CAREC
Central Asia Regional Economic Cooperation Program

21st Transport Sector Coordinating Committee Meeting

22–23 April 2024 • Almaty, Kazakhstan

21-е заседание Координационного комитета по транспортному сектору

22–23 апреля 2024 года • Алматы, Казахстан

Climate-Resilient Road Asset Management

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The resilience questions we want to answer

- What level of adaptation is needed within a city/region
- Where are the priority risk exposure areas
- Where will our investment have the greatest impact to reduce damage and harm
- How could we integrate the resilience improvements with maintenance and renewals
- How could we respond and recover better from disasters

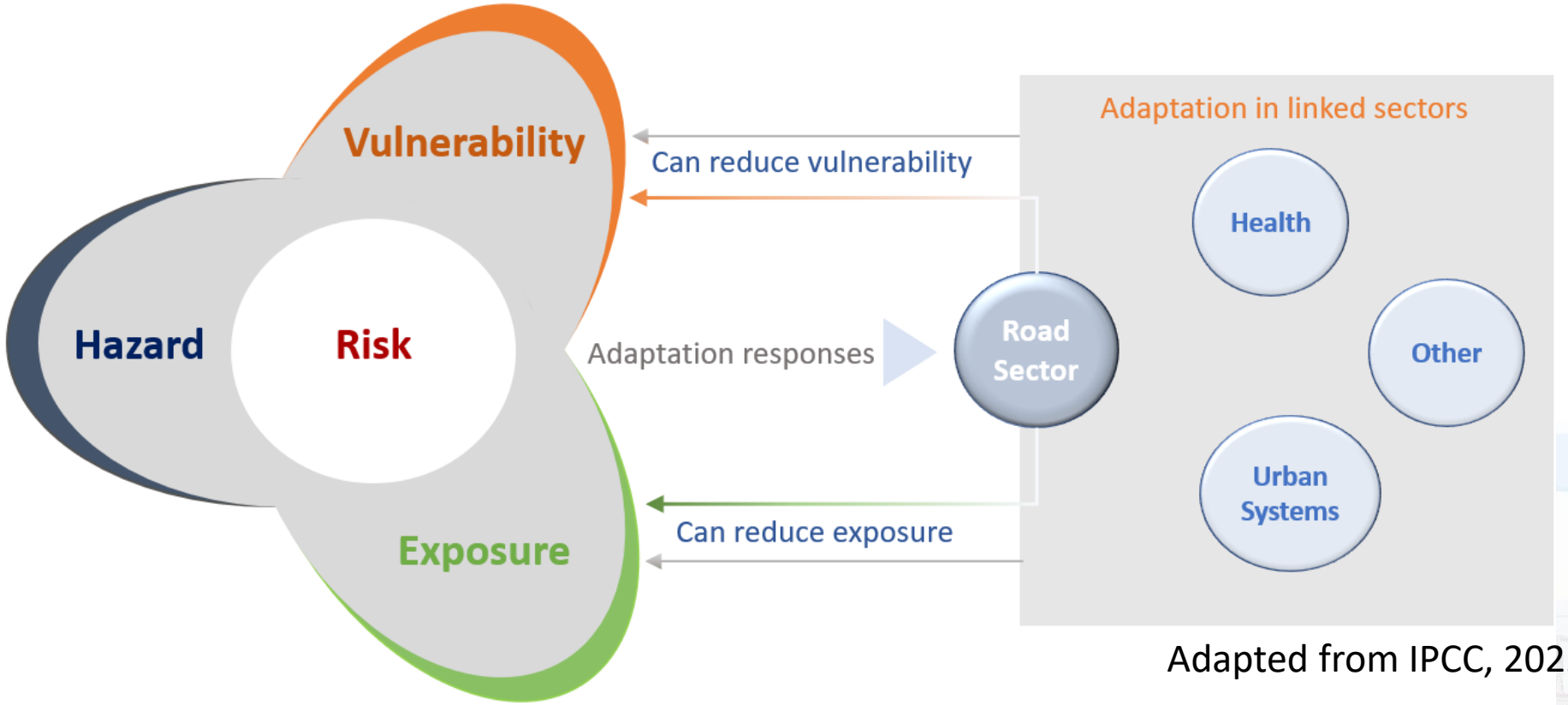
Today's Topic

Using Road Asset Management for effective climate resilience planning

How to develop a Road Map for implementing Resilient Road Asset Management

Resilience

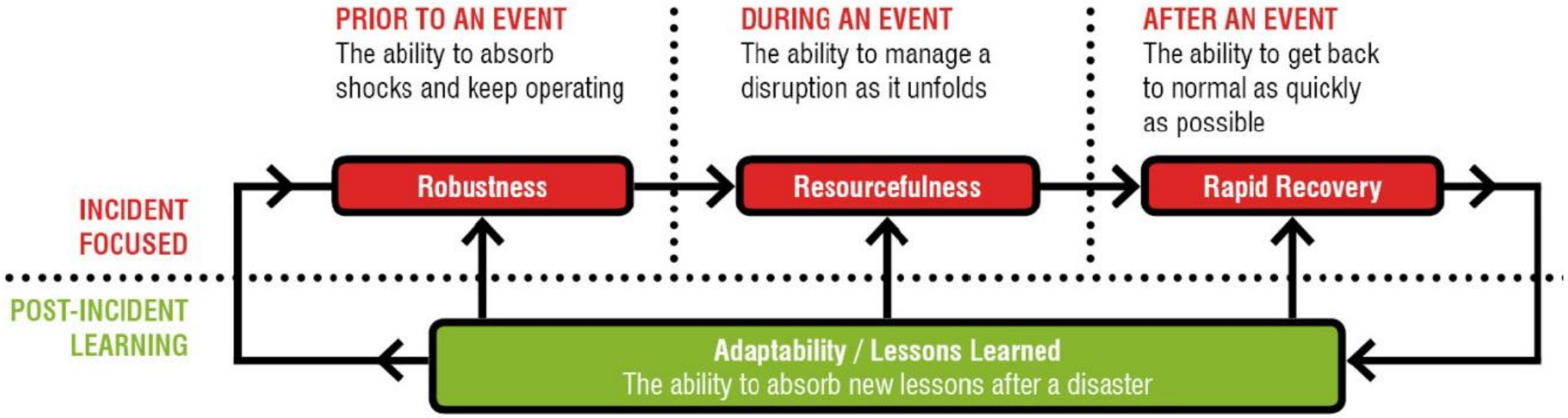
The capacity of social, economic, physical (e.g. infrastructure) and environmental systems to cope with a hazardous event, trend or disturbance by responding or reorganising in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation (IPCC, 2014)



