



# Technical Assistance Report

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Project Number: 51388-001  
Knowledge and Support Technical Assistance (KSTA)  
October 2018

## People's Republic of China: Study on Municipal Solid Waste Regional Integrated Management Model for Beijing–Tianjin–Hebei

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Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 10 September 2018)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.1461
\$1.00	=	CNY6.8448

## ABBREVIATIONS

ADB	–	Asian Development Bank
BTH	–	Beijing–Tianjin–Hebei
MOHURD	–	Ministry of Housing and Urban–Rural Development
MSW	–	municipal solid waste
PRC	–	People’s Republic of China
TA	–	technical assistance

## NOTE

In this report, “\$” refers to United States dollars.

<b>Vice-President</b>	Stephen Groff, Operations 2
<b>Director General</b>	Amy S.P. Leung, East Asia Department (EARD)
<b>Director</b>	Sangay Penjor, Urban and Social Sectors Division, EARD
<b>Team leader</b>	Andrew McIntyre, Unit Head, Project Administration, EARD
<b>Team members</b>	Fiona Anne Connell, Principal Counsel, Office of the General Counsel Cecil Muro, Project Analyst, EARD Rochelle Villanueva, Senior Operations Assistant, EARD

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## CONTENTS

	<b>Page</b>
KNOWLEDGE AND SUPPORT TECHNICAL ASSISTANCE AT A GLANCE	
I. INTRODUCTION	1
II. ISSUES	1
III. THE TECHNICAL ASSISTANCE	3
A. Impacts and Outcome	3
B. Outputs, Methods, and Activities	4
C. Cost and Financing	4
D. Implementation Arrangements	4
IV. THE PRESIDENT'S DECISION	5
APPENDIXES	
1. Design and Monitoring Framework	6
2. Cost Estimates and Financing Plan	8
3. List of Linked Documents	9

## KNOWLEDGE AND SUPPORT TECHNICAL ASSISTANCE AT A GLANCE

<b>1. Basic Data</b>		<b>Project Number:</b> 51388-001
<b>Project Name</b>	Study on Municipal Solid Waste Regional Integrated Management Model for Beijing–Tianjin–Hebei Research and Development	<b>Department/Division</b> EARD/EASS
<b>Nature of Activity</b>		<b>Executing Agency</b> Ministry of Housing and Urban-Rural Development
<b>Modality</b>	Regular	
<b>Country</b>	China, People's Republic of	
<b>2. Sector</b>	<b>Subsector(s)</b>	<b>ADB Financing (\$ million)</b>
✓ Public sector management	Public administration	0.20
Water and other urban infrastructure and services	Urban solid waste management	0.20
<b>Total</b>		<b>0.40</b>
<b>3. Strategic Agenda</b>	<b>Subcomponents</b>	<b>Climate Change Information</b>
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project
Environmentally sustainable growth (ESG)	Urban environmental improvement	Low
<b>4. Drivers of Change</b>	<b>Components</b>	<b>Gender Equity and Mainstreaming</b>
Governance and capacity development (GCD)	Institutional development	Some gender elements (SGE) ✓
Knowledge solutions (KNS)	Institutional systems and political economy	
	Application and use of new knowledge solutions in key operational areas	
	Knowledge sharing activities	
<b>5. Poverty and SDG Targeting</b>		<b>Location Impact</b>
Geographic Targeting	Yes	Rural
Household Targeting	No	Urban
SDG Targeting	Yes	Low
SDG Goals	SDG6, SDG11	High
<b>6. Risk Categorization</b>	Low	
<b>7. Safeguard Categorization</b>	Safeguard Policy Statement does not apply	
<b>8. Financing</b>		
<b>Modality and Sources</b>		<b>Amount (\$ million)</b>
<b>ADB</b>		<b>0.40</b>
Knowledge and Support technical assistance: Technical Assistance Special Fund		0.40
<b>Cofinancing</b>		<b>0.00</b>
None		0.00
<b>Counterpart</b>		<b>0.00</b>
None		0.00
<b>Total</b>		<b>0.40</b>
<b>Currency of ADB Financing: USD</b>		

