Climate Risk Assessment – World Bank Climate and Disaster Risk Screening Tool

Climate & Disaster Risk Screening Tools

Climate and Disaster Risk Screening Report for Belgrade-Nis High Speed Railway in Serbia[1]

Project Information

Project Title:	Belgrade-Nis High Speed Railway
Project Number:	014/22
Project TTL:	Belgrade-Nis High Speed Railway
Assessment completed by:	Sanita Dzino
Estimated timeline for PCN Year:	2022
Estimated timeline for PCN Quarter:	Q1
Screening Tool Used:	In-depth screening

The Climate and Disaster Risk Screening Tool provides a high-level screening to help consider short- and long-term climate and disaster risks at an early stage of project design. The tool applies an Exposure – Impact – Adaptive capacity framework to characterize risks. Potential risks are identified by connecting information on climate and geophysical hazards with users' subject matter expertise of project components (both physical and non-physical) and understanding of the broader sector and development context.

The tool does not provide a detailed risk analysis. Rather, it is intended to help inform the need for further consultations, dialogue with local and other experts and analytical work at the project location to strengthen resilience measures in the course of project design.

[1] This is the output report from applying the World Bank Group's Climate and Disaster Risk Screening Project Level Tool (Global website: climatescreeningtools.worldbank.org; World Bank users: wbclimatescreeningtools.worldbank.org). 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.

Summary Climate and Disaster Risk Screening Report

1. Exposure of the project location: This step assesses the current and future exposure of theproject location to relevant climate and geophysical hazards.

Exposure ratings for climate and geophysical hazards that are likely to be relevant to the project location both in the present and in the future:

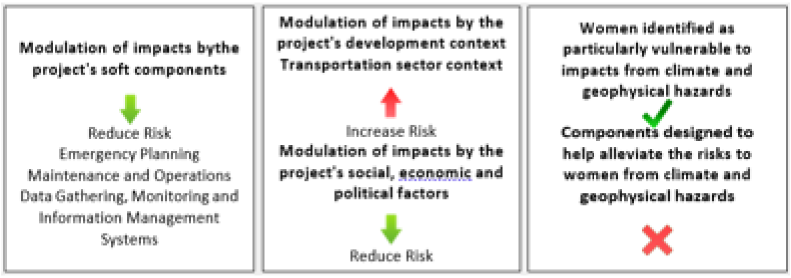
	Climate Change Hazards					Geophysical Hazards		
	Extreme Temperature	Extreme Precipitation and Flooding	Sea Level Rise	Storm Surge	Strong Winds	Earthquake	Landslides	Wildfires
Current								
Future								

2. Impacts on the project's physical components: This step assesses the current and future impacts of identified climate and geophysical hazards on the project's physical components as currently designedunder relevant subsectors.

Impact ratings for relevant project subsectors:

Impact	
	Rail
Current	
Future	

3. Adaptive Capacity – modulating effect of the project's non-physical components and development context: This step assesses how the project's non-physical components, together with its broader development context, modulates potential impacts from climate and geophysical hazards. This step also considers particularly vulnerable groups, namely women, migrants and displaced populations.



4. Risk to the outcome/service delivery of the project: This step assesses the level of risk to the outcome/service delivery that the project is aiming to provide based on previous ratings.

Outcome/Service Delivery

	Rail
Current	
Future	

Key for risk ratings:

Insufficient Understanding	No Exposure	Low Exposure	Moderate Exposure	High Exposure
	No Potential Impact	Low Potential Impact	Moderate Potential Impact	High Potential Impact
	No Risk	Low Risk	Moderate Risk	High Risk

Guidance on Managing Climate Risks through Enhanced Project Design

By understanding which of your project components are most at risk from climate change and othernatural hazards through initial screening, you can begin to take measures to avoid impacts by:

1. Enhancing the consideration of climate and disaster risks early in project design.
2. Using your risk screening analysis to inform follow-up feasibility studies and technicalassessments.
3. Encouraging local stakeholder consultations and dialogue to enhance resilience measures andoverall success of the project.

Table 1 provides some general guidance based on the risk ratings for Outcome/Service Delivery and Table 2 lists some climate risk management measures for your consideration. Visit the "Screening Resources" page of the tool for additional guidance and a list of useful resources.

Note: Please recall that that this is a high-level screening tool, and that the characterization of risksshould be complemented with more detailed work.

Table 1: General Guidance Based on Risk Ratings for Outcome/Service Delivery

Insufficient Understanding	Gather more information to improve your understanding of climate and geophysicalhazards and their relationship to your project.

