



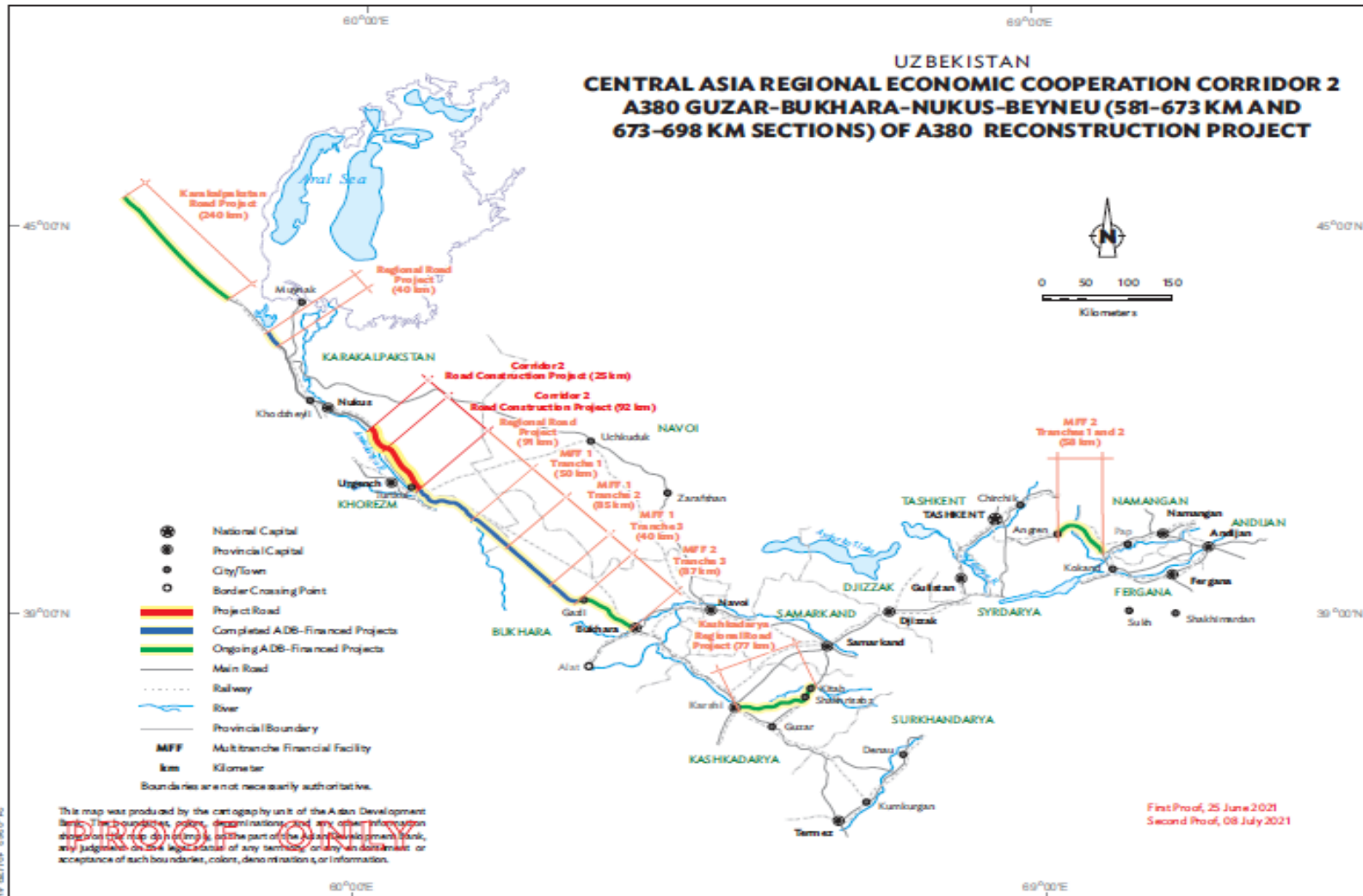
Shaping the Future with Green Roads

Building a Sustainable & Climate Resilient Road Infrastructure - with Digital Twin and AI- Case project in Uzbekistan

Open event (December 7, 2023): Shaping the Future with Green Roads



How we started with the A380 challenge >>> design the road upgrade in a sustainable manner



Project

- Impact assessment for the Asian Development Bank for the A380 highway upgrade in Uzbekistan.
- A 25 km highway section upgrade to widen from one lane per way to two lanes per way, with a separated carriageway
- Objective to reduce the travel time by 15% while increasing the daily traffic by 54%
- Ambition to design the road upgrade in a sustainable manner (reduced environmental footprint, cost-efficient design, resilient to climate change, and reduction in fatalities by 10%).

The pilot work has led to 10% cost and 17% Carbon optimization potential plus natural resources (including 5m litres of water) potential savings

Project

- The project aimed to meet the clients ambitious Sustainability & Circular Economy goals.
- Delivering a **multiple-scenario digital analysis** that helped to make informed and data-driven decisions at an early stage, while improving the design performance in the real local context of upgrading and widening to 4 lanes of a 25-km section.
- The overall analysis allows channeling investments to the most critical items and optimizing the overall financial performance of the project.