## I. INTRODUCTION

1. This knowledge and support technical assistance (TA) will appraise and define the key parameters to successfully establish cross-boundary regional integrated waste management systems in the greater Beijing–Tianjin–Hebei (BTH) region.<sup>1</sup>

2. The TA is included in the country operations business plan for the People's Republic of China (PRC), 2018–2020.<sup>2</sup> The TA is fully aligned with the country partnership strategy for the PRC, 2016–2020, which prioritizes managing climate change and the environment to support the government's priorities in realizing an "ecological civilization".<sup>3</sup> The TA will also support the strategic priorities of the Strategy 2030 of the Asian Development Bank (ADB) to mitigate climate change and promote environmental sustainability.<sup>4</sup>

## II. ISSUES

3. The greater BTH region contributes to almost one third of the PRC's gross domestic product, making it one of the most important and dynamic regions in the country. The PRC has designated the BTH region a priority area because it is essential for increasing intraregional cooperation, leveraging productivity, improving resource use efficiency, integrating infrastructure, and controlling air pollution. ADB started the BTH initiative in 2015 to support this Government priority. ADB's lending support during 2015–2020 in the BTH region revolves around three key pillars (i) policy and regulatory framework in the region; (ii) tailored financing approaches; and (iii) promote use of high technology in key sectors. ADB's support complements the government and other development partners' actions.<sup>5</sup> ADB lending support each year is mutually reinforcing and backed up by analytical, policy advisory and capacity development non-lending work, many of which are already in progress.<sup>6</sup> Most of this support has addressed measures to improve air quality through transport and energy initiatives. There remains a need to also address municipal solid waste management as it contributes to air and water pollution in the region, and investment and economic inefficiencies.

4. Although other areas in the PRC (such as the Pearl and Yangtze river deltas) have witnessed some cross-boundary co-development, establishing and operating regional waste management systems in large urban agglomerations is challenging. Administrative and legal

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<sup>1</sup> The greater BTH region comprises Beijing and Tianjin municipalities; the provinces of Hebei, Henan, Liaoning Shandong, and Shanxi; as well as the Inner Mongolia Autonomous Region.

<sup>2</sup> ADB. 2018. *Country Operations Business Plan: People's Republic of China, 2018–2020*. Manila. The TA first appeared in the business opportunities section of ADB's website on 6 August 2018.

<sup>3</sup> An "ecological civilization" refers to achieving harmony between growth, people, and nature. It includes activities to mitigate ecological damage, relieve pressures on natural resources, and improve the balance between the environment and the economy. ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila.

<sup>4</sup> ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

<sup>5</sup> ADB is closely coordinating with World Bank and other bilateral development partners.

<sup>6</sup> ADB. 2014. *Technical Assistance to the People's Republic of China for the Study on the National Control of the Important Pollutant–Volatile Organic Compounds*. Manila; ADB. 2015. *Technical Assistance to the People's Republic of China for the Beijing-Tianjin-Hebei Regional Air Pollution Control*. Manila; ADB. 2015. *Technical Assistance to the People's Republic of China for the Study on the Coordinated Development of Beijing-Tianjin-Hebei*. Manila. ADB. 2016. *Technical Assistance to the People's Republic of China for the Developing Cost-Effective Policies and Investments to Achieve Climate and Air Quality Goals in the BTH region*. Manila; ADB. 2017. *Technical Assistance to the People's Republic of China for the Study of Clean Energy Supply for the Rural Areas in the Greater Beijing-Tianjin-Hebei Region*. Manila.

obstacles make it difficult to empower a cross-border authority to assume more responsibility for regional waste management. Municipalities and counties do not share facilities because of a lack of high-level coordination, impeding the establishment of regionally integrated waste management systems. The BTH region needs support to establish mechanisms to coordinate and solve municipal solid waste (MSW) issues. Upgrading existing MSW systems and adapting these to newly shaped cross-border catchment areas, particularly in the corridor along the edges of the BTH region, requires coherent cross-border planning that has yet to be established. Although PRC Thirteenth Five-Year Plan and associated policies highlight the need for improved cross-border urban management and regional MSW management, PRC law does not provide mechanisms to establish cross-border institutions.<sup>7</sup> Therefore, alternative approaches will need to be considered to introduce a regionally integrated MSW management in the BTH region.

