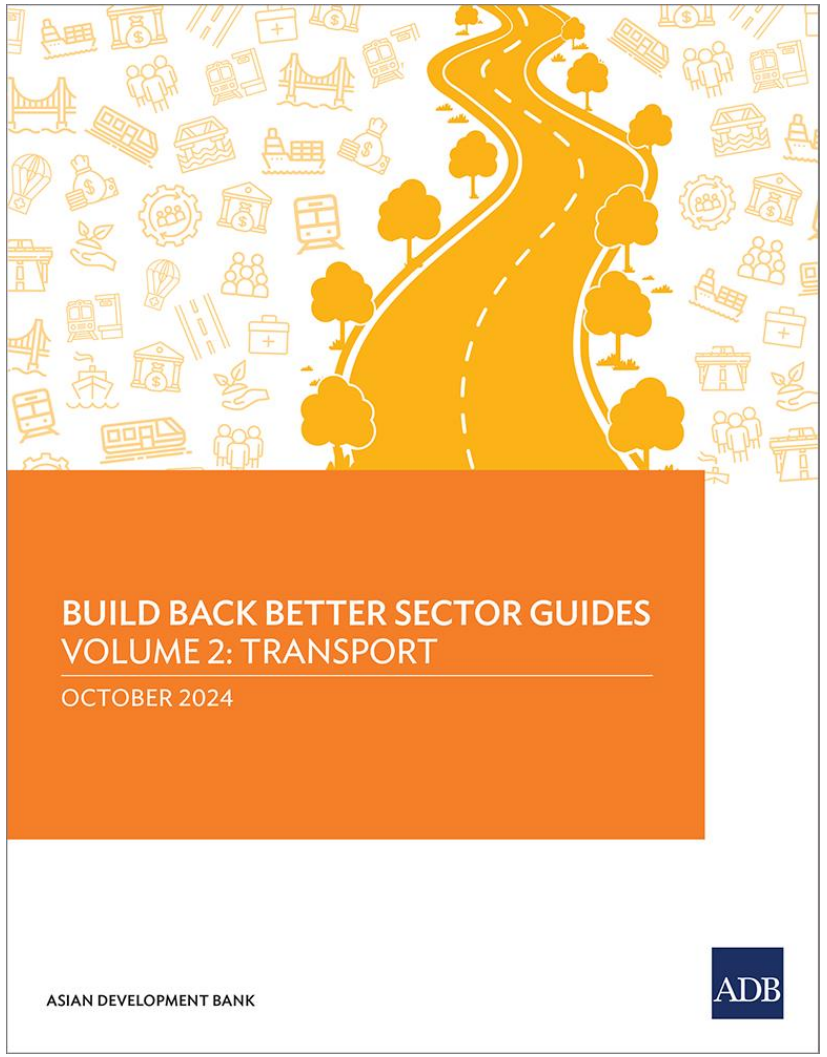
GREEN ROADS WEBINAR

BUILD BACK BETTER

TRANSPORT SECTOR GUIDE



13 February 2025

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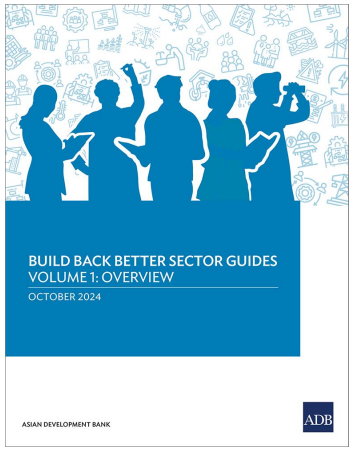
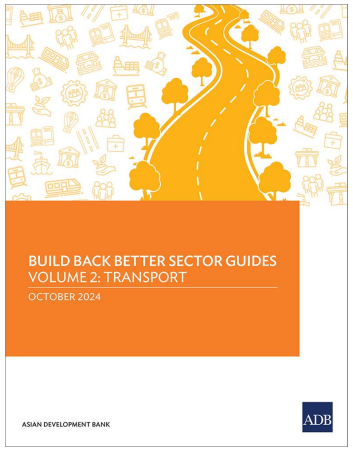
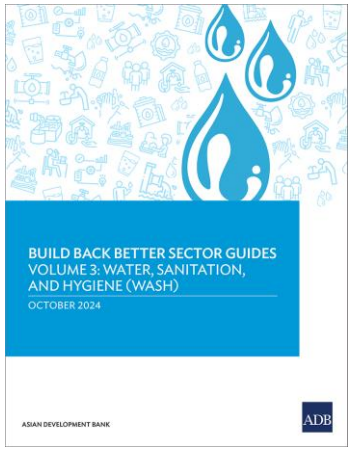
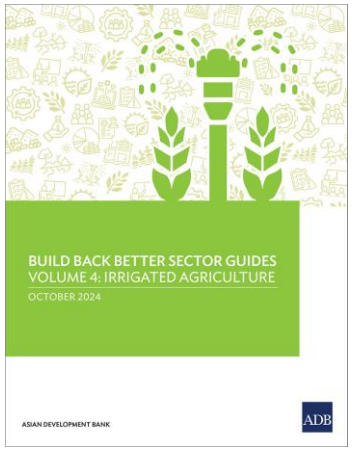
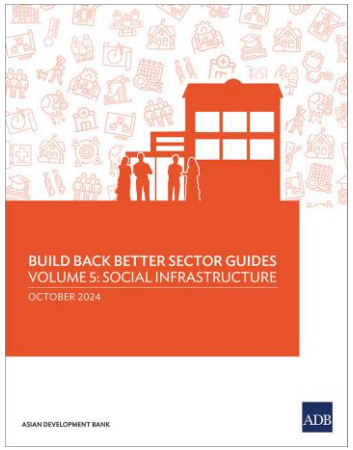
SECTOR GUIDES

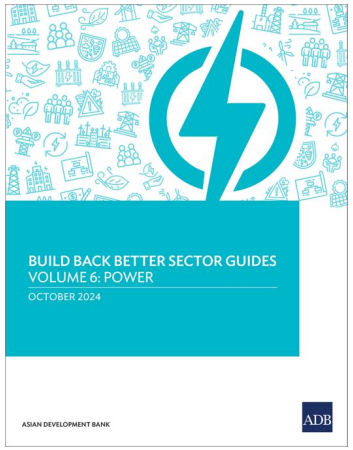












The *Build Back Better Sector Guides* provide practical resources to support clients, partners, and staff of the Asian Development Bank to enhance the climate