ADB

Technical Assistance Report

Project Number: 46248-001
Regional–Capacity Development Technical Assistance (R-CDTA)
December 2013

Mainstreaming Integrated Solid Waste Management in Asia

(Cofinanced by the Urban Environmental Infrastructure Fund under the Urban Financing Partnership Facility)

Asian Development Bank

ABBREVIATIONS

ADB	–	Asian Development Bank
CSC	–	case-study city
DMC	–	developing member country
PPP	–	public–private partnership
SWM	–	solid waste management
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Regional–capacity development technical assistance (R-CDTA)
Targeting classification	–	General intervention
Sector (subsector)	–	Water supply and other municipal infrastructure and services (water supply and sanitation)
Themes (subthemes)	–	**Environmental sustainability** (urban environmental improvement), capacity development (organizational development)
Location (impact)	–	Urban (high), national (medium), regional (medium)
Partnership	–	Urban Environmental Infrastructure Fund under the Urban Financing Partnership Facility

NOTE

In this report, "$" refers to US dollars.

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I. INTRODUCTION

1. Strategy 2020 of the Asian Development Bank (ADB) names infrastructure and environment as two of the five core areas of operations, and private sector development and private sector operations as one of five drivers of change.[1] Solid waste management (SWM), one of the most neglected areas of municipal services and infrastructure in Asia, is a pressing need in most developing member countries (DMCs) to help attain environmental sustainability and improve the quality of life for their citizens. The technical assistance (TA), with its crosscutting focus on infrastructure and environment, fits well with ADB's Strategy 2020 and the Urban Operational Plan, 2012–2020. The TA also ties in well with the country partnership strategy of several DMCs that have singled out sanitation and waste management as a key area of assistance for their urban renewal. Yet ADB's participation in SWM projects in DMCs has been opportunity-based with limited strategic focus.

2. For SWM, ADB has funded only a few projects with more than 1,000 tons/day treatment and/or disposal capacity, a common quantum of daily generation of municipal solid waste in many cities in Asia. These projects largely are waste-to-energy applications in the People's Republic of China, funded through the Private Sector Operations Department. Even these projects do not provide a long-term holistic management of municipal solid waste on a citywide scale. It is thus evident that ADB needs to raise its effort to help DMCs develop holistic, citywide SWM strategies and translate those into technically feasible and commercially viable projects. This TA is a major step in this direction. The TA design and monitoring framework is in Appendix 1.[2]

3. This TA proposes to commence with Armenia and expand into countries covered by ADB's South Asia Department and Southeast Asia Department. Under the project preparatory TA for the Solid Waste Management Improvement Investment Program approved in December 2011, ADB completed a countrywide assessment of strategies needed to develop municipal solid waste management in Armenia.[3] That study recommended dividing the country into five regions for the purpose of SWM, and developing and implementing a regional approach to collection, treatment, and disposal facilities to bring in economies of scale. The Government of Armenia has requested ADB to undertake detailed feasibility studies for the five regions defined in the countrywide SWM strategy. German development cooperation through KfW and European Bank for Reconstruction and Development (EBRD) are now working on pre-feasibility studies for two of these five regions. This TA aims to develop SWM projects for the Yerevan region and undertake pre-feasibility studies on segregation, treatment, and disposal of SWM. It is noteworthy in this context that the Government of Armenia has recently awarded a public–private partnership (PPP) contract for collection of municipal solid waste in the city of Yerevan and it strongly supports private sector participation. The TA will thus effectively help the government develop and implement an integrated waste management solution for one of the key regions in Armenia.

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[1] ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

[2] The TA first appeared in the business opportunities section of ADB's website on 14 November 2013.

[3] ADB. 2011. *Technical Assistance to Armenia for Preparing the Solid Waste Management Improvement Investment Program*. Manila (TA 7991-ARM).