No/Low Risk	If you are confident that climate and geophysical hazards pose no or 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 isdeveloped and implemented.
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 ofthe risk to the project.
High Risk	For areas of High Risk, you are strongly encouraged to conduct a more detailed riskassessment and to explore measures to manage or reduce those risks.

Table 2: Types of Climate Risk Management Measures for Typical Transportation Projects

OBJECTIVE	EXAMPLES
Changes in Operations	> Shift construction schedules to cooler parts of the day to address health and safetyconcerns and avoid vehicle overheating and deterioration > Develop redundant structures or services that can be relied upon if disruptions occur > Shorten maintenance periods to accommodate changes in precipitation andtemperature > Increase inspection frequency to ensure structures are enduring climate changepressures > Increase financial and technical resources for more frequent maintenance and repairs > Shortening of season for use of ice roads to reduce removal costs and environmentalimpacts from salt and chemical use > Increase use of sonars to monitor stream-bed flow and bridge scour > Integrate emergency evacuation procedures into operations > Use bridge openings more frequently for ships in the event of severe storm surges > Increase payload restrictions on aircraft at high-altitude or hot-weather airports > Temporarily close airports and ports when extreme weather events occur
Changes in Infrastructure Design and Materials	> Develop new, heat-resistant paving materials for construction of roadways, runways,and rail tracks > Use improved asphalt/concrete mixtures for roads and runways > Increase use of heat-tolerant street and highway landscaping > Greater use of continuous welded rail lines to avoid rail-track deformities > Use insulation in road prism to reduce thawing of permafrost, which causes subsidenceof roads, rail beds, bridge supports (cave-in), and pipelines > Elevate bridge, tunnel, and transit entrances to reduce inundation and severe floodingof low-lying infrastructure > Build and strengthen existing levees, seawalls, and dikes to protect high-value coastalreal estate > Upgrade existing infrastructure drainage systems and increase standards for new transportation infrastructure and major rehabilitation projects (e.g., assuming 100-yearand 500-year storms) > Increase pumping capacity for tunnels > Increase culvert capacity > Use flexible, expandable materials in railway systems > Protect critical evacuation routes > Protect bridge piers and abutments with riprap > Change bridge design to tie decks more securely to substructure and strengthenfoundations > Adopt modular construction techniques where infrastructure is in danger of failure(such as modular traffic features and road sign systems for easier replacement) > Use more dredging of channels > Raise docks, wharf levels, jetties, and seawalls to protect harbours and terminal andwarehouse entrances > Extend runway lengths at high-altitude or hot-weather airports
Retreat/Relocate	> Convert coastal land uses to establish natural buffer zones > Relocate roads, railways, and airport runways further inland
Build information collection and management systems	> Strengthen climate information systems, building on existing regional and nationalnetworks > Build capacity of national governments to harmonize data across regions > Build relevant national and/or regional research programs on the links between climateand transportation sector > Improve the ability to forecast landfall and trajectory of hurricanes > Track changes in maintenance needs and schedules over time as adaptation actionsare implemented > Monitor changing environmental conditions affected by climate (e.g., land erosion patters, frequency and severity of inundation events) to understand evolving adaptationneeds
Strengthen policies, planning and systems	> Identify transportation-related development goals important to the country, region, orcommunity > Identify inputs and enabling conditions necessary to achieving transportation-relateddevelopment goals > Integrate climate information into system planning to assess climate impacts ontransportation infrastructure and understanding adaptation needs and economicimplications > Design flood risk-management plans with both ecosystem- and construction-basedadaptation options

OBJECTIVE	EXAMPLES
	> Update design standards to elevate roadways to accommodate future sea level riseand high winds > Consider storm surge in coastal road planning > Improve coordination of policies and programs across government agencies to addressthe additional pressures imposed by climate change > Improve finance for transportation systems that are more adaptive and better designedfor a changing climate, including through private sector investment and incentives; ensure consideration of climate risk in financing approaches > Strengthen disaster planning and response for transportation infrastructure andservices

Sources: USAID Climate Risk Screening and Management Tools: Infrastructure, Construction, and Energy; Addressing Climate Change Impacts on Infrastructure; TRS Special Report: Potential Impacts of Climate Change on Transportation

Climate and Disaster Risk Screening Report for Belgrade-Nis High Speed Railway in Serbia

1. Introduction

Building resilience to climate and geophysical hazards is a vital step in the fight against poverty and for sustainable development. Screening for risks from these hazards improves the likelihood and longevity of a project`s success. The project level **Climate and Disaster Risks Screening in Depth** provides early-stage screening for climate and disaster risks at the concept stage of project development. The tool uses an **exposure – impact – 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.