and disaster resilience of communities, infrastructure, and systems through effective post-disaster assistance.

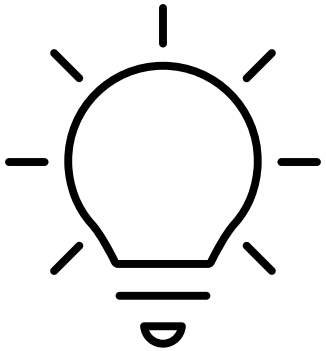
They cover six areas: general overview, transport, water, sanitation and hygiene (WASH), irrigated agriculture, social infrastructure, and power.

https://www.adb.org/publications/series/build-back-better-sector-guides

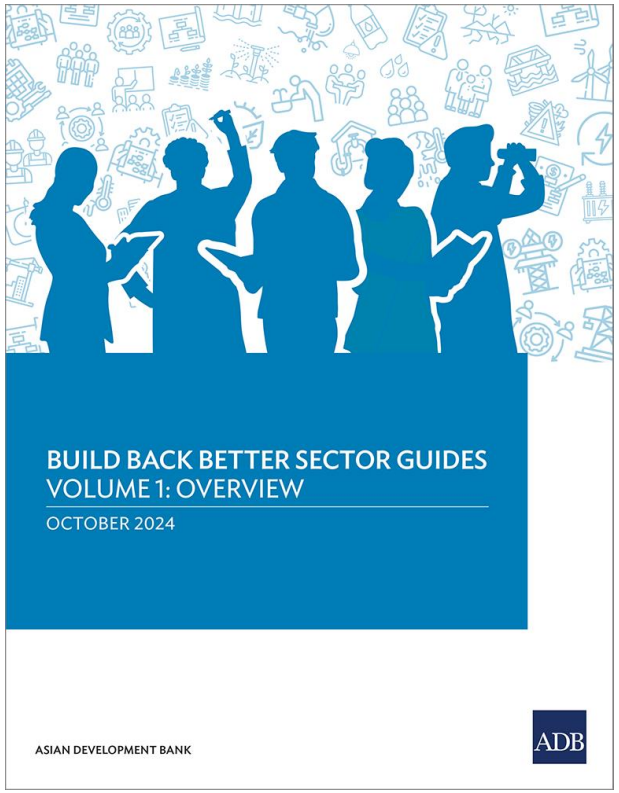
BUILD BACK BETTER
SECTOR GUIDES

OVERVIEW

Principles



- Risk reduction
- Capacity development
- Local leadership
- Inclusion and equity
- Quality
- Innovation and technology
- Scalability



