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18 October 2021

Guidance Note
UNDP Social and Environmental Standards

Standard 2: Climate Change and Disaster Risks

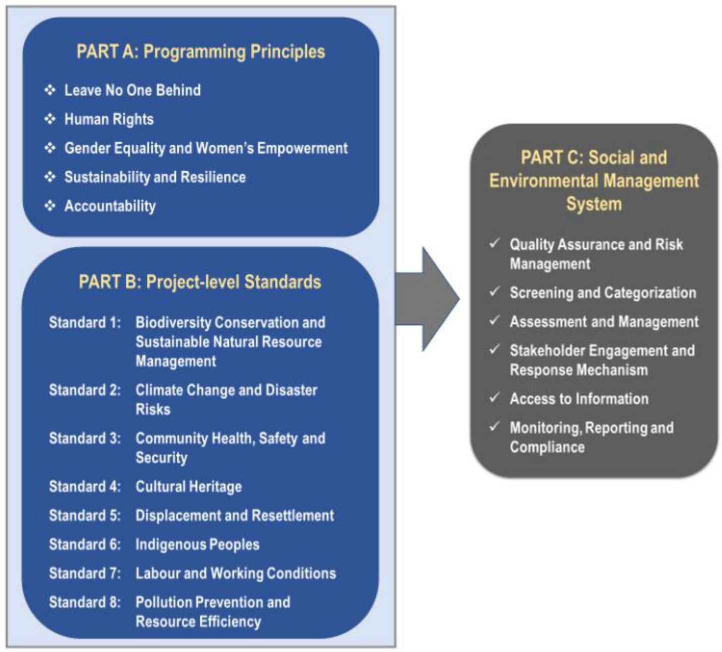
Note: This Guidance Note addresses the requirements of SES Standard 2: Climate Change and Disaster Risks as well as climate change and disaster risk aspects of Standard 3: Community Health, Safety and Security

UNDP Guidance Notes on the Social and Environmental Standards (SES)

This Guidance Note is part of a set of operational guidance materials related to the UNDP Social and Environmental Standards (SES). UNDP's SES seek to (i) strengthen quality of programming by ensuring a principled approach; (ii) maximize social and environmental opportunities and benefits; (iii) avoid adverse impacts to people and the environment; (iv) minimize, mitigate, and manage adverse impacts where avoidance is not possible; (v) strengthen UNDP partner capacities for managing social and environmental risks; and (vi) ensure full and effective stakeholder engagement, including through mechanisms to respond to complaints from project-affected people.

The SES guidance notes follow a similar structure to assist users in finding specific information or guidance (however the SESP Guidance Note focuses on the steps of the screening process). The set of guidance notes to be developed over time will include specific guidance on each of the SES Programming Principles, Project-level Standards, and elements of the Social and Environmental Management System (see Key Elements of the SES). The SES Toolkit is an on-line resource for the guidance notes and supporting materials.

Key Elements of the SES

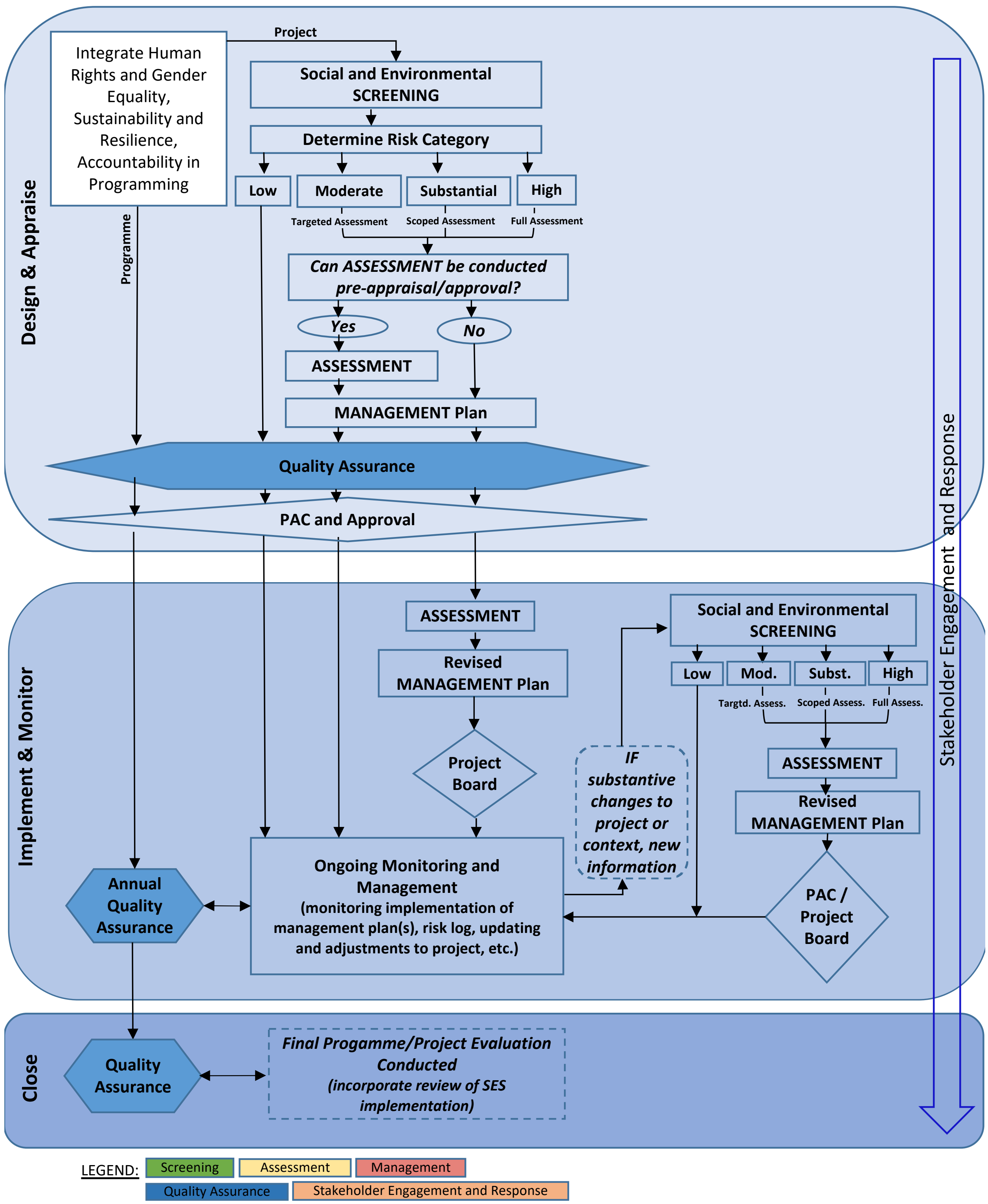


How to Use This Guidance Note

The target users for the SES guidance notes are staff, consultants, stakeholders and partners who are involved in developing, assessing and implementing projects that invoke UNDP's SES. To facilitate use of the overall package of SES guidance, users should understand that the guidance notes:

- Are structured around the process of screening, social and environmental assessment, and management (including monitoring).
- Assist in determining the applicability of relevant SES requirements in the screening process for all projects.
- Provide additional guidance for projects that require assessment and development of management measures (i.e. projects with Moderate, Substantial or High Risks related to a certain Principle or Standard).
- Provide a practical resource for implementing SES requirements to address potential social and environmental impacts within the context of the project cycle. Users do not necessarily need to read them in full but rather may select information that is specific to their needs.
- Complement and elaborate on the SES, which must be read in conjunction with the guidance notes (SES language is generally not repeated in the notes).
- Will continue to be developed as lessons are derived from implementation. Feedback is always welcome and can be sent to info.ses@undp.org.

Figure 1. SES Implementation – Screening, Assessment and Management in the Programming Cycle



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Abbreviations

CC	Climate Change
CCA	Climate Change Adaptation
CCM	Climate Change Mitigation
CO2e	Carbon dioxide equivalent
DRR	Disaster Risk Reduction
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GHG	Greenhouse Gas
LEDS	Low Emission Development Strategies
LPAC	Local Project Appraisal Committee
NAMAs	Nationally Appropriate Mitigation Actions
NAPAs	National Adaptation Programmes of Action
NAPs	National Adaptation Plans
NDCs	Nationally Determined Contributions
NGERs	National Greenhouse Gas Emission Reporting Regulations
PAC	Project Appraisal Committee
SESA	Strategic Social and Environmental Assessment
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

This Guidance Note provides operational guidance for addressing the requirements of SES Standard 2 on Climate Change and Disaster Risks during screening, assessment and management of UNDP projects. This Guidance Note focuses primarily on addressing potential risks and impacts from geophysical and hydro-meteorological hazards and the need for adaptation measures to address gradual changes in long-term average climate parameters (per SES 2).

It also covers some relevant requirements from Standard 3 on Community Health, Safety and Security regarding infrastructure safety and emergency planning. Other aspects of climate change and disaster risks and impacts are noted across the SES Standards and Guidance Notes.

The Guidance Note includes the following sections and figures:

- **Figure 1** provides an overview of SES implementation in UNDP's programming cycle. It should be noted that screening, assessment, and management might occur at different stages of the cycle.
- S**ection 2** provides key background information and an introduction to the objectives, key concepts and an overview of requirements of Standard 2 and related requirements of Standard 3. This section also highlights the normative basis for the Standards and explains the rationale for an integrated approach to climate change adaptation (CCA), climate change mitigation (CCM) and disaster risk reduction (DRR).
- **Section 3** discusses how to determine whether Standards 2 and 3 are relevant to a project by applying the mandatory Social and Environmental Screening Procedure (SESP). It also discusses how to assign a social and environmental risk category to the project.
- **Section 4** addresses the integration of requirements of the Standards into the project's social and environmental assessment process.
- **Section 5** addresses the development of measures to avoid, reduce, mitigate and manage CC and DRR-related risks and impacts. All Moderate, Substantial and High Risk projects require a management plan for consideration by the Project Appraisal Committee/Local Project Appraisal Committee (PAC/LPAC) either a complete or initial management plan depending upon the timing of conducting assessments. Monitoring implementation of management measures is also covered in this section.
- **Table 1** provides and overview of and key considerations for each of the above steps.

Table 1. Overview and Key Considerations

SCREENING (SECTION 3)	
What	***When***
▪ Screen with Social and Environmental Screening Procedure (SESP) to identify potential CC and disaster risks/impacts ▪ Categorize Project: Low/ Moderate/Substantial/High ▪ Draft Stakeholder Engagement Plan, start early consultations to identify options to avoid potential adverse impacts	▪ Screen as early as possible in project development to inform design ▪ Completed SESP must be submitted to PAC for review ▪ Revise SESP during implementation if changes to project/context, reviewed by Project Board or subsequent PAC
ASSESSMENT (SECTION 4)	
What	***When***
▪ Determine type(s) and scale of social and environmental assessment based on project risks and impacts, with focus on exposure and vulnerability to CC and disaster risks and impacts (incl. whether project may exacerbate risks): • *Low Risk:* No further assessment • *Moderate Risk:* Targeted assessment (depending on complexity, either stand alone or SESP analysis and management measures) • *Substantial Risk:* Appropriately-scoped ESIA or SESA • *High Risk:* Full ESIA or SESA ▪ Estimate and report project-related GHG emissions where they may be significant (i.e. above 25,000 tonnes CO2e/year and/or per country regulations) ▪ Utilize relevant expertise and ensure CC and disaster risks and impacts are assessed at appropriate geographic scale ▪ Ensure appropriate disclosure and stakeholder consultations	▪ Where possible, undertaken during project development (pre-PAC) utilizing Initiation Plan or other project preparation funding ▪ Where specific activities are not yet fully defined during project design and/or where assessments need to be financed by the project budget, prepare Environmental and Social Management Framework (ESMF) pre-PAC that specifies procedures for screening and assessing forthcoming activities ▪ In all cases, complete assessments prior to any activities that may cause social/environmental harm ▪ Revise or undertake assessment(s) given changes in project activities, context, or escalation of project risk profile; reviewed by Project Board or subsequent PAC
MANAGEMENT (SECTION 5)	
What	***When***
▪ Develop management measures/plans that reflect relevant requirements of the Standard. Where specific details and sites of proposed projects are not yet fully defined, develop a management framework (ESMF). Scale of plan will vary depending on nature and magnitude of potential risks and impacts. ▪ Determine type(s) and scale of social and environmental management measures based on project risks and impacts: • *Low Risk:* No further management measures • *Moderate Risk:* Targeted management measures • *Substantial Risk:* Appropriately-scoped-ESMF or ESMP • *High Risk:* Full ESMF or ESMP ▪ Ensure appropriate disclosure and stakeholder consultations and monitoring of all management measures	▪ Management measures developed pre-PAC if assessment completed ▪ ESMF prepared pre-PAC if assessments and development of specific management plans to be undertaken during implementation; reviewed by Project Board or subsequent PAC ▪ In all cases, management measures to be in place prior to start of any activities that may cause social/environmental harm ▪ Revise and/or develop further management measures if there are changes in project activities, its context, or escalation of the project risk profile; reviewed by Project Board or subsequent PAC

2 Understanding the Basics of the Standard

2.1 Background and Policy Basis

The rising costs of climate change and disasters threaten progress in achieving the Sustainable Development Goals and poverty eradication. Four important global agreements—the Paris Agreement on Climate Change, the Sendai Framework on Disaster Risk Reduction, the New Urban Agenda and the 2030 Agenda for Sustainable Development (see Box 1)—call on governments to integrate climate change and disaster risk considerations into projects, programs, plans and policies to reduce negative impacts on communities. UNDP's strategic plan 2022-2025 strongly links with the SDGs and proposes "signature solutions" to build resilience and enhance prevention and mitigation.[1]

UNDP's Social and Environmental Standards are designed to help maximize social and environmental opportunities and benefits and to ensure that all programming is risk-informed. SES Standard 2 seeks to strengthen national and local efforts to improve climate change mitigation and adaptation as well as disaster risk reduction. Identifying and addressing risks associated with climate change impacts and disasters is also key to designing successful programmes and projects that contribute to sustainable development results.

Development programming decisions are always based on a (formal or informal) assessment of associated costs and benefits; however, they may be taken in the absence of a sufficient understanding of the costs or risks associated with climate change impacts and disasters. Climate change and disaster risk-informed programming calls for (a) identifying the potential vulnerability and exposure of populations to possible impacts of climate change and disasters, (b) assessing whether project interventions could exacerbate such exposure and vulnerability, and (c) also examining the effect of climate change impacts and disaster risks on programming outcomes.[2]

Measures also need to be taken so that programming does not inadvertently contribute to the accumulation or exacerbation of risks. Box 2 provides examples of how development initiatives can inadvertently increase risks associated with climate change and disasters.

Box 1. Key international and UN frameworks on climate change and disaster risk reduction

2030 Agenda for Sustainable Development (2015) *reflects both action on climate change and DRR. Most SDGs (e.g. zero hunger, good health and well-being) will be unachievable unless progress in CCA/CCM/DRR can be made.*

Paris Agreement or Paris Climate Accord (2015) *is a legally-binding agreement that sets out a path towards resilient and zero-carbon development*

Sendai Framework for Disaster Risk Reduction (2015) *sets out targets for the post-2015 development agenda including a substantial reduction in mortality, in the numbers of people affected by disasters, economic losses and damage to critical infrastructure.*

New Urban Agenda (2016) *specifically promotes resilient and sustainable settlements through disaster risk reduction and climate change adaptation and mitigation*

Other Relevant Conventions and Platforms:

United Nations Conference on Sustainable Development (Rio +20)

UN Convention to Combat Desertification

Ramsar Convention or Convention on Wetlands

Committee on World Food Security

Convention on Biological Diversity

Beijing Declaration and Platform for Action (on Women's Rights)

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[1] UNDP Strategic Plan 2022-2025 (2021) supports change in three directions: (i) structural transformation, particularly green, inclusive and digital transitions; (ii) leaving no one behind; and (iii) building resilience to respond to systemic uncertainty and risk. The plan continues UNDP's work on six signature solutions: (i) keeping people out of poverty; (ii) strengthening effective, inclusive and accountable governance; (iii) building resilience to a wide range of shocks and crises, including conflict, climate change, disasters and epidemics; (iv) promoting nature-based solutions for a sustainable planet; (v) increasing energy access and transitioning to renewable energy; and (vi) strengthening gender equality and the empowerment of women and girls.