Results & Success



1. ROAD PAVEMENT DESIGN
Compared to initial base design.

Cost
- 3.2m\$

CO2
- 6.79 Ktons

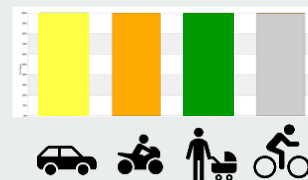
Natural
resources
- 11.9 kT

Water
- 5m liter



2. ROAD SAFETY ANALYSIS

After countermeasures are applied the projects meets and exceeds the **UN safety target of 3 stars** & save **1.800+** serious injured persons and fatalities.

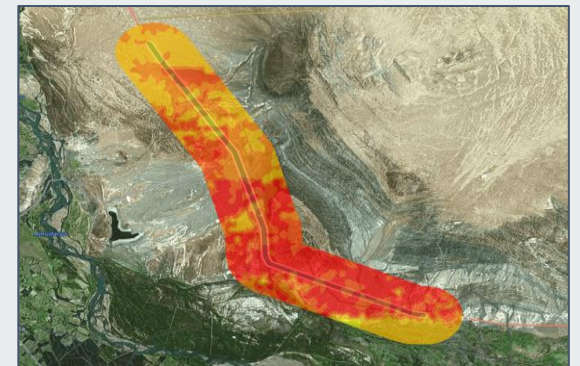


3. ROAD RESILIENCE

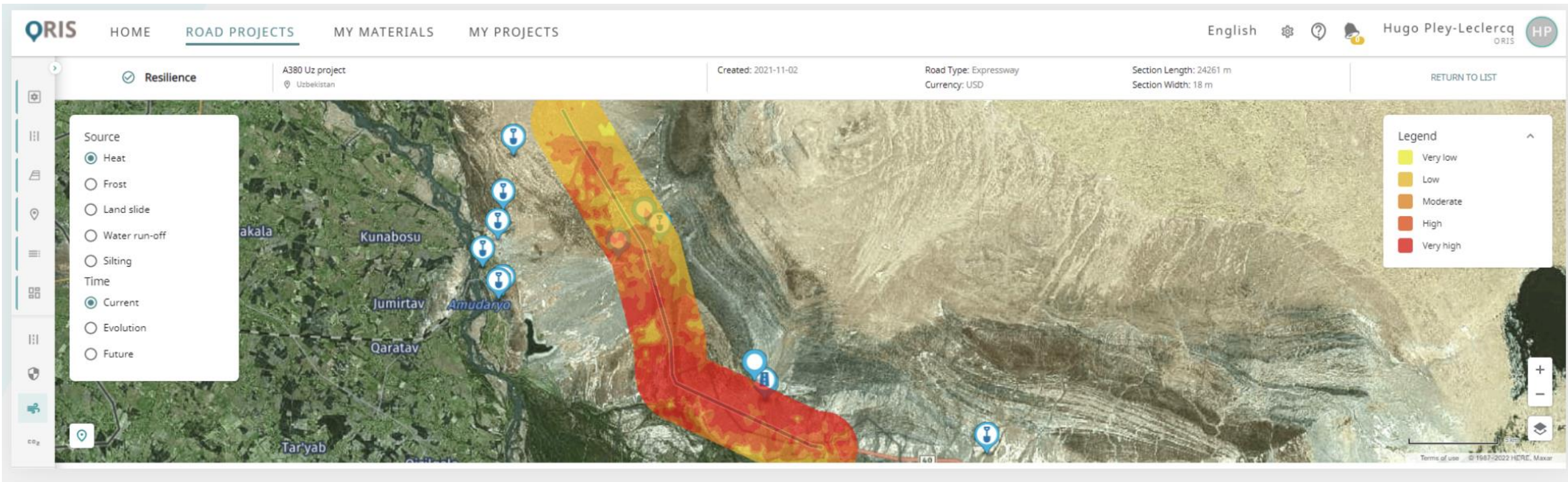
Climate change analysis at 40 years will impact the project in terms of heat, frost/thaw cycles, water run-off floods, silting and landslide.

Adaptation and mitigation measures to climate change and limit later disagreements or damages and avoid early heavy repairs.

Example: Average temperatures in the project region will increase 3,5°C – propose a rigid pavement design.



The platform provided the capacity to digitalize Climate Resilience, Mitigation, and Adaptation analysis for the project.



