Completion Report

Project Number: 49158-001
Technical Assistance Number: 9191
June 2021

Building Climate Change Resilience in Asia's Critical Infrastructure

Asian Development Bank

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TECHNICAL ASSISTANCE COMPLETION REPORT

<table>
<tr><td colspan="2">TA Number, Country, and Name:
TA 9191-REG: Building Climate Change Resilience in Asia's Critical Infrastructure</td><td colspan="2">Amount Approved: $1,500,000
Revised Amount: Not applicable</td></tr>
<tr><td>Executing Agency:
Asian Development Bank (ADB)</td><td>Source of Funding:
Technical Assistance Special Fund</td><td>Amount Undisbursed:
$45,276.98</td><td>Amount Used:
$1,454,723.02</td></tr>
<tr><td rowspan="3">TA Approval Date:
30 Sep 2016</td><td rowspan="3">TA Signing Date:
30 Sep 2016</td><td>TA Completion Date</td><td></td></tr>
<tr><td>Original Date:
30 Jun 2019</td><td>Latest Revised Date:
31 Dec 2020</td></tr>
<tr><td>Financial Closing Date:
29 Apr 2021</td><td>Number of Extensions:
2</td></tr>
<tr><td>TA Type:
Research and Development Technical Assistance</td><td>Nature of Activity:
Capacity development</td><td colspan="2">TA Arrangement:
Regional</td></tr>
</table>

Description

In the Asia and the Pacific region, estimates suggest that an additional investment of $1.5 trillion per year in infrastructure[1] is required to maintain the momentum of economic growth and eradicate the remaining poverty. Bulk of these investment needs are in energy, water, and transport infrastructure which usually have long service lives rendering the region's existing infrastructure stocks and its future infrastructure investments vulnerable to changes in climate conditions. One of five overarching reasons for concern cited by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change in 2014 was the existence of systemic risks "due to extreme weather events leading to breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services." Critical infrastructures are physical assets and systems[2] vital to the effective functioning of society and economy which, if disrupted or destroyed, would have a significant social, economic, or environmental impact. As such, understanding of the impacts of climate change on critical infrastructure is important to inform governments' development plans and identify investment priorities towards increasing climate resilience.

Expected Impact, Outcome, and Outputs

The technical assistance's (TA's) expected impact was scaled-up support for effective climate change adaptation. The TA's expected outcome was knowledge base on climate change risks to critical infrastructure enhanced in South Asia and Southeast Asia enhanced. The expected outputs were (i) critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia identified; (ii) climate change risks to existing and planned critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia assessed; and (iii) policy, financial priorities, adaptation options, and climate resilience standards for the target sectors identified. A change in scope in March 2018 revised output 2 performance indicator on Geographic Information System (GIS) web-based information platform to a web-based interactive geospatial database and analytical decision support tool. In August 2019, another change in scope revised the reporting method for a technical paper on climate change vulnerability of critical infrastructure from peer-reviewed article in an international journal to a technical report.

Implementation Arrangements

ADB was the executing agency for the TA. The Climate Change and Disaster Risk Management Division under the Sustainable Development and Climate Change Department had the overall responsibility for the TA. The TA was initially planned for implementation from October 2016 to June 2019 for a total amount of $1,500,000.

The TA was implemented in three pilot countries: Indonesia, Sri Lanka, and Viet Nam. The TA was initially developed as a knowledge partnership with Centers of Excellence in climate change and infrastructure. However, at the time the TA was approved, the Staff Instruction for Knowledge Partnership was not yet finalized. The TA later recruited a consulting firm following ADB's procurement process and engaged International Centre for Environmental Management

[1] ADB. 2017. Meeting Infrastructure Needs. Manila.

[2] Such as complex network of national highways, bridges, tunnels, airports, seaports and railroads, an integrated system of flood control structures and water storage and supply facilities, linked power generation and national distribution grids, and a major waste treatment and disposal system.

Asia Limited, Hongkong, China; Asian Disaster Preparedness Center, Thailand; and Philkoei International, Inc., Philippines as Consulting Joint Venture to support the implementation of the TA activities.