[2] "Programming" in this document stands for both programs and projects.

Box 2. How development programming may exacerbate climate change impacts and disaster risks

There are numerous ways in which development programming can inadvertently increase exposure and vulnerability and hence risks related to climate change impacts and disasters.

- **Increasing exposure**. Development programming can modify existing patterns of land use. For instance, addressing the energy gap (e.g. increasing energy availability) in areas close to the ocean may ultimately attract more people to settle in those areas and inflate population numbers and assets exposed to sea-level rise and tropical storms. Agricultural policies that promote cash crops to eradicate poverty at the expense of other, possibly more resilient products, may expose the entire sector to damages and losses from rising temperatures and weather-related hazards.
- **Increasing physical and environmental vulnerability.** Development programming involving physical structures (such as irrigation or energy infrastructure and buildings) may contribute directly to the physical vulnerability of people who live and work in or near them if these structures cannot withstand the physical forces of storms or earthquakes. Certain interventions could lead to degradation of natural ecosystems, such as forest areas, wetlands and coral reefs that act as physical barriers against CC impacts and weather-related hazards.
- **Increasing social and economic vulnerability.** Some development and recovery programming may inadvertently contribute to perpetuating gender and age inequalities in decision-making or social norms and thus exacerbate vulnerabilities to future impacts of climate change. For example, promotion of certain types of jobs may provide short-term income generation opportunities for women but are vulnerable to longer-term climate change risks.

2.2 Objectives and Requirements

The **key climate change and disaster risk reduction objectives** set out in Standards 2 and 3 are the following:

- To ensure that UNDP projects are sensitive to climate change and disaster risks in order to achieve sustainable development outcomes (S2)
- To reduce project-related greenhouse-gas (GHG) emissions and intensity (S2)
- To anticipate and avoid adverse impacts on the health and safety of affected communities during the project life-cycle from both routine and non-routine circumstances (S3)
- To avoid or minimize community exposure to disaster risks, diseases and hazardous materials associated with project activities (S3)

Box 3. Summary of SES Requirements related to climate change impacts and disaster risks *(see full text of SES requirements of Standard 2 and Standard 3)*

✓ **Screen Projects for Climate Change Impacts and Disaster Risks**

- Utilize Social and Environmental Screening Procedure (SESP) to identify and categorize potential risks and impacts regarding climate change and disasters

✓ **Climate Change and Disaster Risk Analysis, Planning and Implementation**

- Evaluate risks from climate change impacts and disasters as part of project social and environmental assessment process. Where significant risks are identified, undertake additional scoping and climate change and disaster risk assessment
- Ensure projects are sensitive to and informed by analysis of risks and impacts of climate change and hazards (both natural and human-made) through the following key measures:
    - Identify relevant and up-to-date risk information (based on existing studies and sources)
    - Examine exposure and sensitivity of relevant communities, ecosystems, and critical infrastructure

- Analyse physical, social, economic and environmental factors which increase susceptibility and vulnerability—with a particular focus on marginalized and disadvantaged groups and individuals
- Examine viability or longer-term sustainability of project outcomes due to potential climate change impacts and disaster risks
- Assess whether activities may increase exposure or exacerbate vulnerability of communities to the impacts of climate change or disasters and avoid activities that may exacerbate such exposure
- Ensure that appropriate climate and disaster risk management plans are in place, including but not limited to emergency preparedness and response plans and ensure appropriate monitoring
- Integrate, where relevant, climate change adaptation and disaster risk reduction considerations and seek opportunities for reducing exposure and vulnerabilities to strengthen resilience
- Where possible, integrate disaster risk reduction measures into the recovery of infrastructure and societal systems to "build back better" after a disaster to increase the resiliency of communities

✓ **GHG Emissions**

- Identify and seek to minimize and avoid unwarranted increases in GHG emissions or other drivers of climate change from project activities
- Ensure options are considered to reduce or avoid project-related GHG emissions
- For projects expected to produce significant GHG emissions, characterize (direct vs. indirect GHG emissions) and estimate and report emissions (i.e. above 25,000 tonnes CO2e/year and/or per country regulations)

✓ **Infrastructure Safety and Emergency Preparedness (see Standard 3)**

- Ensure that project-affected communities are protected from natural and human-made hazards associated with project design, construction, operation, and decommissioning (e.g. collapse of project's structural elements, impact of project-induced land use changes on vulnerability or hazards) through:
  - Applying relevant national building and safety codes and good international practice (e.g. engineering, life and fire safety, seismic codes, etc.). Ensure infrastructure is designed, constructed, operated and decommissioned by competent authorities and professionals
  - Avoiding or minimizing community exposure to water-/vector borne diseases, communicable and noncommunicable diseases that could result from project activities
  - Ensuring that projects take into account differences in risk exposure and sensitivity of women and men as well as marginalized and disadvantaged groups, including children, older persons, persons with disabilities, indigenous peoples
  - Ensuring that exposure to hazardous materials from natural hazard-triggered accidents is considered and addressed
  - Supporting appropriate emergency preparedness and response plans to accidents and emergency situations
  - Preparing business continuity plans for key infrastructure

2.3 Key Concepts

Annex 1 includes a glossary of terms related to climate change and disaster risk reduction. Below are some key concepts that should be reviewed to facilitate implementation of the SES requirements.

Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.' The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes.[3]

Climate change—as observed over time in a rise in average temperatures, more erratic precipitation patterns, higher winds speeds and sea level rise and more frequent and intense extreme weather events—threatens to undermine progress towards achieving sustainable development including poverty reduction and economic growth. Reducing the negative impacts of climate change is pursued through two complementary strategies:

- **Mitigation** refers to reducing greenhouse gas emissions and addresses the human or anthropogenic root causes of climate change (climate change mitigation, CCM)
- **Adaptation** to a changing climate helps societies to take action to prevent or minimize the projected negative impacts or exploit beneficial opportunities (climate change adaptation, CCA)

Negative impacts from slow onset events include sea level rise, ocean acidification, rising temperatures and decreased water availability, salinization of land and fresh water, erosion and desertification. These gradual changes and associated losses of natural resources such as land and water already affect livelihoods around the world and constitute the biggest threat to food security in the 21st century.[4] However, climate change does not need to overwhelm communities or societies (i.e. result in a disaster) but can be addressed through structural, social and institutional measures that seek to prevent or mitigate anticipated effects. If unabated, climate change will significantly affect human and animal health and safety, ecosystem integrity, livelihoods (especially those dependent upon natural resources) and the viability of settlements and cities near oceans. It is also disrupting and threatening key development sectors such as agriculture (including forestry and fisheries), energy, water and transport. People and countries with the least resources, especially the most impoverished, are particularly vulnerable and will be disproportionately affected.[5]

Climate change also has an impact on the frequency, intensity, spatial extent, duration and timing of **weather-related or hydro-meteorological hazards** leading to extreme, sudden onset events such as floods, landslides, tropical storms, wildfires and droughts.[6] For instance, while the overall amount of annual rainfall may decrease in many regions, it is predicted to become both more erratic and intense which may lead to more destructive flooding episodes both in densely populated urban centers and in rural areas. For these reasons, CCA draws on disaster risk reduction (DRR) practices to address weather-related extreme events as well as tackling gradual changes through a range of activities. In fact, there is a significant convergence between CCA and DRR, whereby specific measures can be designed to protect communities both from negative impacts of gradual CC and from various hazard events (for example see Table 8).

Many developing countries are also exposed to highly destructive **geophysical hazards** such as earthquakes, volcanic eruptions and tsunamis. It is more effective and efficient to identify **multi-hazard strategies and activities** that will help reduce risks from a range of hazards that may be present in the same geographical area (see comments on the Sendai Framework below).

Climate Change Mitigation (CCM) is a complementary measure to CCA/DRR, addressing a **root cause** of both (a) climate change and (b) more extreme weather-related disaster events (see Figure 2). CCM refers to efforts to reduce or prevent emission of greenhouse gases (GHGs). Mitigation can mean promoting the use of new low emission technologies and renewable energies, facilitating access of households to energy efficient technologies or changing management practices and public attitudes and behaviors towards the long-term goal of "zero carbon." This may inform complex initiatives such as facilitating countries' access to climate finance, helping governments to "green"

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[3] Intergovernmental Panel on Climate Change (IPCC), Special Report: Global Warming of 1.5°C, (October 2018), Glossary.

[4] IPCC, Fifth Assessment Report (AR5): Climate Change 2014: Impacts, Adaptation and Vulnerability (March 2014).

[5] OECD, Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance (2009).

[6] IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (2012).

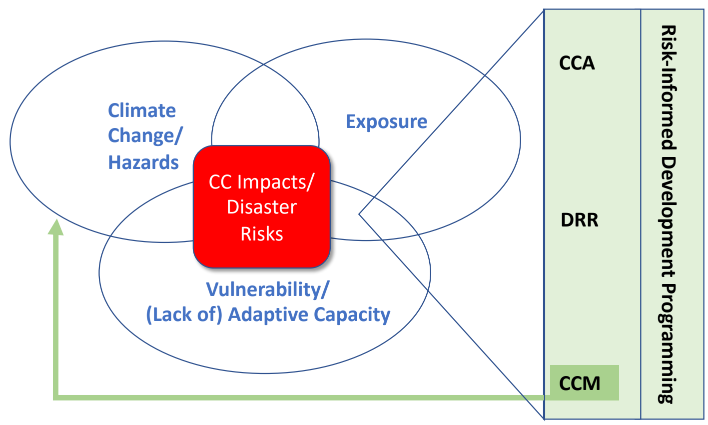
key sectors (transport, energy, forestry, agriculture, etc.), promoting energy efficient transport alternatives or more relatively straightforward actions such as improving cook stove design or the insulation of buildings.

Disaster risk is defined as the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.[7]

Disaster risk reduction (DRR) is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. DRR is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans.

Disaster risk reduction strategies and policies define goals and objectives across different timescales and with concrete targets, indicators and time frames. In line with the **Sendai Framework for Disaster Risk Reduction 2015-2030** [8] these should be aimed at preventing the creation of disaster risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience.[9]

Figure 2. Reducing and managing climate change impacts and disaster risks through risk-informed programming



The Sendai Framework promotes a multi-hazard approach to DRR, encompassing a broad range of potential hazards including **biological, environmental, chemical, and technological** processes and phenomena, in addition to the hydro-meteorological and geophysical hazards already mentioned. (See Annex 1.) A range of SES Standards and Guidance Notes address various types of hazards.

Climate change and disaster risk-informed development programming seeks to reduce negative impacts from climate change and disasters. Exposure and vulnerability are key concepts in this context. **Exposure** reflects the physical presence of people, livelihoods, assets and natural resources in areas under threat of hazards and **vulnerability** refers to the propensity or predisposition to be negatively affected (associated with economic, social and environmental conditions such as poverty and inequality). **Hazards** refers to a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. **Risk reduction** requires integrating CC and disaster risks into development planning (assessments, appraisal and project selection).

In other words, exposure and vulnerability and the underlying processes or “drivers” (e.g. urbanization and environmental degradation, exclusion and marginalization) that feed into these conditions are key to understanding and tackling risks and impacts from climate change and disasters. In order to do so, development planners need to be able to access information on current and expected climate characteristics and hydro-meteorological and geophysical hazards (see explanation below) as well as exposed and vulnerable groups, livelihoods, assets and

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[7] UN Office for Disaster Risk Reduction (UNDRR), Terminology (2017).

[8] UNDRR, Sendai Framework for Disaster Risk Reduction 2015-2030 (2015).

[9] UNDRR, Terminology, (2017).

sectors. Figure 3 illustrates how risk-informed programming seeks to reduce risks and impacts from climate change impacts and disaster risks.

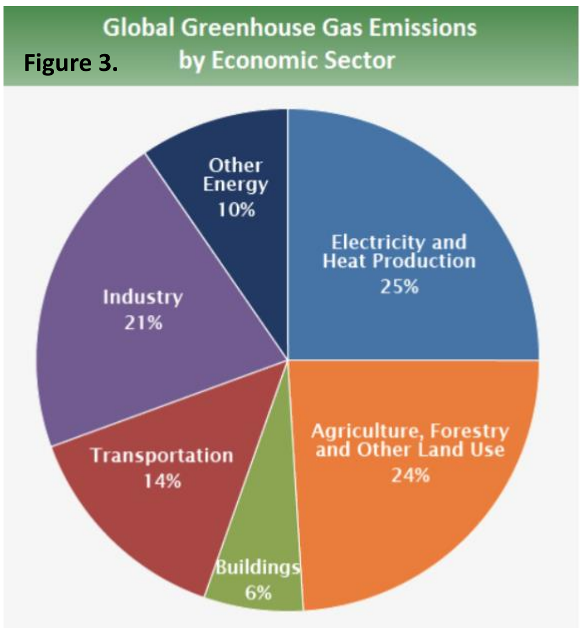
3 Screening for Potential Adverse Risks and Impacts

3.1 UNDP Programming and Potential Adverse Risks and Impacts

In support of the Sustainable Development Goals, UNDP's signature programmes aim to strengthen effective, inclusive and accountable governance, promote gender equality and women's empowerment, keep people out of poverty, enhance prevention and recovery for a resilient society, close the energy gap and promote nature-based solutions for a sustainable planet.[10] UNDP programming tends to be **multi-sectoral.** For instance, strengthening natural resource management policies may impact various sectors including water, energy and agriculture. Similarly, a recovery programme in a peacebuilding context may involve water, energy, food security and agriculture components. UNDP has also been scaling up a broad range of actions to address climate change impacts and disaster risks (see Box 4).

SES 2 and the SESP aim to help ensure that UNDP programming does not lead to (i) inadvertent exacerbation of vulnerability of beneficiaries and communities to climate change impacts or exposure to hazards, or to (ii) inadvertent increases in GHG emissions or long-term lock-in effects (e.g. use of energy inefficient technologies or materials with a lifecycle of 50 years).

Figure 3.



The list of sectors that are most likely to have a significant impact on GHG emissions (see Figure 3) includes **energy, agriculture**, **industry** and the **transport sector.** Energy generation (and to a lesser degree energy transport and distribution) account for one third of GHG emissions. Agriculture follows with about a quarter of anthropogenic GHG emissions, mainly from deforestation, and livestock, soil, and nutrient management (e.g. nitrogen fertilizers). Industrial development activities account for 21% of GHG emissions while the transport sector accounts for 14% of global GHG emissions mostly associated with road transport.[11]

Urban and rural development projects with components affecting land use, energy and transport require particular attention.

These sectors are also among the most climate sensitive and require careful consideration of climate change and disaster risk and impacts for all policy and programme interventions.

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[10] UNDP Strategic Plan 2018-2021 (2017).

[11] IPCC, Fifth Assessment Report (AR5): Climate Change 2014: Impacts, Adaptation and Vulnerability (March 2014).

Box. 4.

UNDP and Climate Change: Scaling Up Climate Action to Achieve the Sustainable Development Goals (2016)

UNDP commits to providing long-term support to significantly scale up climate change action, build resilience and pursue zero-carbon, equitable and inclusive growth and sustainable development.

