

CLIMATE CHANGE ASSESSMENT

I. Basic Project Information

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| Project Title: Multimodal Passenger Hub and Railway Maintenance Project |
| Project Cost (in \$ million): 425.81 million |
| Location: People's Republic of China |
| Sector: Transport |
| Theme: |
| Brief Description: |
| <p>The project outputs are: Output 1: Multimodal Hub developed. This project will construct a multimodal passenger hub in Xichang (Xichang West Station) which is a growing tourist destination in Sichuan province.</p> <p>Output 2: Railway maintenance improved. Track renewal and track laying operations will involve procurement of modern railway track maintenance machines. The equipment will cover track inspection and repair as well as rescue and restoration equipment.</p> <p>The infrastructure components of the project can be at risk to flooding and extreme temperature due to climate change. Low lying areas where the rail road will pass, including the bridges, are potentially the flash point of flooding, river bank erosion, and other similar impacts brought about by the intense rainfall events.</p> <p>The maintenance and operation of the multi-modal hub and railways can also be affected by (i) changes in rainfall pattern – intensity and frequency, and (ii) temperature extremes. The maintenance of the railroads, stations, bridges and other associated infrastructures might need to be more extensive and frequent. Training of staff that will operate the railways should also be covered in managing extreme weather/climatic events, including disaster risk reduction.</p> |

II. Summary of Climate Change Finance (if applicable)

| Project Financing | | Climate Finance (in \$ million) | |
|----------------------------|---------------------------|---------------------------------|------------|
| Source | Amount (in \$ million) | Adaptation | Mitigation |
| ADB Resources | | | |
| Ordinary Capital Resources | 120.00 | 0.32 | 119.68 |

III. Summary of Climate Risk Screening and Assessment

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|--|---|
| A. Sensitivity of project component(s) to climate/weather conditions and sea level | |
| <i>Project component</i> 1. Construction of a rail tracks and stations 2. Construction of a bridges and tunnels 3. Maintenance schedules and coverage | <i>Sensitivity to climate/weather conditions include:</i> 1. Intensity and frequency of rainfall events. |
| B. Climate Risk Screening | |
| Risk topic 1. Precipitation increased | Description of the risk 1. Multimodal hub, including associated facilities such as parking lots, and buildings, may need to consider larger drainage capacity to cope with increasing rainfall (amount and intensity). |

Climate Risk Classification
Medium

C. Climate risk and adaptation assessment

Summary of key findings from the CRA

1. Overall methodology for the risk and adaptation assessment, data and key assumptions used;
 - Simulated precipitation/temperature data were obtained for the following three climate change scenarios: Historical, RCP 4.5 (Low) and RCP 8.5 (high)
 - The climate change will very likely cause temperature to increase in the project area. The annual average maximum temperature at the project site has gradually been increasing since 1950. The observed annual mean maximum and minimum temperatures are 32.21°C and -6.89°C respectively, during the period from 1950 and 2005, while the GMC predicted data are within the range of 32°C to 38.57°C and -5.83°C to -6.07°C under the low and high scenarios, respectively
 - The annual average precipitation increases by 0.1% to 1.4% under the low and high scenarios, respectively, when compared to the historical annual average precipitation of 955.19 mm. By analyzing the annual average rainfall during the wet season from April to October (7 months), the annual average precipitation during the wet season increases by 0.1% to 1.2% compared with historical wet-season data
2. Key climate risks to the relevant components of the project;
 - increase in flood risk due to projected increase in rainfall amount and rainfall intensity in the project area of Xichang. The increase to the rainfall intensity could be significant, especially to the rainfall intensity of storm events of 30-, 50- and 100-year return intervals under the near-term timeframe
3. Adaptation options identified and prioritized for managing the risks.
 - To avoid costly maintenance and/or business disruption in the future, the CRA proposed to consider additional flood risks induced by the climate change impact in designing the project engineering works. Measures for adaptation to the climate change should also be developed in project construction and operation. In response, the project design team increased drain capacity of culverts.

D. Climate Risk Screening Tool/Procedure Used (specify): AWARE Risk Screening

IV. Climate Adaptation Plans within the Project (*if applicable*)

| Adaptation activity | Target climate risk | Estimated adaptation finance (in \$ million) | Adaptation Finance Justification |
|----------------------------|------------------------------------|---|--|
| Increase in drain capacity | More intense and frequent flooding | 0.32 | Due to the projected increase in precipitation intensity from June to September, size of the drainage was increased by 15% from the normal capacity. |

V. Climate Mitigation Plans within the Project *(if applicable)*

| Mitigation Activity | Estimated greenhouse gas (GHG) emissions reduction (tCO ₂ e)/year | Estimated mitigation finance (in \$ million) | Mitigation Finance justification |
|-------------------------------------|--|--|--|
| Switch to low carbon transport mode | | 119.68 | ADB financing will support the railway line which will result in significant modal shift from road to rail (low carbon mode) hereby resulting in mitigation. |

Notes:

* Assumptions: 50 million people connected to smart grid; 885 kilowatt-hours per year electricity consumption per capita; 0.6 tons of carbon dioxide per megawatt-hour emission factor and 5% savings.

** Assumptions: 10,000 motors of 20 kilowatt average capacity each; 3,000 average operating hours per year; 0.6 tons of carbon dioxide per megawatt-hour emission factor; 15% savings.