This report summarizes the results of the screening process for Belgrade-nis High Speed Railway in Serbia, which was applied to the following selected subsectors:

✔ **Rail**

The potential risks flagged in this report were identified by connecting information on climate andgeophysical hazards exposure with the user's subject matter expertise and understanding of the project components and sensitivity to rate the impacts. The in-depth screening does not provide detailed risk assessments, rather it flags risks to inform consultations, enhance dialogue with localand other experts, and define further analytical work at the project location.

This early-stage screening can be used to strengthen the consideration of climate and disaster considerations in key components of the project design, including the physical aspects (e.g., pavement, bridge joints, rail tracks, runways, etc.) and soft components (e.g., capacity building and training to help prepare for and cope with hazards, resource planning and institutional strengtheningat community level, and education campaigns, etc.). The broader sectoral (e.g., availability of alternate means of transportation, emergency protocols are in place that enable the transportation authority to respond to natural disasters, etc.) and development context conditions (e.g., strong institutional capacity in the transport agency, climate related early warning systems, etc.) could helpmodulate the risks to the delivery of the outcome/service level. The results of the screening are presented below, with supporting narrative to guide their interpretation.

2. Exposure of the Project Location to Climate and Geophysical Hazards

The table below presents a summary description of exposure to climate and geophysical hazards at the project location for the Current and Future time frames. Exposure to climate hazards is evaluated in two-times frames, because past records are not necessarily indicative of future conditions.

The following guiding questions are used to assess exposure.

1. What have been the historical trends in temperature, precipitation and drought conditions?
2. How are these trends projected to change in the future in terms of intensity, frequency and duration?
3. Has the location experienced strong winds, seal level rise, storm surge, and/or geophysical hazards inthe past that may occur again in the future?

The descriptions provide a summary of the key characteristics and some indication of the trends in exposure from each hazard, drawing on global, quality controlled data sets from the Climate Change Knowledge Portal (CCKP). It is useful, for example to understand the temperature range and the rate of annual or decadal increase in a region; or precipitation patterns for historical and future time frames and seasonality shifts. Understanding the trends of hazards is important as they act individually and collectively on components/subsectors of the project. Because geophysical hazards (such as earthquakes, tsunamis, landslides, and volcano eruptions) do not have associated future projections, exposure for those hazards is assessed only in the Historical/Current time frame.

Table 3: Summary of Exposure to Climate and Geophysical Hazards at Project Location

Hazard	Time frame	Description of hazards for the project location
Extreme Temperature	Current	Based on the values of average annual temperatures on monitoring stations in the Project area in 2021, the year is assessed as warm in Krusevac and Nis and very warm in Belgrade and Cuprija compared to the reference period 1981-2010. The measured average annual air temperature in Belgrade (13.7 °C) is the 12th warmest since the beginning of the meteorological station's operation (1888). In 2021, 45 tropical nights were registered in Belgrade, which is 28 more than the average. The analysis of mean temperature for the 1998-2017 period and the 2008- 2017 period shows an increase in temperature

Hazard	Time frame	Description of hazards for the project location
		compared to the mean temperature values for the 1961-1990 reference period. It can be concluded that there was an increase in temperature in the Project area between 1.0°C and 2.5°C compared to the reference period.
	Future	By the end of 21st century, a continuous increase in average annual temperature in the Project area is predicted. Seasonal analyses in average maximum and minimum temperatures have shown that temperature increase during the colder part of the year may be slightly less than the temperature increase during the warmer part of the year. The average annual temperature in the Project area is expected to increase up to 2.5°C according to the RCP4.5 scenario and up to 4.5°C according to the RCP8.5 scenario, by the end of the century.
Extreme Precipitation and Flooding	Current	In the south of Serbia and in some central parts, the year 2021 has been assessed as rainy and very rainy. Based on the values of average annual rainfall in the Project area in 2021, the year is assessed as normal in Belgrade and Cuprija and rainy in Krusevac and Nis compared to the reference period 1981-2010. Although the changes on an annual basis are not extreme, several extremely rainy months in the Project area and one extremely dry month in Nis were recorded. The recorded amounts of precipitation show an increase from 5% to 10% in the period 1998-2017 and from 5% to 20% in the period 2008-2017 compared to the reference period 1961-1990. On the other hand, the Project area is characterised by a decrease in the amount of precipitation in the summer period from 5% to 30% compared to the reference period.
	Future	Based on climate models for RoS, precipitation is predicted to increase by 10% according to the RCP4.5 scenario and stay the same or decrease by 15% according to the RCP8.5 scenario by the end of the century. It is expected that changes in precipitation will be more seasonal than annual, with more frequent heavy precipitation events and higher precipitation accumulation.
Sea Level Rise	Current	The Project area is not exposed to sea level rise.
	Future	The Project area is not exposed to sea level rise.
Storm Surge	Current	The Project area is not exposed to storm surge.
	Future	The Project area is not exposed to storm surge.
Strong Winds	Current	The Project area is not exposed to strong winds.
	Future	The Project area is not exposed to strong winds.
Earthquake	Current	In the last 100 years, the Project area has been hit byseveral earthquakes, which were mostly of minor intensity. However, several major earthquakes caused significant material damage.
Landslides	Current	The Project area was affected by landslides, butwithout great impact.
Wildfires	Current	The Project area was affected by wildfires, butwithout great impact.