II. ISSUES

4. A recent study by the World Bank indicates that 35% of municipal solid waste in South Asia, 25% in East Asia, and 25% in Southeast Asia remains uncollected.[4] A large part of the collected municipal solid waste finds its way to unsanitary landfills, causing health hazards and releasing greenhouse gases. In the People's Republic of China and India alone, the annual greenhouse gas emissions from such landfills are estimated to be 59 million tons of carbon dioxide equivalents. Lack of funds and technical skills of urban local bodies, their reluctance to engage in long-term contracts, and inadequate policies and regulations to attract finances are the main constraints on effective management of municipal solid waste in Asia. Private sector participation that can infuse funds, technical skills, and operational efficiencies is likely to be a key element in solving the problem, especially for large and medium-sized cities.[5] To date, however, such participation in SWM has been limited to waste collection contracts, waste-to-energy applications, and a few landfill projects. SWM in a majority of cases has remained a gap-filling exercise with little or no element of holistic proactive planning. This TA tackles these issues to help promote long-term planning in SWM.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

5. The TA aims to develop long-term strategies for integrated SWM for two large and two medium-sized cities, and one small city—the case-study cities (CSCs)—in Asia, translate each city strategy into an action plan that provides basic project structure and bidding procedures, and recommend regulatory and policy reforms to attract investments in SWM.

6. The impact of the TA will be that more Asian cities implement sustainable SWM strategies.

7. The outcome of the TA will be that city governments in CSCs adopt sustainable SWM strategies.

B. Methodology and Key Activities

8. The scope of work under the TA covers collation of information, analyses, and presentation of the current status of municipal SWM—e.g., waste generation trends and estimates; waste characteristics; gaps in collection, treatment, and safe disposal; financing and capacity constraints—in five selected CSCs in Asia, and formulation of a long-term holistic SWM strategy for each CSC. Each city's SWM strategy will contain (i) a workable and cost-effective technical solution for effective management of municipal solid waste; (ii) an estimate of financing needs and gaps, and recommendations for regulatory, policy, and financing mechanisms to enable sustainable financing and private sector participation in SWM; and (iii) a concrete action plan that contains basic project structure and bidding procedures.

9. The beneficiary cities will be selected from DMCs that are better suited for private sector participation, such as Armenia, India, Indonesia, the Philippines and Thailand. These countries

[4] D. Hoornweg and P. Bhada-Tata. 2012. *What A Waste: A Global Review of Solid Waste Management*. Washington, DC: World Bank.

[5] For the purpose of this TA, a large city is defined as having a population above 5 million, a medium city having a population between 1 million and 5 million, and a small city having a population below 1 million.

have been shortlisted in consultation with Private Sector Operations Department because of their attractiveness for private sector investments in SWM in the present investment climate, and with ADB's regional departments due to their ongoing and projected SWM efforts in their regions. Participation by the private sector due to its technical knowhow, operating skills, and financing ability is considered important to develop effective SWM practices in DMCs. The TA will have the following activities leading to three outputs:

10. **Output 1**: **Five case-study cities selected based on criteria prepared and applied for such selection.** The process of selecting the beneficiary cities initially within the shortlisted countries will follow a two-step procedure. First, based on a broad review and findings of the TA in Armenia, an inception workshop will explain the scope and methodology of developing the pre-feasibility studies for the possible pilot to be undertaken later. Similar workshops will then be organized in the other shortlisted countries to explain scope and methodology of the TA and identify candidate cities. ADB's respective regional departments will lead the effort. Having obtained the acceptance of the countries to participate in the TA, one large and one medium or two medium-sized cities each in India, Indonesia, and Thailand, and one medium-sized and one small city in the Philippines, in addition to one city or region in Armenia, will be preselected. If necessary, alternative countries could be considered in South Asia or Southeast Asia. As the second step, the TA consultant will visit these cities, assess the SWM status, identify technically viable SWM options, hold stakeholder consultations, and assess the readiness or willingness of local governments to undertake policy reforms to improve financing for environmental infrastructure, and to introduce transparency in decision making and their commitment to integrated SWM. Based on this assessment, and using selection criteria developed under the study, these cities will be ranked. Five CSCs will be selected for the detailed study. The desirable composition of the CSCs is two large and two medium-sized cities, and one small city. The time frame for this deliverable is 8 months.

11. **Output 2: A 20–25-year strategy prepared for sustainable solid waste management practice in the case-study cities.** For each CSC, the results of the desk review, supplemented by the city-specific investigations and consultations, will be analyzed and a draft SWM strategy prepared for a time horizon of 20–25 years. The strategy is envisioned to contain (i) a city profile, including population and growth, economic activity, expected budgetary support for SWM, willingness and ability to pay for the services by the consumers, and any other parameters considered relevant; (ii) an SWM review covering (a) waste generation and characteristics; (b) existing SWM system, institutions, regulations, and enforcement; (c) financial modalities such as PPPs and external assistance; (iii) a summary of SWM issues, constraints, and opportunities; (iv) sector recommendations with strategic objectives and milestones, investment requirements (including PPP modalities), and an outline of sector reforms and capacity-strengthening initiatives; and (v) a list of projects that will implement the SWM strategies and that can potentially be financed by ADB. The time frame for this deliverable is 12 months (completion by 20th month).