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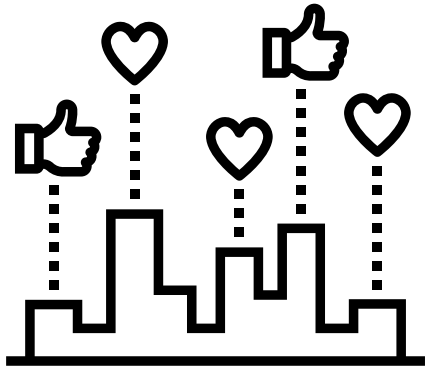
SECTOR GUIDES

OVERVIEW

Crosscutting Climate and Disaster Resilience Measures

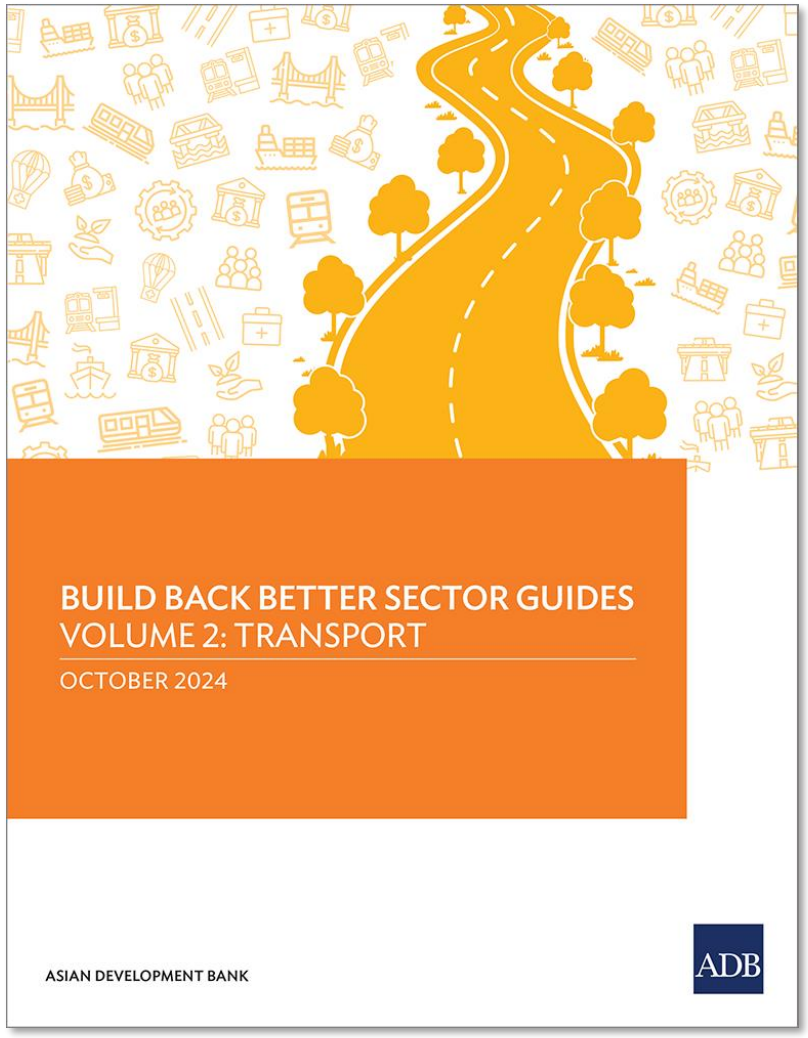


1. Institutional Resilience Building and Governance Arrangements
2. Risk Assessment
3. Early Warning Systems
4. Land-Use Planning
5. Integrated Flood Risk Management
6. Resilient Building and Infrastructure Standards
7. Capacity Development on Resilient Buildings and Infrastructure
8. Strengthening Local Community Social Systems
9. Shock-Responsive Social Protection
10. Resilient Livelihood Recovery

Objectives for post-disaster transport recovery & reconstruction

Post-disaster recovery should reduce future damage and loss; improve the resilience of transport assets, users, owners, and operators, and….