Adaptation and Resilience

- **Strengthen Integrated Adaptation Policies, Plans and Strategies.** UNDP helps countries use the tools of the UNFCCC, including National Adaptation Programmes of Action (NAPAs) and National Adaptation Plans (NAPs), to strengthen climate adaptation for resilient development. This also includes strengthening adaptation actions emerging from Nationally Determined Contributions (NDCs).
- **Advance Cross-sectoral Adaptation Action.** UNDP works to scale up climate-resilient livelihoods for the poor and vulnerable, support small and medium enterprises to reduce exposure to climate risks, improve climate information and early warning systems, and expand ecosystem-based adaptation solutions and resilient infrastructure.
- **Address Climate and Disaster Risks.** UNDP commits to identifying and incorporating the management of climate risks with disaster risk reduction (DRR) into all governance, planning, implementation and monitoring.
- **Instill Risk-informed Disaster Recovery.** UNDP integrates climate change into disaster recovery efforts to build back better and more resilient communities that can plan for and withstand future disasters and climate shocks.

Zero-Carbon Growth

- **Implement Nationally Determined Contributions.** Helping countries turn national targets into concrete actions is key. This work includes the planning and delivery of climate change initiatives, as provided through the mechanisms of the UNFCCC, such as formulating and implementing Nationally Appropriate Mitigation Actions (NAMAs) and Low Emission Development Strategies (LEDS).
- **Integrate Zero-carbon Development.** UNDP supports developing countries to integrate climate change into development planning across all sectors at the national and subnational levels.
- **Deliver Sustainable Energy.** This includes closing the energy access gap, including through on- and off-grid electricity access, promoting energy efficiency and conservation, and increasing the global share of renewable energy. The creation of an environment conducive to private sector investment, through energy market transformation and de-risking investment, underpins these efforts.
- **Reduce Emissions through Protecting Forests.** UNDP supports efforts to protect against deforestation and forest degradation while also reducing emissions and promoting sustainable livelihoods.

UNDP Climate Promise Formally launched at the UN Climate Action Summit in September 2019, UNDP's Climate Promise supports over 100 countries to enhance their Nationally Determined Contributions (NDCs) under the Paris Agreement. Delivered in collaboration with a wide variety of partners such as UNEP, the Climate Promise is the world's largest offer of support for the enhancement of climate pledges. While climate change impacts pose a risk for everyone and threaten to roll back decades of sustainable development gains, the poorest, marginalized and most vulnerable populations are disproportionately burdened. UNDP advocates for an inclusive approach to ensure ownership of climate actions across government and society, advance equality, and strengthen social and environmental sustainability.

3.2 Screening UNDP Projects for Adverse Climate Change Impacts and Disaster Risks

All UNDP projects and their constituent components need to be screened with the SESP for risks related to climate change impacts and disasters to check whether they may:

- Have **development outcomes/outputs** that may be **impacted** or challenged by **climate change** and/or **disaster risks** (e.g. related to rising temperatures, land degradation, forest fires, floods, tsunamis etc.)
- Involve development activities whose **construction and operation** may contribute to increased exposure to hazards or vulnerability to climate change impacts (e.g. flooding, landslides, earthquakes, tropical storms etc.)

- May **increase GHG emissions,** black carbon and volatile organic compounds that cannot be otherwise avoided and reduced. Increases in GHG emissions could be the result of short term project implementation activities (e.g. construction), or, more significantly, inappropriately designed policy frameworks or project interventions could lead to "locking-in" increased GHG emissions over the long term, extending far beyond the project's duration.

As the above points make clear, risks regarding climate change impacts and disaster risks need to be reviewed both as potential "risks to the project" as well as "risks from the project."

When screening projects for potential risks and impacts, it is important to recall that:

i. **All activities** outlined in the Project Document (e.g. in Results and Resources Framework) are screened and reviewed for potential direct and indirect impacts in the project's area of influence[12], and

ii. Project activities are screened for potential social and environmental risks and impacts **without consideration of potential mitigation and management measures** in order to form a clear picture of potential risks in the event that mitigation measures are not implemented or fail. Risks should be initially identified and quantified as if no mitigation or management measures were in place.

It should be noted that climate change mitigation and adaptation projects may have differing objectives, and each may have consequences that interact in both positive and negative ways. Therefore, the climate and disaster risk screening should consider the potential interactions of mitigation and adaptation consequences and measures (which would be further analyzed during the assessment process).

Note on uncertainty: Given the long-term and dynamic nature of climate change and disaster risks, the complexity of cause-effect relationships and at times gaps in localized climate change projections, it must be acknowledged that there could be levels of uncertainty in identifying specific risks and impacts associated with climate change and disaster risks. Gaps in information should be noted and qualitative information and reasonable assumptions utilized where necessary (important information gaps may need to be addressed during the assessment stage).

Table 2 lists and elaborates on the SESP questions for identifying general risks related to climate change impacts and disasters (for SES Standards 2 and 3). The screening process may require the use of existing databases and tools (see Box 5) and in some cases the involvement of qualified experts. More targeted, geographic and sector-specific screening may be required utilizing other available tools.

As outlined in the SESP Guidance Note and noted further below, for all answers answered in the affirmative, screeners would need to consider the potential "impact" and "likelihood" of the identified risk and incorporate appropriate measures into project design and implementation. Annex III includes further information on "Evaluating the Probability and Impact of Climate Change Impact & Disaster Risks."

Table 2. Guidance for responding to Standard 2/3 risk-based questions in SESP
Standard 2 Climate Change and Disaster Risk
Question 2.1: Would the project involve areas subject to hazards such as earthquakes, floods, landslides, severe winds, storm surges, tsunami, volcanic eruptions?

[12] As noted in the SES, a project's area of influence encompasses (i) the primary project site(s) and related facilities (e.g., access roads, pipelines, canals, disposal areas), (ii) associated facilities, (iii) areas and communities potentially affected by cumulative impacts from the project or from other relevant past, present and reasonably foreseeable developments in the geographic area (e.g., reduction of water flow in a watershed due to multiple withdrawals), and (iv) areas and communities potentially affected by induced impacts from unplanned but predictable developments or activities caused by the project, which may occur later or at a different location (e.g. facilitation of settlements, illegal logging, agricultural activities by new roads in intact forest areas).

Identify potential exposure i.e. whether the project's geographical locations and area of influence is projected to experience negative impacts of climate change and/or disasters (with attention to frequency and variability).

This requires the use and review of:

a) Global databases and tools
b) National/sub-national assessments and data-bases
c) Due diligence in discussing climate change and disaster risks with local communities in the project area

A good start to answering these questions is by accessing the following information sources (see Box 5 for additional sources):

- ThinkHazard! for natural hazards
- World Bank Climate Change Knowledge Portal for data on historical and future climate, vulnerabilities and impacts (by country, region, watershed)
- INFORM for quantitative analysis relevant to humanitarian crises and disasters
- ArcGIS online mapping allows for application of extensive filters to identify location-specific disaster risks

However, due to the scale of coverage of some of these tools (e.g. countries, regions), more localized climate change variability and smaller scale natural hazards may not be captured. This is why it is important to also consult regional, **national/sub-national assessments** (e.g. National Communications reports to the UNFCCC, disaster risk assessments) and **data-bases** (e.g. disaster damage and loss data-bases) in order to complement information.

Localized data may still be limited and answering this question may require reliance on local stakeholder inputs. If an area is historically known to suffer from water scarcity then even if there is no recorded local information about future rainfall or water availability, activities that may increase water usage would need to be flagged for potential risks.

Question 2.2: Would the project potentially involve or lead to outputs or outcomes sensitive or vulnerable to impacts of climate change or disasters? (For example, through increased precipitation, temperature, salinity, extreme events, earthquakes)

Looking at the suggested outcome and key outputs, determine whether (a) the identified adverse climate change impacts or disaster risks (see above) may threaten these outputs/outcomes over the life of the project and beyond and whether (b) the project has identified appropriate adaptation or risk reduction measures.

Timescales beyond the limited time frame of the project also need to be considered: how might the project be affected by projected climate change impacts over the coming decades? Would projected changes in climate affect the efficacy of the proposed interventions?

Example[13]: A rural livelihoods project proposes micro-irrigation schemes for poor, female-headed households in an area that is experiencing recurrent small-scale droughts. Screening shows that the area is likely to experience a further decrease in annual precipitation due to climate change. In other words, the envisaged outcomes of the project (increased farming productivity and incomes of poor, female-headed households in the target area) would be vulnerable to the impact of climate change or extreme weather events such as droughts. The project could include measures to promote water saving irrigation technologies as well as strategies for livelihood diversification so as to reduce overreliance of the target stakeholders to irrigated agriculture that is highly susceptible to drought impacts.

Question 2.3: Would the project potentially involve or lead to increases in vulnerability to climate change or disaster risks now or in the future (also known as maladaptive or negative coping practices)?

Verify whether project activities may inadvertently increase vulnerability of communities. For instance, a project might reduce the ability of a community to cope with climate change or disaster-related shocks and stresses (see example below) or increase

[13] All examples are based on real projects/activities from UNDP projects however the description of potential climate impacts and disaster risks are illustrative and have been added for the purposes of this guidance note.

the physical/environmental vulnerability of a community by destroying protective habitats (see example under Question 3.6 below).

Also, projects should be reviewed whether they might exacerbate drivers of disaster risks, such as unplanned and rapid urbanization processes (in addition to unsustainable natural resource use and degradation of ecosystems which are addressed in SES Standard 1).

<u>Example</u>*: A community development project is promoting the commercialization of agro-pastoral products through a range of measures including road network development, electrification, innovative production technologies, and marketing. Communities are currently quite isolated, mostly self-sufficient and have limited access to services and markets. They rely on a range of communal social norms and mutual support mechanisms that help them cope with frequent shocks and stresses including extreme heat and droughts, flash floods and animal diseases. Climate change projections imply that these impacts/risks are likely to get worse. The intended integration of communities into markets and government-funded social services could potentially exacerbate vulnerability by altering or undermining the resilience provided by existing social networks and norms (at least until sufficient benefits from livelihood changes materialize).*

Question 2.4: Would the project involve or lead to increases of greenhouse gas emissions, black carbon emissions or other drivers of climate change?

Projects typically associated with a potential increase of GHG emissions are those in the sectors of energy (including those likely to increase energy demand), transport (road), waste and landfills, agriculture, industrial and economic development, and land use and ecosystems (see previous pages and examples below). Projects involving significant travel and freight transport (road, air) also require specific scrutiny. However, not all projects in the above-mentioned sectors might necessarily lead to significant GHG emissions (and many UNDP interventions may specifically seek to reduce such emissions).

In addition to GHGs (which includes methane), screeners should also consider whether project activities may lead to increased emissions of other drivers of climate change such as black carbon (e.g. soot produced by incomplete combustion of fossil fuel or biomass burning).

The below list of sectoral areas often associated with increased potential for higher GHG emissions is therefore indicative:

<u>Energy</u>: Policies/regulatory frameworks or projects that support or involve power generation, transport and distribution. *Power generation* has the largest impact on GHG emissions in the energy sector and may either increase or decrease GHG emissions. *Energy transport and distribution* infrastructure (e.g. fuels, sub-stations, transformers, conductors, transmission lines, etc.) contribute to GHG emissions both directly (losses related to distribution, technical problems or lack of maintenance require increased production and emissions) and indirectly (e.g. construction activities convert/degrade habitat which releases carbon/methane from biomass and soils).

<u>Agriculture</u>: Policies/regulatory frameworks or projects that support or involve *crop production intensification* (possibly requiring increased levels of fertilizers, water, electricity fuel and other inputs); *land use conversion* (e.g. possible drainage of organic soils, peat extraction, deforestation and land/soil degradation) and *livestock development* (changed grassland management and livestock feeding practices).

<u>Road Transport</u>: Policies/regulatory frameworks or projects that support or involve **i***nfrastructure development* (roads, public transport systems etc.); promote *transport solutions* (e.g. carbon and fuel taxes, light and heavy duty energy efficiency standards, technology development, etc.); address *incentives and disincentives* in the sector (e.g. taxes, vehicle use permits/restrictions, etc.)

<u>Waste and landfills</u>: Policies/regulatory frameworks or projects that support or involve the development of *municipal solid waste and landfills* which, for example, may vent waste gases (e.g. flaring) and lack gas reduction approaches.

<u>Industry</u>: Policies/regulatory frameworks or projects that support or involve industrial development, supporting creation/expansion of industries involved in product manufacturing, material recovery, recycling.

Standard 3 Community Health, Safety and Security

(note that numbering reflects specific SESP S3 screening questions)

3.1: Would the project potentially involve or lead to construction and/or infrastructure development (e.g. roads, buildings, dams)?

Question 3.1 generally focuses on overall infrastructure safety. This aspect is addressed in the S3 Guidance Note. Here, however, the focus is on infrastructure development that (a) may be at risk to impacts of climate change and disasters (e.g. viability of infrastructure may be compromised), and (b) may increase the exposure and vulnerability of beneficiaries and communities (e.g. infrastructure exacerbates risk exposure)

Example: A project involves five small dams to improve access to water in water-stressed villages along a river stream that has been drying up over the last years with increased sedimentation and water flowing below sand in the river bed. The so-called "sand" dams are concrete embankment walls built across the river to harvest sand sediments and runoff from upstream and facilitate water extraction. If the design of these dams is not based on future climate predictions, it would pose a risk to the local community. The project document does not discuss the possible negative impact on water availability in downstream communities (i.e. communities in the project impact area). The project document also fails to clearly identify the lifespan of the project both in terms of the longer-term viability of this approach given climate change predictions and the expected durability of the dams. It is therefore unclear how long villagers will be able to benefit from the project and what alternative adaptation strategies can or need to be explored once the project is decommissioned, possibly leaving primary project beneficiaries more vulnerable than before.

3.3: Would the project potentially involve or lead to harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)?

Any project promoting the building or renovation/rehabilitation of physical structures needs to consider structural and operational safety as a priority, and such safety concerns are further heightened if (a) structures or buildings will be used by the public (e.g. health clinics, schools, office buildings, roads) and/or if (b) peoples' livelihoods and health depend on them (e.g. irrigation systems, fresh water distribution networks etc.).

A key consideration is whether the possible failure or collapse of structural elements may create a direct hazard to the community (e.g. dams, power stations, buildings, roads). Structural failures could lead to losses of lives, assets, and/or livelihoods. It is critical that climate change predictions and disaster risk analysis be integrated into the planning, construction and operation of any infrastructure and its structural elements.

Structural safety requires that communities are protected from possible injuries, physical trauma, burns and smoke inhalation and exposure to hazardous materials. This requires using siting and safety engineering criteria, the application of building codes as well as ensuring safe operation and maintenance through life and fire safety systems, and emergency preparedness measures and business continuity plans.

Example: An HIV/AIDS project envisages the renovation of health clinics in a semi-urban area. Screening shows that some of the clinics are located along riverbanks that are historically safe from riverine flooding, but where the national hydrometeorological agency warns of future flood risks due to intensifying rainfall during the wet season. Therefore, the structures, related biohazard storage, and the people working and receiving services in them could be at risk. The project document does not identify these hazards and does not specify any need to reinforce existing structures or otherwise address the physical vulnerability of both the structures and the people working and receiving services in them. This includes concerns about the safety of biohazard waste removal and management arrangements.

3.5: Would the project potentially involve or lead to transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?

Hazardous materials and substances present significant health and safety risks to communities and may exacerbate and/or be the source of disaster risks (e.g. unsafe storage of explosive or poisonous materials, natural hazard-triggered technological—"Natech"—accidents[14]). Hazardous materials management and safety measures are required to avoid the potential release of hazardous materials. This may also be required in disaster recovery operations that involve removal and disposal of debris.