Adapted from IPCC, 2022

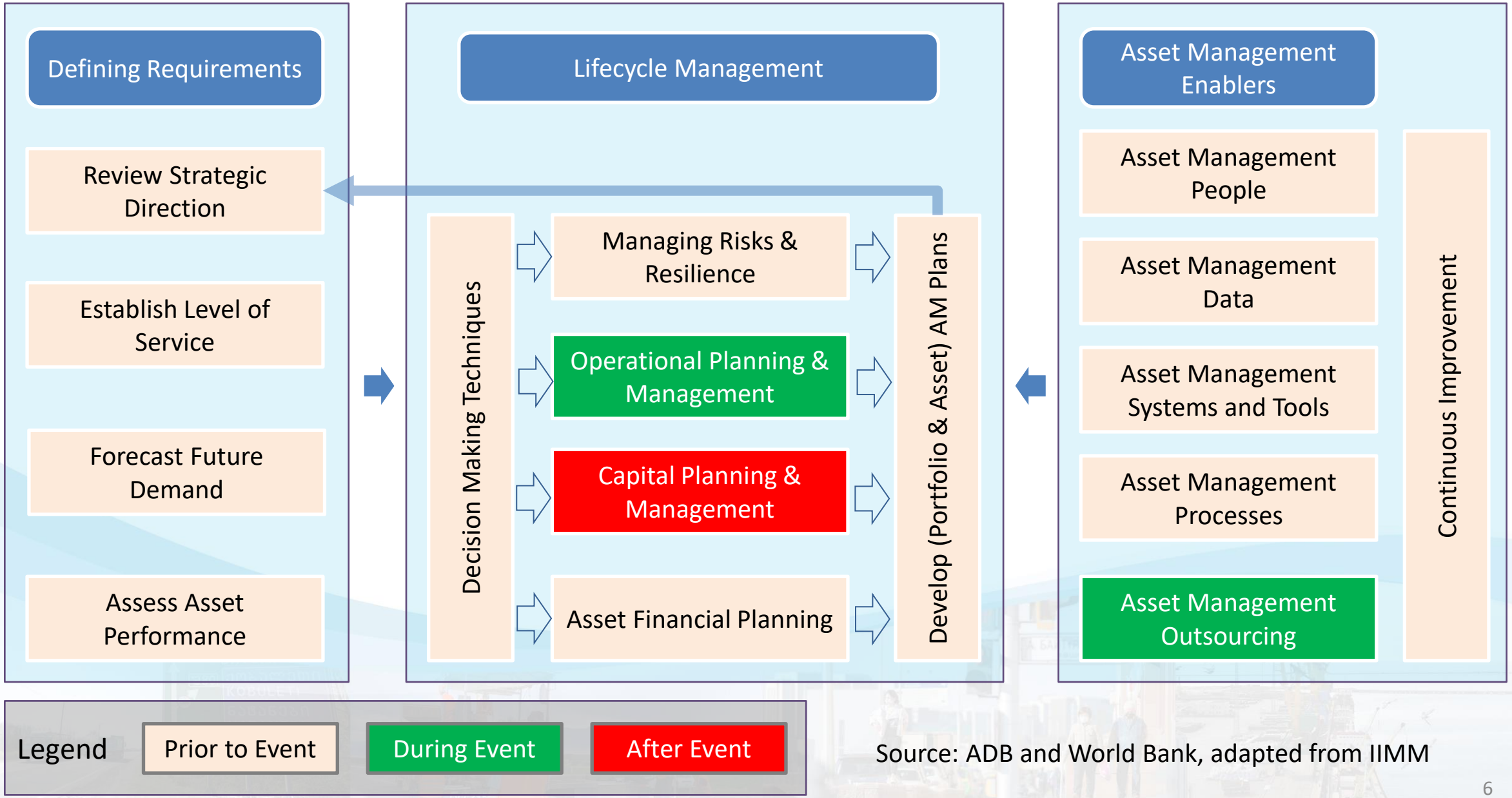
3-Rs of Resilience

Readiness **Response** **Recovery/ Reconstruction**



Road Asset Management could assist in building resilience in all three of these stages

