



Technical Assistance Report

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Transaction Technical Assistance (TRTA)
November 2020

India: Support for Integrated and Sustainable Urban Development along Mass Rapid Transit Corridors in Bengaluru City

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 9 November 2020)

Currency unit	–	Indian rupee/s (₹)
₹1.00	=	\$0.0135179
\$1.00	=	₹73.976100

ABBREVIATIONS

ADB	–	Asian Development Bank
BMRCCL	–	Bangalore Metro Rail Corporation Limited
TOD	–	transit-oriented development
MMI	–	multimodal Integration
TA	–	technical assistance
DULT	–	Directorate of Urban Land Transport

NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2020 ends on 31 March 2020.
- (ii) In this report, “\$” refers to United States dollars.

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I. THE PROPOSED PROJECT

1. The proposed Bengaluru Metro Rail Project will support the Government of Karnataka state to improve the livability and competitiveness of Bengaluru city by enabling integrated and sustainable urban development and rejuvenation of areas along mass transit corridors and by providing safe, affordable, barrier-free, high-quality, multimodal public transport for all. The project will finance (i) the construction of 56 kilometers (km) of new metro rail line and 30 metro stations; (ii) the preparation of urban development plans and implementation frameworks based on transit-oriented development (TOD) principles that facilitate land value creation and capture; and (iii) the creation of enabling infrastructure and institutional provisioning for seamless integration of different modes of public transport to provide efficient, accessible, convenient, and safe mobility options for all commuters. The project will also strengthen institutional structures and build capacities of line agencies and stakeholders at all levels for designing and delivering sustainable and comprehensive urban mobility solutions and TOD-based urban development schemes. In addition, the project will support formulating a communication strategy and participatory process for TOD implementation and urban mobility solutions. The implementing agencies of the project will be the Bangalore Metro Rail Corporation Limited (BMRCL) and the Directorate of Urban Land Transport (DULT) of the Government of Karnataka state.

II. THE TECHNICAL ASSISTANCE

A. Justification

2. Bengaluru, Karnataka's state capital, is India's fourth most populous city.¹ Spatially, the city's area has tripled in the last two decades to about 800 square km, making it the fastest growing major metropolis in the country. The city is India's fourth largest gross domestic product contributor and is responsible for 11% of the country's foreign direct investment, next only to Delhi and Mumbai. Bengaluru is also expected to be one of the world's fastest-growing city economies during 2019–2035. About 33% of the city's population is engaged in the secondary sector, with the remaining 67% employed in services. Numerous public sector undertakings, engineering and manufacturing industries, software and information technology (IT), aerospace, telecommunications, biotechnology, and defense organizations are located in the city. Bengaluru, with one of the youngest and most efficient technology workforces among all global start-up hubs and one of the best start-up ecosystems in the world, has emerged as the IT start-up capital of India and the country's leading IT exporter, with more than 30% of the national share.

3. Despite well-documented advantages, rapid urban growth in Bengaluru has not been without problems arising from urban sprawl, unplanned sporadic development in the absence of a cohesive vision, and the inability of the city's infrastructure to keep pace with population growth. This has resulted in problems such as congestion, worsening mobility of people and goods, high land prices, crumbling essential infrastructure, and environmental degradation. All of these are reportedly reducing productivity, inhibiting the efficiency of the economy and leading to a much larger crisis of consistently declining quality of life.²

¹ United Nations. 2018. [*The World's Cities in 2018: Data Booklet, Statistical Papers – United Nations \(Ser. A\), Population and Vital Statistics Report*](#). New York. The estimated current population of Bengaluru Metropolitan Area (BMA) is about 12 million.

² The Boston Consulting Group. 2018. [*Unlocking Cities: The Impact of Ridesharing across India*](#). Delhi. Bengaluru loses a staggering ₹380 billion every year as the social cost of traffic congestion. Bengaluru ranks a low 149 (of 231) on the 2019 Mercer's Quality of Living Index. According to a report by TomTom, the Netherlands-based global provider of navigation, traffic, and map products, Bengaluru is the world's most traffic-congested city. The average speed on critical roads drops to less than 10 kilometers per hour during peak traffic hours.