It is important to note that a number of conventions address the use, handling and disposal of a range of harmful chemicals and hazardous materials subject to international bans or phase-outs, such as for DDT, PCBs, and other chemicals listed in

[14] Impacts of natural hazard events on chemical installations, pipelines, offshore platforms and other infrastructure that process, store or transport dangerous substances can cause fires, explosions and toxic or radioactive releases. See UNISDR, Words into Action Guidelines: 9. Natech Hazards and Risk Assessment (2017).

international conventions such as the Montreal Protocol, Minamata Convention, Basel Convention, Rotterdam Convention, Stockholm Convention. See SES Standard 8 on Pollution Prevention and Resource Efficiency for further related requirements and guidance. Example: *A rapid response project will collect and remove debris as part of a disaster recovery operation. The natural disaster affected both rural and urban areas, including an industrial zone with multiple warehouses. The project however did not identify the particular types of hazardous wastes that require safe removal, transport and storage. An analysis of community exposure to the substances was not included in the project plan.*
3.6: Would the project potentially involve or lead to adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g. food, surface water purification, natural buffers from flooding)?
There is a whole range of ecosystems that can provide some level of protection from disasters and climate change impacts, including saltwater intrusion and floods (swamps and wetlands, mangroves, etc.), increasing temperatures and heatwaves, and landslides (vegetation cover and forests). As part of the screening, there is a need to identify the possible impact of project interventions on the use of land and natural resources and identify whether this may increase the environmental vulnerability of communities to climate change and/or natural hazards. Example: *A project is dedicated to help a municipal government design an affordable housing plan for low income households as people are being priced out of the rental market in a bigger city. The envisaged strategy is to convert public lands into land for private development and engage in public-private partnerships under a clear set of guidelines and regulations to promote affordable rents. Public lands near the city are covered with dense brush and forest that help absorb torrential rains during the rainy season. The implementation of the affordable housing plan would deforest some of these areas. Screening shows that the city experiences regular but moderate levels of seasonal flooding. A network of drainage channels currently is capable to deal with most excess water. Climate change projections, however, predict an intensification of rainfall in the area which together with the envisaged housing development and destruction of forests/brush may overwhelm the capacity of the current drainage network and increase the physical vulnerability of urban neighborhoods.*

Box 5. Selection of information sources and screening tools for climate change/disaster risks

The World Bank's **ThinkHazard!** is an online hazard information and knowledge platform for the non-specialist project planner and manager. This tool provides a one-stop-shop to inform users on hazards in a given location, that should be considered in project planning and design and implementation. ThinkHazard! covers eleven major hazards i.e. riverine flood, urban flood, coastal flood, earthquake, cyclone, tsunami, volcano, landslide, water scarcity, extreme heat, and wildfire, and highlights the likelihood of different natural hazards affecting project areas. ThinkHazard! also highlights how certain hazards may change in the future as a result of climate change. It provides recommendations and guidance on how to reduce the risk from each hazard within the project area, and provides links to additional resources such as national disaster risk assessments, best practice guidance, additional websites.

INFORM is a global, open-source risk index covering humanitarian crises and disasters maintained by the Inter-Agency Standing Committee. While it has been primarily designed for response and preparedness it has also useful country information on hazard and exposure, vulnerability, and coping capacities that reflects the degree of vulnerability in each country.

The **UNDP Climate Change Adaptation website** overs a range of adaptation and mitigation initiatives, knowledge and learning sources and materials. Specifically, it offers a search tool that facilitates access to country-specific information on CC-related reports, assessments, case studies, program documents etc.

The **Climate Change Knowledge Portal (CCKP)** developed by the World Bank, is an online tool that facilitates access to global, regional and country data on (historical and projected) climate change and development to explore, evaluate and learn about climate related vulnerabilities and risks. It is not a screening tool. Instead the CCKP contains environmental, disaster risk, and socio-economic datasets, as well as synthesis products, which are packaged for specific user-focused functions such as climate change indices for a particular country.

USAID Climate Risk Screening and Management Tools support climate risk screening and management in strategy, project and activity design. The tools guide users through the process of assessing and addressing climate-related risks.

CRiSTAL (Community-based Risk Screening Tool – Adaptation and Livelihoods) is based on a participatory, local-scale approach to prioritize climate risks. Tool versions are available for Food Security and Forests.

Climate Watch, maintained by the World Resources Institute, includes climate data, visualizations and resources they need to gather insights on national and global progress on climate change.

The **Climate, Environment and Disaster Risk Guidance (CEDRIG)** developed by the Swiss Agency for Development and Cooperation, presents modules (light, strategic, operational) designed to systematically integrate climate, environment and disaster risk reduction (DRR) into development cooperation and humanitarian aid in order to enhance the overall resilience of systems and communities.

GEF STAP Guidance on Climate Risk Screening proposes a common standard for climate risk screening of GEF projects. At a minimum, each agency should use a 4-step screening process.

PreventionWeb is a knowledge platform for disaster risk reduction and includes compilations of relevant country information.

ArcGIS is an online mapping service that provides extensive filters to *inter alia* to identify location-specific disaster risk.

3.3 Determining the Applicability of Standards 2/3

Any affirmative responses to the risk screening questions indicate the potential for exacerbating risks and/or adverse impacts from climate change and disasters that need to be summarized in the SESP Screening Template (under question 2). The level of significance of each identified risk is estimated (based on "Likelihood" and "Impact"), a risk categorization is assigned and these are recorded under questions 3 and 4 of the SESP template (see Annex III for more details on evaluating the probability of natural hazards and CC impacts). Where risks and impacts associated with climate change or disasters is judged to be Moderate, Substantial or High Risk, then further assessment and management planning is required and the requirements of the Standards need to be carefully reviewed in the context of project design and implementation.

The SESP risk categorization guides the nature, scope and depth of the follow-up assessment that will be performed which is addressed in the next section.

Table 3 provides some indicative examples of some project types that may fall into Low, Moderate, Substantial and High Risk categories. Projects of course need to be reviewed in their specific contexts before any determination of overall environmental and social risk categories. It is also important to keep in mind that the risk categories are relative to one another. For example, Substantial Risk projects are defined as those that include activities with potential adverse social and environmental risks and impacts that are more varied or complex than those of Moderate Risk projects but remain limited in scale and are of lesser magnitude than those of High Risk projects (e.g. reversible, predictable, smaller footprint, less risk of cumulative impacts). The SESP Guidance Note includes definitions and further guidance to help determine the significance level of identified risks.

Table 3. Indicative examples of risk significance

Risk Significance	Example
Low	**Climate Change and Natural Hazards:** Projects to support parliamentary elections, support country reporting under various conventions and/or facilitate national or regional dialogues on selected issues. **GHG emissions:** Projects that adopt and implement low-carbon fuel emission standards, such as the adoption of hybrid and plug-in hybrid systems; bike sharing and/or scooter sharing programmes; micro-scale off-grid electrification by means of standalone systems and/or ground-mounted micro-scale solar PV mini-grid; energy efficiency improvements in lighting.
Moderate	**Climate Change and Natural Hazards**: Projects with investments in **physical structures** and/or involving **land use changes** in locations (a) exposed to moderate levels of climate change impact and disaster risks (resulting in manageable losses of project investments without undermining project outcomes) and/or (b) where project investments/activities threaten to increase vulnerability in a localized area but where (c) vulnerabilities can be reduced through standard practices and interventions. See example under screening questions 3.1 and 3.4 Projects involving **livelihood changes** and **natural resource management** in locations exposed to (a) moderate levels of climate change impact and/or disaster risks (resulting in manageable losses of project investments without undermining project outcomes) and/or (b) where project investments/activities threaten to increase vulnerability in a localized area but where (c) vulnerabilities can be reduced through good international practice and interventions. (See Table 8 for high-level overview of approaches.) **GHG Emissions**: Projects that involve small-scale interventions in agriculture, transport and energy and have limited emissions potential. For instance, mini-grid development projects; small-scale agricultural development projects; clean cooking projects.
Substantial	**Climate Change and Natural Hazards**: Projects in locations exposed to increasingly significant climate change impacts and disaster risks that may undermine project outcomes and which may exacerbate vulnerability of beneficiaries and communities. For example, activities that involve water extraction/abstraction in areas that are historically known to suffer from drought, or activities that put in place permanent structures in a historically known flood area. **GHG Emissions:** Projects that involve interventions in agriculture, transport, energy, industry and land use changes that may result in significant GHG emissions (e.g. more than 25,000 tonnes of CO2-equivalent/year or exceed country emission regulations).
High	**Climate Change and Natural Hazards**: Projects investing in **physical structures** and/or involving **land use changes** exposed to (a) expected severe climate change impact and/or disaster risks (i.e. resulting in possible total or near total loss of project investment) and/or (b) where project investments threaten to increase vulnerability in a large geographical area and/or (c) adverse risks and impacts cannot be readily reduced or only with major investments in risk reduction measures.

	All projects involving **livelihood changes** and **natural resource management** in (a) locations exposed to significant levels of highly likely or expected climate change impact and/or disaster risks and/or (b) where project investments threaten to increase vulnerability in a large geographical area and/or (c) adverse impacts and risks that cannot be easily reduced. **GHG Emissions**: Projects involving large-scale interventions in agriculture, transport, energy, industry and land-use changes with significant potential for GHG emissions (e.g. more than 25,000 tonnes of CO2-equivalent/year or surpass country emission regulations).

4 Assessment of Adverse Risks and Impacts associated with Climate Change and Disasters

4.1 General Principles and Requirements for Standard 2/3 Assessments

If screening has found that Standard 2/3 is applicable due to Moderate, Substantial or High Risks associated with climate change or disaster risks, the potential risks and impacts need to be examined as an integral aspect of assessing the project's full range of potential adverse social and environmental impacts.

Social and environmental assessments—conducted with the meaningful and effective participation of potentially affected populations—help to ensure that social and environmental considerations inform project design and decision-making so that adverse impacts can be avoided (or, where not possible, reduced and managed) and benefits can be delivered in a sustainable manner. Such an integrated approach is very important for addressing the risks associated with Standards 2/3 as they interact closely with risk areas addressed by other SES Standards (e.g. S1 on biodiversity and sustainable use of resources). The assessment provides data and analysis for preparing climate change adaptation, mitigation and disaster risk reduction measures.

The general steps and requirements for assessing the potential social and environmental impacts of Moderate, Substantial and High Risk Projects are outlined in the UNDP Guidance Note on Social and Environmental Assessment in the SES Toolkit. Many Moderate Risk projects require targeted forms of social and environmental assessment (e.g. targeted, location-specific disaster risk analysis), while projects that present potentially Substantial/High Risks require comprehensive assessment of potential social and environmental impacts, i.e. Environmental and Social Impact Assessment (ESIA) or Strategic Environmental and Social Assessment (SESA) (noting that assessments for Substantial Risk projects will not be as extensive as those for High Risk projects). These impact assessments may build on targeted analysis and studies, such as climate change or disaster risk analysis, but overall the assessment should take an integrated approach to considering all social and environmental risks and impacts.

Timing of Assessments and Stakeholder Involvement: Assessments should be undertaken with the participation of local stakeholders to help identify potential climate change impacts and disaster risks. Draft assessments should be shared with relevant stakeholders and communities prior to project approval.

However, many UNDP projects may include a range of subprojects that have not been fully specified at the time of approval or may require access to the approved project budget to undertake a full assessment during the first phase of project implementation. In such cases, an Environmental and Social Management Framework (ESMF) may be utilized that would include a preliminary assessment of key social and environmental issues and potential risks and impacts associated with anticipated project components and activities and would stipulate the procedures for further screening, assessment and management planning once project activities are specified. Site-specific assessments may be required for sub-projects and other activities once they are defined. In all cases, assessments and adoption of appropriate mitigation, adaptation and risk reduction measures must be disclosed and discussed with key stakeholders prior to implementation of any activity that may cause adverse social and/or environmental impacts.

Addressing Key Assessment Challenges: As noted earlier, the long-term and dynamic nature of climate change—both in relation to mitigation and adaptation—and disaster risks (e.g. in particular those related to catastrophic but less frequent events such as highly destructive earthquakes, tsunamis, etc.) present a challenge. Assessments should therefore avoid analyzing projects **at a single point in time** but identify **trends** and **alternative scenarios** ("with" and "without" project-scenarios, for instance). The **complexity** of cause-effect relationships of both climate change and disaster risks means that an assessment cannot possibly cover all possible factors influencing the generation and accumulation of risks. It is better to identify/focus on some key trends (e.g. urbanization, desertification, etc.) that may drive vulnerabilities and risks. **Uncertainty** of information related to the long-term effects of climate change and certain hazards (natural and human-made) needs to be acknowledged and requires making reasonable assumptions and complementing (insufficient) quantitative with qualitative information.

4.2 Addressing Standard 2: Climate Change Mitigation Requirements in the Assessment

The assessment of key climate change mitigation (CCM) issues in the context of project design (and implementation) focuses on the **issue of Greenhouse Gas (GHG) emissions**: how might the project significantly change GHG emissions and what measures can be proposed to prevent or reduce them?

Implementing a project may lead to, for example:

- a direct increase in GHG emissions
- an increase in energy demand leading to an indirect increase in GHG emissions
- indirect GHG emissions, e.g. due to energy use in material production, transport, etc.
- loss of habitats that provide carbon sequestration (e.g. through land-use change), soil conversion and decay of biomass.

SES Standard 2 includes several requirements regarding CCM that need to be considered during project design and the assessment process. These are outlined briefly below.

1. Identify potential project-related increases in emissions that may exacerbate climate change

For Moderate, Substantial, or High Risk projects that may lead to increases in GHG emissions or other drivers of climate change (Screening Question 2.4), the assessment process should identify the sources of potential emissions and their scale. (Note that point 3 below discusses the requirement for estimating GHG emissions).

It is important to keep in mind that when considering potential project-related GHG emissions, both direct and indirect sources of GHG emissions need to be considered.[15] As noted in Section 3.2 above (see guidance on screening question 2.4), it is necessary to consider potential effects on GHG emissions not just from projects with a physical footprint (e.g. infrastructure, waste management, transport, etc.) but also from supported policy reforms and frameworks. Sector-wide interventions may in fact have the most significant effects regarding GHG emissions and, where relevant, this would need to be accounted for in the project's social and environmental assessment.

Table 4 below further defines sources of emissions and poses sample questions. (Also see the Glossary for definition of GHGs.)

[15] The GHG Protocol defines direct and indirect emissions as follows: (i) direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity and (ii) indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity.

The assessment should also consider whether the project may lead to emission increases of other drivers of climate change, such as short-lived climate pollutants that include black carbon, tropospheric ozone, hydroflourocarbons.[16]

Table 4. Sample questions on key CCM concerns[17]

CCM Concern	Sample Questions
Direct GHG Emissions (Scope 1)[18] Linked to the construction, operation and possible decommissioning of project facilities and activities, covering land-use, land-use change and forestry (e.g. loss of habitats that support carbon sequestration), direct energy use, transportation owned/controlled by project partners	• How much GHG emissions such as carbon dioxide, nitrous oxide or methane will the project emit on an annual basis? • How much land will be impacted by the project and/or changed in terms of its current use (e.g. conversion of wetlands, etc.)? How much forest may be impacted by the project (e.g. deforestation)? How and at what magnitude will this affect GHG emissions?
Indirect GHG Emissions due to purchased energy (Scope 2) Emissions from purchased electricity to support project facilities, activities, services	*Due to increased demand for energy* • How will the project affect the demand for energy (e.g. production methods, cooling, heating, etc.) and what are the expected numerical values of associated GHG emissions? • Does the project plan to use clean/renewable sources of energy and what are the expected quantifiable GHG emission reductions?
Other indirect GHG emissions (Scope 3) Emissions arising from purchased goods and services not owned or controlled by the project partners (e.g. from supply chain), outsourced activities, waste disposal, other transport-related activities	*Due to supporting activities or infrastructure that is required to implement the project* • What will be the project's impact on road travel/road freight transport and what are the expected numerical values of associated GHG emissions? • What are the production processes for materials used in project implementation and what are the likely numerical values in terms of (increased) GHG emissions?

