Climate and Disaster Risk Screening Report for Energy Project in Nepal: Hypothetical Energy Project for Nepal[1]

[1] This is the output report from applying the World Bank Group's Climate and Disaster Risk Screening Project Level Tool. The findings, interpretations, and conclusions expressed from applying this tool are those of the individual that applied the tool and should be in no way attributed to the World Bank, to its affiliated institutions, to the Executive Directors of The World Bank or the governments they represent. The World Bank does not guarantee the accuracy of the information included in the screening and this associated output report and accepts no liability for any consequence of its use.

1. Introduction

The project level **Climate and Disaster Risks Screening Tool** provides due diligence on climate and disaster risks at an early concept stage. The tool uses an **exposure – sensitivity –adaptive capacity framework** to consider and characterize risks from climate and geophysical hazards, based on key components of a project and its broader development context (Annex 1). The tool helps inform consultation, dialogue, and further work to be done in the course of project design.

The results of applying the project level tool to screen for climate and disaster risks for "Hypothetical Energy Project" in Nepal are summarized below.

2. Climate and Disaster Risk Screening Results Summary

2.1 Project Information Summary

Table 1 below provides key project information.

Table 1: Project information

PROJECT INFORMATION	
Title	Hypothetical Energy Project
Number	P132289
Region	South Asia
Country	Nepal
Type of Assessment	Energy Projects
Purpose of Screening	Screen a Project at the Concept Stage
Current Project Phase	Concept (Identification)
Funding Source	IDA
Keywords	Hydropower
Sub Sectors	Hydropower
Description of Location	Kali Gandaki River
GPS Coordinates	This is optional information which may be useful when searching for geospatial climate and hazard information from data sources. It is not directly used in the screening process.

2.2 Summary of Exposure to Climate and Geophysical Hazards

Table 2 presents a summary description of exposure to climate and geophysical hazards at the project location for the Historical/Current and Future time frames. The Future time frame is based on changes projected to occur between the 1980-1999 average and a future average. This future average is most likely the 2040-2059 average (i.e., the default in the Climate Change Knowledge Portal - CCKP), but the range is dependent upon the specific time frame that the user applied using the CCKP or other climate information. Again, these descriptions, if based on information in the CCKP, may be supplemented by national data sets.

Table 2: Summary of Exposure to Climate and Geophysical Hazards at Project Location

HAZARD	TIME FRAME	DESCRIPTION OF HAZARDS FOR YOUR LOCATION
Extreme Temperature	Current	Historical/past trends: Insufficient understanding. Past data on mean annual temperature is consistent. Shrestha et al. (1999), Dhakal(2003), and Liuand Chen (2000) suggest that temperatures between 1977 and 1994 rose between 0.5°C-0.6°C per decade, particularly in the northern mountains, while McSweeney et al. suggest that temperatures between 1960 and 2003 decreased slightly during the warm and dry season.
	Future	Future (2050): High Potential Impact as mean annual temperature is projected to increase between 1.3 to 3.8°C.
Extreme Precipitation and Flooding	Current	Historical/past trends: Mean rainfall has significantly decreased on an average of 3.7mm (-3.2%) per month per decade, and this decrease is particularly significant during the monsoon period between June September. Between 1900 and 2014, 44 flood events have occurred, which have killed 6563 and affected 3,628,854 people. Lately, the number of casualties from floods and related landsides has increased. 1314 lives were lost between 2000 and 2005.
	Future	Future (2050): Insufficient understanding as projections remains inconsistent. It is not possible to get a clear picture of precipitation change, due to large model uncertainties. However, increases in rainfall are more consistent for south-east Nepal.
Drought	Current	Historical/past trends: Six severe droughts have struck Nepal between 1900 an 2014. These droughts have affected 4,903,000 people.
	Future	Future (2050): Moderate impact is envisaged as droughts are becoming more frequent occurrences in Nepal, particularly during the winter months and in the western Terai plains, which are already characteristically quite dry because of the late arrival of the monsoons.
Sea Level Rise	Current	Historical/past trends: No Impact as Nepal is a landlocked country
	Future	Future (2050): No Impact as Nepal is a landlocked country
Storm Surge	Current	Historical/past trends: No Impact as Nepal is a landlocked country
	Future	Future (2050): No Impact as Nepal is a landlocked country
Strong Winds	Current	Historical/past trends: Insufficient understanding
	Future	Future (2050): Insufficient understanding
Earthquake	Current	Historical/past trends: Moderately exposed to earthquakes and landslides. Between 1900 and 2014, six seismic events occurred, which killed 9,936 and affected 729,950 people. During the same period, 22 landslides occurred and killed 1,884 and affected 619,217 people.
Landslide	Current	Historical/past trends: Moderately exposed to earthquakes and landslides. Between 1900 and 2014, six seismic events occurred, which killed 9,936 and affected 729,950 people. During the same period, 22 landslides occurred and killed 1,884 and affected 619,217 people.