During the TA implementation, the following changes in implementation arrangements were undertaken along with the changes in scope: (i) in March 2018, reallocated TA resources under Centers of Excellence cost item; added three regional workshops, one TA workshop in Manila, and two rounds of national consultations in each of the three pilot countries under budget line on training, seminars, and conferences; and assigned the administration and management of consultants to the Consulting Joint Venture; (ii) in November 2018, extended TA completion by 12 months from 30 June 2019 to 30 June 2020 due to delays caused by lengthy time taken in obtaining no objections and conducting national consultation missions; extended Consulting Joint Venture's engagement for 9 months from 30 June 2019 to 31 March 2020; and reallocated $91,900 resources to consultants; and (iii) in May 2020, extended TA completion to 31 December 2020; added 6 person-months each to two individual consultants to allow the development of a consolidated knowledge product; and design, organize and document the outcome of the webinar series in Q4 2020. As per TA design, outputs were implemented by a firm and individual consultants.

Conduct of Activities

The TA delivered on all three target outputs.

1. Critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia Identified. In each country, three missions were conducted involving national workshops, consultations, and site visits to understand existing methodologies for identifying critical infrastructure and to select case-study areas for applying the concept of critical infrastructure. Based on consultations with country stakeholders and literature review of global good practice on critical infrastructure, the methodological approach for the analysis of critical infrastructure was developed and captured in a technical report "Technical Working Paper on Identifying Critical Infrastructure". The consultations with country stakeholders and review of national plans and strategies support the development of the second report "Technical Report on Inventory of Regional and National Critical Infrastructure."

2. Climate change risks to existing and planned critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia assessed. The TA produced high-resolution downscaled climate projections for the South and Southeast Asia regions for the three pilot countries and for key locations (river basins). This work is summarized in the technical report "Climate Change Hotspots and Implications for Critical Infrastructure." The TA also produced a GIS-web based critical infrastructure information system comprising three key sub-components combined into a single online platform (i) GIS map viewer; (ii) critical infrastructure inventory; and (iii) critical infrastructure metadata catalogue.

3. Policy, financial priorities, adaptation options, and climate resilience standards for the target sectors identified. The TA collaborated with ADB-financed projects and provided technical inputs for conducting climate risk and adaptation assessment. These include the Enhanced Water Security Investment Project (EWSIP) in Indonesia (Project Number 51157-001);[3] and Transaction TA Power System Reliability Strengthening Project in Sri Lanka (Transaction TA 9460). No corresponding project was selected in Viet Nam as there were no existing or planned projects in the country that fit in the TA's timeline and objective. An additional study was prepared in support of the EWSIP that utilized TA9191 climate projections to estimate future climatic water balances for river basins throughout Indonesia. The TA produced three case studies (i) Indonesia case study report focused on the Cimanuk-Cisanggarung River Basin; (ii) Viet Nam case study report focused on the Long Song River Basin; and (iii) Sri Lanka case study report focused on the Kelani River Basin. In addition, a technical note was prepared, which provides a framework for developing metrics for measuring climate adaptation responses in the three sectors (included in Kelani Basin Case Study). A knowledge product "A System Wide Approach for Infrastructure Resilience" was published in January 2021. The document aims to improve how climate-related financial risks are considered in infrastructure, including for the planning, delivery, and management of national infrastructure plans.[4]

Due to the coronavirus disease (COVID-19) pandemic, the planned interregional policy dialogue was converted into a webinar series entitled "Virtual Dialogues on Resilient Infrastructure,"[5] which started in October 2020. The three webinars conducted laid the foundations for understanding the fundamental concepts towards building resilient infrastructures. Given the continued interest on topics related to resilient infrastructure, the webinar series is being extended until 2021 through support from other TAs.

[3] The project is renamed to Indonesia Flood Management and Coastal Protection for North Java Project for approval in 2023.
[4] ADB. 2021. A System-Wide Approach for Infrastructure Resilience. Manila. https://www.adb.org/sites/default/files/publication/672501/system-wide-approach-infrastructure-resilience.pdf.
[5] Session summaries, PowerPoints, and recorded webinars can be accessed in this link: Virtual Dialogues on Resilient Infrastructure (eventsair.com).