Insufficient Understanding	Not Exposure	Slightly Exposed	Moderately Exposed	Highly Exposed

3. Impacts on the Project's Physical Components Under Relevant Subsectors

This section presents the detailed results of screening for relevant subsectors to the transportationproject, including the project's investments in physical structures. The impact ratings are based onthe exposure ratings and the understanding of the project's sensitivity by the user. Understanding the contribution of risks from the subsectors, both individually and collectively can help inform theprocess of dialogue, consultation, and analysis during project design.

The following guiding questions are used to assess potential impacts:

1. Does the project design take into account recent trends and future projected changes in identified climate and geophysical hazards?
2. Does the project design consider how the structural integrity, materials, siting, longevity andoverall effectiveness of transportation infrastructure, if applicable, may be impacted?
3. In particular, does the design "lock in" certain decisions for the future?

Rail

The potential impact of climate and geophysical hazards on the project's rail investments is ratedbased on exposure ratings for the location, and an understanding of the project's historical and future sensitivity to these risks. Please note that for this step, the tool is helping judge the effectthese impacts may have on the investment, and the ability of the project to sustain and improve rail infrastructure under a changing climate. Projected increases in temperature and the related increases in the frequency and severity of extreme temperatures may decrease the service life ofthe rail systems. In areas where precipitation or storm surge is expected to increase, rail infrastructure can experience significant physical damage and service disruptions due to flooding, which can cause track washout and bridge scour.

The ratings are based on expert judgment and an understanding of the local development context.

	Potential Impact	
	Current	**Future**
Rail		

Description ofimpacts	Over the past two decades, climate-related extreme events have caused major physical losses with significant impacts on Serbia's economy. The most dominant climate change impact in the wider area are floods,	Based on the Preliminary Flood Risk Assessment for RoS, the entire watercourse of the Juzna Morava River and Velika Morava