12. By way of an example, if the SWM strategy for a CSC 1—a large city generating about 10,000 tons of municipal solid waste per day—finds the main challenges to be waste transportation, treatment, and disposal for two out of three zones (existing infrastructure may be adequate for one of the city zones), it may recommend projects to augment transportation (by constructing transfer stations and procuring a long-haul fleet), waste treatment (by using biomethanation and waste-to-energy applications), and disposal capacity for residual waste (by constructing sanitary landfills) for zones 1 and 2. For a medium-sized or small city it may be a single waste treatment facility comprising composting and sanitary landfill.

13. **Output 3: Action plans prepared for solid waste management projects in the case-study cities.** For each project recommended in output 2, a detailed action plan that contains the basic project structure and bidding procedures will be prepared. A project may opt for a PPP form, e.g., a concession. In this case the action plan shall include a term sheet describing the key parties, respective rights and obligations, approximate size of the project(s), key risks, and risk management measures in sufficient detail to form the basis for future project contracts. The action plan in this case will also include broad parameters of the bidding process, including basic qualifications of bidders. For medium-sized and small cities, award of a management contract for waste collection and treatment to a private operator, and operation of disposal facilities by the urban local body itself, may be a most suitable option. In this case the detailed action plan may include performance indicators for the service providers, minimum period of management contract, qualifications and experience of service providers, obligations of the city government, and capacity building measures for the local government's SWM department. The time frame for this deliverable is 10 months (completion by 30th month).

C. Cost and Financing

14. The TA is estimated to cost $1,400,000, of which (i) $800,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-V) and (ii) $600,000 will be financed on a grant basis by the Urban Environmental Infrastructure Fund[6] under the Urban Financing Partnership Facility, and administered by ADB.

D. Implementation Arrangements

15. ADB will be the executing agency. The TA will be implemented by the Regional and Sustainable Development Department, in coordination with other departments and offices and the environment and urban development community of practice.[7] An advisory committee comprising the Environment and Safeguards Division director, Sustainable Infrastructure Division director, and sector directors of participating regions will supervise the TA outputs and provide guidance to linking TA outputs with downstream projects for financing by ADB.

16. The TA will be implemented over 3 years and, from January 2014 to December 2016. This includes the time required to seek no-objection letters from the nominated countries, appoint the consultants, and undertake the actual study.

17. In its biennium conference on "Global Partnership in Waste Management" in Osaka, Japan (5–6 November 2012), the International Solid Waste Association has shown keen interest in the TA concept and in participating through technical reviews and dissemination. It is envisaged that direct participation by beneficiary municipalities and experience sharing through the International Solid Waste Association and other international forums on SWM will contribute to rich knowledge exchange.

18. An international consulting firm with proven experience in designing and/or operating at least two SWM projects concerning treatment and disposal capacity in municipal SWM (strategy and policy development), feasibility studies and design, procurement and implementation of SWM infrastructure (including private sector participation) will be engaged in accordance with

[6] Contributor: the Government of Sweden.

[7] Environment and Safeguards Division, RSDD will lead the development of the SWM strategies and Regional Sustainable Infrastructure Division, RSDD will lead the pre-feasibility studies for the CSCs.

ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). Inputs from five international specialists (24 person-months total) and five teams of three national consultants each (32.5 person-months total) are required. National staff resources will be equally divided in participating countries. Procurement under this TA will be in accordance with *ADB's Procurement Guidelines* (2013, as amended from time to time). All disbursements under the TA will be made in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time). The consulting firm will be recruited following project administration instructions on recruiting consultants through a quality- and cost-based selection process (90:10).[8] Higher emphasis is placed on the technical proficiency of the consultant in the selection process because of the pioneering nature of the study, especially in the Asian context. The terms of reference for the consultants are in Appendix 3. No TA activities will be financed or undertaken in the territory of a DMC until a no-objection letter has been obtained from the government of that DMC.