And fully integrated the IRAP methodology in the platform demonstrating a single platform multidimensional analysis capacity

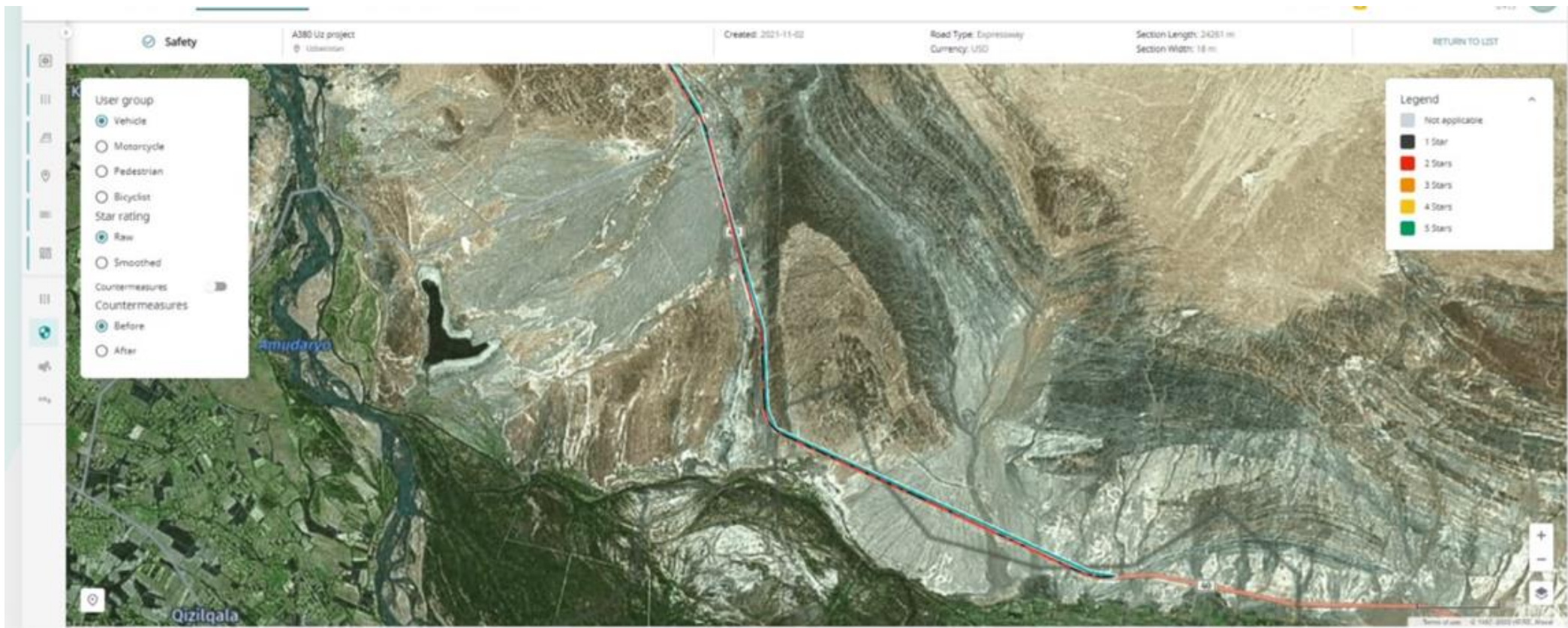


Figure 5: Design safety assessment



Knowledge Event on Building a Climate-Responsive Road Sector

Sharing the result of the pilot in the A380 25km in ADB

More than 250 participants from 36 countries

The First Deputy Chairman of the Committee of Roads from Uzbekistan, Mr Nazarov, ADB DG Stephanie Hung, and DDG Hideaki Iwasaki presented the joint initiative

Using AI / ML, data science, and materials data knowledge, the project could show improved climate resilience, cost, and carbon impacts

TSG Brown Bag Session

Building a Climate-Responsive Road Sector

Tuesday, 25 April 2023
2:00–3:00 p.m., Manila time (GMT+8)
HQ 4A508 Modern Meeting Room

Building of roads and transportation networks face unprecedented challenges, with the dual imperative of being more than ever needed for economic development, at the same time needing to ensure limited climate change impact and minimal contribution to carbon emissions. The use of new digital solutions shows promising results in being able to anticipate, adapt, and mitigate the impact of road construction on climate change.

This session will explore how new digital solutions support the road sector in mitigating its carbon footprint and anticipating climate change impacts to avoid early repairs. Presenters will use real projects to demonstrate the potential of advanced “digital twin” to build a climate responsive road sector, including one in Uzbekistan - delivered in coordination with the e Information Technology Digital Learning Lab.