2.3 Summary of Overall Project Risk

Tables 3A and 3B below summarize ratings for project components and/or project subsectors, and outcome/service level for *Historical/Current* and *Future* time frames. The ratings are derived on the basis of the hazard information, subject matter expertise, contextual understanding of the project, and the larger development context.

The results indicate where risks may exist and where further work may be required to reduce or manage these climate and geophysical risks. An ongoing process of monitoring risks, refining climate and other information, and regular impact assessment may also be appropriate.

2.3.1 Results Summary - by Component

Table 3A summarizes the ratings for the project. The results provide a characterization of risks caused by climate and geophysical hazard on project sub-sector and components. The potential impact due to exposure from hazards is modulated by the project's non-physical components (enabling and capacity building activities) and the larger development context to determine overall risk to the intended project outcome.

Table 3A: Results Summary - by Component

Hazard	Project Context						Development Context				Outcome / Service Delivery	
	Location		Hydropower		Non-Physical Components (Overall)		Energy Sector		Broader Context(Overall)			
Time Frame	Current	Future	Current	Future	Current	Future	Current	Future	Current	Future	Current	Future
Extreme Temperature					Overall: Slightly Reduces Impact		Slightly Reduces Impact		Insufficient information provided			
Extreme Precipitation and Flooding												
Drought												
Sea Level Rise												
Storm Surge												
Strong Winds												
Earthquake		X		X								X
Landslide		X		X								X

2.3.2 Results Summary by Time-Frame

The matrix below depicted in Table 3B displays the same results as Table 3A, but does so by time frame.

Table 3B: Results Summary - by Time Frame

Time Frame	Current						Future					
Hazard	Project Context			Development Context		Outcome / Service Delivery	Project Context			Development Context		Outcome / Service Delivery
	Locat-ion	Hydropo - wer	Non-Physical Components (Overall)	Energy Sector	Broader Context (Overall)		Location	Hydropo-wer	Non-Physical Components (Overall)	Energy Sector	Broader Context (Overall)	
Extreme Temperature			Overall: Slightly Reduces Impact	Slightly Reduces Impact	Insufficient information provided				Overall: Slightly Reduces Impact	Slightly Reduces Impact	Insufficient information provided	
Extreme Precipitation and Flooding												
Drought												
Sea Level Rise												
Storm Surge												
Strong Winds												
Earthquake							X	X				X
Landslide							X	X				X

Insufficient Understanding	Not Exposed No Potential Impact No Risk	Slightly Exposed Low Potential Impact Low Risk	Moderately Exposed Moderate Potential Impact Moderate Risk	Highly Exposed High Potential Impact High Risk

2.4 Key Drivers of Risks

Based on the results above, Table 4 highlights the key drivers of risks for each project component and/or subsector ratings. Specific consideration should be given to those which have high/moderate ratings. Note also the overall modulating effects of non-physical components and the broader development context to the project outcome.

Table 4: Key Drivers of Risk

	Historical/Current Drivers	Future Drivers
Hazards and Location	Earthquake Landslide	Extreme Temperature Extreme Precipitation and Flooding
Physical Components	Hydropower-Earthquake Hydropower-Landslide Hydropower-Earthquake Hydropower-Landslide Hydropower-Extreme Temperature Hydropower-Extreme Precipitation and Flooding	Hydropower-Extreme Precipitation and Flooding
Outcome / Service Delivery	Extreme Precipitation and Flooding Earthquake Landslide	Extreme Temperature Extreme Precipitation and Flooding

Key: High Risk  Moderate Risk 

* No high or moderate risks identified for this particular portion of the project.