IV. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of $600,000 to be financed on a grant basis by the Urban Environmental Infrastructure Fund under the Urban Financing Partnership Facility, and (ii) ADB providing the balance not exceeding the equivalent of $800,000 on a grant basis, for Mainstreaming Integrated Solid Waste Management in Asia, and hereby reports this action to the Board.

[8] ADB. Recruiting Consultants. *Project Administration Instructions*. Manila (2.01-2.04).

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact More Asian cities implement sustainable SWM strategies	Investments in SWM projects increased by 50% by 2020 in at least 3 CSCs (Baseline to be determined once CSCs selected)	City assessment reports and city SWM summary by the International Solid Waste Association	**Assumption** City governments and other stakeholders remain committed to investing in sustainable SWM **Risks** Financial resources for SWM are not available City governments do not adopt policy and regulatory reforms required for strategy implementation
Outcome City governments in CSCs adopt sustainable SWM strategies	At least 3 city governments from CSCs present their strategic vision at international forums by 2016 At least 2 city governments request ADB to support implementation of SWM projects in CSCs by 2017	City assessment reports, city SWM summary, and regional reports by the International Solid Waste Association	**Assumptions** City governments are willing to commit to sustainable SWM
Outputs 1. 5 CSCs selected based on criteria prepared and applied for such selection	SWM strategic vision prepared for at least 7 cities At least 4 cities selected as CSCs for developing 20–25-year SWM strategy	Project reports	**Assumption** City governments share the SWM information and participate in discussions to develop SWM strategy at pertinent level of local bodies
2. A 20–25-year strategy prepared for sustainable SWM practice in 5 CSCs	Strategy for at least 4 CSCs prepared and peer-reviewed as satisfactory	City government approval of SWM strategy	
3. Action plans prepared for SWM projects in the CSCs	Basic project structure and bidding procedures for at least 4 cities prepared and approved by city governments	City government approval of basic project structure and bidding procedures	

Activities with Milestones	Inputs
1. Output 1: Selection of 5 CSCs based on criteria prepared and applied for such selection (8 months) 1.1 Perform a preliminary assessment of the status of municipal SWM in participating countries—likely to be Armenia, India, Indonesia, Thailand, and the Philippines—while integrating the findings of ongoing SWM subprojects under the TA for Project Preparation Support for Livable Cities and other relevant TA undertaken by ADB.[a] 1.2 In coordination with ADB's Regional Sustainable Development Department, Private Sector Operations Department, and the urban development and water divisions of operations departments, (i) set key parameters for preselection of 9 cities in participating countries suitable for integrated SWM and representing large, medium, and small populations; and (ii) hold inception workshops in the shortlisted countries. Select additional countries, if necessary, in any of the regions covered under the TA. 1.3 Develop and apply criteria for the selection of 5 CSCs from among the preselected cities (preferably 1 CSC each in participating countries). **2. Output 2: Development of SWM strategies for CSCs** (12 months) 2.1. For each CSC, analyze the results of the desk review, supplemented by the in-country consultations, and prepare a draft SWM strategy for a time horizon of 20–25 years. 2.2. Review the bidding documents and contract agreements for public–private partnerships in SWM in the region, and single out weaknesses by comparing with international best practices. Organize workshops with private sector operators (existing and prospective), regulators, and nongovernment organizations in the selected countries to discuss the gaps, determine the means to overcome the weaknesses, and reach a consensus on model bidding and contract documents. 2.3. Prepare a regional summary report that will outline the results of the assessment for each CSC, and the proposed sector development recommendations and investments for each CSC. 2.4. Prepare a summary presentation of assessment findings, to be utilized for subsequent technical and professional presentations, and assist discussion on SWM in country partnership strategies. **3. Output 3: Preparation of action plan for SWM projects in CSCs** (10 months) 3.1 For each CSC, based on the studies and assessments, prepare an action plan for development and implementation of SWM projects. 3.2 Prepare case study briefs for each of the CSCs and a final report for the TA that documents the findings and recommendations.	ADB: $800,000 Urban Environmental Infrastructure Fund under the Urban Financing Partnership Facility: $600,000

ADB = Asian Development Bank, CSC = case-study city, SWM = solid waste management, TA = technical assistance.
[a] ADB. 2009. *Technical Assistance for Project Preparation Support for Livable Cities*. Manila (TA 7450-REG).