SPEAKERS



Stephanie King Chung Hung
Director General
Information Technology
Department, ADB



Shukhrat Nazarov
First Deputy Chairman
Committee for Roads, UZB



Pawan Karki
Principal Transport Specialist
CWRD, ADB



Nicolas Miravalls



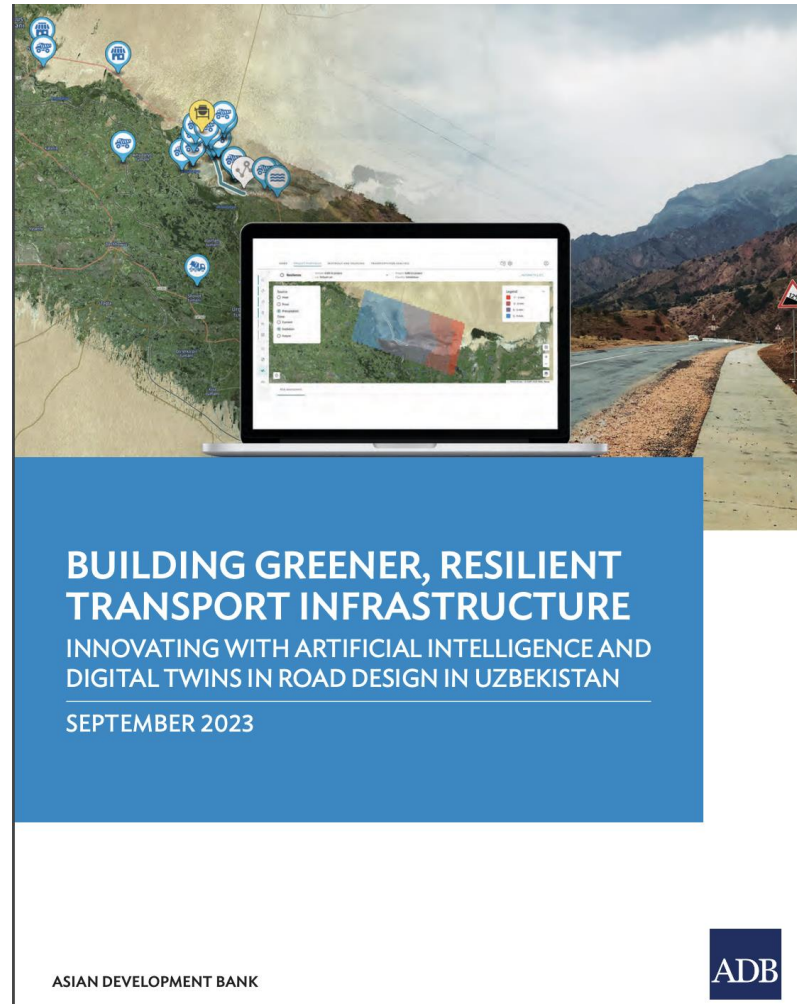
Hugo Plev-L'eclercq
Manager
Finance



Michel Di Tommaso
General Manager Istituto
Meccanica dei Materiali SA



An ADB Publication based on the Uzbekistan case project was released last September



ASIAN DEVELOPMENT BANK



Use of the Digital Platform extended to two more projects in Uzbekistan... Demonstrating how digitalization can help develop climate-resilient projects

Project 1: A380 25 Km Highway *Completed*

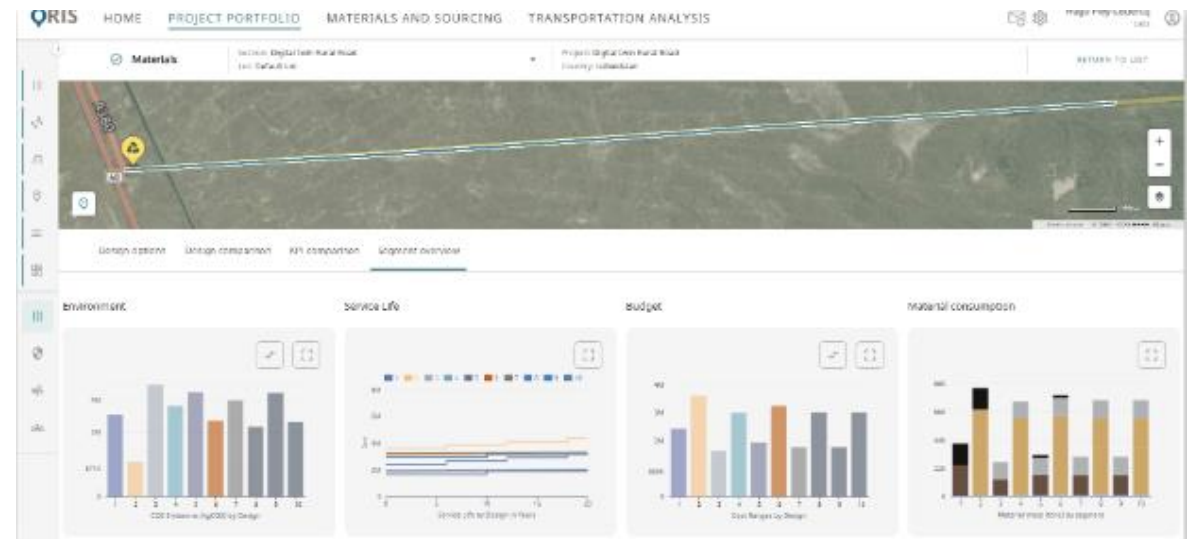
- Pavement optimization (costs, material resources), Road safety improvement, Road sustainability (Potential Carbon Emissions reductions), Resilience to climate change exposure analysis and recommendations
- Paris Agreement Alignment Assessment