5. Rapid urbanization in the PRC is changing population and income dynamics and resulting in new consumption and waste-generation patterns. The increasing volume and changing composition of waste is challenging existing waste management infrastructure. These challenges will deepen as more urban agglomerations in the PRC increase in size. Furthermore, it is becoming increasingly difficult to site new facilities in heavily populated Beijing and Tianjin because of land scarcity and a lack of public understanding on waste disposal practices. Procedures to enable the public to proactively participate in MSW planning to overcome the "not in my backyard" problem have yet to be applied. Diversion of waste from landfills is being applied inconsistently, and alternative technologies are not being used consistently across the BTH region. Current disposal practices favor landfilling or incineration; special treatment of organic waste has only recently been introduced.

6. The PRC's Thirteenth Five-Year Plan calls for formalizing and extending recycling. Despite this, the region continues to rely mainly on the informal sector to recycle and carry out source-separation of recyclables. Similarly, PRC and BTH waste authorities have not analyzed existing MSW infrastructure for major upgrades or practice improvements, despite available solutions.<sup>8</sup> For example, combining waste-to-energy plants with local district heating systems would reduce the overall environmental footprint of waste management systems and increase resource efficiencies. However, the BTH region has had little success scaling up and integrating waste management infrastructure at the regional level to leverage economies of scale, optimize transport routes, or improve equipment technology. Consequently, MSW facilities across the BTH region are lacking in terms of size, location, and technology. For example, Hebei Province has a relatively fragmented ad hoc disposal and treatment regime, with almost every county managing its own separate waste management facilities. By contrast, Beijing and Tianjin have developed larger, more efficient disposal sites and treatment plants, yet they are already at capacity with consequent environmental integrity and financial management concerns. No waste management agency in BTH has had any success formalizing the small ad hoc regional cooperation solutions, let alone solving the broader concerns facing the larger waste management operations.

7. The PRC's waste-related regulations are comprehensive and based on robust environmental laws. Regulations cover (i) environmental protection, (ii) prevention and control of environmental pollution from solid waste, (iii) promotion of cleaner production, and (iv) promotion

<sup>7</sup> Government of the People's Republic of China, State Council. 2016. *National Economy and Social Development Thirteenth Five-Year Plan, 2016–2020*. Beijing; Government of the People's Republic of China, State Council. 2014. *National New-type Urbanization Plan, 2014–2020*. Beijing.

<sup>8</sup> H.B. Zhang et al. 2018. *Analysis of physical composition and heavy metals pollution of municipal solid waste (MSW) in Beijing*. Beijing; and Y. Yongqiang and W. Zhang. 2016. *Greenhouse gas emissions from solid waste in Beijing: The rising trend and the mitigation effects by management improvements*. Beijing.

of the circular economy. However, enforcement of these regulations and monitoring of compliance measures are mostly left to local governments. BTH waste management agencies must bridge these regulatory weaknesses and adapt themselves and their regulations to be able to respond to future national and regional policy and planning requirements.<sup>9</sup>

8. Regional MSW management solutions are not well understood at the local authority level. Rapid urbanization and changing population and income dynamics lead to varied consumption and waste generation patterns. Waste management infrastructure in the BTH region must account for these crucial changes. Knowledge of international and regional best practices is weak across almost all BTH administrative levels, to such a degree, alternatives are not well understood or discussed. Regional public MSW campaigns (e.g., to promote waste reduction, recycling, or source segregation) to reduce the amount of waste disposed at regional facilities are generally inconsistent and are only sustained beyond a few years. Ultimately, they have limited to no effect on waste generation rates. County and city capacity to initiate, monitor, and control regional waste management systems is limited. The Ministry of Housing and Urban–Rural Development (MOHURD) is responsible for overseeing MSW management in the PRC and is working to develop a strategy to improve coordination across the BTH region.