- Improve **connectivity and reliability** to enable long-term economic recovery and revitalization, with future growth and transport needs in mind.
- Improve **transport accessibility and equity**, particularly for women and girls, the poor, disabled, elderly, and other marginalized populations.
- **Enhance transport safety** and address the chronic socioeconomic burden of road trauma through design, road user education, and capacity building.
- Leapfrog to **green, efficient, smart, and low-carbon solutions** that promote decarbonization and demotorization of the transport sector, in support of Nationally Determined Contributions and healthy environments.



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Resilient Recovery Challenges for Transport

- **Time pressure.** While many post-disaster assistance projects are under significant time constraints, transport projects particularly are, given the need for the speedy delivery of relief, reparation of assets, and economic recovery.

- **Knock-on impacts of decision-making.** Following severe damage or heightened risk levels (e.g., slope failure or destabilization), decisions on whether to reinstate, realign, or decommission transport infrastructure as part of a transport recovery plan have significant impact on people, existing infrastructure, and regional connectivity, particularly in the case of a managed retreat.

- **Labor and material needs.** Transport projects, particularly in the case of road restoration, require significant volumes of construction materials and labor, compared to other sectors.

Climate & Disaster Resilience Measures

- Network Planning, Integration, and Redundancy
- Green Transport Networks
- Intelligent Transport Systems
- Resilient Structures
- Resilient Materials Selection
- Enhanced Drainage
- Slope Stabilization and Erosion Control
- Transport Sector Capacity Development

Network Planning, Integration and Redundancy

Reconstruction on a wide scale presents an opportunity to review the performance of transport systems and existing bottlenecks from the local to national levels, so that network improvements will enhance performance in future emergencies.

In Samoa, the **Cross Island Road** provides a critical alternative between the island's northern and southern coasts in the event of cyclone and tsunami. After the devastating impacts of Tropical Cyclone Evan in 2012, a significant portion of the road network fell into disrepair. The ADB funded project (51268-001) upgraded 20 kilometers of the main road link for future safe evacuation. The project also addressed climate-responsive road maintenance and the capacities of Samoa's Land Transport Authority

Source: ADB. Samoa: Central Cross Island Road Upgrading Project.

Green Transport Networks

Repair and reconstruction of transport corridors provides an opportunity to prioritize water management and nature-based solutions as part of planning and design for some components of the transport network.

The ADB **Pakistan: Flood Emergency Reconstruction and Resilience Project** (49038-001) supported the rehabilitation and reconstruction of high-priority infrastructure, including roads and bridges following the 2014 flooding and landslides in Pakistan's northern regions. Nature-based solutions and bioengineering were employed as a slope stabilization technique to reduce future landslide risk. Planting of road corridors provided a vital post-disaster income opportunity to community members, including a large proportion of women.

Source: ADB. Pakistan: Flood Emergency Reconstruction and Resilience Project.