Project 2: 4R180 Rural road *Completed*

- Pavement optimization, Road safety improvement, Road sustainability (Potential Carbon Emissions reductions), circular economy, Resilience to climate change exposure analysis and recommendations
- Paris Agreement Alignment Assessment

Project 3: 250 km Rural Roads - *Completed*

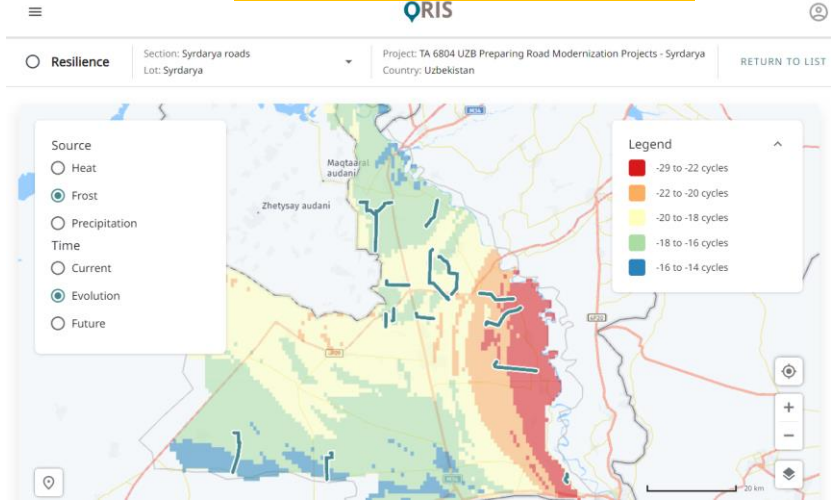
- Climate change expertise
- Digitalization of the Preliminary Climate Risk Screening for 140 km of rural road in 2 districts
- Ongoing climate risk assessment and management and Paris Accords Alignment Assessment



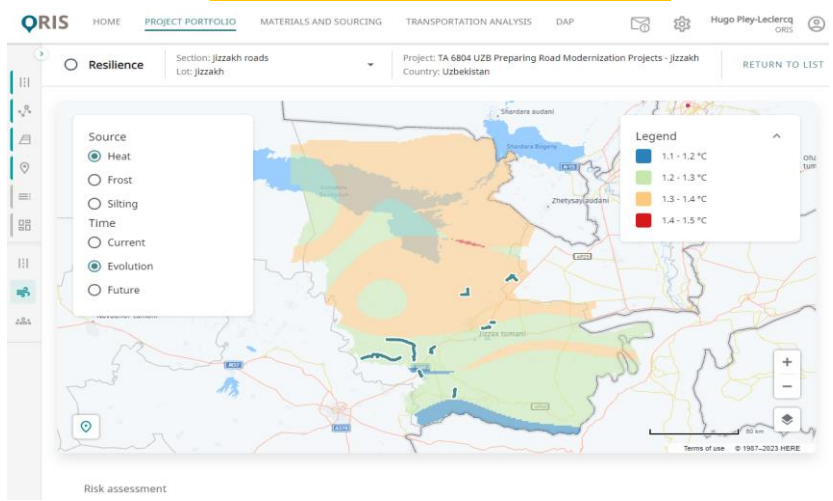
- + 2 additional scope of work on network level assessment and climate - resilient road projects
- + Additional capacity in ORIS platform since the completion of the A380 pilot in 2022

Climate risk and vulnerability mapping in the Rural Road Project – a more systematized approach to complex road network resilience and adaptation analysis

