# UNIVERSITY GRANTS COMMISSION

**NURTURING EXCELLENCE IN HIGHER EDUCATION PROGRAM (NEHEP)**

**2021/22 – 2025/26**

CLIMATE RESILIENCE FRAMEWORK FOR ADDRESSING CLIMATE CHANGE

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# Table of Contents

# 1. Introduction

Climate Change due to the increase in human-caused greenhouse gases, which has led to health, ecological and humanitarian crises. Regardless of this, the fight against climate change is a real opportunity to transition to a low carbon society, creating jobs, innovation and social justice locally and internationally.

Over the past century, there has been an increase in the need for cities, businesses and communities to enhance their resilience to climate change impacts and natural disasters (Foster & Smith, 2015). Like local governments and businesses, higher education institutions face accelerating risks from climate disruptions, such as extreme heat and changing weather patterns. Universities have the potential to lead the design of innovative solutions to enhance the campus' and the surrounding community's resilience to climate threats. Despite this opportunity, most scholarly research has focused on resilience as it pertains to urban planning, individual resilience, resilient ecosystems, and disaster preparedness rather than resilience on university campuses (Storms, Simundza, Morgan, & Miller, 2015).

The Nurturing Excellence in Higher Education Program (NEHEP), supported by the World Bank, is a subset of the National Higher Education Program to address the higher education shortcoming and challenges especially on four results areas (RA): RA-1: Improving labor-market relevance, Entrepreneurship, and Collaborative Research; RA-2: Strengthening Governance and Financing of Higher Education for Quality Enhancement; RA-3: Widening Access to Quality Higher Education for Disadvantaged Students; and RA-4: Extending Digitalization of Higher Education. To achieve the targeted goals, all the activities should be developed and managed to get the desired outcomes.

The climate-resilient framework is a set of outcomes which is closely related with the interactions between all sectors in which the process that is followed to prepare checklists/formats: criteria, process, procedures, steps, time, and responsibility as well as necessary tools (format, checklists etc.) and assessment guidelines. The foreseeable potential environmental and social impacts of the activity and recommends the appropriate mitigation/management measures to eliminate, minimize, or manage these impacts. The monitoring and evaluation shall be integral part of overall project monitoring system which is in practice. This also includes mechanism to measure the indicators. Within the overall objective of efficient and effective climate resilience in the project, the framework will be set out for environmental and social management. The framework will be disclosed in the UGC website, and widely disseminate to the Universities and Higher Education Institutions through orientation, and print media. There will be clearly mentioned good practices and bad practices (do and do not do) for most likely types of activities.

The climate-resilient framework takes a "development-first" approach and is consistent with the traditional project cycle. The framework lays a stepwise process to scope, assess, design, implement/manage, and evaluate/adjust actions required to achieve development goals. These five stages are summarized below. Subsequent sections provide additional details on the types of tasks that development planners will undertake to deal with climate considerations, and briefly explain about the climate stressors and other elements at each stage of the process.

## 2. Definition

- **Adaptation** is "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities." In natural systems, adaptation is a reaction to an actual change in climate since ecosystems cannot anticipate or plan for climate change.
- **Climate** refers to long-term weather conditions, in terms of mean conditions (e.g., average temperature of the year and annual precipitation) and variability (e.g., how often monsoons occur, highest precipitation amounts), over a certain time period in a given area. The World Meteorological Organization uses 30 years of observations to determine climate.
- **Climate change** is the persistent change in climate, including the mean state and/or expected variability, over decades or longer.
- **Climate impacts** are the effects on natural and human systems of climate variability and climate change.
- **Climate projections** are potential future climate conditions (e.g., higher sea levels, warmer temperatures, wetter or drier rainy seasons). These are typically generated from climate models. Climate projections may be accompanied by assumptions about change in socioeconomic conditions (e.g., income, technology, greenhouse gas emissions).
- **Climate resilience** is the capacity of a system to "anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions
- **Equity** has to do with the degree to which access to resources is evenly distributed among populations within a society, or there is marginalization or exclusion of different sectors of the population (e.g., women, racial, ethnic, or religious minorities).
- **Climate Change resilience framework** is the capability to anticipate, prepare for, respond to, and recover from significant stressors with minimum damage to social well-being, the economy, and the environment. Essentially, the more resilient a system (e.g., ecosystem, village, country) is, the less vulnerable it is to climate change (and climate variability such as extreme events).
- **Climate stressors** are climate factors that can affect the functioning of a system. For example, rising temperatures and greater rainfall variability may affect agricultural productivity, with implications for food security.
- **Climate variability** is variations in climate, including the normal highs and lows, wet and dry periods, hot and cool periods, and extreme values. It can refer to day-to-day variability (e.g., heat wave). It can also refer to year-to-year variability (e.g., long-term dry or wet period). It can even refer to decadal scale variability. But, variability over a multi-decadal scale can be thought of as climate change.
- **Exposure** is defined by the Intergovernmental Panel on Climate Change (IPCC) as the "presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets in places that could be adversely affected by a climate stressor.