Green Transport Networks

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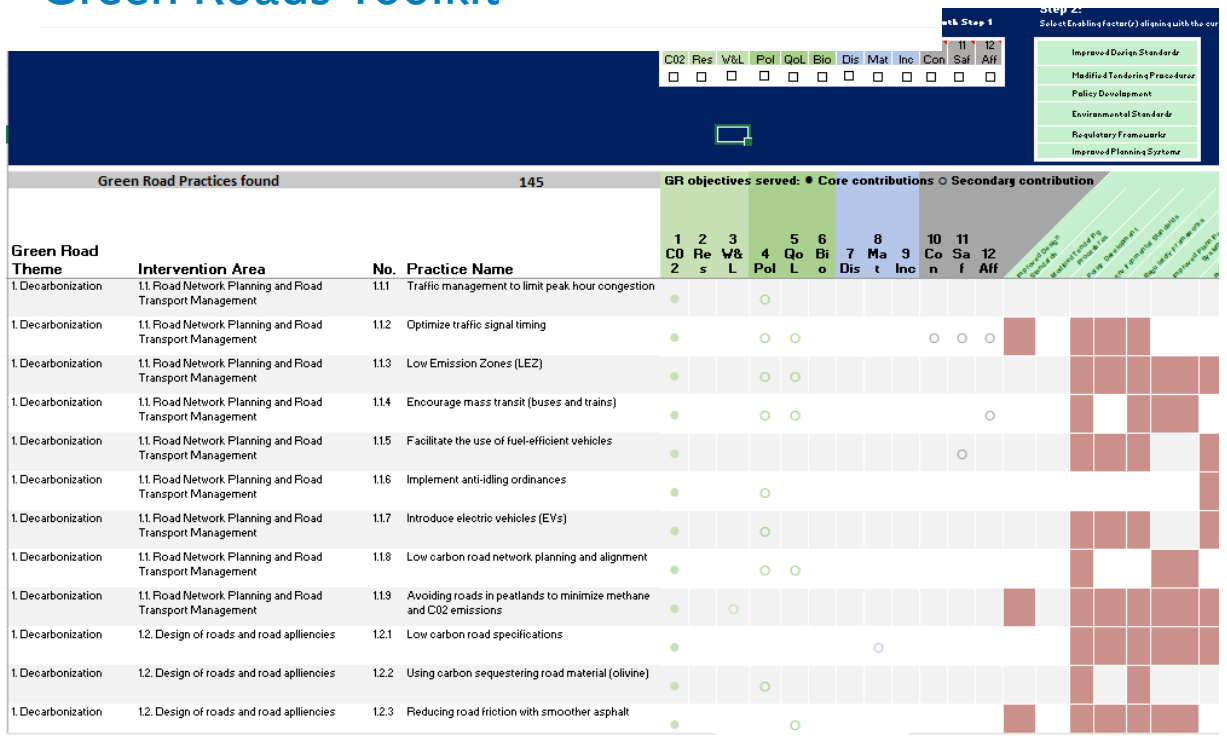
Green Roads Toolkit



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Intelligent Transport System

An intelligent transport system (ITS) collects and shares real-time data on user traffic, environmental conditions, asset conditions, and network performance to accurately predict future traffic demand and incremental risk and to enable adaptive management, operation, and maintenance.

ADB's **Uzbekistan: Central Asia Regional Economic Cooperation Corridor 2 Karakalpakstan Road (A380 Kungrad to Daut-Ata Section) Project** (48414-006) includes ITS to provide real-time information on road conditions (including climate hazards) to transport authorities and drivers.

Source: ADB. Uzbekistan: Central Asia Regional Economic Cooperation Corridor 2 Karakalpakstan Road (A380 Kungrad to Daut-Ata Section) Project

Resilient Structures

Selection of structural resilience measures must be based on an understanding of class of transport infrastructure components, climate change scenarios, vulnerability to identified hazards, and projected impacts over the infrastructure lifetime.

The **Solomon Islands: Emergency Assistance Project** (41105-012) of the ADB supported the rehabilitation and maintenance of roads, bridges, footbridges, wharf, and jetty that were damaged and destroyed by an 8.1 magnitude earthquake. Australian and New Zealand design standards were adopted as the most appropriate in lieu of local standards to reduce further vulnerability to natural hazards. Bridges and beams were anchored to pile abutments to prevent the rising of bridge decks from their supports. Road drainage was reinforced with concrete culverts, replacing existing structures.

Source: ADB. Solomon Islands: Emergency Assistance Project.

Resilient Materials Selection

Materials must be selected with care, bearing in mind functional requirements (e.g., performance, availability and familiarity of the contractors for use of such material, local conditions, hazards, maintenance implications) and availability, as well as sustainability and cost. Evaluating which materials functioned well or failed based on learning from previous disaster and climate impacts can help to inform context-specific resilience solutions.

The **Maldives: Tsunami Emergency Assistance Project** (39099-013) was instrumental in the reconstruction of several islands devastated by the 2004 India earthquake and tsunami. The reconstruction and upgrade of Dhidhdhoo Island Harbor in the capital of Maldives incorporated a range of resilient materials. These included an enduring rock type for the seawalls in contrast to the previous gunny sacks with cement, which decompose within a few years; steel piling for the quay; and reinforced concrete for the docking areas.

Source: ADB. Maldives: Tsunami Emergency Assistance Project.

Enhanced Drainage

It important to provide adequate water drainage and retention systems to account for future rainfall and flood scenarios based on assessment of future climate scenarios.

The **Cambodia: Flood Damage Emergency Reconstruction Project** (46009-001) supported the reconstruction of damaged and/or destroyed roads and bridges as a result of the 2011 Mekong River floods and 2013 flashfloods. The project improved the resilience of roads and bridges to flooding by providing slope stabilization. Gabion retaining structures were built near major bridges and road embankments close to the Mekong River, and side drains were created in urban areas. Grass planting improved the stability of slopes along roads. New drainage systems enhanced the capacity to accommodate increased flood risk due to climate change. A network of hydromet and automatic weather stations was created to support flood early warning. The project also sought to ensure long-term commitment and funding for adequate road maintenance.