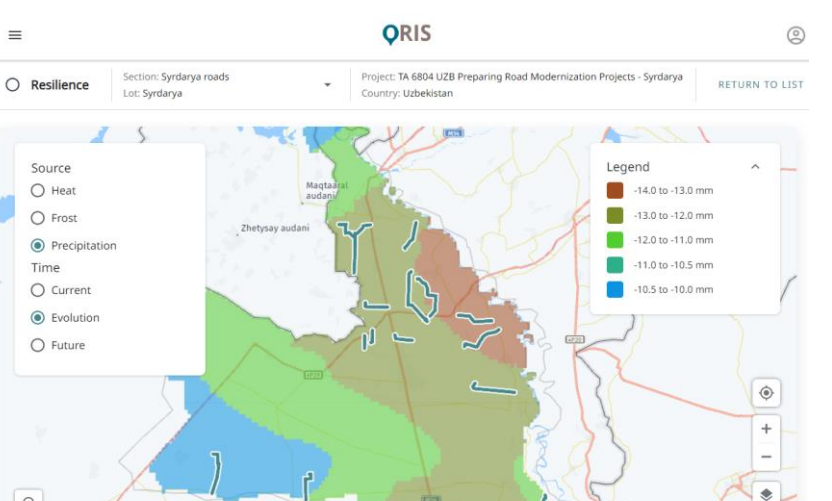
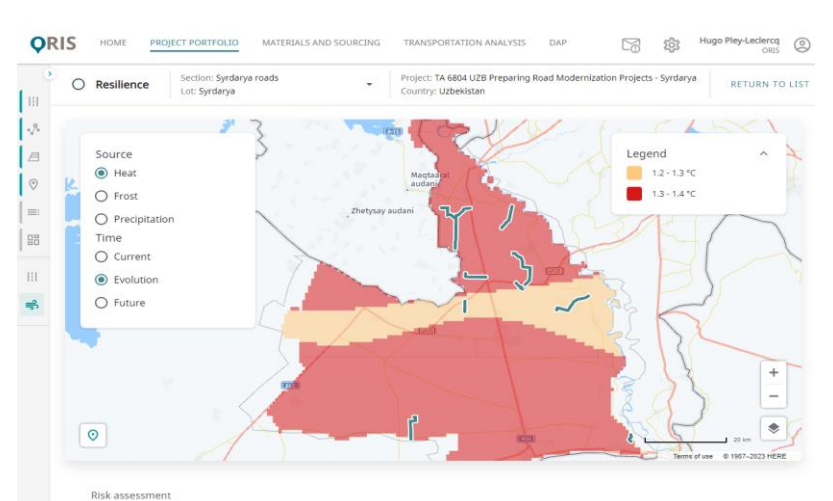
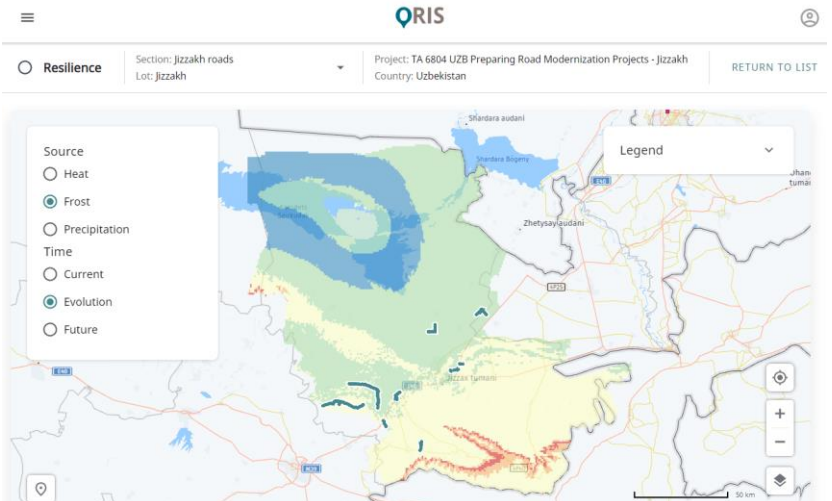
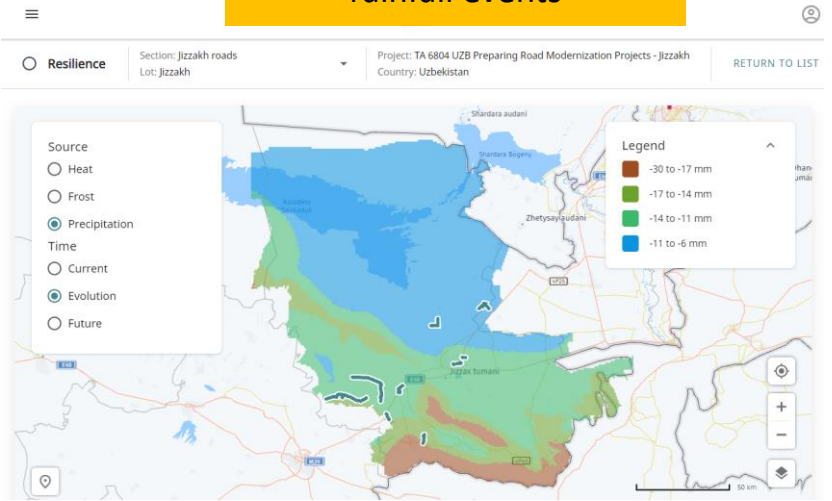
Frost