- **Inputs** are the factors that support or enable development. Inputs include financing, technology, training, and information.
- **Mainstreaming** refers to the integration of climate stressors into existing planning and decision-making processes. It means that existing institutions and processes can include climate change as an additional consideration.
- **Non-climate stressors** are development challenges such as environmental degradation, corruption, population growth, and pollution that can harm the functioning of a system, thus hindering the achievement of development goals.
- **Sensitivity** is the extent to which something will be positively or negatively affected if it is exposed to a climate stressor.
- **Vulnerability** to climate change is the "propensity or predisposition to be adversely affected" by climate stressors. It is a function of a system's exposure, sensitivity, and adaptive capacity.

## 3. Climate Resilient Framework

The framework lays out a stepwise process to scope, assess, design, implement/manage, and evaluate/adjust actions required to climate resilient goals. The higher academic institutions have the potential to lead the design of innovative solutions to enhance the institute and the surrounding community's resilience to climate threats. The framework for it can be depicted in five stages as follows.

### 3.1 Conceptual Process

- **Scope** – This stage establishes the context in higher education institutions and assesses vulnerability at an appropriate level of detail to support initial planning. It includes understanding development goals, identifying the key inputs and enabling conditions for meeting those goals, and identifying climate and non-climate stressors that may put key inputs at risk and undermine the enabling environment, compromising the overall development goals. It is also important to determine what decisions are being made, their timeframe, and whether they can be influenced by this process. This provides the context for all subsequent stages of the framework.
- **Assess** – This stage involves carrying out more detailed assessment of the vulnerability of key inputs and/or the system identified in the scoping stage to climate and non-climate stressors, as well as the capacities of stakeholders and implementing partners to deal with potential impacts or take advantage of opportunities. The assessment should provide actionable information, so it needs to be carried out at the level of detail necessary to support strategy, program, or project design, and it should integrate climate information that appropriately aligns with the scope for action.
- **Design** – This stage focuses on identifying, evaluating, and selecting actions to reduce the impact of climate and non-climate stressors. Climate stressors are explicitly considered in order to design actions that reduce vulnerability and support climate-resilient development. This can include actions that minimize potential damage (e.g., increase flood protection), take advantage of opportunities (e.g., capture and store rainfall where average precipitation amounts may

increase), or cope with unavoidable impacts speeding recovery or spreading risk through insurance programs). The design stage should include strategic consideration of the potential for impacts.

- **Implement and Manage** – This stage puts the actions selected in the design stage into practice. Because addressing climate stressors does not fundamentally alter the nature or challenges of implementation, development practitioners should build upon established practices. Climate change and variability introduce a new dimension into the monitoring of implementation progress.
- **Evaluate and Adjust** – This stage involves analyzing implementation progress and adjusting the strategy, program, or project as needed or providing additional support to improve performance. While this stage is also similar to conventional development practice, evaluation is especially important to assess and respond to changing climate conditions and to incorporate changes in climate knowledge. Additional efforts may be warranted to ensure that climate stressors are specifically taken into account during this stage in order to adjust development initiatives appropriately. The following sections also focus primarily on climate considerations within the framework. We do not focus on non-climate considerations because development practitioners have extensive experience addressing the non-climate aspects of development. We focus on climate because climate stressors have rarely been consistently or systematically integrated into development decision-making.