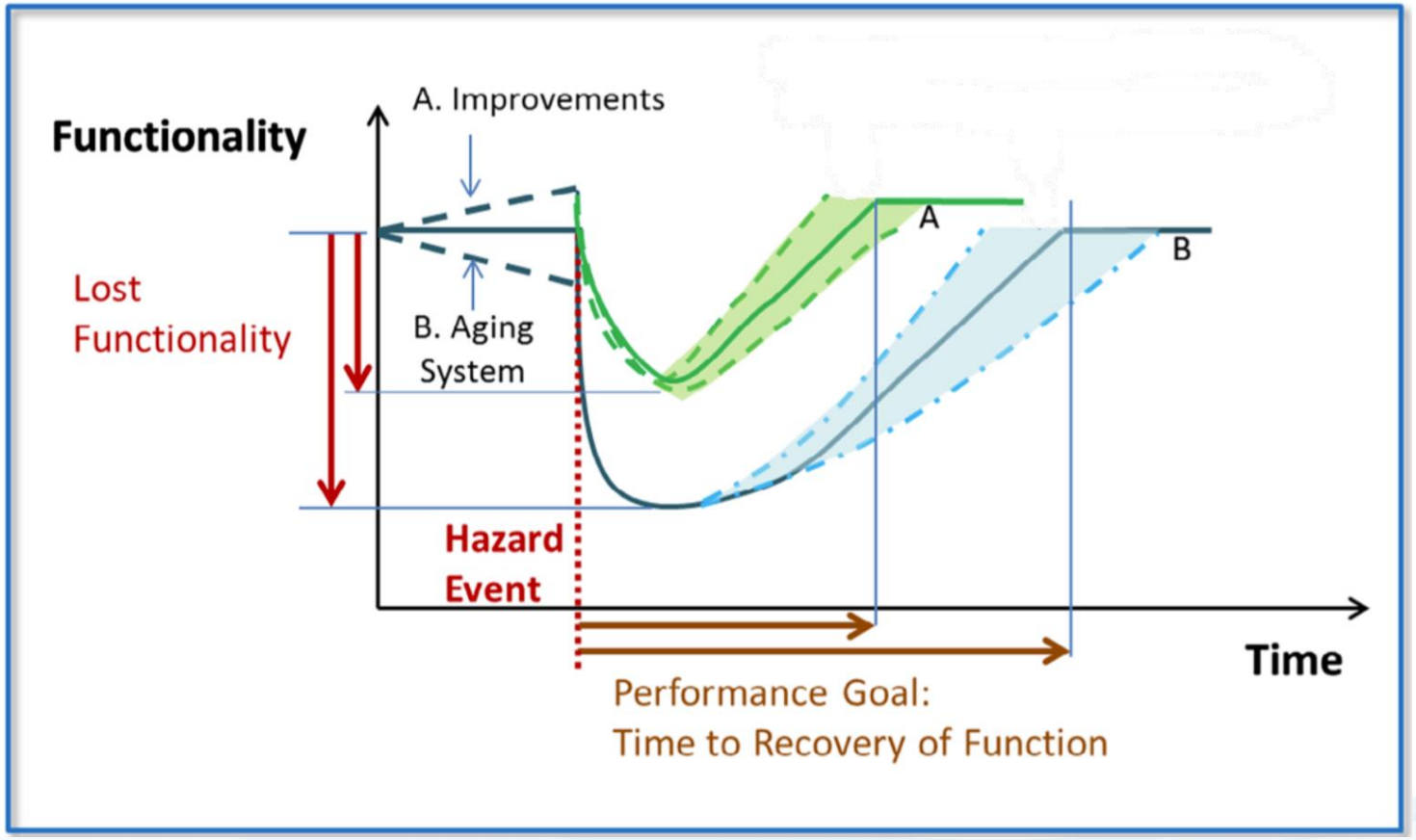
Climate-Resilient Asset Management



Source: ADB and World Bank, adapted from IIMM

Improving the Resilience of Infrastructure

System Resiliency Curves