4. As a strategic response to the above challenges, the state government is orienting the city's public mass transit system toward more sustainable modes, including the expansion of metro rail, introduction of suburban rail, and the upgrading of public bus transport. Moreover, the state government recognizes the importance of (i) developing integrated urban planning to manage growth, catalyze strategic renewal of the city core, and enhance the competitiveness, sustainability, and inclusiveness of the city;³ (ii) creating a ridership base that improves the economic and financial viability of mass transit investments; (iii) ensuring accessibility of basic urban services for all city residents; (iv) using land as a revenue source to finance the city's long-term investment; and (v) addressing complex and intertwined economic and technological needs. To meet these objectives, the state government is planning to develop a new model for sustainable redevelopment and growth for Bengaluru city, including the proposed mass rapid transit system expansion plan, and has requested technical assistance (TA) from the Asian Development Bank (ADB) for the following:

- (i) **Transforming Bengaluru through transit-oriented development to realign growth and densities along mass transit corridors.** The proposed extension of the metro rail network will link major hi-tech hubs, new growth areas of the city, and the international airport. Stations of the proposed corridor and surrounding areas have significant potential to create agglomeration effects, accommodate planned growth, and increase the economic productivity of the city through strategic renewal and densification. The use of TOD, a new urban development model, will help achieve the objective by realigning growth and densities along these new mass transit corridors and creating higher density, mixed use, mixed income, resource-efficient, safe, and inclusive neighborhoods that are designed for effective diseases containment and cure, and will reduce the city's carbon footprint. In addition, this new planning approach will enhance land values along the corridor and generate capital revenues for the city to meet its long-term investment needs.
- (ii) **Enabling a mobility shift in Bengaluru toward low-carbon modes through multimodal integration.** Multimodal integration (MMI) across four key pillars of integration—physical, information, operational, and institutional—and integrated ticketing, will provide seamless, convenient, and affordable route and mode choices to all citizens. This will make mobility more efficient, safe, affordable, and accessible for all, empowering women and differently abled persons to move and access opportunities and amenities across the city with greater ease and confidence. Overall, these people-oriented, environment-friendly solutions will help alleviate Bengaluru's mobility challenges and the associated adverse impacts.

5. TOD and MMI are quickly gaining ground in India because of the substantial merits they bring, but these concepts are complex to plan, design, implement, and manage. The proposed TA will support BMRCL and DULT to integrate TOD and MMI into their urban development schemes. The TA will also help BMRCL and DULT to incorporate lessons from similar brownfield TOD developments and MMI initiatives in the region, and to identify measures to ensure “buy-in” from stakeholders and the market to enable urban transformation at the required scale.

6. To facilitate the preparation and on-the-ground implementation of the TA and make the planning process demand-driven and evidence-based, ADB is supporting BMRCL and DULT in TA preparatory activities, which include (i) setting up a relevant database so that the TA is founded on high-quality, robust analytics; (ii) formulating an integrated regulatory framework to resolve

³ Studies show that investments in mass rapid transit have the potential to leverage 10 times in economic gains for a city and its surrounding regions.

conflicts among existing policies and plans and create conditions for successful TOD implementation; (iii) developing pilot concept plans for physical MMI for seven proposed stations to demonstrate the tangible benefits of convenient intermodal connections and barrier-free access for all; (iv) devising a strategy for integrated service and financial planning for the city public bus transport agency, to ensure that the readjusted travel demand generated in the context of the upgraded mass rapid transit system is met; and (v) organizing sensitization workshops for decision makers and capacity building programs and exposure visits for operational staff of line agencies to create conditions of ownership and commitment for a lasting legacy.