[16] See IGSD, Climate Threat from Short-Lived Climate Pollutants Upgraded by IPCC in 5th Assessment (2013). Also see IPCC, Report on Expert Meeting on Short-lived Climate Forcers (2018). Black carbon is a primary aerosol emitted directly at the source from incomplete combustion processes such as fossil fuel and biomass burning.

[17] Adapted from European Commission, Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013).

[18] Direct and indirect GHG emissions can be further categorized into three broad "scopes" (Scope 1, Scope 2, Scope 3) which have been noted in the GHG Protocol and further specified by the International Financial Institutions Technical Working Group on Greenhouse Gas Accounting. The scope definitions are provided in the Glossary.

2. Avoid and minimize unwarranted increases in GHG emissions or other drivers of climate change from project activities

Per Standard 2, the assessment should consider technically and financially feasible and cost-effective options to reduce project-related GHG emissions and intensity, in a manner appropriate to the nature and scale of the project's operations and impacts.

Technical feasibility means the proposed measures and actions can be implemented with commercially viable skills, equipment and materials, taking into consideration prevailing local factors such as climate, geography, demography, infrastructure, security, governance, capacity and operational reliability. Financial feasibility means the ability to apply sufficient financial resources to install the measures and maintain them in operation in the long term. Cost-effectiveness is determined according to the capital and operational costs and also the financial benefits of the measure, considered over its lifespan.

Alternative options may include, but are not limited to, alternative project locations, adoption of renewable or low-carbon energy sources, energy efficiency, use of low-global-warming-potential coolants for air-conditioning and refrigeration, and climate-smart agricultural, forestry, and livestock management practices, and ecosystem-based adaptation and mitigation measures (including potential integration of carbon sinks). Potential mitigation and management measures are further addressed in Section 5.

3. For projects expected to produce significant GHG emissions, estimate and report emissions

Standard 2 requires estimation and reporting of GHG emissions for projects that, despite application of avoidance and minimization measures, are expected to produce significant quantities of GHGs, providing such estimation is technically and financially feasible. Estimating GHG emissions helps to form a baseline for developing GHG reduction measures.

Determining what constitutes "significant" quantities of GHG emissions is to be assessed in the context of relevant country commitments, policies, or regulations and international good practices. Below are key points to be followed:

- GHG emissions need to be estimated for projects that may result in more than 25,000 tonnes of CO2-equivalent annually (pre-mitigation). For such projects, gross GHG emissions from the project, including direct and indirect emissions, need to be quantified and reported annually in accordance with internationally recognized methodologies and good practice (see Annex II). This threshold for significant project-related GHG emissions has been utilized by other institutions such as the International Finance Corporation (IFC) and the Inter-American Development Bank (IDB).[19] Projects and project components that could reach this GHG emissions threshold typically involve activities in, and reforms to, sectors such as energy, transport, heavy industry, building materials, agriculture, forest products, and waste management.
- UNDP projects that may result in increases in GHG emissions also need to ensure consistency with any applicable country commitments, policies or regulations regarding GHG emissions reporting for specified activities, facilities or entities. Partner countries may have established mandatory GHG emission reporting programs, emissions trading schemes or other sectoral reporting requirements to enhance their understanding of significant emissions sources. Such regulations could stipulate GHG emissions estimation thresholds other than (and potentially lower than) 25,000 tonnes of CO2-e/year. For example, South Africa's National Greenhouse Gas Reporting Regulations establish thresholds for production capacity and

[19] See IFC Performance Standard 3: Resource Efficiency and Pollution Prevention, para. 8; IDB Environmental and Social Performance Standard 3: Resource Efficiency and Pollution Prevention, para. 8. The World Bank requires estimation of gross GHG emissions resulting from its projects, providing that such estimation is technically and financially feasible. While it did not establish a specific threshold, the World Bank notes that the focus is on significant emissions and key sectors; see World Bank Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention, para. 16 and ESS3 Guidance Note, paras. 16.1-16.3.

emissions for activities across multiple sectors for which GHG reporting is required.[20] Kazakhstan's emissions trading scheme (ETS) requires annual emissions reporting for operators of installations with emissions between 10,000 tCO2e/year and 20,000 tCO2e/year (with mandatory participation in the ETS for those exceeding the 20,000 tCO2e/year threshold).[21] Mexico has established a National Emissions Register (RENE) that requires mandatory reporting of direct and indirect GHG emissions for facilities with annual emissions at or above the 25,000 tCO2e/year threshold.[22] A number of countries have various reporting systems and/or emissions trading schemes under development and consideration.[23]

UNDP projects typically do not involve large-scale energy production and industrial activities that may lead to emissions above the 25,000 tonnes of CO2-equivalent per year reporting threshold.[24] Nevertheless, projects (including those that promote policy and/or sectoral reforms) need to be carefully reviewed for their potential effects on GHG emissions, particularly in sectors such as transportation, agriculture and livestock, forest and land use, and waste and chemicals management, among others. Experts may need to be engaged in the assessment process to provide general estimates whether certain activities may exceed the GHG reporting threshold.

The Standard 2 requirement also notes that estimation of significant project-related GHG emissions needs to be undertaken provided it is "technically and financially feasible." There are very few circumstances where estimating significant project-related GHG emissions would be considered not feasible. For example, it may be difficult to provide an overall estimation of significant quantities of GHG emissions for a project that includes a large number of subprojects, each with diverse sources of potential emissions. In such cases, the project would need to identify the subprojects and/or activities with the highest emitting potential and ensure that estimation of GHG emissions (based where necessary on conservative assumptions, see below) is carried out before those subprojects and/or activities may proceed.

Calculating GHGs. Estimating or calculating GHG emissions is not trivial and needs to be supported by a **qualified expert** following sound approaches and methodologies (see Annex 2). It requires a range of data to estimate both the absolute (gross) GHG project emissions as well as relative (net) emissions in comparison to the project's baseline (pre-project scenario or alternative scenario) that a project is expected to produce on an annual basis for a representative year once it is complete and at normal operating capacity.

GHG estimation should include all **direct** and **indirect GHG emissions** from **activities, facilities, infrastructure** attributed to the project over its projected life span (that is, within the project's assessment boundary). This would include all Scope 1 and Scope 2 emissions, and would potentially include Scope 3 emissions where such sources may likely be important emission sources (see Table 4 and Glossary for "scope" definitions).[25]

Those responsible for estimating GHG emissions should use conservative assumptions and values that are more likely to overestimate absolute emissions and "positive" relative emissions (net increases), and underestimate "negative" relative emissions (net reductions). Uncertainties with respect to GHG estimates or calculations should

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[20] See Republic of South Africa, National Greenhouse Gas Reporting Regulations (Government Gazette vol. 622, No. 40762, April 3, 2017). Energy projects generally have threshold based on a 10 MW thermal installation.

[21] See International Carbon Action Partnership (ICAP), Kazakhstan Emissions Trading Scheme (updated August 9, 2021).

[22] See ICAP, Mexico (updated August 9, 2021).

[23] For example, ICAP reports that ETS systems which may include GHG reporting requirements are under development in Columbia, Indonesia, Montenegro, Vietnam, and under consideration in Brazil, Chile, Pakistan, Philippines, Thailand, Turkey.

[24] Such as fossil fuel energy production and generation projects or heavy industry projects such cement and iron or steel production. The IFC has included an illustrative set of examples of projects that may exceed the 25,000 tonnes/CO2e/year threshold in the IFC Guidance Note 3 on Resource Efficiency and Pollution Prevention (2012, Annex A).

[25] For example, in transport projects, it may be necessary to consider the indirect GHG emissions from induced traffic growth. This type of indirect emissions would be under Scope 3 emissions, namely, all indirect emissions other than those from the generation of energy used by the project, and are a consequence of the activities of the project but occur from sources not owned or controlled by the project.

be reduced to the extent possible (utilizing conservative assumptions where questions of data accuracy remain), and estimation methods should avoid bias.

The credible quantification of GHG emissions requires that the same method is always applied to a project in the same manner, and the same criteria and assumptions are used to allow for meaningful comparisons over time. GHG emission assessment should follow the following basic steps:

1. Define the goal and scope of the GHG emissions assessment
2. Determine assessment boundary[26]
3. Decide upon assessment methodology
4. Collect the necessary data for assessment/calculation and outline assumptions; and
5. Calculate/determine the GHG emissions.

Annex II provides links to a number of **GHG accounting approaches** and other relevant tools that can be used for preliminary estimates. Table 4 above includes some sample questions that CCM assessments need to ask in relation to both direct and indirect project emissions.

Standard 2 also notes that significant project-related GHG emissions will be tracked and reported. Estimations of significant GHG emissions would need to be reported to UNDP and its project partners, including to any relevant country regulators. Operators of facilities responsible for significant GHG emissions should disclose their GHG emissions annually through public reports and/or through other voluntary disclosure mechanisms (e.g. Carbon Disclosure Project).

4.3 Addressing Standard 2/3: CCA and DRR Requirements in the Assessment

This section presents **key climate change adaptation (CCA) and disaster risk reduction (DRR) issues** and requirements for both targeted assessments for projects with moderate risks and comprehensive ESIA/SESA for Substantial and High Risk projects. It aims to provide project developers and managers with key information to design Terms of References for qualified experts/consultants. Overall, the key questions to be answered/informed by assessments are:

- Are project areas and communities expected to experience serious consequences from climate change and disaster risks?
- Will project activities exacerbate exposure and vulnerability to climate change impacts and/or disaster risks? Could project activities create new risks?
- What measures can be taken to avoid, adapt or reduce these impacts and risks (adaptation and risk reduction measures will be explored in more detail in Section 5).

Five key steps are proposed for addressing CCA and DRR issues in the assessment process:

1. Analysis of data on current conditions and futures trends
2. Future scenario planning
3. Risk exposure of project components and outcomes
4. Project impacts on community exposure and vulnerability
5. Review safety of project-supported infrastructure

[26] The geographical boundaries that include sources of significant emissions and sources significantly affected directly or indirectly as a consequence of the project. This allows the assessor to establish which operations and sources cause direct and indirect emissions, and to decide which indirect emissions to include that are a consequence of the project operations.

Note: The steps below should be addressed in a proportional manner, with increasing levels of detail and due diligence based on the significance of risks and impacts regarding CC and disasters. High Risk and Substantial Risk projects would typically require extensive data and analysis as part of the ESIA/SESA. Targeted assessments for Moderate Risk projects with limited, relatively identifiable potential risks and impacts subject to well-understood mitigation measures would typically involve less extensive data collection/analysis and scenario planning.

1. Examine historical data, current status and future trends with regard to climate change and natural hazards in project location and project influence area

It is important that the assessment identifies both **present conditions** (taking into account historical data) and **future trends** with regard to climate change impact and disaster risks. This fundamental step gathers key data on **physical aspects** of (a) gradual changes in the climate as well as (b) hydro-meteorological and (c) geophysical hazards. Most important for the assessment is to capture key characteristics of hazards in terms of location, size or volume, intensity and their historical and future frequency (please see Annexes III and IV for further details). Examining the impact of climate change on the occurrence and characteristics of hydro-meteorological hazards and climate variability is an important component of this analysis. This information serves as the base-line from which it will be possible to identify possible impacts on the project and project area of influence (base lines with and without the project). Annex IV provides a table summarizing key aspects to assess the physical characteristics of climate change phenomena and natural hazards. These serve as the basis from which risks to the project and communities in the project area of influence can be identified. This step should also include a review of the adequacy of climate change and disaster risk information for the project area and, where necessary, steps to address important gaps.

Key questions to be addressed in the assessment include:

- which are the dominant hazards in the project's area influence?
- what has been the trend of occurrence and intensity of these hazards, including the type and scale of losses and damages?
- which communities and socio-economic activities have been most subjected to climate change impacts and hazards?

2. Identify future scenarios with regard to climate change and natural hazard impact

It is important to note that exposure and vulnerability to climate change impacts and natural hazards change over time as they are driven by larger societal trends such as demographic changes (e.g. population increases or decreases), urbanization, labor migration, intensification of agricultural production, environmental degradation, destitution and exclusion of certain groups from decision-making, etc. It is important to identify and analyze the **key drivers** of change and to develop a limited set of likely future **scenarios** that would, for instance, examine how projections of change may affect project and community exposure and vulnerability over time. It is likely that the social and environmental assessment will analyze relevant trends under sections devoted to, as relevant, social protection, biodiversity and/or natural resources. The CC/DRR component of the assessment needs to make the link between these trends and climate and disaster risks. For instance, a project location is relatively close to a district that experiences desertification. People are already moving from that area. Is it likely that they will settle in the project area of influence and increase the number of people and assets exposed to possible threats and risks? Or is it likely that the area experiencing desertification will expand into the district where the project is located? What does that mean for the current design of the project and its vulnerability to excess temperatures, dust and soil erosion, wildfires and drought conditions?

Obviously, it is important to (a) limit the number of trends and drivers to investigate to a manageable number and (b) focus on issues that have already been researched and documented by credible institutions.

3. Examine project exposure and vulnerability to climate change and natural hazards ("risks to project")

Against the findings from the preceding steps 1 and 2 examine the vulnerability of project investments and outcomes to key CC/natural hazards. Depending on the nature of the project this may involve an investigation of (a) the physical and environmental vulnerability of the project; (b) social and economic vulnerability of direct beneficiaries as well as (c) adaptive capacity and/or coping mechanisms of the project and its beneficiaries. For instance, in its current design what is the chance that outcomes of a rural development project would be reversed by stresses and shocks associated with CC or natural hazards? Are there any particular vulnerable groups (for a discussion of vulnerability assessment, see also Step 4) amongst its direct beneficiaries that would be disproportionately affected? Table 5 explores key questions in relation to a selected type and number of climate change impacts and natural hazards.

Table 5. Sample questions to examine impacts of CC and natural hazards on project

Climate Change (Gradual)	**Sample Questions for Assessment**
Rising Temperatures/ Heat Waves	• How will higher air or water temperature affect the project? • Will the project absorb or generate heat and, if yes, can this be quantified? • Can the materials used during construction withstand higher temperatures and, if not, what is the expected impact on the project? • What is the current adaptive capacity of direct beneficiaries? Are there groups that are particularly vulnerable (social, gender, age)?
Changes in Precipitation	• How will lower water levels (aquifers, streams and rivers, etc.) and water scarcity affect the project? Why? • How will intense rainfall/extreme precipitation affect the project? Why? • How will the changes in seasonal precipitation patterns affect the project? Why? • What is the current adaptive/coping capacity of direct beneficiaries? Are there groups that are particularly vulnerable? What is their current access to water?
Hydro-Meteorological Hazards and extreme events (and CC Impact)	**Sample Questions for Assessment**
Droughts	• How will predicted intensities of droughts affect the project and its outcomes? Why? • Are current hazard reduction measures identified by the project sufficient? (e.g. monitoring and early warning mechanisms, livelihood diversification, enhancing sustainable use of water resources, etc.) • Can direct beneficiaries cope with predicted intensities of droughts? Why not? Are there groups that are particularly vulnerable (social, gender, age)?
Floods (Riverine and Coastal Floods)	• How will predicted levels of floods affect the project and its outcomes? Why? • Are current hazard reduction measures identified by the project sufficient? (e.g. early warning mechanisms and preparedness plans, public awareness and information, structure elevation, land use planning and zoning, wetland conservation or restoration, etc.) • Can direct beneficiaries cope (adaptive capacity) with predicted levels of flooding? Why not? Are there groups that are particularly vulnerable (social, gender, age)?
Geophysical Hazards	**Sample Questions for Assessment**

Earthquakes	• Are project components designed and constructed in a way that is resilient to earthquakes? • Are the non-structural elements of the project (furnishing, electrical heating/cooling systems) vulnerable to earthquakes? • What is the overall level of hazard reduction capacity including earthquake awareness and preparedness in the project location? • Is there a legal framework with relevant building codes? • Are beneficiaries prepared for earthquakes and do they know how to behave and what to do? Why not? Are there groups that are particularly vulnerable to earthquake risks (social, gender, age, location)?