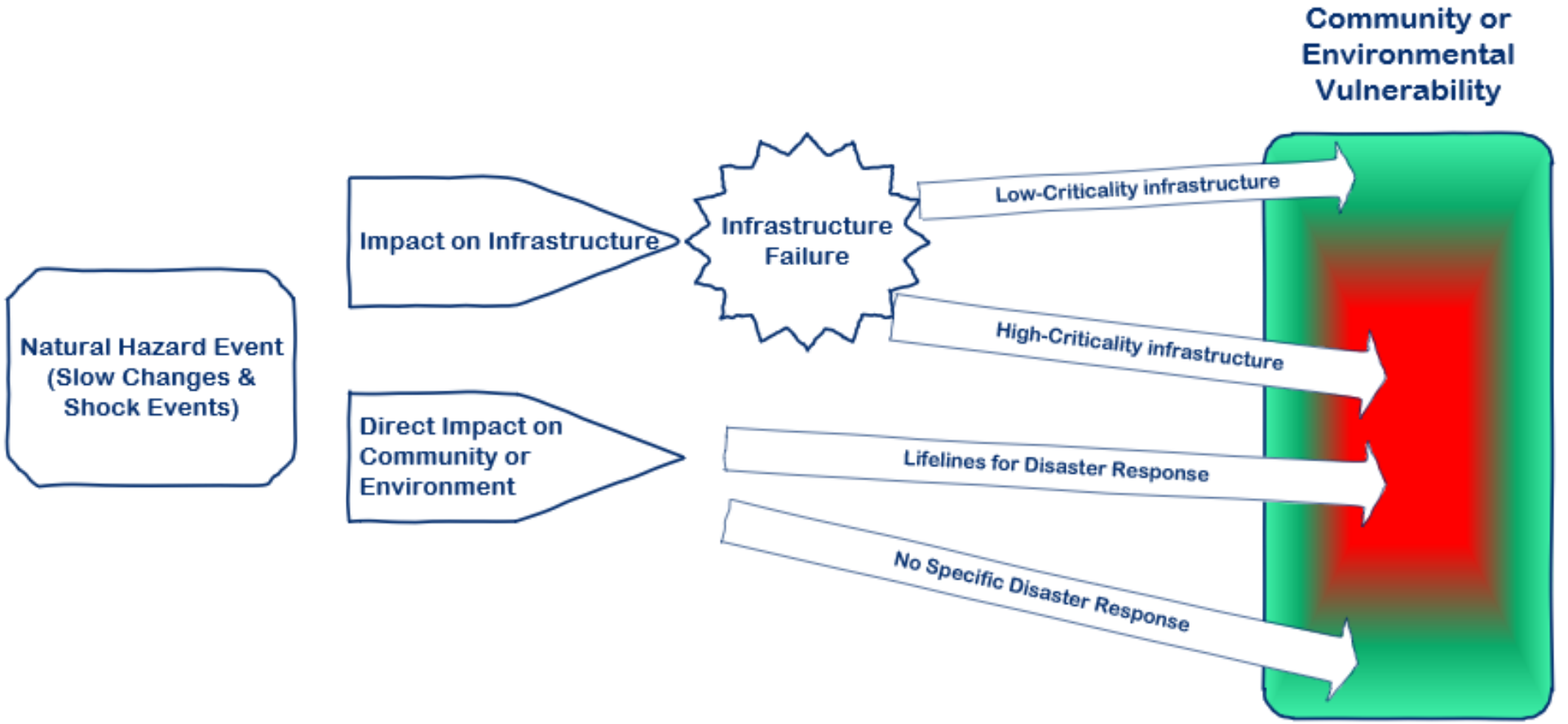
Infrastructure Resilience Improvement

- Prevents the level damage and loss of service
- Results in a quicker recovery time