COST ESTIMATES AND FINANCING PLAN
($'000)

Item	Amount
A. Asian Development Bank [a]	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	335.0
ii. National consultants	150.0
b. International and local travel	90.0
c. Reports and communications	10.0
2. Workshops, training, seminars, and conferences	104.0
3. Survey, data collection, and laboratory analysis	60.0
4. Miscellaneous administration and support costs	6.0
5. Contingencies	45.0
Subtotal (A)	**800.0**
B. Urban Environmental Infrastructure Fund under the Urban Financing Partnership Facility [b]	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	255.4
ii. National consultants	110.0
b. International and local travel	71.4
c. Reports and communications	6.7
2. Workshops, training, seminars, and conferences	77.5
	40.0
3. Survey, data collection, and laboratory analysis	4.0
	35.0
4. Miscellaneous administration and support costs	**600.0**
5. Contingencies	
Subtotal (B)	
Total	**1,400.0**

[a] Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-V)
[b] Contribution: the Government of Sweden. Administered by the Asian Development Bank.
Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) aims to undertake in-depth assessments of the current status of solid waste management (SWM) in five case-study cities (CSCs) in shortlisted Asian countries (Armenia, India, Indonesia, Philippines, and Thailand) covering institutional, regulatory, physical, environmental, social, financing, cost recovery and public–private partnership (PPP) aspects. From this, recommendations will be developed for each city, including outline strategic objectives and milestones, likely investment levels and modalities (including PPPs), and sector support initiatives necessary to incrementally improve SWM service provision and effectively attract private investments. The TA will cover a wide spectrum of population sizes in Asian cities, from above 5 million (large city) to 1–5 million (medium-sized city) to below 1 million (small city).

2. Following is a brief description of the tasks the international and national specialists will perform under the TA.

3. **Solid waste management specialist – technical** (team leader, 12 person-months, international). The specialist will have a master's degree in civil or environmental engineering with minimum 15 years of work with demonstrable experience in developing SWM strategies for large cities and good understanding of technical, financial, institutional, and regulatory aspects of SWM in Asia. Working experience in SWM projects in developing countries (preferably in Asia) is necessary.

4. The SWM specialist will supervise the work of national consultants and coordinate inputs from PPP, financing, and contract specialists to deliver the outputs of the TA, and deliver as the team leader. The tasks will include the following:

(i) Consult with ADB's Regional Sustainable Development Department, which is supported by the regional departments, and the Private Sector Operations Department to determine the nine candidate cities in participating countries that are suitable for undertaking policy, regulatory, and financial reforms in SWM. Prepare the criteria for the selection of the CSCs. Undertake preliminary evaluation of the status of municipal SWM in candidate cities, including existing and future generation of municipal solid waste, SWM systems and procedures, and constraints on and opportunities for integrated SWM (such as private sector participation). Prepare a draft guidance framework for assessing preparedness of Asian cities for integrated SWM.

(ii) Undertake a desk review of available information pertaining to the SWM systems of each of the candidate cities, undertake field visits, interact and consult with the municipal authorities and other stakeholders to gain additional information and generate data as needed, and apply the guidance framework developed in item (i) to rank these cities and select the five CSCs.

(iii) For each CSC, analyze the results of the desk review, supplemented by the in-country consultations, and prepare a draft SWM strategy for a time horizon of 20–25 years.

(iv) Prepare a summary presentation of assessment findings to be used for later technical and professional presentations.

5. **Public–private partnership specialist** (4 person-months, international). The specialist will have a master's degree in management (finance) or equivalent with more than 10 years of work experience in delivering PPP projects for urban infrastructure. Experience with PPPs in SWM projects in developing countries, and especially in Asia, will be given preference.