## 3.2 Course of Action

### 3.2.1 Selection, Analysis and Course of Action

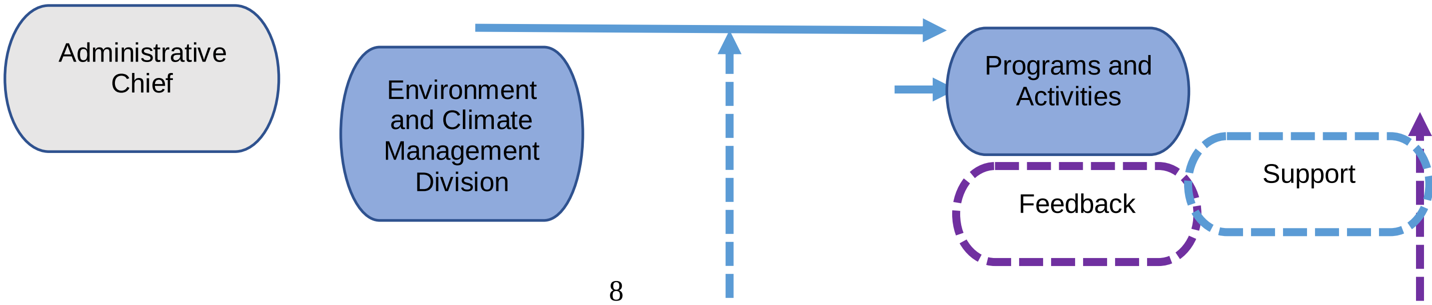
- **Select Criteria:** The process of identifying adaptation actions is likely to yield many more options than a development practitioner can possibly implement. It is important to analyze options according to a set of agreed criteria that reflect the key considerations relevant to decision-making context, and apply the criteria to inform choices in a systematic and strategic way.
- **Analyze Options:** Based on effectiveness, feasibility, and cost the select criteria will be analyzed. The cost-benefit analyses, triple bottom line assessments, classic decision analysis/decision trees, and other techniques may be more appropriate in a particular context. This list of criteria is suggestive, not comprehensive.
- **Course of Action:** The course of action describes how well does the option reduce the specific climate risks of concern and generate the primary benefit sought (e.g., damages reduced, costs avoided, lives saved) over an appropriate time horizon? How well does it address the applicable climate-related vulnerabilities (e.g., reduce exposure and/or sensitivity, and/or increase adaptive capacity)? Does the option align with and promote overall development goals?
- **Feasibility** – Is there sufficient technical and financial capacity, political support, and cultural acceptance to implement the option? Is the option relatively straightforward to implement and maintain from a technical perspective (e.g., Is an infrastructure solution relatively easy to build and operate)? Will key institutional actors and stakeholders support the action (e.g., Will necessary zoning regulations be enacted and enforced)? Is this an activity that can be funded with resources available for development assistance?
- **Cost** – What are the costs to implement the option, when considering both initial costs and longer-term costs of operation and maintenance?
- **Unintended consequences** – To what extent are there costs and other unintended negative consequences associated with the option, beyond the direct expense of its implementation? For example, construction of a seawall to protect communities against sea level rise may adversely impact the near-shore coastal ecosystem or harm local fisheries.
- **Additional benefits** – To what extent might an option provide significant co-benefits, in addition to reducing the specific climate-related risk of concern? For example, building a dam and associated reservoir may be an option to enhance water supply reliability for a key urban or agricultural region, given the increased variability of rainfall and increased risk of prolonged drought. However, the dam may also provide other benefits, such as the potential to generate hydropower, improve downstream flood protection, or develop lake-based tourism and recreational sectors.
- **Implementation timing** – How long will it take to develop and implement the option? Can the option be implemented within relevant planning/funding/political timelines? Will the option yield benefit within the implementation timeframe?

- **Flexibility** – How easily can adjustments be made in response to evolving conditions and/or information? Are there incremental steps that can be taken (e.g., Would a dam be designed and constructed such that its height can be increased cost-effectively in the future, if and when changing climate conditions indicate more water storage or flood protection is needed)? Note that a flexible option may sacrifice optimality to some degree. Flexibility may be an especially important consideration for options that are intended to be long-lived, are relatively costly, and/or have irreversible consequences.

### 3.2.2 Implementation

Implementation focuses on putting the actions that are selected at the design stage into practice. Implementation builds upon established project management practices because including climate stressors does not fundamentally alter the nature or challenge of implementation. However, a key difference from how implementation may have been carried out in the past is that the climate is continuing to change even as implementation occurs. One way to address this is through a flexible, adaptive approach to implementation and management that incorporates new information and learning, responds to shifting conditions, and takes advantage of new opportunities that increase the likelihood of success. Climate stressors introduce additional dynamic elements of changing information and impacts that affect how monitoring systems are designed. Baseline climate information and a monitoring and evaluation implementation plan should be established to later determine if actions are performing as designed and if not, whether poor performance is a result of changing climate conditions or the implementation effort. The implement and manage stage should be part of a continuous process where the performance of an adaptation action, as well as changes in climate stressors, are proactively monitored to support an iterative process of implement/manage and evaluate/adjust. Higher education institutes therefore can manage and implement the programs and activities within the framework outline in Figure 2. Short term and long-term programs and activities are required for achieving the climate resilient institution (Figure 3).