- Overall, the Non-physical Components : **Slightly Reduces Impact**
- The Energy Sector : **Slightly Reduces Impact**
- The Broader Development Context : **Insufficient information provided**

3. Next Steps

Table 5A provides some general guidance on follow-up based on the risk ratings for the Outcome/Service Delivery. Table 5B lists some climate risk management measures for your consideration. Visit the "Next steps" page of the tool for guidance and a list of useful resources.

Please recall that that this is a high-level due diligence tool, and the characterization of risks should be complemented with more detailed work.

Table 5A: General Guidance Based on Risk Ratings for Outcome/Service Delivery

Insufficient Understanding	Gather more information to improve your understanding of climate and geophysical hazards and their relationship to your project.
No Risk	If you are confident that climate and geophysical hazards pose no risk to the project, continue with project development. However, keep in mind that this is a high-level risk screening at an early stage of project development. Therefore, you are encouraged to monitor the level of climate and geophysical risks to the project as it is developed and implemented.
Low Risk	If you are confident that climate and geophysical hazards pose low risk to the project, continue with project development. However, keep in mind that this is a high-level risk screening at an early stage of project development. Therefore, you are encouraged to monitor the level of climate and geophysical risks to the project as it is developed and implemented. You may also consider gathering additional information to increase your level of confidence in your rating.
Moderate Risk	For areas of Moderate Risk, you are encouraged to build on this screening through additional studies, consultation, and dialogue. This initial screening may be supplemented with a more detailed risk assessment to better understand the nature of the risk to the project.
High Risk	For areas of High Risk, you are strongly encouraged to conduct a more detailed risk assessment and to explore measures to manage or reduce those risks.