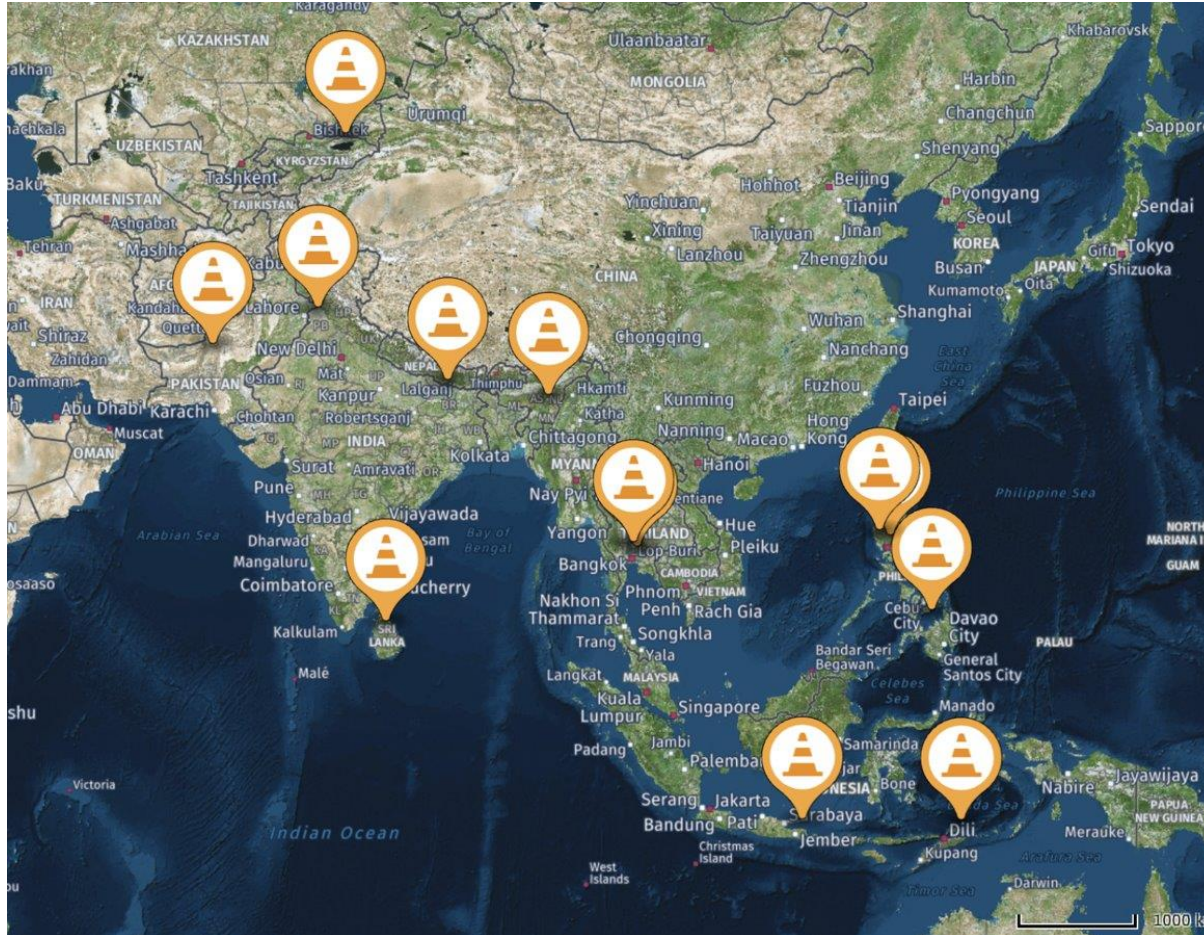
Heat



Precipitation and extreme rainfall events



With a high potential to support other transport project closely linked to climate resilience, mitigation, optimization, and adaptation targets.



12 Road Projects

*Thailand (1), Kyrgyz (1), Pakistan (2), Philippines (3), Indonesia (1), Timor Leste (1), India (2), Sri Lanka (1)

2 TASF

(Thailand/Vietnam, Philippines)