Technical Assistance Assessment Ratings

Criterion	Assessment	Rating
Relevance	The TA was ***relevant***. It is aligned with the priorities of the ADB's Strategy 2030 Operational Priority 3 (OP3)—tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability; and the country partnership strategies (CPS) of the three pilot countries. The design of TA outputs was sound and had coherent linkage with the TA outcome and impact. It supported the increase in ADB's adaptation-related projects and corresponding finance targets by providing useful examples and recommendations. Recognizing the scope of the TA was developing new methodology and assessment frameworks, it was appropriate that the TA was a research and development TA. However, the concept of partnering with Centers of Excellence could not be undertaken due to the then absence of Staff Instructions for Knowledge Partnership. The replacement of a consulting firm to undertake all the planned activities, nevertheless, did not impact the quality of TA outputs. Changing the GIS web-based information platform to a web-based interactive geospatial database and analytical decision support tool has demonstrated to be more beneficial in visualizing critical infrastructure and climate change projections; and supporting decision-making for planning, investment priorities, and development of resilient infrastructure. The intended objective of the in-person regional dialogues was not compromised when it was converted to online format due to the outbreak of COVID-19. The shift in fact allowed for more dialogues on resilient infrastructure, which is currently being continued through other TAs, thereby demonstrating the topic's continued relevance.	Relevant
Effectiveness	The TA was ***effective*** in achieving its outcome of enhancing the knowledge base of climate change risks to critical infrastructure in the selected regions. This is evident from (i) direct contribution of the TA to the design of two ADB investment projects in Indonesia and Sri Lanka; and (ii) contribution in scaling up of ADB's investments in climate adaptation from $256.36 million in 2015 to $613.23 million in 2019, exceeding the 50% target increase. Close look at the three infrastructure sectors shows a 320% increase from $98.96 million in 2015 to $415.70 million in 2019. The TA through generation of high-quality climate information and review of national policies and plans and stakeholder consultations, contributed in making the case for climate resilience to be prioritized in CPS of Indonesia (approved in 2020), Sri Lanka (under development) and Viet Nam (under development). Indonesia was also supported in developing a comprehensive set of basin-level water balance projections reflecting the joint impacts of changes in temperature and precipitation, which can guide the formulation of future investment projects. The TA provided useful examples to improve resilience in infrastructure projects, which is helping ADB in developing its long-term approach for adaptation projects. Outputs 2 and 3 were particularly important for achieving the TA outcome as it helped DMCs in producing high-resolution downscaled climate projections; and undertaking analysis on critical infrastructure resilience for case study areas. The latter included organizing a series of consultation workshops with a wide range of participation from different government agencies, which helped in enhancing understanding among DMC officials on the concept of critical infrastructure resilience. Output 3 also included developing a knowledge product with the Global Center on Adaptation (GCA) on the need for adopting a system-wide approach for infrastructure resilience, which allowed sharing of TA knowledge and experiences with global technical organizations. The knowledge product was launched by the GCA at the Global Climate Adaptation Summit in January 2021. All output indicators were achieved.	Effective
Efficiency	The TA was ***efficient*** even though it encountered unavoidable delays***.*** The TA was implemented for more than 4 years and was extended twice. The first extension was due to delay in securing no objections from the pilot countries, which caused implementation delays of initial in-country activities. The second extension was due to COVID-19, which required some changes in the delivery of planned activities. Despite these, all target outputs were achieved. The implementation adapted to the situation on the ground adjusting activities such as the conduct of webinars in lieu of face-to-face regional dialogues. The TA utilized 51 person-months of inputs from consulting firm and 43.5 person-months for individual consultants (international and national consultants). All the activities were completed and within budget, with about 97% of the TA budget utilized. The web-based tool and reports produced provide useful guidance and examples that will help inform development plans and identify climate resilient investment priorities, which will lead to socio-economic benefits at the national and local levels.	Efficient