4. Examine project impact on community exposure and vulnerability in project influence area ("risks from project")

With the findings from the above steps, examine potential impacts of the project on exposure and vulnerability of communities in the project area of influence (i.e. the area that will be directly and indirectly impacted by the project, see examples below) to key CC impacts and hazards. Could project activities exacerbate exposure and vulnerability? Could project activities create new risks?

This will involve an investigation of the physical, environmental, social and economic vulnerabilities of communities to climate change and disaster risks that could be exacerbated by project activities. Particular attention needs to be given to the vulnerabilities of marginalized and disadvantaged group, including persons with disabilities, and **gender- and age-specific vulnerabilities** that could be exacerbated by the project.

It is important to understand that certain projects, especially those involving interventions in natural resource and watershed management can have a potentially negative impact on communities living far from the project site. For instance, a flood protection project invests in the rehabilitation of dikes and flood walls at a particular segment of a larger floodplain. However, such protection can increase the height of flooding levels immediately upstream, across the stream, and downstream by reducing the amount of land available for storing or conveying excess water. In other words, communities that are not direct beneficiaries of the project may be both exposed and vulnerable to higher levels of flooding as a result of the project.[27] Projects with a large footprint–such as those along a shared watershed–therefore require extra attention and expert inputs to identify the project area of influence, including upstream and downstream communities,[28] that could be negatively affected and to recommend mitigation measures (if feasible) or even to recommend relocating or abandoning a particular project component.

There is also a need to analyze very carefully who is directly benefitting from projects, especially those that involve service delivery (e.g. irrigation, drainage, clean water, sanitation, etc.) and whether the project excludes certain communities or groups (women, ethnic or religious minorities, special needs groups etc.) from decision-making and service provision and thereby may increase their vulnerability. Table 6 provides sample questions to identify projects that could exacerbate wider community exposure/vulnerability to **CC impacts and hazards** in the project area of influence.

[27] Furthermore, none of these structures can possibly be built high enough to protect against all levels of flooding. Consequently, even direct beneficiaries may be exposed to more sudden and higher volume flooding episodes (if not accompanied by non-structural measures such as awareness and regulating the use of land in flood plains). See also FEMA, Flood Damage Reduction Strategies and Tools (undated).

[28] It is understood that the assessment needs to set some level of geographical boundaries to remain feasible, however these should be set by a good understanding of the dynamics of the hazard in question.

Table 6. Sample questions to examine community exposure/vulnerability in project area of influence

Climate Change Impact	
Rising Sea Levels	• Will the project promote increased habitation in areas subject to rising sea-level risks? • Will the project contribute to coastal erosion and if yes how and why? • Will the project reduce ecosystems acting as a natural barrier against coastal flooding (e.g. coral reefs, mangroves, etc.) and if yes what is the expected scale of the problem? • Will the project facilitate or increase saltwater intrusion and, if yes, what volumes are expected in what locations? • What is the status of current adaptive capacity and arrangements in the project influence area? • Which communities/groups would be most vulnerable to the impact of the project on coastal erosion, saltwater intrusion, etc. (social, gender, age)? Why?
Hydro-Meteorological Hazards (with CC Impact)	**Sample Questions for Assessment**
Droughts	• Will the proposed project increase water demand and, if yes, by what margin? • Will the project adversely affect aquifers or other sources of (clean) water and, if yes, what is the scale and key locations of the problem? • Will the project affect the exposure/vulnerability of woodlands or bushlands to wildfires (e.g. in reforestation by increasing number/density of small diameter trees in a dry zone thus increasing the "fuel" for possible fires) and, if yes, what is the size of these areas? • What is the overall level of risk reduction capacity in the project area of influence (e.g. monitoring and early warning, livelihood diversification, sustainable water management)? • Which communities/groups would be most vulnerable to the impact of the project on aquifers, possible wildfires etc.? Why?
Floods (Riverine and Flash Floods)	• Will the project reduce floodplain capacity to absorb excess water and act as barriers against floods and if yes how and in what specific locations? • Will the project reduce wetlands/swamps/other natural barriers against floods and, if yes, what is the size and location of these areas? • Will the project affect volume/velocity of water in the watershed (e.g. dry/rainy season/excessive rainfall scenarios) and, if yes, can this be quantified? • What is the overall level of risk reduction capacity including structural (levees, dikes, dams, etc.) and non-structural measures (e.g. early warning and preparedness) in the project influence area? • Which communities/groups (social, gender, age) would be most vulnerable to the impact of the project? • Will the project develop infrastructure and other community assets in known hazard areas (e.g. floodplain and coastal buffer zones)?

5. Examine safety of proposed project infrastructure during its lifespan

This step applies to projects with **investment in buildings, roads or other infrastructure** (either new construction or rehabilitation) and covers the safety and integrity of these structures throughout their life-span, from design to decommissioning. The core issue is whether a lack of basic safety measures or weaknesses in structural integrity and/or functionality represent a direct threat to those utilizing and/or exposed to the infrastructure. Table 7 provides sample questions for the assessment of infrastructure safety.

Particular attention needs to be given to the question whether the project would pose a particular threat to the health and safety of **women and children and persons with disabilities**. The following questions capture these essential safety requirements from a multi-hazard perspective (i.e. not in relation to individual hazards as in the previous steps) and are organized according around basic stages of the infrastructure lifecycle: Project Design, Construction, Operation & Maintenance and Decommissioning**.**

Table 7. Sample questions regarding the safety of infrastructure

Infrastructure Lifecycle Stage	**Sample Questions**

Design	• What siting and engineering criteria/codes have been used to prevent structural failures and losses of function (e.g. due to fires, earthquakes, floods, windstorms, landslides, heat waves, etc.)?
	• Are there special building codes applicable to the project due to its location in disaster prone zones? For example, have hazard-resistant building codes been developed or updated. Examples include criteria/standards for:
	  o Building standards to increase seismic resistance
	  o Site selection and grading criteria to reduce susceptibility to landslides and flooding
	  o Land clearance and use of inflammable roofing and other building materials to reduce fire hazards
	  o Accessibility and emergency access and exits
	  o High wind roof design and construction standards
	  o Flood-hazard informed site selection criteria away from coastal, estuarine, and riverine floodplains, and criteria regarding building elevation, floodwalls, etc.
	  o Safe storage of hazardous materials, etc.
	• Have these criteria/codes been successfully incorporated into design, architectural and engineering plans? Please provide analysis and supportive evidence.

Construction	• Have there been changes to design/engineering plans during the course of construction that may have reduced the safety of the structure? If yes, which ones and what is the expected impact on safety? • What life and fire safety systems29 and equipment have been incorporated into the building/project? (e.g. clearly marked and appropriate number of emergency exists, evacuation routes, emergency lighting, fire extinguishers, fire walls, smoke detection and control systems, communication, etc.) Are they sufficient? Have these been certified by appropriate authorities/experts? • Has the construction site been sufficiently isolated from the public to prevent hazards associated with heavy machinery, hazardous materials, contamination, etc.? If not, what have been some of the problems? • Have waste materials been properly handled? How? • If necessary, are there emergency response and evacuation plans in place to contain/reduce the impact of construction-related hazards? Have these been activated and what has been the experience?
Operations & Maintenance	• Does the building/structure have an emergency preparedness and response plan for operations? What is the quality of the plan and has staff been trained to act according to the plan?

[29] Life Safety Code is an accepted international standard. See: http://www.nfpa.org/catalog/product

	• Has the public been informed about possible hazards associated with the operation and/or failure of the structure and its functions? What is the quality of information and information dissemination? What arrangements have been made to involve communities including the most vulnerable in preparedness and response arrangements? • Is there regular maintenance and testing/training with regard to life and fire safety equipment and systems? If yes, what have been the results and what measures have been taken to address possible issues? • Are resources allocated to regular maintenance of the structure and its key functional elements? How much and are these resources sufficient? • How will the structural integrity and proper functioning of the structure be monitored and ensured?
Decommissioning	• What are current plans regarding the structure at the end of its life span? Will it be renovated, replaced or removed? Who will be in charge? • What are possible hazards from decommissioning the structure (e.g. hazardous materials, drainage, site safety)? • What are current arrangements and capacity to manage these hazards? Are these adequate?

5 Management and Monitoring Measures

Climate change mitigation, adaptation and/or disaster risk reduction measures need to be developed for each impact and risk identified in the social and environmental assessment. These measures are typically presented in an **Environmental and Social Management Plan (ESMP)** that also identifies roles and responsibilities of key actors, resources as well as implementation and monitoring arrangements required to avoid, minimize and mitigate potential risks and impacts.

All Moderate, Substantial and High Risk Projects require a management plan for consideration by the PAC at project appraisal. The form of this plan will vary depending on the nature and scale of potential risks and the timing of assessments.

Where project activities are not fully specified at the time of project approval, the assessment and development of management measures may need to take place during project implementation. In such cases, an Environmental and Social Management Framework (ESMF) may be utilized that stipulates the procedures for undertaking further screening, assessment and management planning once project activities are specified. Multiple site-specific assessments and management plans may be required during implementation (e.g. for specific infrastructure elements) and should be noted in the ESMF. See the SES Guidance Note on Social and Environmental Assessment and Management in the SES Toolkit for further details on management plans.

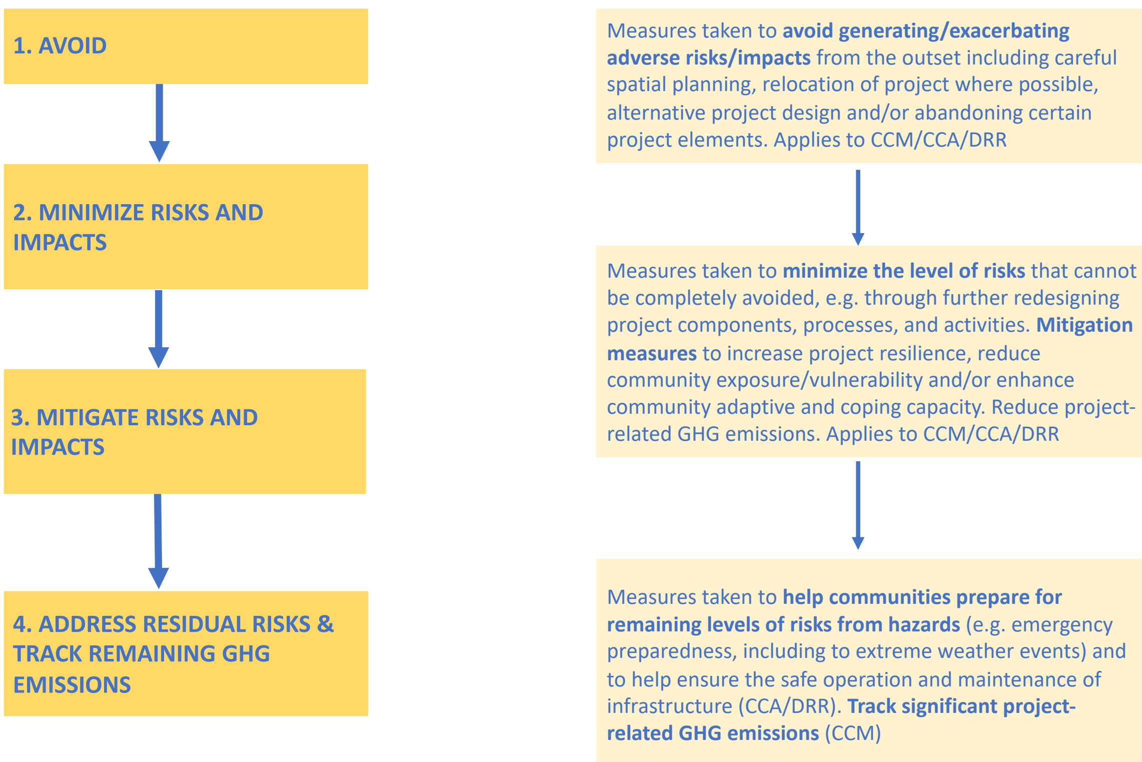
Regardless of whether the assessment is conducted prior to or after appraisal, t**he management plan needs to be in place and appropriate mitigation measures taken prior to the conduct of any activity that may cause adverse social and environmental impacts.**

5.1 Identify and Prioritize Management Measures in Relation to Climate Change and Disaster Risks

Standards 2 and 3 contain a range of requirements regarding climate change impacts and disaster risks that need to be addressed in the development of management measures (see Box 3). Not all of these requirements will be relevant for each individual project. As a general rule, management measures need to meet (and ideally exceed) not only Applicable Law (i.e. national law and obligations under international law) but also the requirements specified in Standards 2/3 and UNDP's SES. The paragraphs and sections below provide guidance on how to address relevant Standard 2 and 3 requirements in the design of effective management measures and plans.

Apply a precautionary approach. This principle calls for a risk-averse and cautious approach in cases where there are high levels of uncertainty about project impacts and/or where the project poses significant risks to communities and there is uncertainty about the effectiveness of adaptation and risk reduction measures. In these cases, the activity should either be stopped until further information and expertise can be mobilized or a "worst case" scenario should be adopted with regard to addressing possible impacts and risks through modifications to project design, implementation and management.

Figure 4. Mitigation Hierarchy for Climate Change/Disaster Risks



Follow the mitigation[30] hierarchy. Management measures need to follow a clear hierarchy to prioritize, to the extent possible, avoidance of negative risks and impacts as the first step followed by actions to minimize and reduce potential adverse consequences. Figure 4 above illustrates the hierarchy of risk/impact avoidance and adaptation/reduction strategies. **Avoidance** is sometimes the only possible means to prevent unacceptable levels of GHG emissions or hardships and losses amongst both direct beneficiaries and communities in the project area of influence. Where avoidance is not possible, climate change mitigation, adaptation and risk reduction measures come into play with the aim to **minimize and reduce** negative impacts and risks. All risks that cannot be avoided or minimized to acceptable levels (**residual** risks) require further additional management measures, such as **emergency preparedness** related to extreme events from hydro-meteorological and geophysical (as well as biological and

[30] "Mitigation" in the context of mitigation hierarchy is used here to describe the prioritization of climate change adaption, climate change mitigation and disaster risk reduction and hence refers to all measures to reduce and manage climate change impact and disaster risks (not just climate change mitigation).

technological) hazards as well as **safety-focused operation and maintenance** procedures in the case of engineered structures. Significant project-related GHG emissions that cannot be avoided/further reduced need to be **tracked and reported according to UNFCCC** guidelines (see Annex II).

The following sub-sections discuss key measures that fall under the mitigation hierarchy. Climate change adaptation/mitigation and disaster risk reduction are cross-sectoral and could involve a range of interventions to reduce physical/environmental and social/economic vulnerability.

5.1.1 Site project in areas not exposed to moderate or significant levels of CC impacts or hazards

This risk/impact avoidance strategy is theoretically the most straightforward. It applies to geographic areas subject gradual climate change impact (rising sea levels, rising temperature, etc.) and disaster risks (floods, earthquakes etc.). In reality moving project sites is often problematic as it is tied to questions of **land ownership** and **accessibility** and **objectives** of a planned operation or activity. For example, avoiding sensitive sites completely might make the project technically or financially unfeasible given its development objectives and targeted beneficiaries.