The higher education institutions are integral for galvanizing climate action and climate resilient strategies. The institutions are crucial for carrying the baseline research and generate discoveries that often influence policy-making towards sustainable future.



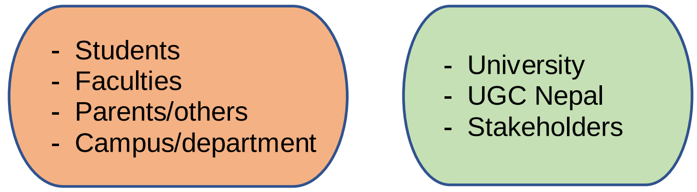



Figure 2: Climate resilient management and implementation framework in higher education institutions

### 3.2.3 Evaluation

Evaluation focuses on assessing the results of strategy, program, or project implementation to improve performance, ensure accountability, and promote learning. Generally, evaluation should not be done very differently than in a conventional development approach. The framework presented in this document can be used to produce the elements of a logical framework; each step or layer in the logical framework can be used to develop indicators and targets. There should be direct feedback to the implementation stage to improve outputs and outcomes of any particular action, and also possibly to the design stage. Climate change poses some additional challenges for evaluation. Specifically, evaluation should consider the performance of a strategy, program, or project under changing climate conditions, e.g., assessing whether observed climate change, variability, or extreme events have affected the performance and fulfillment of goals. Critically distinguishing between the different reasons for poor performance – such as a design flaw, substandard project implementation, an unpredictable climate surprise, or poor projections of climate.