Criterion	Assessment	Rating
Overall Assessment	The TA is considered ***successful***. It supported the implementation of OP3 of Strategy 2030 and achieved its target outcomes. It has contributed to improving understanding on climate risks and its impact on critical infrastructure in the transport, energy, and water sectors and in increasing adaptation finance. The outputs are useful references for future planning and project development and design. Implementation delay is less than 2 years. The TA was implemented within budget.	Successful
Sustainability	The TA outputs are ***likely sustainable.*** The technical reports and the GIS web-based tool are useful resources for future country-level assessments. In addition, the GIS web-based output offers useful and extensive data which can be integrated in the next generation screening and assessment tool currently being developed by SDCD. The webinar series on resilient infrastructure is being continued through other TAs contributing to the sustainability of knowledge developed under TA 9191.	Likely sustainable

Lessons Learned and Recommendations

Design and/or planning	At the design stage, it is important to have the Staff Instructions already in place to ensure planned activities will be implemented, and to adopt a process where ADB has control to still deliver an output or activity considering there will be potential delays in TA implementation. Early engagement with government is also necessary to identify TA counterpart agency and in securing no objection letter.
Implementation	Working closely with sector groups (transport, energy, and water) helped in generating practical and operation-oriented solutions. The TA also worked very closely with ADB staff at Resident Missions, which provided an opportunity to influence wider discussions on resilience that were factored in CPS.
Management of staff and consultants	The TA has successfully achieved its target outputs despite the succession of three project officers, implementation delays, and changes in planned activities due to COVID-19. The TA engaged an international consulting firm and national consultants with relevant expertise. The quality of outputs the consultants have rendered were mostly satisfactory.
Knowledge building	The webinar series (initially planned as interregional policy dialogues) aimed to build and disseminate knowledge in the region by discussing issues, solutions, and opportunities related to strengthening infrastructure resilience. The conversion from in-person regional conference to webinar series allowed knowledge sharing to reach more participants in different DMCs and to invite global and regional experts as speakers. Arranged as three consecutive monthly webinars per season, it enabled the webinar series to have a more focused content which were based on demand and relevance.
Stakeholder participation	The national consultations and workshops held with relevant government agencies from national to local levels allowed for better understanding on the topic and built capacity to undertake planning and assessment, and explore opportunities to scale up options for application at the national level.
Partnership	The TA has provided a platform for creating partnerships with knowledge partners. The partnership with Centers of Excellence, however, did not materialize because the Staff Instructions for Knowledge Partnership was still under development when the TA was initiated. To avoid implementation delays, a consulting firm was engaged to do all the planned activities. The consulting firm was able to deliver quality and satisfactory outputs as required by the TA. The TA engaged public and private sectors as key stakeholders which helped increased their capacity to anticipate climate risk and appreciate the net benefits of investing in climate resilience. The TA strengthened partnership with GCA's infrastructure resilience program, and with global and regional experts through the webinar series.
Replication and/or scaling up	The model developed through the TA, which emphasizes (i) climatological analysis and scenario development, (ii) identification of critical infrastructure in key sectors, (iii) identification of climate-infrastructure "hot spots" as focuses for intervention, (iv) extensive consultation with stakeholders at multiple levels of government, and (v) identification of risk management strategies at the scale of critical infrastructure complexes is readily replicable, and elements of this strategy are planned to be replicated more widely in at least one of the pilot countries (Indonesia).

Follow-up Actions

The use of common approach and thresholds in defining criticality of infrastructure will help ensure availability of comprehensive, consistent, and accurate data to inform current and future plans at the national and subnational levels. The use of a GIS-web based critical infrastructure information system provides a valuable resource among DMCs and ADB project officers to inform infrastructure investment designs. The geospatial data can be integrated with the next generation screening and assessment tool currently being developed by SDCD.

TA = technical assistance.