Table 5B: Types of Climate Risk Management Measures for typical Energy Projects

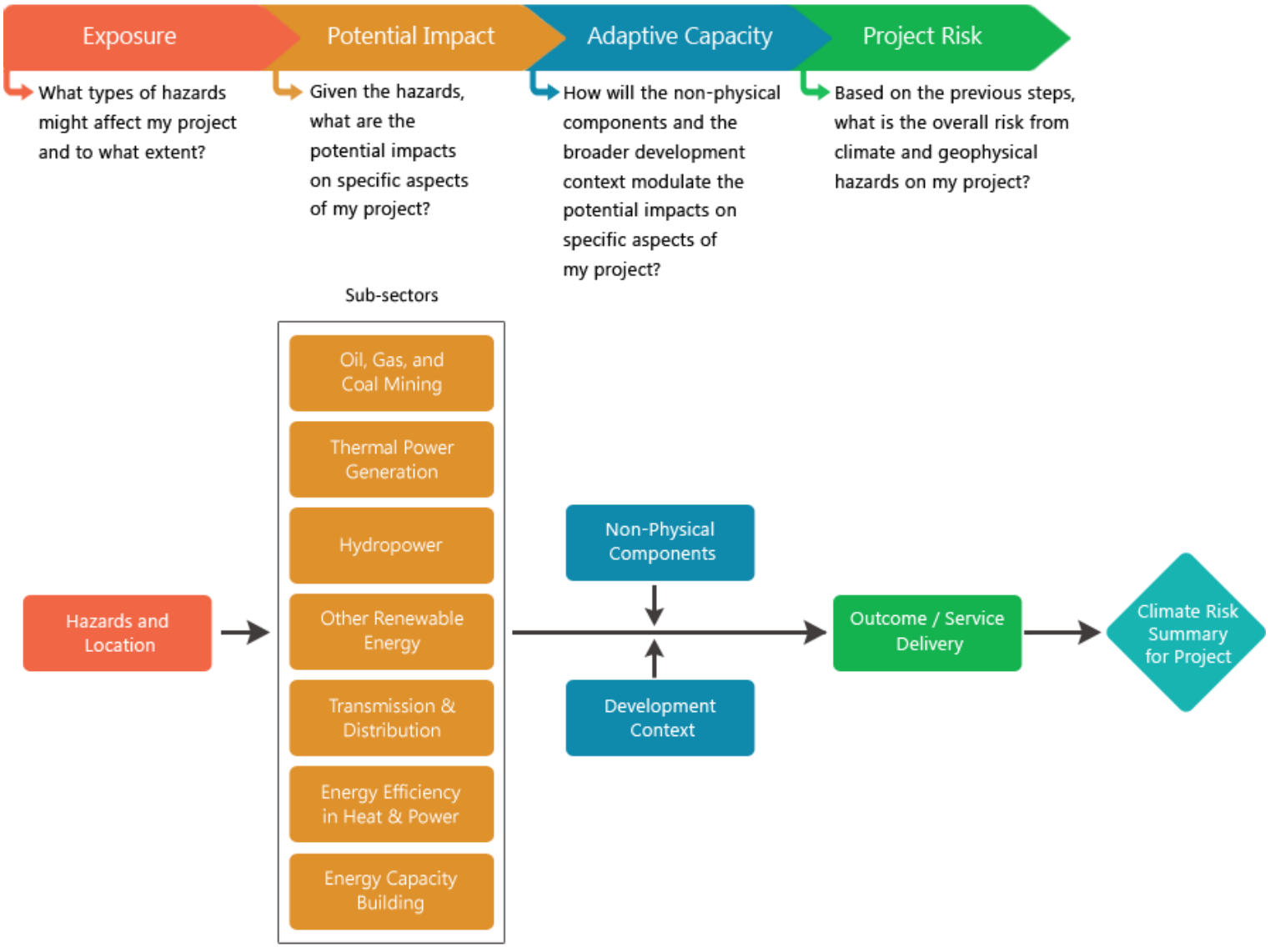
CATEGORY	PROS	CONS	EXAMPLES
Accommodate and Manage	• Flexible • Typically low-cost • Useful when risk is low, but projected to rise in the future	• Temporary solution • Can be insufficient in preventing losses	• Increase repair and maintenance budgets • Consider future fuel and generation demands and costs in planning • Incentivize demand-side management • Conduct monitoring through data collection and analysis
Protect and Harden	• Can be used for existing and new assets • Responds to immediate risks	• High cost • Inflexible • Effectiveness may decrease over time	• Upgrade existing cooling systems • Add reinforcements to walls and roofs • Build dikes to contain flooding • Incorporate structural improvements to transmission • Increase drainage of energy facilities
Retreat and Relocate	• Long-term solution • Responds to immediate risk	• High cost • Inflexible	• Integrate sea level rise projections and storm surge in coastal siting • Move infrastructure further inland or on higher ground

Annex 1: Tool Approach

Tool Approach

The framework below describes the approach taken to screen the project. Climate and natural hazards information used to screen the project is most likely obtained from the World Bank's Climate Change Knowledge Portal, which houses numerous global data sets with historical records and future projections as well as country-specific adaptation profiles.

Figure 1: Project Level Climate and Disaster Risk Screening Tool: Approach for Energy projects



Annex 2: Notes

Table A2-1 summarizes the sub-national locations of high risk noted during the assessment, if the user entered these sub-national locations. Table A2-2 summarizes all the notes entered by user for each section while completing the assessment, if the user elected to enter notes. These notes can help shed light on specific ratings as well as considerations and limitations of the user's expertise.

Table A2-2 Summary of Comments by Section

Section		Notes
Hazards and Location	Extreme Temperature	Agriculture, Energy, and health are highly exposed sectors. Increasing extreme temperature will further exacerbate midseason dry spells that damage young plants and cause severe crop loss are recurrent threats to local livelihoods.Increase in extreme temperature may substantially increase evapotranspiration causing a severe impact on hydropower generation. Increase in extreme temperature can increase heat island effects, which in turn can cause heat stroke and may lead to physiological disruption, organ damage, and even death – especially in vulnerable populations such as the elderly. Heat island phenomenon can also impact communities by increasing peak energy demand, air conditioning costs, and air pollution levels.
	Extreme Precipitation and Flooding	Extreme flooding in south-east would adversely impact agriculture sector. Nepal Extreme flooding may deposits debris in channels, changing the flow of water within irrigation channels.