menuPK:3725076~pagePK:210058~piPK:210062~theSitePK:407864,00.html

CEDRA (Climate change and Environmental Degradation Risk and Adaptation Assessment) by Tearfund. A field tool which helps agencies working in developing countries to access and understand the science of climate change and environmental


Paul Jeffrey/Haiti

degradation and compare this with local community experience of environmental change. Adaptation options are discussed and decision-making tools are provided to help with planning responses to the hazards identified. CEDRA includes integrating Disaster Risk Reduction responses as relevant existing forms of adaptation. http://tilz.tearfund.org/Topics/Environmental+Sustainability/CEDRA.htm

CLIMATE ASSESSMENT BY GIZ: (a) Climate Proofing = systematic climate risk reduction and increase of adaptive capacity; (b) Emission Saving = systematic maximisation of contributions to GHG reductions. Tool to assess whether project goals are threatened by climate change and identify adaptation measures within the scope of the project; and identify climate-friendly ways of achieving project goal. http://www.gtz.de/en/index2.htm

CRISTAL (Community-based Risk Screening Tool – Adaptation and Livelihoods) by IISD. Tool for community scale vulnerability assessment and adaptation planning. Specifically to (a) Understand the links between livelihoods and climate in their project areas; (b) Assess a project's impact on community-level adaptive capacity; and (c) Make project adjustments to improve its impact on adaptive capacity and reduce the vulnerability of communities to climate change. Users can follow this process through a Microsoft Excel interface or by reading the accompanying document (User's manual). http://www.cristaltool.org/content/download.aspx

GLOBAL ADAPTATION ATLAS by Resources for the Future, a dynamic climate change impact mapping tool. The Atlas brings together diverse sets of data on the human impacts of climate change and adaptation activities across the themes of food, water, land, health and livelihood to help researchers, policymakers, planners and citizens to establish priorities for action on adaptation. http://www.adaptationatlas.org/index.cfm

SERVIR is a regional visualisation and monitoring system for Mesoamerica and Africa that integrates satellite and other geospatial data for improved scientific knowledge and decision making. Developed by USAID, NASA, the Institute for the Application of Geospatial Technology (IAGT), the University of Colorado, and CATHALAC. http://www.servir.net/

CI:GRASP aims to provide a sound information basis on climate stimuli, climate impacts, vulnerabilities, and response options in selected threshold countries on an open, web-based platform. Developed by the Potsdam Institute for Climate Impact Research (PIK) and GTZ, funded by the German Federal Ministry for Environmental Protection, Nature Conservation and Nuclear Safety (BMU). http://cigrasp.pik-potsdam.de/

WIKIADAPT is a flexible, accessible, inclusive medium for enhancing the knowledge base of the climate adaptation community. The wiki is a collaborative project, and the idea is to have a community of contributors. Part of the weADAPT platform. http://www.weadapt.org/knowledge-base/guidance/knowledge-base

ORCHID AND CRISP: Opportunities and Risks from Climate Change and Disasters (ORCHID): Vulnerability and poverty reduction research, climate change and disaster risk screening of development agency portfolios. The methology was developed by the UK Department for International Development, an adapted version is known as CRISP. http://www.ids.ac.uk/climatechange/orchid

ADAPTING TO COASTAL CLIMATE CHANGE: A GUIDEBOOK FOR DEVELOPMENT PLANNERS has been developed in conjunction with the US Agency for International Development (USAID). The guidebook is both a tool itself and a link to other resources valuable for assessing vulnerability, developing and implementing adaptation options, and integrating options into programs, plans, and projects at the national and local levels. http://www.crc.uri.edu/index.php?actid=366

ADB CLIMATE SCREENING CHECKLIST: The Asian Development Bank (ADB) is helping the region's economies enhance their resilience to adverse climate change impacts through mainstreaming adaptation into national, sectoral and project level plans and actions. To mitigate climate change, ADB is addressing the main causes of emissions in the region. The Climate Screening Checklist is not publicly available. http://www.adb.org/

BMZ/GTZ CLIMATE CHECK tackles climate change issues from two angles: "Climate Proofing" deals with the impact climate change risks can have on the sustainability of development projects. "Emission Saving" identifies contributions of the cooperation programmes to mitigating climate change and helps maximise these contributions. http://www.gtz.de/en/themen/23930.htm

PRECIS stands for "Providing REgional Climates for Impacts Studies." Researchers at the Met Office Hadley Centre (meteorogical service and world area forecasting) produce and maintain a range of gridded datasets of meteorological variables for use in climate monitoring and climate modelling. http://precis.metoffice.com/index.html

CLIMATE CHANGE IMPACT AND ADAPTATION IN ASIAN COASTAL CITIES: The Japan International Cooperation Agency (JICA) has conducted a Joint Study "Climate Change Impact and Adaptation in Asian Coastal Cities" in cooperation with the World Bank and the Asian Development Bank. http://www.jica.go.jp/english/