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Designation and Division:
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DESIGN AND MONITORING FRAMEWORK

<table>
<tr><td colspan="3">Impact
Scaled-up support for effective climate change adaptation (Midterm Review of Strategy 2020)[a]</td></tr>
<tr><th>Results Chain</th><th>Performance Indicators with Targets and Baselines</th><th>Achievements</th></tr>
<tr><td>Outcome
Knowledge base of climate change risks to critical infrastructure enhanced in South Asia and Southeast Asia</td><td>a. At least two projects addressing vulnerabilities identified by the TA are included in selected DMCs' pipelines by 2019</td><td>a. Achieved. Two projects included in DMC pipeline: (i) Sri Lanka Transaction TA (transaction TA 9660) Power System Reliability Strengthening Project ADB approved in December 2017; and (ii) Indonesia Flood Management and Coastal Protection for North Java Project (formerly Enhanced Water Security Investment Project with Project Number 51157-001) to be approved in 2023.
• In Sri Lanka, the TA reports and recommendations helped shape the transaction TA
• In Indonesia, the TA prepared the climate risks vulnerability assessments for the river basins selected under the proposed ADB project and made recommendations for adaptation in linked critical infrastructure as part of the 2020–2024 Mid Term Development Plan (RPJMN).</td></tr>
<tr><td></td><td>b. ADB investments in climate-resilient infrastructure in selected regions increased by 50% by 2019 (2015 baseline: $256.36 million)[b]</td><td>b. Achieved. In 2019, total adaptation finance for South Asia and Southeast Asia is $613.23 million (139% increase from 2015 baseline)
• Out of this, total adaptation finance for transport, energy, and water sector is $415.70 million (320% increase from 2015 baseline)

SARD and SERD Adaptation Finance (based on approvals), 2019
<table>
<tr><th>2019</th><th>SARD</th><th>SERD</th><th>Total</th></tr>
<tr><td>Energy</td><td>95.20</td><td>1.17</td><td>96.37</td></tr>
<tr><td>Transport</td><td>211.64</td><td>34.64</td><td>246.28</td></tr>
<tr><td>Water and Other Urban Infrastructure and Services</td><td>63.99</td><td>9.06</td><td>73.05</td></tr>
<tr><td>Total (selected sectors)</td><td>370.83</td><td>44.87</td><td>415.70</td></tr>
<tr><td>Total Adaptation Finance</td><td>406.74</td><td>206.48</td><td>613.23</td></tr>
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<table>
<tr><th>Results Chain</th><th>Performance Indicators with Targets and Baselines</th><th>Achievements</th></tr>
<tr><td></td><td></td><td>SARD and SERD Adaptation Finance (based on approvals), 2015
<table>
<tr><th>2015</th><th>SARD</th><th>SERD</th><th>Total</th></tr>
<tr><td>Energy</td><td>13.36</td><td>-</td><td>13.36</td></tr>
<tr><td>Transport</td><td>46.85</td><td>-</td><td>46.85</td></tr>
<tr><td>Water and Other Urban Infrastructure and Services</td><td>9.20</td><td>29.55</td><td>38.75</td></tr>
<tr><td>Total (selected sectors)</td><td>69.41</td><td>29.55</td><td>98.96</td></tr>
<tr><td>Total Adaptation Finance</td><td>224.41</td><td>31.95</td><td>256.36</td></tr>
</table></td></tr>
<tr><td>Outputs
1. Critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia identified</td><td>By 2019:
1a. Technical working paper on the methodology to identify critical infrastructure finalized (2016 baseline: none)

1b. Road map of infrastructure planned for each target area produced (2016 baseline: none)</td><td>1a. Achieved. “Technical working paper on Identifying Critical Infrastructure” completed in May 2019. The report presents a methodological framework for identifying and classifying critical infrastructure.

1b. Achieved. Technical report “Inventory of Regional and National Critical Infrastructure” completed in November 2019. The report provides a narrative description of the existing and planned critical infrastructure at the sub-national, national, and regional levels and sets out the analysis of critical infrastructure development pathways for the three countries for energy, transportation, and water sectors.