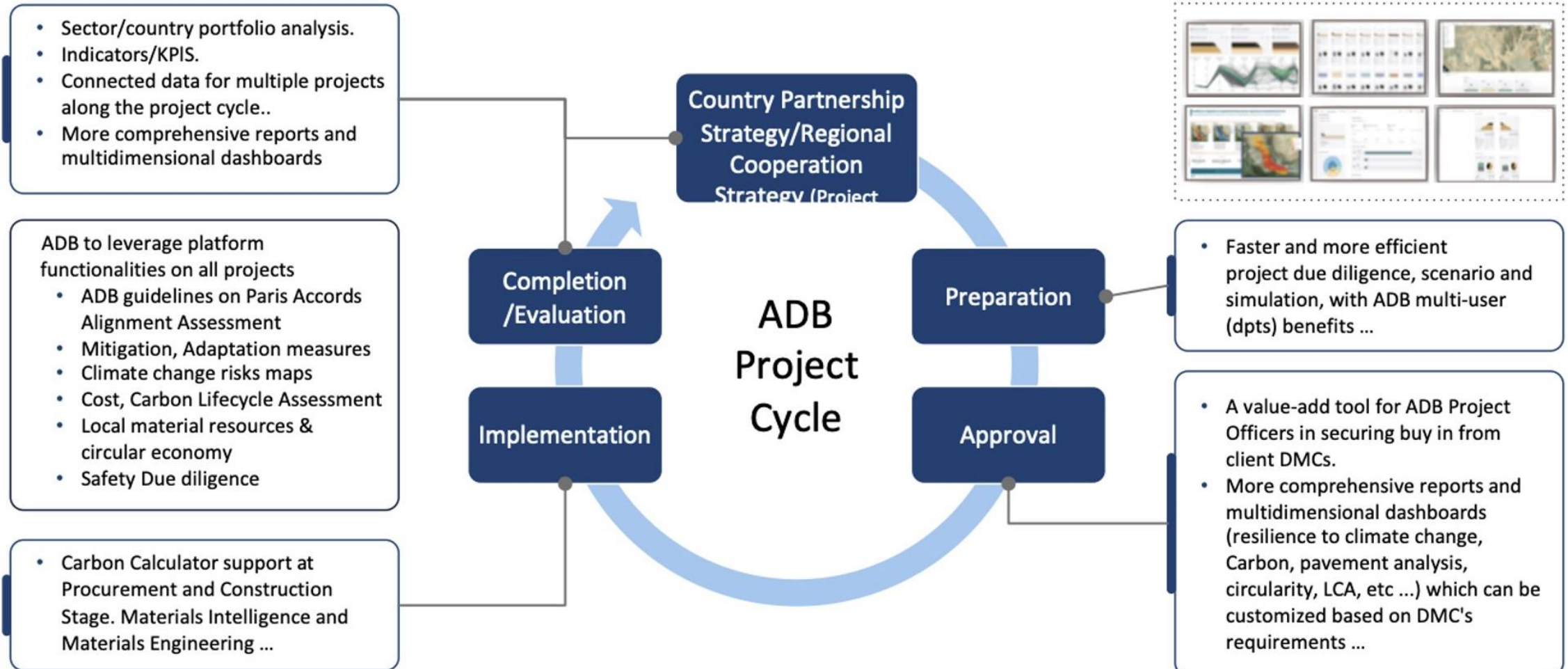
*Regional : Preparing Sustainable Southeast Asia Transport Projects – USD 2.5 Mn

TA: Preparing Climate Resilient Southeast Asia Transport Projects

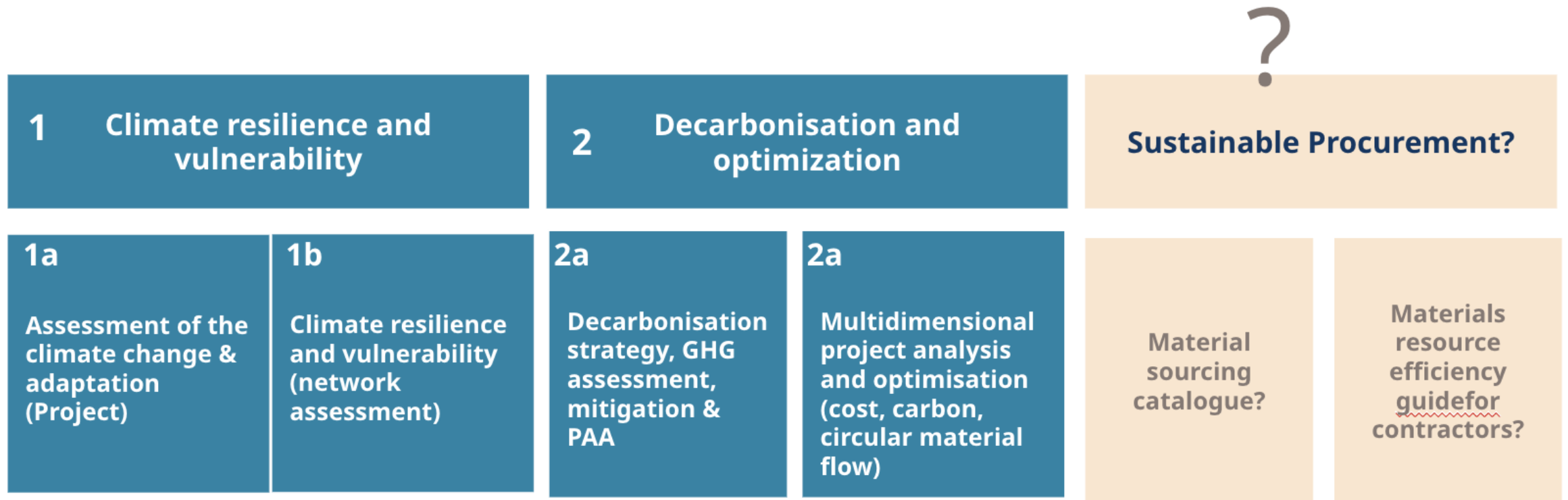
*Philippines : Infrastructure Preparation and Innovation Facility, Second Additional Financing - USD 200 Mn + USD 500k

TA - Promoting Climate Smart Infrastructure

Digital Twin Platform demonstrated and potential additional capacity along the ADB Project Cycle



From pilot project to potential ADB-wide implementation in the use of AI / Digital Twins as an accelerator in attaining targets towards building a more Sustainable, Climate Resilient, Adaptation-oriented Transportation projects in a more systematized manner





Shaping the Future with Green Roads

Thank you

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