- Return on Investment for resilience is often significant
- A well maintained infrastructure network is by nature more resilient

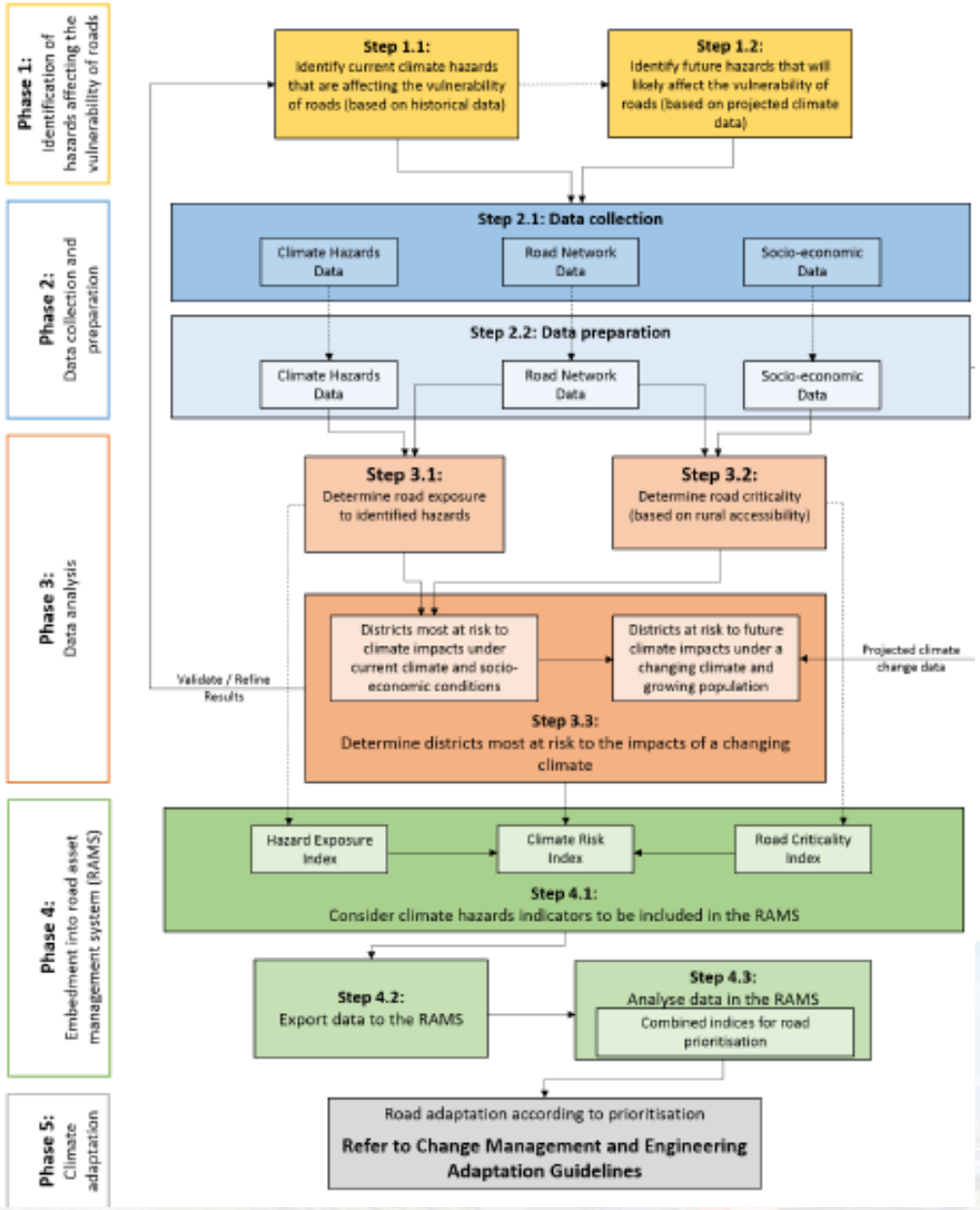
Source:
https://imgur.com/gallery/3F82Ot