Excel-based database inventory of existing and planned critical infrastructure each for Indonesia, Sri Lanka, Viet Nam and South Asia and Southeast Asia were prepared as input to the report.</td></tr>
<tr><td>2. Climate change risks to existing andplanned critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia assessed</td><td>2a. Technical paper on climate change vulnerability of critical infrastructure produced (2016 baseline: none)</td><td>2a. Achieved. Technical report “Climate Change Hotspots and Implications for Critical Infrastructure” completed in April 2020. The report contains hot spot maps for the sub-regions and for the three pilot countries (national maps); summary description on critical infrastructure inventories for transport, water, and energy; and analysis of hot spot overlay on critical infrastructure inventories for the three sectors.</td></tr>
</table>

Results Chain	Performance Indicators with Targets and Baselines	Achievements
	2b. Web-based interactive geospatial database and analytical tool produced (2016 baseline: none)	2b. Achieved. GIS- web based critical infrastructure information system completed in March 2020. The tool is comprised of three key sub-components combined into a single online platform (i) GIS map viewer; (ii) critical infrastructure inventory; and (iii) critical infrastructure metadata catalog. Climate projections data was incorporated in the GIS map to provide a visual representation of vulnerable areas and affected critical infrastructures in the areas. The GIS-facility was populated using information from the other outputs completed (i.e., climate projections, inventory of critical infrastructures, etc.). For Viet Nam, the detailed climate data (available in GIS format) that was generated nation-wide will be very useful for the design of future projects such as the Green Infrastructure for Ethnic Minorities project.
3. Policy, financial priorities, adaptation options, and climate resilience standards for the target sectors identified	3a. Interregional policy dialogue conducted (2016 baseline: none)	3a. Achieved. Three webinars (1.5 hours each) under Virtual Dialogues on Resilient Infrastructure webinar series organized: (i) Towards Resilient Infrastructure completed on 21 October 2020 (55 participants attended) (ii) Assessing climate and disaster risks of infrastructure systems, 11 November 2020 (87 participants attended); and (iii) Measures for strengthening resilience of infrastructure, 9 December 2020 (68 participants attended) The webinar series was targeted at government officials and practitioners in ADB's DMCs. Each session featured interactive talks, case studies, and discussions that promote peer-to-peer learning and highlight regional and global perspectives and good practices on climate and disaster resilient infrastructure. Participants provided positive feedback and expressed that the topics presented were very informative.
	3b. Three case studies completed (2016 baseline: none)	3b. Achieved. Three case studies completed (i) Critical Infrastructure and Climate Change in the Kelani River Basin, Sri Lanka completed in October 2020 (ii) Critical Infrastructure and Climate Change, and Adaptation: Cimanuk-

Results Chain	Performance Indicators with Targets and Baselines	Achievements
		Cisanggarung Basin Indonesia Case Study completed in October 2020; and (iii) A proactive Approach to Climate Change Resilience in Infrastructure and Investment in Viet Nam completed in October 2020 The case studies examined options for building climate resilience at the river basin level and for the critical infrastructure complex and specific assets and recommendations on how to integrate measures into an adaptation action plan for each river basin. The case studies selected river basin as spatial unit of analysis because climate change has and is expected to further affect its hydrologic conditions. Within the river basin, each case study used a specific sector as the main focus and demonstrated its linkages with other sectors. • For Indonesia, the Cimanuk Basin was selected as one of the target basins and water sector being the main focus because it was linked to ADB's upcoming investment in "Enhanced Water Security Investment Project" (EWSIP) to improve flood management and raw water supply. The river basin analysis and downscaled climate information will be used to inform other operations (irrigation, agriculture, and aquaculture) in the ANR sector in Indonesia. • For Sri Lanka, the Kelani River Basin, was selected because of the linkage with ADB project Power System Reliability Strengthening Project in Sri Lanka, and thus the main focus was on energy sector. • In the case of Viet Nam, the Long Song River Basin, located in Binh Thuan province, was selected based on recommendations of national government and focused on transport sector and its linkages with other sectors.