	especially in the vicinity of the Velika and Juzna Morava Rivers. Other climate change incidents are extreme temperatures, droughts, wildfires and landslides. The most severe floods in RoS occurred in May 2014, when some parts of Corridor X were also under water. The Project section was flooded on the Jagodina-Cuprija subsection. The May floods in 2014 also affected the Belgrade settlements of Rakovica and Resnik, as well as Cuprija. According to available data, 361 mm of precipitation was recorded at the Krusevac meteorological station in the spring of 2014, which is twice the average value and more than the record of the highest spring precipitation from 1970. In April 2015, an overflow of the Velika Morava in Velika Plana occured, when residential buildings were flooded. The area of Krusevac was again hit by devastating floods in May 2016, when the average monthly level of precipitation in May was reached within a period of 4 days (2-5 May). As a result, the Juzna Morava River overflowed in the settlement of Djunis. The road Krusevac-Djunis was flooded. The overflow of the Juzna Morava River in the settlement of Djunis occurred again in the spring of 2018 because of large amounts of precipitation in a short time and melting snow. As a result, the state road Krusevac-Nis was flooded. Due to the heavy rainfall that hit Cuprija in July 2021, a state of emergency was declared. As a result of the floods, residential buildings and local roads were flooded. There is approx. 3,000 active and potentially active landslides in Serbia. The occurrence of landslides and erosion in the Project area is mainly related to the previous occurrence of droughts and floods. Most of them cause the damage on local roads and highways and a few of them cause the damage on residential buildings. RoS ranks fifth in the risk of drought globally, while it is among the three European countries with the highest risk of drought. Droughts have been more frequent since 1990, especially during summer months. According to the 2020 UNCCD Drought Initiative, RoS was hit by 5 droughts in the period 2000-2017, which negatively affected agriculture, population health and energy production from hydropower plants. During the drought episode in 2012, 282 forest fires were recorded and 6,799.9 ha of forests burned (10,652.98 ha total burned area). In the last 100 years, the Project area was hit by several earthquakes, which were mostly of minor intensity. However, several major earthquakes caused significant material damage. There is no information regarding the impacts of the earthquakes on the Begrade-Nis railway section.	River, as well as the course of Nisava from the mouth to Dimitrovgrad are assessed as a significant flood area. The municipality of Cuprija has been designated as a significant flood area. The future railway alignment mainly follows the course of the Velika Morava River, Juzna Morava River and Nisava. Based on the flood modelling, the river flood hazard is classified as high, which means that potentially damaging floods are expected to occur at least once in the next 10 years. The possibility of landslides occurrence was assessed as 'likely' to 'very likely' in Belgrade and central Project area, while going towards Nis it decreases and is assessed as 'unlikely'. For the event with most negative consequences, drought and heat wave risk is assessed as high. According to the European Environmental Agency, projected forest fire danger changes under two climate scenarios, and an increase in the number of fires in the RoS is expected. According to the RCP 4.5 scenario, the expected increase in the number of fires is between 10-15%, while the expected increase in the number of fires according to the RCP8.5 scenario is 20%.

Insufficient Understanding	No Potential Impact	Low Potential Impact	ModeratePotential Impact	High PotentialImpact

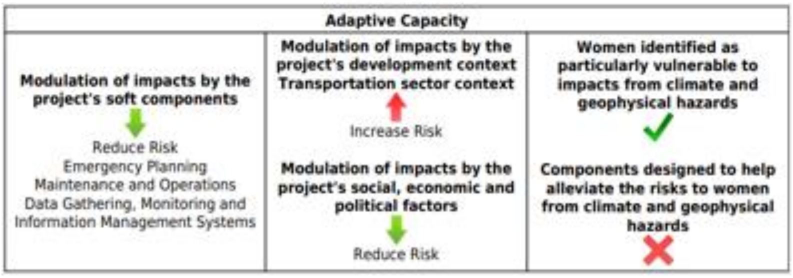
4. Adaptive Capacity: modulating effect of the project's soft components anddevelopment context

The potential impact on key components/subsectors due to exposure from hazards is modulated bythe project's non-physical components (enabling and capacity building activities). The right kind of capacity building measures could increase preparedness and longer-term resilience and reduce risks. An understanding of larger sector and development context with respect to key modulating factors helps to assess the climate risks in terms of adaptive capacity. For example, in the transportation sector, budgeting processes that account for additional maintenance costs to address increasing damages from hazards, and access to improved technology may help reduce risks; while weak institutional capacity of local transport authorities may aggravate the risks.

In addition, vulnerable groups, namely women, migrants and displaced populations may be particularly affected by climate and disaster risks. Non-physical components can be designed to help alleviate the risks to women from climate and geophysical hazards.

The table below presents a summary description of the modulating effect the project's non- physical components and broader development context, which includes the transportation sectorcontext and other social, economic and political factors.

Summary of Adaptive Capacity: Modulating effect of the project's non-physicalcomponents and development context



Description of modulating effects of non-physical components: The Project has a significant focus on capacity enhancement, drainage of wastewater and atmospheric water along the railway alignment (especially in tunnels), construction of embankments to prevent floods, and emergency preparedness planning. The project also includes a flood mapping update to reflect future climate impacts and for use in long-term transport planning. Combined, these features will reduce the anticipated risk from climate and geophysical hazards. The Serbia Railways Infrastructure has developed an internal Disaster Risk Assessment document and procedures that define how to manage in emergency situations.

Description of modulating effects of the transportation sector context: In the project country’s transportation sector, there is a limited access to weather monitoring technologies and information. This, combined with the lack of emergency response systems in place to bring in critical supplies for isolated communitiesand relief services in case of extreme weather events, increases the risk from climate and geophysical hazards.

Description of modulating effects of social, economic and political factors in the project country: The investment in this Project, including the planned embankments for flood protection, indicates that the Republic of Serbia is moving towards reducing the risk of natural disasters. In case of emergencies, there is an appropriate action plan, and it can be said that policies are aimed at adequately addressing the problem in that case. However, Serbia needs to pay more attention to timely action and prevention of accidents at an early stage.