B. Outputs and Activities

7. The major outputs and activities are summarized in Table 1.

Table 1: Summary of Major Outputs and Activities

Major Outputs	Key Activities with Milestones
1. TOD vision plan for the proposed phase 2A and phase 2B corridors and TOD-based urban development plans for selected six zones prepared, and TOD implementation framework adopted	1.1. Review the policy framework and study area to identify (i) different transit-oriented development (TOD) typologies based on development context, (ii) underutilized areas with significant development and densification opportunity, and (iii) developed areas in need of renewal. 1.2. Prepare an overall vision plan for the corridor with specific strategies for densification, urban renewal, and retrofitting, among others, for each TOD zone, to create vibrant and inclusive neighborhoods that safeguard public health and ensure safety. 1.3. Prepare detailed area plans for six priority TOD zones identified within the corridor to demonstrate different strategies arrived at in 1.2, and devise a comprehensive implementation framework that addresses different development contexts and strategies. 1.4. Develop detailed plans for three identified parking management areas within different development contexts based on the city parking policy to demonstrate strategies for parking allocation (for all modes), pricing, place-making, etc. 1.5. Recommend TOD development control regulations based on learnings from planning of priority TOD zones to create an integrated regulatory framework for effective implementation of TOD. 1.6. Based on the above, devise guidelines for planning, designing, and implementing future TODs and parking management areas. 1.7. Support agencies to institutionalize TOD.
2. Multimodal integration plan covering physical, information, operational, and fare aspects prepared and institutionalized	2.1. Undertake urban travel demand modelling based on an existing city travel model, calibrated as required, to estimate the number of trips by type, time of day, origin and destination, mode, route, etc. 2.2. Collect data and assess (i) existing localized service levels and capacity of different public transport and intermediate public transport modes; (ii) existing information sharing systems, operational protocols, and regulatory mechanisms; and (iii) existing fare structures, revenue generation, and competitiveness for different modes. 2.3. Prepare a micro-simulation model (based on urban travel demand modelling) to understand localized characteristics of physical multimodal integration (MMI) at 23 metro station locations. 2.4. Study MMI best practices from across the globe. 2.5. Based on 2.3, prepare MMI concept plans and designs for physical integration at 23 stations and evaluate the same through micro-simulation. Prepare design guidelines and implementation frameworks for physical MMI for all future corridors.

Major Outputs	Key Activities with Milestones
	<p>2.6. Investigate the potential to address overall travel demand by improving access and service levels of various public transport, intermediate public transport, and non-motorized transport modes.</p> <p>2.7. Develop an MMI strategy to enhance the operational efficiency and competitiveness of Bengaluru's public transport system (through physical, information, operational, institutional integration, and integrated ticketing) to meet the readjusted travel demand generated by TOD.</p> <p>2.8. Prepare an MMI implementation plan to operationalize the MMI strategy and to deliver a comprehensive urban mobility solution to empower all communities and user groups (particularly women, differently abled, and elderly).</p> <p>2.9. Support agencies to institutionalize and implement MMI.</p>
<p>3. Capacity of line agencies for planning and implementation of TOD and MMI enhanced, and community awareness program prepared and implemented</p>	<p>3.1. Conduct institutional capacity diagnostics and identify all stakeholders—public and private.</p> <p>3.2. Prepare a capacity building framework focusing on strengthening the institutional capacity of key agencies, meeting their training needs, and supporting identification of training service providers.</p> <p>3.3. Prepare manuals, toolkits, standard operating procedures, and all other necessary training materials for various aspects of planning, implementing, operating, and managing TOD and MMI in close consultation with the government agencies and the identified training service providers.</p> <p>3.4. Support rollout of training programs and all allied activities identified in the capacity building framework. Track training outcomes and feedback and suggest improvements for future training programs.</p> <p>3.5. Prepare a communication strategy, conduct awareness programs, and disseminate information to promote TOD and MMI and ensure buy-in from stakeholders and the market to enable urban transformation at the required scale.</p> <p>3.6. Provide technical assistance to line agencies to address emerging issues encountered during project implementation.</p>

Source: Asian Development Bank.

C. Cost and Financing

8. The TA is estimated to cost \$2,200,000, of which \$2,000,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-Others). The key expenditure items are listed in Appendix 1. The government will provide counterpart support to fund training expenses and in the form of staff, space for training, and other in-kind contributions.

D. Implementation Arrangements

9. The TA will be implemented over 24 months. The Government of Karnataka state, acting through BMRCL, is the executing agency and BMRCL and DULT are the implementing agencies of the TA. A TA secretariat, headed by the commissioner of DULT, has been established with officials from BMRCL and DULT to administer day-to-day TA activities. The state government has constituted (i) a steering committee chaired by the additional chief secretary, urban development, Government of Karnataka state, to provide overall direction, oversight, and policy advice; and (ii) a working group chaired by the commissioner of DULT to provide inputs at the operations level for delivery of TA outputs and subsequent implementation of TA recommendations. ADB will evaluate, select, and supervise consultants and will administer the TA with the support of the TA secretariat. The implementation arrangements are summarized in Table 2.