Source: ADB. Cambodia: Flood Damage Emergency Reconstruction Project.

Slope Stabilization and Erosion Control

Numerous solutions to prevent future slope destabilization and erosion include surface drainage management, bioengineering, toe protection, masonry, concrete or gabion retaining walls, anchoring systems, crib walls, and knitted geotextiles.

The 2005 **Bangladesh: Emergency Flood Damage Rehabilitation Project** (38625-013) of the ADB provided support for the rehabilitation and resumption of railways and services between flood-affected areas. Geotextile technology was applied for slope protection on railway embankments, reducing not only the need for temporary repair work but also savings in government expenditures over the long term. Municipal roads were resealed and repairs were carried out on the potholes, eroded sub-base, bridges, and drains or culverts of 55 pourashavas (secondary level towns).

Source: ADB. Bangladesh: Emergency Flood Damage Rehabilitation Project.

Transport Sector Capacity Development

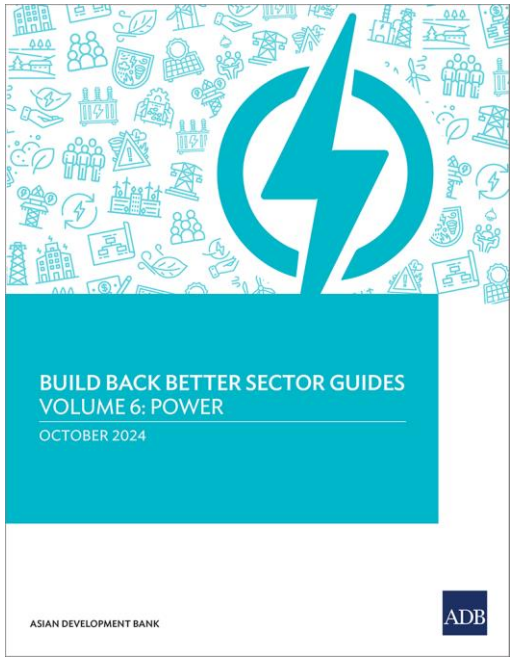
Support to transport authorities and stakeholders enhance budgeting; network risk assessment; risk monitoring; contingency and evacuation planning; and risk-informed infrastructure design and O&M can enhance the impact of post disaster recovery projects.

In 2009, the **China, People's Republic of China of: Emergency Assistance for Wenchuan Earthquake Reconstruction Project** (42496-013) of the Asian Development Bank provided capacity building to executing and implementing agencies on adopting recent updates to seismic engineering standards and codes, risk-informed operation and maintenance practices; and management, technical, and administrative capacities in the construction and maintenance of rural roads, bridges, and schools. Experience gained from the project has benefited other government-financed projects.

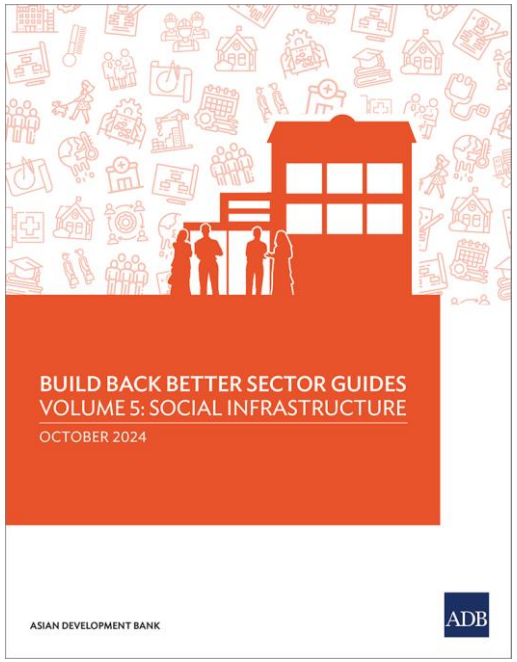
Source: ADB. People's Republic of China: Emergency Assistance for Wenchuan Earthquake Reconstruction Project.

BUILD BACK BETTER
Sector Dialogues

WASH
26 February



Social Infrastructure
13 March



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