Caution needs to be taken to not relocate the project to an area that may harbor a **different set of threats** (e.g. drought to flood or saltwater intrusion). **Spatial planning and regulations** can be effective to eliminate or radically reduce exposure to certain hazards[31] (e.g. effectively preventing/sanctioning building activities or storage of hazardous materials in certain zones). Developing spatial plans and regulations (where they do not exist) requires beneficiary/community involvement and a sustainable capacity for monitoring and enforcement and is thus a time-consuming process that needs to be properly considered in project plans and budgets.

5.1.2 Reduce GHG emissions

There is a range of strategies to reduce both direct and indirect GHG emissions. These include the promotion/use of **clean and renewable energy sources** (e.g. solar and wind power); **increase energy efficiency** in operations and reducing energy use by preventing losses in transport and distribution of utilities, conserving resources); **improving carbon offset** on project lands through ecosystem-based approaches (e.g. planting of forests, managing soil or wetland to increase carbon storage, restoration of ecosystem services) (see Box 6); **nitrous oxide NO2** and **methane CH4 emission reduction** (e.g. through promotion of fertilizers low in nitrates, technologies that capture and destroy methane originating from landfills or wastewater plants and reduce methane emissions through climate smart agriculture). Ideally such interventions could serve both a climate change mitigation and adaptation goal and build on activities foreseen in the project. As noted earlier, significant project-related GHG emissions that cannot be avoided/further reduced need to be tracked, reported, and options explored and implemented, to the extent feasible, to offset them (see Annex II).

[31] Much more problematic for dynamic hazards such as droughts that may change occurrence, duration and intensity depending on climate variability patterns (e.g. El Nino) and – in the longer run – climate change.

Box 6. Ecosystem-based Adaptation (EbA) and Ecosystem-based Disaster Risk Reduction (Eco-DRR)

EbA is a nature-based approach that uses biodiversity and ecosystem services to help people adapt to the adverse effects of climate change. It involves activities such as planting vegetation on slopes to prevent landslides, restoring coastal habitats to address sea level rise and storm surges, applying integrated water resource management to address water shortages, and managing forests sustainably to prevent erosion and regulate water flow. The approach rests on combining local knowledge with evolving information on climate change.

EbA is therefore a people-centred approach that acknowledges the direct dependence of human well-being on ecosystems and the goods and services they provide (e.g. water and food supply, fuel and fibre provision, pest and disease regulation, water and nutrient cycling, climate regulation).

The adaptation benefits of working with ecosystems (see examples) can include buffering communities from, or reducing the risk of, direct climate change impacts (e.g. flood or storm damage or heat stress); ensuring that ecosystem services on which communities depend (e.g. freshwater provision) persist and meet their needs despite climate change impacts; creating new livelihood options to replace those being threatened by climate change impacts. (e.g. supplementing livelihoods).

While EbA builds on the potential of ecosystems to provide adaptation (and other) services, it also acknowledges that ecosystem health alone cannot guarantee human well-being and resilience especially in light of uncertainties around how ecosystems themselves will be affected and altered by climate change. Therefore, EbA should be implemented as an integrated element of a broader adaptation strategy to maximise the effectiveness of adaptation actions. This means that in each context, EbA should be considered as one option among engineered (e.g. sea walls, levees) and hybrid approaches (e.g. artificial reefs, green roofs), as well as social and institutional measures (e.g. capacity building, improving governance, influencing behaviour and/or markets).

Some examples:

- *Maintenance and/or restoration/rehabilitation of mangroves and other coastal wetlands to reduce risks of flooding/erosion for coastal communities.*
- *Sustainable management of upland wetlands and floodplains to maintain favourable water flow regimes and water quality for downstream communities, despite changing rainfall patterns.*
- *Conservation and restoration of forests to stabilise mountain slopes and regulate water flows, protecting people and assets from flash flooding and landslides as rainfall levels and intensity increase.*
- *Establishment of diverse agroforestry systems, incorporating climate-resilient trees and ground crops for human and animal consumption, thus reducing crop damage caused by or extreme weather and providing flexible livelihoods and income options.*
- *Sustainable management of grasslands/rangelands to increase adaptive capacity and resilience of pastoral communities against flood and drought.*
- *Establishment of marine protected areas to enhance resilience of coastal ecosystems against climate impacts, increase fish productivity and provide opportunities for nature-based tourism, thus diversifying livelihoods and income.*
- *Use of indigenous plant species to strengthen and restore dune vegetation, thus preventing infiltration of sand into human settlements in desert environments subject to increasing levels of drought.*

From GIZ, UNEP-WCMC and FEBA, Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions (2020)

Above summary from following resources:

- iied, IUCN, UNEP-WCMC, Briefing: Nature-Based Solutions to Climate Change Adaptation, September 2019.
- GIZ, UNEP-WCMC and FEBA, Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions, 2020.
- UNEP, Guide to ecosystem-based adaptation in projects and programmes, (set of seven briefing notes), 2019.
- CBD, Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction and supplementary information, 2018.
- FEBA, Making ecosystem-based adaptation effective. A framework for defining qualification criteria and quality standard, 2017.

5.1.3 Reduce project vulnerability

Redesigning project components can refer to **structural** and **non-structural interventions**[32] to increase the resilience of a project and its outcomes against adverse risks and impacts. Table 8 below presents examples of such interventions.

Redesign may either **add new** components or **change** intended components and activities. For instance, on the physical/structural side, it may involve adding a **new protective structure** (e.g. a shelter, a levee or pumping station, etc.) or **physical strengthening** of a planned or existing structure (e.g. retrofitting or flood-proofing a structure or using heat-resistant materials). This may also require changing the design and installation of non-weight bearing systems of a structure (e.g. electricity or heating systems; see Table 7 for more details). It is very important that any structural changes to a project are informed by the **best available expertise** and national and international **building codes and standards**.

On the **non-physical** side redesigning project components or activities refers to a wide range of possible social, economic or governance-related interventions depending on the scale, sector, intended outcomes and direct beneficiaries of the project. For instance, this may involve the **diversification of livelihoods** of vulnerable project beneficiaries, **facilitating equitable access to key services** (social protection, education and health), adding **micro-insurance schemes** and **contingency funds** to a rural development project and/or **managing critical natural resources** (rehabilitating a wetland area to absorb excess water, for instance; see also Box 6). **Safe operation and maintenance** as well as **emergency preparedness plans and measures** are other important types of interventions to reduce project vulnerability and are discussed in more detail below.

Table 8. Some key measures to address climate change impact/associated disaster risks[33]

Category	Sub-Category	CCA/DRM Examples
Structural/Physical	**Engineered and built environment**	○ Improved drainage, storm and waste water facilities ○ Coastal protection structures including shelters
	Technological	○ Efficient irrigation and water saving technology ○ Early warning systems
	Ecosystem-based	○ Wetland and flood plain conservation ○ Afforestation and Reforestation
	Services	○ Social safety nets and protection ○ Enhanced emergency health capacities
Non-structural: Social	**Educational**	○ Awareness raising and education ○ Knowledge sharing and learning platforms
	Informational	○ Downscaling climate scenarios ○ Hazard, exposure and vulnerability mapping
	Behavioral	○ Household Preparedness and Evacuation Planning ○ Community-Driven Adaptation Planning
Non-structural: Governance	**Economic**	○ Contingency funds

[32] Other than outright abandoning a project or component which has been discussed under 5.1.

[33] Adapted from IPCC, Fifth Assessment Report (AR5): Climate Change 2014: Impacts, Adaptation and Vulnerability (March 2014).

		○ Water tariffs etc.
	Laws and Regulations	○ Building codes and standards ○ Land zoning
	Government Policies and Programs	○ National and regional adaptation plans ○ Watershed management

Please note that physical, social and institutional measures are often mutually complementary.

5.1.4 Reduce community exposure/vulnerability

Together with 5.1.3, measures need to be taken to ensure that the project both (a) does not exacerbate exposure/vulnerability to CC impacts and disaster risks, and (b) reduces exposure and vulnerability of all communities living in the **project area of influence** who may be affected (and who may not be direct beneficiaries of the project). The difference to the measures above is the **territorial scope which may be significantly larger** than the area in which the project is implemented. Obviously, some common sense needs to be applied to identify the project area of influence and indicators for the possibly negative impact of the project. The assessment would have identified project components that need to be redesigned to ensure they do not exacerbate risk exposure. The range of possible measures to reduce exposure and vulnerability of communities in the area of influence is very similar to measures outlined under 5.1.3. In some cases, reducing this vulnerability just requires expanding the territorial scope of mitigation measures beyond direct beneficiaries (e.g. public awareness or emergency preparedness initiative) while making sure that all communities are properly consulted and involved. In other cases, given high exposure/vulnerability, this may be very costly, which could suggest that the project (or key components) may need to be dramatically redesigned or abandoned.

5.1.5 Safe operation, maintenance and decommissioning of project infrastructure

Projects with significant levels of **investment in buildings or infrastructure** need to facilitate the safety and integrity of these structures throughout their life-span (which will extend years beyond project closure). Safe operation and maintenance requires a **system of monitoring, inspections, technical guidance and incentives** for the necessary works to be carried out. Projects can invest in a range of measures to support this by helping to define **standards and procedures**, to design **operations and maintenance plans** and to **train managers and staff** to apply safe operation and maintenance principles. Clearly defined **project ownership**, **handing-over procedures** and helping future owners/operators to **budget for operation and maintenance** (including the identification of resources) are vital to ensure the safety and functionality of a structure. Procedures and documents should also clearly identify the time by which a structure may require **decommissioning** and any possible threats associated with that and the type of mitigation measures that will be needed to ensure it would be undertaken safely

5.1.6 Promote emergency preparedness plans and measures

Develop emergency preparedness plans and measures that aim to reduce and mitigate the **residual risks** arising from CC impacts and hazards that could not be avoided. These measures may include **public awareness**, **early warning systems**, strengthening **response mechanisms** (including plans and procedures**) and services**, provision of **equipment** and support to establishing **contingency funds and stocks**. The development of effective emergency preparedness measures requires the involvement of governmental emergency services and disaster management organizations; the affected public, in particular vulnerable communities; private sector; community and humanitarian organizations, among others. Emergency preparedness and response plans should be widely disclosed.

5.2 Monitoring and Reporting Project Implementation

Management plans include monitoring and reporting requirements that are to be fully integrated into the project's overall monitoring plan. This includes tracking social and environmental risks and management measures through the Project Risk Register (entered as risk management actions).

The extent of monitoring will be proportionate to the nature of the project, the project's social and environmental risks and impacts, and compliance requirements.

UNDP requires monitoring of the following:

i. progress of implementation of mitigation/management plans required by the SES
ii. complaints and grievances from project-affected stakeholders
iii. follow-up on any identified corrective actions, and
iv. completion and disclosure of any required monitoring reports on SES implementation (including on-going reporting to project-affected stakeholders).

If there are substantive changes to the project during implementation, or changes in the project context that alters the project's risk profile, rescreening assessment and revised risk management measures may be required (see Figure 1 of this guidance note).

Measures identified to manage risks associated with climate change and disasters need to be included into the social and environmental risk management plan and ultimately into the project's overall monitoring plan. The extent of monitoring will be proportionate to the type of project, the identified risks and impacts, and risk management requirements. A project should not be considered completed unless all measures and actions set out in the social and environmental risk management plan have been implemented.

Monitoring should focus on those aspects of risk management most likely to change as a result of project implementation. This includes the reduction of GHG emissions, community resilience and the resilience of project investments. Monitoring requires **specific, relevant and timely indicators** to track the effectiveness of GHG reduction measures, as well as indicators to monitor the resilience of project investments and affected communities. To the degree possible these indicators should be aligned with existing indicators in the project's overall monitoring plan. Given the diversity and complexity of risks associated with GHG emissions, climate change impact and disasters, defining these indicators will require the input from **specialists** (preferably those who helped to undertake the assessment and/or design management measures/plans) but also, especially where community vulnerability is concerned, the inputs from **key stakeholders** and **vulnerable groups**.

Findings from monitoring should be integrated into an adaptive management framework where management responses are adapted as necessary to ensure that risks from climate change and disasters are still properly addressed and communities are protected. When appropriate the findings from monitoring should be verified with independent experts, communities and other key stakeholders.

Where residual project-related GHG emissions (e.g. after avoidance and reduction measures) remain significant, UNDP is committed to tracking these throughout the project cycle (see section 4.2 and Annex II).

Based on the monitoring results, any necessary corrective actions are undertaken. The implementing partner needs to promptly notify UNDP and stakeholders of any incident or accident related to the project activities that has had (or is likely to have) significant adverse impacts on people or the environment. Immediate measures are to be undertaken by the responsible partner to address and remedy the incident or accident, and to prevent any recurrence. Similarly, where monitoring indicates a potential lack of compliance with project commitments, including in addressing SES requirements, the implementing partner informs UNDP which works with the partner to bring the project back into compliance.

If there are substantive changes to the project during implementation or changes in the project context that alters the project's risk profile, then rescreening, assessment and revised management measures may be required (see Figure 1 at the beginning of this Guidance Note).

UNDP's review activities may include:

- reviewing monitoring reports, conducting site visits and reviewing project-related information
- reviewing compliance with SES requirements
- advising partners on how to manage issues related to the SES
- communicating risks and probable consequences of failure to comply with the SES requirements, and initiating remedies if the partner fails to (re)establish compliance.

Annex I Glossary

Absolute emissions. Annualised estimations of the GHG emissions from sources within the project assessment boundary from Scope 1 sources, and where relevant Scope 2 sources and Scope 3 sources. Absolute emissions are a subset of the project emissions. (IFI TWG – AHG-003, 2021).

Adaptive Capacity (in relation to climate change impacts) The ability of a system to adjust to ***climate change*** (including ***climate variability*** and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (IPCC 2007).

Assessment boundary. The physical delineation or geographical area that includes the significant sources and sources significantly affected directly or indirectly as a consequence of the project. The assessment boundary for estimating relative emissions will always include the project's absolute emissions and can include other sources affected as a consequence of the project. (IFI TWG – AHG-003, 2021).

Baseline emissions. Annualised estimations of GHG emissions from sources that would occur in a baseline scenario. As with absolute emissions and project emissions, baseline emissions can be estimated using one of the two options, i.e. as an annual average or for a representative year. The option for estimating baseline emissions should be consistent with the option selected for absolute emissions and project emissions estimations. (IFI TWG – AHG-003, 2021).

Carbon dioxide equivalent or CO2 equivalent, abbreviated as CO2-eq of CO2e, is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential (Eurostat, Statistics Explained Glossary).

Climate Change Adaptation. In human systems, the process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate (IPCC 2012).

Climate Change Mitigation. An *anthropogenic* intervention to reduce the anthropogenic forcing of the *climate system*; it includes strategies to reduce *greenhouse gas sources* and emissions […] (IPCC 2007).

Building code. A set of ordinances or regulations and associated standards intended to regulate aspects of the design, construction, materials, alteration and occupancy of structures which are necessary to ensure human safety and welfare, including resistance to collapse and damage (UNDRR 2017)

Disaster. A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts (UNDRR, 2017).

Disaster Risk. The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UNDRR, 2017).

Disaster Risk Assessment. A qualitative or quantitative approach to determine the nature and extent of disaster risk by analyzing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend (UNDRR, 2017).

Disaster Risk Management. Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses. Disaster risk management actions can be distinguished between prospective disaster risk management, corrective disaster risk management and compensatory disaster risk management, also called residual risk management (UNDRR, 2017).

Disaster Risk Reduction. Denotes both a policy goal or objective and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience (IPCC 2012). Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development (UNDRR, 2017).