9. The financial benefits of a regionally integrated MSW management model for the BTH region are difficult to determine. This presents an obstacle to mobilizing resources efficiently. At the county and district levels, fees paid by waste generators are insufficient to cover system costs. A lack of meaningful data makes it difficult to gauge the financial requirements of counties and districts and to reliably calculate the benefits of economies of scale. Alternative financial models such as polluter-pays and extended producer responsibility, which eventually could reduce the need for financial subsidies from local government administrations, are not well recognized in the PRC.<sup>10</sup> Similarly, BTH waste management agencies' understanding of policies and public–private partnership approaches to regionally integrate MSW systems need to be improved. Large scale regional MSW facilities operate more efficiently despite higher transportation costs, yet their viability for a public–private partnership investor primarily depends on the revenue generated from gate fees and sales of any recovered products. These products include (i) electricity (from waste-to-energy plants) with feed-in tariffs that are nationally regulated, and (ii) recovered recyclables that are subject to a highly fluctuating local and international commodities market.

### III. THE TECHNICAL ASSISTANCE

#### A. Impacts and Outcome

10. The TA is aligned with the following impacts: (i) management of climate change in BTH region improved; and (ii) the government's priorities in realizing an ecological civilization supported (footnote 3). The TA will have the following outcome: regional MSW management model for the BTH region established.<sup>11</sup>

<sup>9</sup> ADB. 2018. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project*. Manila.

<sup>10</sup> "Polluter pays" principle refers to the financial approach whereby those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment. "Extended producer responsibility" is where producers have the financial responsibility for the treatment or disposal of waste from consumer products.

<sup>11</sup> The design and monitoring framework is in Appendix 1.

11. Two BTH municipalities and one BTH province will endorse regional integration of MSW management as proposed under the TA. Following this endorsement, the BTH governments will establish a mechanism to promote the regional MSW integration approach across the region.

## **B. Outputs, Methods, and Activities**

12. The project will have two outputs.

13. **Output 1: Integrated regional municipal solid waste management model for the Beijing–Tianjin–Hebei region developed.** Based on the lessons from the integrative nature of the air quality work and lessening negative impact in the environment undertaken in the current ADB BTH initiatives, the team will (i) identify scope of needed integration and develop an integrated regional MSW management model for the BTH region that will lead to coherent planning and coordination to overcome administrative barriers and improve resource allocation efficiency; (ii) define the institutional setup for cross-border MSW management and suggest ways to improve regulations relating to environment and financial sustainability; and (iii) explore and recommend cost recovery mechanisms, including structured cross-border fund transfers and eco-compensation models.

14. The TA team will evaluate current and projected data on waste composition and quantity and will undertake a census and review of existing MSW treatment facilities across the BTH region. This will provide a baseline for defining an integrated waste treatment scheme that provides options for optimizing both technology and regional distribution. Upon due consultation with the stakeholders and in line with national policies, the TA team will make recommendations to improve the efficiency of collection, transport, and disposal operations in at least four appropriately sized catchment areas.

15. **Output 2: Regional municipal solid waste management understanding and capacity in the Beijing–Tianjin–Hebei region enhanced.** To improve MSW management understanding and capacity across the BTH region, the TA team will (i) provide four thematic discussion workshops related to output 1, with a focus on approaches for integrating regional waste management systems; (ii) deliver at least one TA project results dissemination workshop in another urban agglomeration in the PRC; and (iii) conduct an international study tour to expose participants to international best practices in regional MSW management and eco-compensation.<sup>12</sup> An article detailing the TA project and its results will be published by the TA team on <http://development.asia>.