PUBLICATIONS

Climate Change Implications for Food Security and Natural Resources Management in Africa http://www.preventionweb.net/files/13825_k7542e1.pdf

GTZ: Climate Change Information for Effective Adaptation http://www2.gtz.de/dokumente/bib/gtz2009-0175en-climate-change-information.pdf

IASC: Climate Change, Food Insecurity and Hunger http://www.humanitarianinfo.org/iasc/pageloader.aspx?page=content-subsidi-common-default&sb=76

IDS Tearfund: Adapting to Climate Change http://www.tearfund.org/webdocs/website/Campaigning/policy%20and%20research/Adapting%20to%20climate%20change%20discussion%20paper.pdf

IIED: Beyond cost benefit: developing a complete toolkit for adaptation decisions http://www.iied.org/pubs/pdfs/17081IIED.pdf

IIED: Community-Based Adaptation to Climate Change http://www.iied.org/pubs/pdfs/14573IIED.pdf

The Blue Revolution: Adapting to Climate Change https://www.mm.dk/sites/default/files/thebluerevolution.pdf

OECD publishing: Harmonising Climate Risk Management: Adaptation Screening and Assessment Tools for Development Co-operation. http://dx.doi.org/10.1787/5kg706918zvl-en

EXAMPLES OF COMMUNITY CENTRED CLIMATE PROBLEMS AND SOLUTIONS

ActionAid: The Time is Now. Lessons from farmers adapting to climate change. http://www.actionaid.org/assets/pdf/The%20Time%20is%20NOW%20report%20WEB.pdf

FAO Community Based Adaptation in Action - A case study from Bangladesh ftp://ftp.fao.org/docrep/fao/010/i0481e/i0481e.pdf

IFPRI Strategies for Adapting to Climate Change in Rural Sub-Saharan Africa http://www.ifpri.org/sites/default/files/publications/ifpridp01013.pdf

IFPRI: Are Soil and Water Conservation Technologies a Buffer Against Production Risk in the Face of Climate Change? Insights from Ethiopia. http://www.ifpri.org/sites/default/files/publications/rb15_17.pdf

IFPRI: Micro-level Practices to Adapt to Climate Change for African Small Scale Farmers http://www.ifpri.org/sites/default/files/publications/ifpridp00953.pdf

IFPRI: The Impact of Climate Change and Adaptation on Food Production in Ethiopia http://www.ifpri.org/sites/default/files/publications/rb15_11.pdf

IFPRI: Understanding Farmers' Perceptions and Adaptations to Climate Change and Variability http://www.ifpri.org/sites/default/files/publications/rb15_08.pdf

India Case Study: Community-Based Institutions http://www.intercooperation.org.in/images/Climate%20Change%20-%20Case%20study%20on%20Community%20based%20Institutions.pdf

India Case Study: Introduction to the Climate Change Case Studies http://www.intercooperation.org.in/images/Climate%20Change%20-%20Introduction%20to%20V&A%20Case%20studies.pdf

India Case Study: Pastureland Development http://www.intercooperation.org.in/images/Climate%20Change%20-%20Case%20study%20on%20Pasture%20Land%20Development.pdf

India Case Study: System of Rice Intensification http://www.intercooperation.org.in/images/Climate%20Change%20-%20Case%20study%20on%20The%20System%20of%20Rice%20Intensification.pdf

India Case Study: Water Resource Management http://www.intercooperation.org.in/images/Climate%20Change%20-%20Case%20study%20on%20Water%20Resource%20Management.pdf

India Case Study: Weather-based Farming Model for Communities http://www.intercooperation.org.in/images/Climate%20Change%20-%20Case%20study%20on%20WFMC.pdf

Oxfam: Climate Change Adaptation. Enabling people living in poverty to adapt http://www.oxfam.org.uk/resources/policy/climate_change/downloads/rr_climate_change_adaptation_full_290410.pdf

Oxfam: People Centered Resilience. Working with vulnerable farmers towards climate change adaptation and food security. http://www.oxfam.org/en/policy/people-centered-resilience

Oxfam: The Rain Doesn't Come on Time Anymore. Poverty, vulnerability, and climate variability in Ethiopia. http://www.oxfam.org/sites/www.oxfam.org/files/rain-poverty-vulnerability-climate-ethiopia-2010-04-22.pdf

Practical Action: Integrating Sustainable Livelihoods and Climate Change Adaptation http://www.eldis.org/vfile/upload/1/document/1005/ESRCBriefingPaper1.pdf

The Blue Revolution: Adapting to Climate Change https://www.mm.dk/sites/default/files/thebluerevolution.pdf

The Impact of Climate Change on Pastoral Societies of Somaliland http://wardheernews.com/Organizations/Amoud_Foundation/climate_%20Somaliland_amoud_univer.pdf