Road Criticality

We will never have enough funding to address all resilience issues - we have to prioritise



Climate Risk Planning Process



Understand hazard

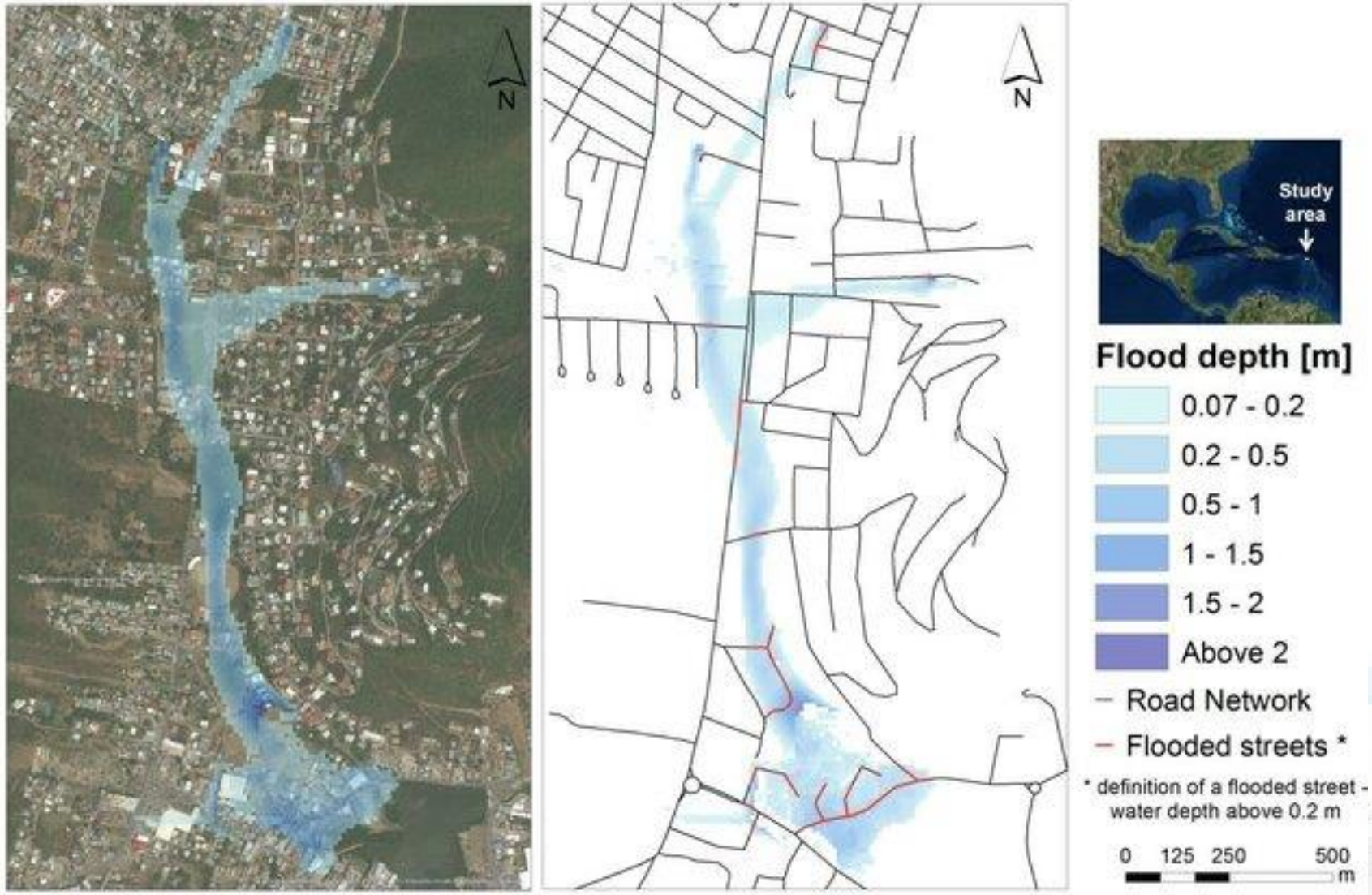
Network and climate data

Determine Risk and criticality

Integrate with RAMS

Source ReCAP -Le Roux 2019

Example Road Network Impact Due to Flooding



Source: Katya Pyatkova

CR Maturity Assessment Scope of Review

Source: ADB adapted from DPWH-Philippines and World Bank

Mongolia Actions

RAM Component	Improvement Actions	Priority H/M/L
Resilient RAM Data	•Undertake a multi-hazard risk analysis to identify critical and high-risk hotspots on the network	H
	•Undertake a specialist network survey to determine locations susceptible to permafrost failures	M
	•Establish long term pavement performance (LTPP) sites across the network.	M
Resilient RAM Business Process	•Prepare a Climate Resilient Transport Policy (or integrate with an overall RAM Policy), with approval by Senior Government officials (Minister and Secretary) to lead.	H
	•Update design and maintenance standards and specifications to reflect climate change.	M
	•Update budgeting process to bring climate-resilience into the allocation of budgets.	M
	•Establish the business process to integrate climate resilience projects with routine maintenance and renewal programmes.	M
	•Update procedures for monitoring hazards.	M
People	•Develop internal skill resources on climate hazard identification and adaptation strategies to address these hazards.	M
Training	•Develop a training strategy for climate resilient design and integrated planning.	H
	•Undertake training and update design and maintenance practices related to adaptation strategies. A particular focus is required to consider changes on permafrost.	M
RAMS	•Complete implementation of asset management system	H
	•Ensure RAMS is capable of storing hazard data.	H
Technology	•Implement pilot of technology for automatic monitoring of weather conditions on at least one mountain pass.	H
	•Implement automated monitoring of pilot permafrost sites (Western Regional Roads as a priority)	M
	•Monitor effectiveness of piloted permafrost solutions,.	H
Works Program	•Update practices of budget allocation to include climate-resilience requirements in decision making.	M
Funding	•Develop methods to ensure there is recognition of the financial risks of climate change.	M
	•Explore options for different financial instruments to address climate change.	M

Source: ADB – Climate Resilient Transport Workshop 2023

Key Points

- Capacity and capability for climate responsive asset management is much wider than just software –we need people skills business processes and various tools
- Three stage of Resilient RAM Development Road Map
  - Current state – current capacity and capabilities in asset management
  - Future state – the capacity and capability needed to include climate adaptation to asset management
  - Development Roadmap -> The deve3lopment pathway to reach desired future state
- To be sustainable, all enablers should be Fit for Purpose that takes account of the complexity of the issues, size and capacity of the organization and budget

Thank you

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