Table 2: Implementation Arrangements

Aspects	Arrangements		
Indicative implementation period	June 2021–June 2023		
Executing agency	Government of Karnataka state, acting through BMRCL		
Implementing agencies	BMRCL, in association with DULT, through the TA secretariat, will play the principal role in administration and supervision of the TA, together with ADB, including implementation oversight, accountability for the outputs, and communication with consultants and stakeholders.		
Consultants	To be selected and engaged by ADB		
	QCBS	132 person-months	\$1.6 million
	ICS	20 person-months	\$ 0.4 million
Advance contracting	Advance contracting will be used for consultant recruitment		
Disbursement	The TA resources will be disbursed following ADB's <i>Technical Assistance Disbursement Handbook</i> (2020, as amended from time to time).		

ADB = Asian Development Bank, BMRCL = Bangalore Metro Rail Corporation Limited, DULT = Directorate of Urban Land Transport, ICS = individual consultants' selection, QCBS = quality- and cost-based selection, TA = technical assistance.

Source: Asian Development Bank.

10. **Consulting services.** The TA will require about 152 person-months of consulting services. An international firm with an estimated input of 132 person-months (26.5 person-months international, and 105.5 person-months national) will be recruited through a full technical proposal and quality- and cost-based selection method with a 90:10 quality–cost ratio. Five individual national consultants for a total of 20 person-months will be recruited to support implementation and quality control. ADB will recruit the consultants following the ADB Procurement Policy (2017, as amended from time to time) and TA staff instructions.⁴ The summary of consulting services requirements is presented in Table 3.

Table 3: Summary of Consulting Services Requirements

Positions	Person-Months
CONSULTING FIRM	
International	26.5
Team Leader and TOD Specialist (Urban Designer/Planner)	12
TOD Specialist (Land Use and Transport integration)	4
MMI Specialist (Urban Transport Planner)	4
TOD Implementation Specialist (Implementation and Enabling Frameworks)	4
Public Space and/or Public Realm Strategy Specialist	1
Sustainable Master Planning – Water Specialist	1.5
National	105.5
Deputy Team Leader MMI Specialist (Urban Transport Planner and/or Engineer)	12
Deputy Team Leader TOD Specialist (Urban Designer and/or Planner)	12
Urban Design Specialist (with spatial planning and/or design guidelines expertise)	7
Urban Planning Specialist (with land use and/or FSI planning expertise)	6
Sustainable Master Planning – Energy Specialist	1.5
Landscape and/or Public Realm Design Specialist	3
Transport Engineer (with MMI expertise)	8
Transport Modelling Specialists (2) (with UTM and/or micro simulation expertise)	7
Real Estate Expert	6
Financial Expert (with LVC expertise)	4
Financial Expert (with public transport fare rationalization expertise)	4

⁴ Terms of Reference for Consultants (accessible from the list of linked documents in Appendix 2).

Positions	Person-Months
Legal Expert (with town planning act and land expertise)	2
ICT Specialist (with operational MMI and integrated ticketing expertise)	4
Data Analytics and GIS Expert	6
Gender Specialist	6
Institutional Specialist	4
Training Specialist	7
Communication Specialist	6
INDIVIDUAL EXPERTS (National)	20
TOD and Urban Design/Mobility Specialist	10
Urban Institutional and Governance Specialist	3
LVC and Urban Finance Specialist	2
Transport Specialist with ITS knowledge for Operational MMI	3
Communication Specialist	2

FSI = floor space index, GIS = geographic information systems, ICT = Information and communication technology, ITS = information technology service, LVC = land value capture, MMI = multimodal integration, TOD = transit-oriented development, UTDM = urban travel demand modelling.

Source: Asian Development Bank estimates.

COST ESTIMATES AND FINANCING PLAN (\$'000)

Item	Amount^a
A. Consultants	
1. Remuneration and per diem	
a. International consultants	430.0
b. National consultants	1,045.0
2. Out-of-pocket expenditure	
a. International and local travel	44.0
b. Office space rental and related facilities	92.0
c. Surveys	20.0
d. Training, seminars, and workshops	120.0
e. Reports and communication	20.0
f. Miscellaneous administration and support costs ^b	29.0
B. Contingencies	200.0
Total	2,000.0

Note: The technical assistance (TA) is estimated to cost 2,200,000, of which contributions from ADB are presented in the table above. The government will provide counterpart support in the form of counterpart staff, space for training, and other in-kind contributions. The value of government contribution is estimated to account for 9% of the total TA cost.

^a Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-Others).

^b To cover consultant's support staff and printed external publications.

Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/LinkedDocs/?id=53326-001-TARreport>

1. Terms of Reference for Consultants