## **C. Cost and Financing**

16. The TA is estimated to cost \$450,000, of which \$400,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The key expenditure items are listed in Appendix 2. The government will provide counterpart support in the form of office space, office supplies, secretarial assistance, domestic transportation, and other in-kind contributions.

## **D. Implementation Arrangements**

17. The implementation arrangements are summarized in the table.

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<sup>12</sup> Study tour will include visits to ADB member countries only.



**Table: Implementation Arrangements**

Aspects	Arrangements		
Indicative implementation period	October 2018–April 2020		
Executing agency	Ministry of Housing and Urban–Rural Development		
Consultants	To be selected and engaged by the Asian Development Bank		
	Fixed budget selection	Study on Municipal Solid Waste Regional Integrated Management Model for Beijing–Tianjin–Hebei	\$367,000
Disbursement	The technical assistance resources will be disbursed following the Asian Development Bank's <i>Technical Assistance Disbursement Handbook</i> (2010, as amended from time to time).		

Source: Asian Development Bank.

18. **Consulting services.** A consulting firm will be selected by evaluating their proposed approach, methodology, and staffing plan to achieve the detailed outputs within the fixed price. The consulting firm will lead an international study tour involving six officials visiting two countries over 10 days and linking with knowledge partners. The firm will host all workshops and training sessions under the TA and will disseminate flyers and materials related to these. The consultant firm will submit progress reports that ADB and MOHURD will review. The firm will develop knowledge products and ADB will distribute electronic copies of these products, including posting a detailed article on <http://development.asia>.<sup>13</sup>

19. ADB will administer the TA and will engage a consulting firm in accordance with the ADB Procurement Policy (2017, as amended from time to time) and the associated project administration instructions and TA staff instructions.<sup>14</sup> The consulting firm will be hired using output-based terms of reference, full technical proposal, and fixed budget selection method. This method is preferred so that all responding-firms can determine how they can best deliver the detailed outputs for the expected price, utilizing the best combination of inputs.

20. The government and ADB may invite resource persons to review the consultants' outputs and share knowledge during workshops. If there is strong justification, ADB staff may participate in the study tour to develop longer-term knowledge partnerships that would benefit other regions in the PRC. ADB will evaluate the TA outcome using ADB guidelines and will provide the evaluation to the MOHURD.

#### IV. THE PRESIDENT'S DECISION

21. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$400,000 on a grant basis to the Government of the People's Republic of China for the Study on Municipal Solid Waste Regional Integrated Management Model for Beijing–Tianjin–Hebei, and hereby reports this action to the Board.

<sup>13</sup> Relevant knowledge products to be proposed by each shortlisted firm, with details finalized during contract negotiations. At a minimum, they are expected to consist of a 10-page information booklet and one online article.

<sup>14</sup> Terms of Reference for Consultants (accessible from the list of linked documents in Appendix 3).

## DESIGN AND MONITORING FRAMEWORK

<b>Impacts the Technical Assistance is Aligned with</b> Management of climate change in BTH region improved and the government's priorities in realizing an "ecological civilization" supported (country partnership strategy for the PRC, 2016–2020) <sup>a</sup>			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting Mechanisms</b>	<b>Risks</b>
<b>Outcome</b> Regional MSW management model for the BTH region established	<b>By October 2020</b> a. The two municipalities and one province of BTH region endorse the regional planning approach for further adoption (2018 baseline: Not applicable)  b. A mechanism to promote the regional MSW management approach in BTH is established (2018 baseline: Not applicable)	a. Technical assistance workshops and meetings  b. Data provided by the Ministry of Housing and Urban–Rural Development	Political process will not allow endorsement  BTH region model is not appropriate
<b>Outputs</b> 1. Integrated regional MSW management model for the BTH region developed	<b>By April 2020</b> 1a. Institutional arrangements for coordinating and supervising subgovernment body defined (2018 baseline: Not applicable)  1b. Cost recovery and eco–compensation scheme approved (2018 baseline: Not applicable)  1c. Improved policies and regulations recommended (2018 baseline: Not applicable)	1a. Consultant's reports  1b. Executing agency approves cost recovery and eco-compensation scheme  1c. Consultant's reports	Data disclosure delayed or no data provision  Local administrations object to clustering  Lack of private sector interest
2. Regional MSW management understanding and capacity in the BTH region enhanced	<b>By April 2020</b> 2a. At least 50% of participants at four thematic workshops held in BTH region report enhanced knowledge of MSW regional integration (2018 baseline: 0)  2b. At least 50% of decision makers on international study tour indicate improved understanding of best	2a–c. Workshop reports and results from feedback questionnaires	Nominated participants have poor technical knowledge or decision-making ability  Partnerships with other PRC urban agglomerations and international practitioners are delayed