5. Risk to the Outcome/Service Delivery of the Project

This section provides information on the level of risk to the outcome/service delivery that the Projectis aiming to provide based on previous ratings.

The actual ratings themselves, while instructive, should inform further consultations, dialogue, andfuture planning processes. Keep in mind that the greatest value of the tool is that it provides a structured and systematic process for understanding climate and disaster risks.

5.1 Level of Risk by Subsector

Table 4 below highlights the impact ratings on the project's components/subsectors, and the overall risk to the outcome/service level for both Current and Future time frames.

The ratings are derived on the basis of hazard information, subject matter expertise, contextual understanding of the project, and modulated on the basis of adaptive capacity, including the Project’s non-physical component, transportation sector context and broader development context.The results indicate what components are most at risk. The results indicate where risks may exist within one or multiple components and where further work may be required to reduce or manage these risks. An ongoing process of monitoring risks, refining climate and other information, and regular impact assessment may also be appropriate.

Table 4: Summary of Risk to Outcome/Service Delivery by Subsector

Sub-sector	Potential Impact		Non-Physical Components		Development Context: Transportation Sector		Development Context: Broader Context		Outcome/Service Delivery	
Timeframe	Current	Future	Current	Future	Current	Future	Current	Future	Current	Future
Rail			Reduce Risk		Increase Risk		Reduce Risk			

Insufficient Understanding	No Risk	Low Risk	Moderate Risk	High Risk

5.2 Level of Risk by Time Frame

Table 5 below draws attention to how climate impacts and risks shift from the Current to the Futuretime frame. Potential impacts to subsectors are evaluated separately for the Current and Future timeframes to capture changes in the exposure from climate hazards over time. For example, projectionsmight indicate that extreme temperature conditions and flood risk are likely to increase significantly.Both of these changes would affect transportation infrastructure.

For investments with long operational lifetimes, such as physical infrastructure, considering futureclimate variability and change is critical to avoid “locking in” designs and features that are only suited to the current climate. For example, roads can be inundated from sea level rise and storm surge or experience damage from earthquakes, while sustained temperatures above 42°C may affect pavement integrity. Furthermore, increases in very hots days can result in rail track deformations. Tunnels and drainage systems capacity can be overwhelmed by excessive precipitation and flooding. These impacts may influence the resilience of transportation investments.

Table 5: Summary of Risk to Outcome/Service Delivery by Time Frame

	Current					Future				
			Development Context					Development Context		
Sub-sector	Potential Impact	Non-Physical Components	Transportation-sector	Broader Context	Outcome/ Service Delivery	Potential Impact	Non-Physical Components	Transportation-sector	Broader Context	Outcome/ Service Delivery
Rail										

Sub-sector	Current					Future				
	Potential Impact	Non-Physical Components	Development Context		Outcome/ Service Delivery	Potential Impact	Non-Physical Components	Development Context		Outcome/ Service Delivery
			Transportation-sector	Broader Context				Transportation-sector	Broader Context	
		Reduce Risk	Increase Risk	Reduce Risk			Reduce Risk	Increase Risk	Reduce Risk	

Insufficient Understanding	No Risk	Low Risk	Moderate Risk	High Risk

5.3 Key Drivers of Risk

Table 6 below highlights the key drivers of risk for each project subsector ratings, in terms ofhazards that are likely to pose the greatest challenge.

The ratings for the potential impact to each subsector reflect the aggregate rating across multiplehazards, drawing on all of the exposure information and expert judgment. For example, extreme temperatures can affect infrastructure and service delivery of multi-modal and transit systems, while sea level rise combined with storm surge can cause damage to port infrastructure.

Table 6: Key Drivers of Risk

	Historical/Current Drivers	Future Drivers
Hazards & Location	Extreme Temperature Extreme Precipitation and Flooding Earthquake	Extreme Temperature Extreme Precipitation andFlooding
Physical Components	Rail	Rail
Outcome/Service delivery	*	*

High Risk	Moderate Risk

*If a cell is blank it implies there are 'No high or moderate risks' identified for this aspect of theproject.

Specific consideration should be given to those hazards which have high ratings, or are moving frommoderate to high ratings over time. For example, sea-level rise may not be a key risk driver in the Historical/Current time frame; but may emerge as a key driver across multiple subsectors in the future time frame. Understanding which hazards are key drivers may help flag follow-on work to manage climate risks within the design and delivery of the project.