Results Chain	Performance Indicators with Targets and Baselines	Achievements
	3c. Climate resilience metrics for transport, energy, and water sectors developed 3d. Knowledge product on measures to build climate resilience in Asia's infrastructure published	3c. Achieved. Technical Note: Climate Change Metrics for the Energy, Transport, and Water Sectors (included in Kelani Basin Case Study) completed in October 2020. 3d. Achieved. Knowledge Product on A System Wide Approach for Infrastructure Resilience published in January 2021.[6]

Actual Key Activities with Milestones

1 Critical infrastructure in the energy, transport, and water sectors in South Asia and Southeast Asia identified

1.1 Agreed on criteria and methodological approach for the analysis of critical infrastructure (November 2017)
1.2 Engaged a consulting firm to support the implementation of the TA activities and to ensure the timely delivery of TA outputs (July 2017)
1.3 Carried out scoping activity to identify target countries and/or target geographical areas (August 2017)
1.4 Produced a universal list of existing critical infrastructure in South Asia and Southeast Asia and produced technical report on "Inventory of Regional and National Critical Infrastructure" (November 2019)
1.5 Analyzed relevant sector development plans and policy (November 2019)
1.6 Held national consultations (12 July 2018, 20 June 2019 and 5 December 2019 in Indonesia; 14 March 2019 and 22 August 2019 and 4 February 2020 in Sri Lanka; and 17 January 2019, 27 June 2019 and 21 November 2019 in Viet Nam)
1.7 Produced technical report on identifying critical infrastructure (June 2019)

2 Climate change risks to existing and planned critical infrastructure assessed in the energy,transport, and water sectors in South Asia and Southeast Asia

2.1 Conducted a study on climate variability and climate change on selected regions as input to thevulnerability assessment of critical infrastructure (June–August 2019)
2.2 Conducted webinar series (in lieu of regional dialogues) (October–December 2020)
2.3 Reviewed (internal) a draft final report on the climate vulnerability of critical infrastructure (Analysis were done for: (i) technical report on Climate Change Hotspots and Implications for Critical Infrastructure; and (ii) case study areas) (March 2020)
2.4 Developed a web-based interactive geospatial database and analytical decision support tool (March 2020)

3 Policy, financial resources, adaptation options, and climate resilience standards identified

3.1 Conducted preliminary study to analyze an existing policy and regulatory framework that can support climate change adaptation (November 2019)
3.2 Conducted webinar series (in lieu of policy dialogues) (October–December 2020)
3.3 Selected one candidate case study for each sector of a target DMC to demonstrate the benefits of investing in climate resilience (March 2020)
3.4 Produced an assessment of viable policy, regulatory, financial, and adaptation measures aimed at increasing the climate resilience of existing and planned infrastructure (Part of the three case studies) (March 2020)

[6] ADB. 2021. A System-Wide Approach for Infrastructure Resilience. Manila. https://www.adb.org/sites/default/files/publication/672501/system-wide-approach-infrastructure-resilience.pdf

3.5 Developed standards for climate resilience in infrastructure in the transport, energy, and water sectors (Part of Kelani case study) (March 2020) 3.6 Produced a knowledge product and a summary for policy makers on the climate vulnerability of critical infrastructure and recommendations for investing in climate resilience (April 2020) 3.7 Launched knowledge product (January 2021)
Actual Inputs ADB Technical Assistance Special Fund: $1,454,723.02

DMC = developing member countries, TA = technical assistance, Q = quarter.

[a] Defined by TA.[b] ADB's 2015 internal financing for climate change adaptation (based on approval) in South Asia and Southeast Asia.

Source: Asian Development Bank.

TECHNICAL ASSISTANCE COST

Table A2.1: Technical Assistance Cost by Activity

($'000)

Item	Amount		
	Original	Revised	Actual
1. Consultants	690.3	1,290.2	1,309.3
2. Centers of excellence	552.8	000.0	000.0
3. Training, seminars and/or conferences	100.0	182.8	140.2
4. Surveys/Studies	36.9	5.0	000.0
5. Equipment	0.0	5.0	0.0
6. Miscellaneous TA administration	40.0	7.0	5.2
7. Representative for contract negotiations	5.0	0.0	0.0
8. Contingency	75.0	10.0	000.0
Total	**1,500.0**	**1,500.0**	**1,454.7**

TA = technical assistance.
Source: Asian Development Bank estimates.

Table A2.2: Technical Assistance Cost by Fund

($'000)

	TASF	Total Cost
1. Original	1,500.00	1,500.00
2. Revised	1,500.00	1,500.00
3. Actual	1,454.72	1,454.72
4. Unused	45.28	45.28

TASF: Technical Assistance Special Fund.
Source: Asian Development Bank estimates.