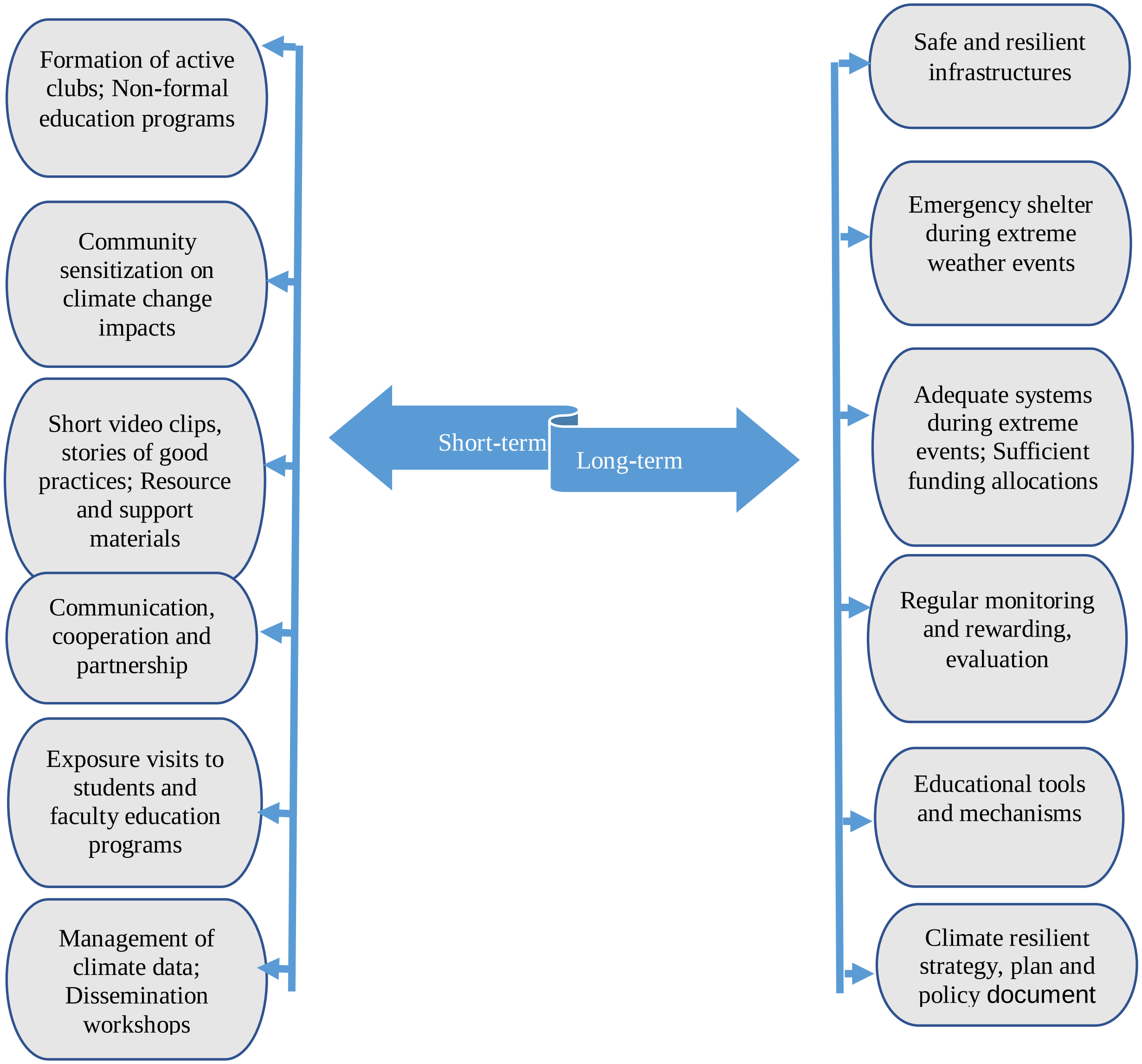



Figure 3: Short and long-term programs and activities for developing climate resilient higher education institutions

# 4 Climate Resilient Higher Education Systems

## 4.1 Direct and indirect impacts:

that can be observed in higher education institutions due to climate change are shown in Table 1.

Table 1: Direct and indirect climate impacts by sectors

| Sector | Direct (closely connected to climate change) | Indirect (caused by a sequence of changes linked to climate change) |
|---|---|---|
| Infrastructure | • Infrastructure damage for energy, transportation, water resources, communications, and other sectors from extreme climate events, lighting systems in classes and buildings<br>• Inundation of infrastructure from flooding<br>• Damage to paved roads and rail from excess heat | • Productivity loss due to disruptions in piped water and sewerage services if infrastructure is damaged<br>• Higher operating costs and/or shorter lifetime of energy and water systems, and potential for rising water prices<br>• Loss of transportation system efficiency<br>• Electricity blackouts/ brownouts<br>• Infrastructure destruction, changes in land use systems |
| Water and agricultural systems | • Water use & efficiency, quality and availability<br>• Droughts/floods<br>• Drinking water contamination from flooded sanitation systems<br>• Wastewater disposal and management | • Reduced agricultural output<br>• Reduced food security<br>• Water-use conflicts<br>• Spread of waterborne diseases |
| Energy and utility supply | • Increase frequency and intensity of stress in utility and energy demands<br>• Increase in distribution costs | • Decrease in affordability of students |
| GESI, disadvantaged/ marginalized groups | • Minimum access in higher education<br>• More time spent for collecting water<br>• Limited opportunity | • Reduced time for schooling<br>• Water-use conflicts |
| Sanitation and health | • Rising water temperatures can enable spread of waterborne diseases<br>• Rising ambient temperatures increase risk of heat stress and dehydration<br>• Increase in temperature demands more energy for cooling during both night and day | • Shifting and expansion of disease like malaria, dengue fever, and yellow fever<br>• Chances of increase in cholera and diarrhea<br>• Increased ground level ozone, which may adversely impact air quality, especially in urban settings |
| Environmental degradation and disasters | • Loss in greenery (due to increase in temperature and less availability of water for irrigation – increase in maintenance cost; cleaning cost of micro-bursts)<br>• Soil erosion, debris flow and landslide<br>• Increase in dust due to changing wind pattern | • Urbanization and its consequences (urban heat island) |

| | | |
|---|---|---|
| | • Increase in monsoon rain and flood<br>• Land subsidence | |
| Laboratory | • Solid waste management<br>• Hazardous and e-waste disposal<br>• Storage of hazardous chemicals<br>• Lighting system | |
| Socio-economic and cultural environment | • Students' enrollment<br>• Safety<br>• GRM | • Goodwill of the institution |

## 4.2 Monitoring & Evaluation

Table 2 shows the stages and details of strategies relating to monitoring strategies in higher education institutions.

Table 2: Monitoring and framework for climate resilient strategies in higher education institutions

| S.N. | Type of Monitoring | Stages of Project Responsibility | Responsibility | Aspects of Monitoring | Remarks |
|---|---|---|---|---|---|
| 1. | Regular | During construction | • Recipient Institution (RI) with required guidance/ technical support | • Environmental status at site<br>• Mitigation works implemented<br>• Difficulties encountered<br>• Unforeseen issues etc. | • Monitoring report preparation |
| 2. | Quarterly | During construction | • UGC | • Review of regular monitoring report, on the spot verification of EMF and EMP compliance | • Quarterly report |
| 3. | Independent verification | MTR and end of project | • UGC out sourced independent experts/firms | • Review of regular and quarterly monitoring, and the spot monitoring as per the EMF and the adequacy of EMF prepared for the project | |

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