6. The PPP specialist will be responsible for ranking the candidate cities (especially large and medium-sized cities) for their suitability to attract private sector investment in SWM, engaging in detailed assessment of five CSCs, and later developing the term sheets for these cities. The tasks will include the following:

(i) Develop key selection parameters to be applied at the country and municipality level in choosing nine cities for their attractiveness to private sector investment and participation. Obtain detailed information on each of these cities to assist the team leader in ranking them, selecting the five CSCs, and documenting the justification of their selection.
(ii) Lead the discussions in meetings and consultations with private sector operators in the shortlisted countries to understand their concerns, constraints, and risk perceptions relating to PPP and help ensure that these concerns are adequately reflected in the bidding term sheets.
(iii) Assist the team leader in all discussions with municipalities and other stakeholders to explain private sector perception of investments risks and their allocation among private sector and the public sector client (municipality). Suggest any regulatory or institutional changes that may be necessary to invite private sector participation to the waste management sector.
(iv) Work with the financial specialist to figure out financial returns suitable to the risk profile for the potential SWM projects and assist in assessing willingness to pay by the consumers. Help define the revenue-generating possibilities for the municipality (arising from the likely benefits of these projects) and channelization of these revenues through appropriate financial instruments to pay for the services of private sector operators.

7. **Financial specialist** (3 person-months, international). The specialist will have a master's degree in finance, chartered accountancy, or economics with more than 10 years of work experience in financial modeling for project finance applications. Experience from working in SWM projects in developing countries, and especially in Asia, will be given preference.

8. The financial specialist will develop and run financial models for each project identified in output 2 to establish its financial viability and to determine the service fee and the subsidy necessary for the project to assist the municipality in its budget planning. In developing these estimates the expert will work closely with the team leader to ensure realistic data on cost and revenue streams for potential SWN projects and their byproducts such as electricity and compost.

9. **Solid waste management specialist – contracts** (3 person-months, international). The specialist will have a master's degree in law with more than 10 years of experience in working with major international waste management firms or consulting firms engaged in PPP contracts. Experience in urban infrastructure and SWM in developing countries, and especially in Asia, will be preferred.

10. The specialist will review the bidding documents and contract agreements for PPP initiatives in SWM in the region and identify weaknesses by comparing with international best practices. The specialist will organize workshops with private sector operators (existing and prospective), regulators, and nongovernment organizations in the shortlisted countries to discuss the gaps, define means to overcome the weaknesses, and reach a consensus on model bidding and contract documents.

11. **Carbon finance specialist – contracts** (2 person-months, international). The specialist will have a master's degree in environmental engineering or science, finance or economics with more than 8 years of experience in working for Clean Development Mechanism (CDM) and/or carbon financing projects. The specialist must have worked on at least two CDM-registered and/or CDM-financed SWM projects.

12. The specialist will assist the team leader in incorporating climate change adaptation and mitigation aspects in selection and structuring of potential SWM projects. The tasks will include the following:

(i) Assemble and review country-specific information on climate change vulnerabilities and possible mitigation and adaptation options for addressing the projects in SWM sector in CSCs.
(ii) Define possible options and practices for reducing greenhouse gases in the SWM sector that can be integrated in the design of SWM projects.
(iii) Provide technical support to the TA team to include climate-change adaptation and mitigation considerations in development of SWM strategy for CSCs especially bringing in sector-specific national and/or international cases and good practices.
(iv) Perform other tasks relevant to this TA as may be assigned by the team leader.

13. **Solid waste management specialists – technical** (5 positions totaling 15 person-months, 3 person-months for each country). The specialists will have a master's degree in civil, mechanical, or environmental engineering with minimum 10 years of work with demonstrable experience in SWM projects in the country.

14. In each shortlisted country, the respective national specialists will assist the team leader in information collection, data generation, consultation meetings, and other local activities related to project-relevant technical aspects of SWM.

15. **Solid waste management specialists – policy and/or institutional** (5 positions totaling 10 person-months, 2 person-months for each country). The specialists will have a master's degree in social sciences, public administration, economics, or engineering with minimum 10 years of work with demonstrable experience in policy and/or institutional aspects of municipal infrastructure in the country.

16. In each shortlisted country, the respective national specialist will assist the team leader in information collection, data generation, consultation meetings, and other local activities related to project-relevant legal and institutional aspects of SWM.

17. **Financial specialist** (5 positions totaling 7.5 person-months, 1.5 person-months for each country). The specialist will have a master's degree in finance or economics with minimum 10 years of work with demonstrable experience in financial analysis of municipal infrastructure projects in the country.

18. In each shortlisted country, the respective national financial specialist will collect information on municipal budgets for SWM, and analyze the cost of services for waste collection, treatment, and disposal. The national specialist will assist the international specialist in consulting public and private SWM service providers to develop a realistic understanding of the costs and revenues for SWM projects, and perform financial analysis of projects to identify the constraints and opportunities in the sector.