Disaster Risk Drivers. Processes or conditions, often development-related, that influence the level of disaster risk by increasing levels of exposure and vulnerability or reducing capacity. Underlying disaster risk drivers — also referred to as underlying disaster risk factors — include poverty and inequality, climate change and variability, unplanned and rapid urbanization and the lack of disaster risk considerations in land management and environmental and natural resource management, as well as compounding factors such as demographic change, non-disaster risk-informed policies, the lack of regulations and incentives for private disaster risk reduction investment, complex supply chains, the limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics (UNDRR, 2017).

Ecosystem. The interactive system formed from all living organisms and their abiotic (physical and chemical) environment within a given area. Ecosystems cover a hierarchy of spatial scales and can comprise the entire globe, *biomes* at the continental scale or small, well-circumscribed systems such as a small pond (IPCC 2007).

Ecosystem Services. Ecosystem services are the benefits that people derive from ecosystems. Ecosystem services may be organized into four types: (i) *provisioning services*, which are the goods people obtain from ecosystems (i.e. food, freshwater, timber, fibers, medicinal plants); (ii) *regulating services*, which are the benefits people obtain from the regulation of ecosystem processes (e.g. surface water purification, carbon storage and sequestration, climate regulation protection from natural hazards); (iii) *cultural services*, which are the nonmaterial benefits people obtain from ecosystems (e.g. sacred sites, areas of importance for recreation and aesthetic enjoyment); and (iv) *supporting services*, which are the natural processes that maintain the other services (e.g. soil formation, nutrient cycling, primary production) (Millennium ecosystem Assessment, 2005)

Exposure. The presence of people, livelihoods, environmental services and resources, infrastructure or economic, social, or cultural assets in places that could be adversely affected (IPCC 2012). The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas (UNDRR, 2017).

Global Warming Potential (GWP) is used to adjust for the energy the emissions will absorb. Specifically, the GWP is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given time-period, relative to the emissions of 1 ton of carbon dioxide (CO2). Typically, the time-period used for the reporting of GHG emissions, and for the selection of the appropriate GWP, is 100 years (GWP100). By and large GHG accounting practitioners use GWP tables compiled by the Intergovernmental Panel on Climate Change (IPCC) and published in IPCC's assessment reports. GWP values have changed over time, to reflect the increasing scientific understanding of the different greenhouse gases and of their effect on the climate system (IDB).

Greenhouse gas. Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect. Water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere (IPCC 2007). The UNFCCC requires countries to report on the following direct GHGs: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulfur hexafluoride (SF_6); nitrogen trifluoride (NF_3) from five sectors (energy; industrial processes and product use; agriculture; land use, land-use change and forestry; and waste). The Montreal Protocol calls for the phase out of the powerful GHG hydrochlorofluorocarbons (HCFCs) and the phasedown of controlled hydrofluorocarbons (HFCs).

Hazard. A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. (UNDRR, 2017). See UNDRR Annotations below.

Land use planning. The process undertaken by public authorities to identify, evaluate, and decide on different options for the use of land, including consideration of long-term economic, social, and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses (UNDRR, 2009).

Project emissions. Annualised estimations of GHG emissions from sources included in the assessment boundary that occur in a project scenario. Project emissions are estimated in metric tonnes of CO2 equivalent (tCO2e) and calculated using the 100-year time horizon global warming potential (GWP) values provided in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report adopted by the UNFCCC. Project emissions can be estimated as an annual average (option 1), or for a representative year (option 2) for a project in which the physical asset financed is operating at full capacity, or after the new practice (such as a new agricultural practice) or land-use change (such as reforestation) has been fully implemented. Option 1 is especially suitable for cases when emissions do not occur with the same intensity throughout the economic lifetime of the asset, e.g., emissions that occur during construction or biogenic emissions from hydropower plant reservoirs. (IFI TWG – AHG-003, 2021).

Relative (or net) emissions. Annualised estimations of the GHG emissions calculated as the difference between the project emissions and baseline emissions using the same assessment boundary. Depending on the calculation procedures adopted, relative emissions can be calculated by subtracting baseline emissions from project emissions or vice versa. (IFI TWG – AHG-003, 2021).

Resilience. The ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recovery positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects of sustainable development, peace and security, human rights and well-being for all (CEB, 2017 – on Risk and Resilience).

Scope of GHG emissions. The concept of scope in emissions accounting has been developed in the context of estimating absolute emissions. The assessment boundary and sources of emissions are defined from the perspective of the project partners (International Financial Institutions Technical Working Group on Greenhouse Gas Accounting, 2021). The following three types of sources are defined for the purpose of estimating absolute emissions:

(i) Scope 1 emissions – direct GHG emissions from the sources that are affected by the project and that are owned or controlled by the project partners;

(ii) Scope 2 emissions – indirect GHG emissions from energy sources not owned or controlled by the project partner but directly utilised by the project. This includes emissions associated with electricity, heating or cooling purchased for the project activities;

(iii) Scope 3 emissions – other indirect GHG emissions from sources that are upstream or downstream of a value chain and not owned or controlled by the project partners. Scope 3 emissions may include the following categories:

a. Goods and services. Emissions due to production of goods and services used by the project partners' activities;

b. Feedstock and energy. Upstream emissions from feedstock or energy used by the project partners' activities and not included in scope 1 or scope 2. Examples include upstream emissions associated with fuel extraction, production, and transportation;

c. Transportation and distribution. Emissions indirectly caused by the project partners' activities through the use of mobile assets for road, rail, water or air transport that are not owned or operated by the project partners;

d. Waste. Emissions due to disposal and treatment of waste generated by the investee's activities, including end-of-life treatment of products produced by project partners' activities;

e. Service or product use. Emissions due to the use of service or further processing of products produced by the project partners' activities.

Vulnerability The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (UNDRR, 2017).

UNDRR Annotations on hazard definition (UNDRR, Terminology, 2017)

Hazards may be natural, anthropogenic or socionatural in origin. **Natural hazards** are predominantly associated with natural processes and phenomena. **Anthropogenic hazards**, or human-induced hazards, are induced entirely or predominantly by human activities and choices. This term does not include the occurrence or risk of armed conflicts and other situations of social instability or tension which are subject to international humanitarian law and national legislation. Several hazards are **socionatural**, in that they are associated with a combination of natural and anthropogenic factors, including environmental degradation and climate change.

Hazards may be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity or magnitude, frequency and probability. Biological hazards are also defined by their infectiousness or toxicity, or other characteristics of the pathogen such as dose-response, incubation period, case fatality rate and estimation of the pathogen for transmission.

Multi-hazard means (1) the selection of multiple major hazards that the country faces, and (2) the specific contexts where hazardous events may occur simultaneously, cascadingly or cumulatively over time, and taking into account the potential interrelated effects.

Hazards include (as mentioned in the Sendai Framework for Disaster Risk Reduction 2015-2030, and listed in alphabetical order) biological, environmental, geological, hydrometeorological and technological processes and phenomena.

Biological hazards are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildlife and insects, poisonous plants and mosquitoes carrying disease-causing agents.

Environmental hazards may include chemical, natural and biological hazards. They can be created by environmental degradation or physical or chemical pollution in the air, water and soil. However, many of the processes and phenomena that fall into this category may be termed drivers of hazard and risk rather than hazards in themselves, such as soil degradation, deforestation, loss of biodiversity, salinization and sea-level rise.

Geological or geophysical hazards originate from internal earth processes. Examples are earthquakes, volcanic activity and emissions, and related geophysical processes such as mass movements, landslides, rockslides, surface collapses and debris or mud flows. Hydrometeorological factors are important contributors to some of these processes. Tsunamis are difficult to categorize: although they are triggered by undersea earthquakes and other geological events, they essentially become an oceanic process that is manifested as a coastal water-related hazard.

Hydrometeorological hazards are of atmospheric, hydrological or oceanographic origin. Examples are tropical cyclones (also known as typhoons and hurricanes); floods, including flash floods; drought; heatwaves and cold spells; and coastal storm surges. Hydrometeorological conditions may also be a factor in other hazards such as landslides, wildland fires, locust plagues, epidemics and in the transport and dispersal of toxic substances and volcanic eruption material.

Technological hazards originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities. Examples include industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires and chemical spills. Technological hazards also may arise directly as a result of the impacts of a natural hazard event.

Annex II GHG Accounting Approaches and Tools

GHG emission accounting is technically demanding and needs to follow established principles and methodologies to ensure consistency and integrity.

A number of International Financial Institutions (IFIs), together with the UNFCCC, are developing harmonized standards for GHG accounting for projects. Close to 25 institutions are members of the International Financial Institutions Technical Working Group on Greenhouse Gas Accounting (IFI TWG).

Some specific approaches and methodologies for GHG appraisal of projects are noted below.

GHG emission calculators estimate the emissions from projects or distinct project activities, direct or indirect sources of GHG emissions, for the construction or the operation of a project. Various calculators cover different aspects of emissions and are usually based on proxy indicators (such a typical energy consumption of an activity).

Caution: Online tools should be used for smaller scale projects; large scale projects require qualified experts/consultants to calculate emission potential. Not all calculators are relevant to all projects as some only focus on a single source of possible GHG emissions (e.g. transport).

Below are some references to approaches and calculators for estimating GHG emissions:

- The Clean Development Mechanism of the UNFCCC has developed several baseline and monitoring methodologies for small-scale projects, large-scale projects as well as afforestation and reforestation projects which can be accessed through the CDM website.
- GHG Protocol: The World Resource Institute and World Business Council for Sustainable Development maintain the widely used Greenhouse Gas protocol website which includes a wide range of calculator tools and case studies.
- International Financial Institutions Technical Working Group on Greenhouse Gas Accounting (IFI TWG) has developed a set of principles and harmonized standards, including GHG accounting approaches for renewable energy projects, energy efficiency projects, transport, water supply and other technical guidance.
- Some consultancy firms offer on-line calculators that can also be used for projects such as Carbon Independent.
- USAID offers a user-friendly and simple Carbon Calculator specifically for afforestation and reforestation projects. The US Environmental Protection Agency also provides a GHG Equivalencies Calculator.
- ISO 14064 (Part 1 and 2) specify principles and requirements at the organization level for the quantification and reporting of greenhouse gas (GHG) emissions and removals.

Annex III Evaluating the Probability and Consequence of Climate Change Impacts & Natural Hazards

Based on existing data and information on the frequency or estimated probability of natural hazards and the expected impact of climate change – whether derived from sophisticated models or limited figures on past events and current conditions – the project developer/appraiser needs to evaluate the levels of risk the project is exposed (or contributing) to. The following steps help to evaluate both probability and impact of destructive events which are combined to configure risk levels.

Below are general figures of likelihood that serve as an orientation.[34] The left column describes the likelihood of occurrence of an event occurring once during a certain number of years ("return period") and the left column translates these into annual probabilities/percentages. However, a 100-year flood does not necessarily occur every 100 years but may be distributed more randomly over time (especially given the unknowns of climate change). It can therefore be more meaningful to translate return periods into the annual probability of a hazard. For example, a 100-year flood is a flood of a magnitude that has a 1% probability of occurring in any given year, as indicated in the table below.

	Event per x Years "Return Period"	Annual Probability
Expressing Probability of Natural Hazards	1 in 500	0,2%
	1 in 200	0,5%
	1 in 100	1%
	1 in 50	2%
	1 in 20	5%
	1 in 10	10%
	1 in 5	20%
	1 in 2	50%

Probability of an event or impact should always be evaluated against the expected lifespan of the project and/or individual components. Probability of climate change impact is based on climate change projections that will predict – with varying degrees of certainty impacts such as rainfall amounts, sea level rise, salt water intrusion, etc.

[34] Information on likelihood is sometimes available in the form of national or sub-national hazard probability maps based on quantitative analysis. This type of information can be collected from specialized agencies such as Hydro-Meteorological and Geo-Physical Institutes and observatories. In other cases, such maps do not yet exist but raw data on disaster damages and losses are collected nationally (often by national disaster management offices) and can then be fed into a more qualitative analysis (see heat map next page). More often data on hazard occurrence and associated losses and damages is spread over several agencies. International data-bases (see Box 5) provide further sources of information.

Combining probability with expected impact (see the UNDP Screening Procedure for further qualifications) will help to evaluate the level of risks.

Risk Table of Probability and Expected Consequence

ANNUAL PROBABILITY	**5 Expected** **(>20 % A.P.)**					
	4 Highly likely **(20% AP)**					Floods
	3 Moderately likely **(5-10% AP)**					
	2 Slight likelihood **(0,5 -2% A.P.)**					
	1 Unlikely **(<0,5% A.P.)**					
		1 “Negligible”	**2 “Minor”**	**3 “Moderate”** **(Limited)**	**4 “Severe”** **(Significant)**	**5 “Critical”** **(Total losses)**
		CONSEQUENCE				
	Green = Low, Yellow=Moderate, Red = High Risk					

Annex IV Climate Change Impact and Natural Hazards in Project Location/Influence Area

*(Assessments will **select** climate change issues and natural hazards that are relevant in the project location/influence area as per results of the screening)*

Climate Change (Gradual)	**Key Aspects for Assessment** (Assuming Project Exposure)
Sea Level Rise/Saltwater Intrusion	• Location and size/volume of current saltwater intrusion • Projected location/size/volume of saltwater intrusion • Current adaptation capacity/measures • Projected changes over life-time of project and likelihood that project will be affected (in blue: general and to be repeated below)
Rising Temperatures/Heat Waves	• Current temperatures and temperature extremes including seasonal heat waves • Future changes in temperatures and temperature extremes
Changes in Precipitation	• Current rainfall volume, intensity and seasonal distribution *(including dry and wet seasons)* • Current rainfall extremes (impact on droughts and floods below) • Future rainfall volume, intensity and changes to seasonal distribution and rainfall extremes
Glacier Melting/Thawing of Permafrost Areas	• Current size of glaciers/permafrost areas and speed/volume at which melting/thawing occurs both seasonal and over time *(impact on floods below)* • Future size of glaciers/permafrost areas and speed/volume at which melting/thawing occurs *(impact on floods below)*
Hydro-Meteorological Hazards (and CC Impact)	**Key Physical Aspects**
Droughts	• Frequency and seasonality of drought events (historical) • Current intensity and duration of drought events • Location/size of drought affected areas • Current risk reduction capacity/coping measures • Projected CC-induced impact on frequency, intensity (duration) and location/size of droughts and predicted impact on project (in blue: general: repeated under all hazards)
Forest/Wildfires	• Frequency and seasonality of forest/wild fires (historical) • Current intensity and duration of forest/wild fires • Location/size of affected or exposed areas
Floods (Riverine and Flash Floods)	• Frequency and seasonality of floods (historical) • Intensity of floods (speed, volume) • Duration of floods (riverine) • Location/size of flood affected areas
Rain-fed Landslides	• Frequency and possible seasonality of landslides • Size (volume) of landslides • Location of landslide-affected areas • Projected impact of CC on frequency, size/volume of landslides
Storms and Winds	• Frequency and seasonality of storms (historical)

	• Intensity of storms (wind speed, amount of precipitation/hour) • Duration of storms • Location/size of storm-affected areas
Geophysical Hazards	**Key Physical Aspects**
Earthquakes	• Frequency of earthquakes (historical) • Intensity of earthquakes (Richter/Mercalli scales) • Location/size of earthquake-affected areas
Tsunamis	• Frequency of Tsunamis (historical) • Intensity of Tsunamis • Location/size of tsunami-affected areas
Volcanic Eruptions	• Frequency of volcanic eruptions (historical) • Duration of volcanic eruptions • Intensity of volcanic eruptions (eruptive volume, plume height etc.) • Location/size of affected areas