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	international practices in regional MSW management (2018 baseline: 0)  2c. At least 50% of participants at regional TA project results dissemination workshops report greater understanding of regional MSW management model (2018 baseline: 0)		
<b>Key Activities with Milestones</b> 1. <b>Integrated regional MSW management model for the BTH region developed</b> 1.1 Develop a comprehensive integrated regional planning model for MSW (by May 2019) 1.2 Assess and develop an innovative financial cost recovery and eco-compensation plan (by July 2019) 1.3 Prepare an innovative institutional system and detailed policy framework (by December 2019) 2. <b>Regional MSW management understanding and capacity in the BTH region enhanced</b> 2.1 Prepare and undertake four thematic discussion workshops (by July 2019) 2.2 Conduct an international study tour on international best practices in regional MSW management and eco-compensation (by August 2019) 2.3 Conduct at least one TA project results dissemination workshop in other PRC urban agglomerations (by December 2019)			
<b>Inputs</b> Asian Development Bank: \$400,000 Note: The government will provide counterpart support in the form of office space, office supplies, secretarial assistance, domestic transportation, and other in-kind contributions.			
<b>Assumptions for Partner Financing</b> Not applicable			

BTH = Beijing–Tianjin–Hebei, MSW = municipal solid waste, PRC = People’s Republic of China.

<sup>a</sup> Asian Development Bank. 2016. *Country Partnership Strategy: People’s Republic of China, 2016–2020—Transforming Partnership: People’s Republic of China and Asian Development Bank*. Manila.

Source: Asian Development Bank.

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Amount
<b>Asian Development Bank<sup>a</sup></b>	
1. Consultants (output-based) <sup>b</sup>	266.0
2. Training, seminars, and workshops <sup>c</sup>	101.0
3. Miscellaneous administration and support costs <sup>d</sup>	13.0
4. Contingencies	20.0
<b>Total</b>	<b>400.0</b>

Note: The technical assistance is estimated to cost \$450,000, of which contributions from the Asian Development Bank (ADB) are presented in the table above. The government will provide counterpart support in the form of office space, office supplies, secretarial assistance, domestic transportation, and other in-kind contributions. The value of government contribution is estimated to account for 11% of the total technical assistance cost.

<sup>a</sup> Financed by ADB's Technical Assistance Special Fund (TASF-other sources).

<sup>b</sup> Includes all consulting inputs, local and international travel, per diems, report preparation and online dissemination, and leadership of study tour.

<sup>c</sup> Allows for international study tour (comprising six government officials for two country visits over 10 days; and to be led by consultant team), 4 workshops of 100 people, additional training sessions, flyers, and materials.

<sup>d</sup> Includes final report editing, translation, and possible travel costs of ADB staff (acting as sector resource person for knowledge transfer and facilitation) and experts on study tour and at conferences.

Source: Asian Development Bank estimates.

**LIST OF LINKED DOCUMENTS**

<http://www.adb.org/Documents/LinkedDocs/?id=51388-001-TARreport>

1. Terms of Reference for Consultants