ADB

Board of Directors

FOR OFFICIAL USE ONLY

R102-18
5 September 2018

Proposed Loan
Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project
(People's Republic of China)

1. The Report and Recommendation of the President (RRP: PRC 48443-002) on the proposed loan to the People's Republic of China for the Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project is circulated herewith.

2. This Report and Recommendation should be read with *Country Operations Business Plan: People's Republic of China, 2018–2020*, which was circulated to the Board on 5 April 2018 (DOC.IN.63-18).

3. In the absence of any request for discussion and in the absence of a sufficient number of abstentions or oppositions (which should be communicated to The Secretary by the close of business on 26 September 2018), the recommendation in paragraph 39 of the paper will be deemed to have been approved, to be so recorded in the minutes of a subsequent Board meeting. Any notified abstentions or oppositions will also be recorded in the minutes.

For Inquiries: Alan Baird, East Asia Department
(Ext. 4410)
Baurzhan Konysbayev, Office of the General Counsel
(Ext. 4882)

Report and Recommendation of the President to the Board of Directors

Project Number: 48443-002
September 2018

Proposed Loan
People's Republic of China: Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 17 August 2018)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1453
$1.00	=	CNY6.8826

ABBREVIATIONS

3Rs	–	reduce, reuse, and recycle
ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
EMP	–	environmental management plan
HPG	–	Hunan Provincial Government
HURD	–	Hunan Provincial Housing and Urban–Rural Development Department
MSW	–	municipal solid waste
O&M	–	operation and maintenance
PAM	–	project administration manual
PRC	–	People's Republic of China
YREB	–	Yangtze River Economic Belt

NOTE

In this report, "$" refers to United States dollars.

Vice-President	Stephen Groff, Operations 2
Director General	Amy S.P. Leung, East Asia Department (EARD)
Director	Sangay Penjor, Urban and Social Sectors Division, EARD
Team leaders	Alan Baird, Senior Urban Development Specialist, EARD Baochang Zheng, Senior Project Management Officer, EARD
Team members	Maricelle David, Associate Project Analyst, EARD Arnaud Heckmann, Principal Urban Development Specialist, EARD Hubert Jenny, Principal Infrastructure Specialist, EARD Baurzhan Konysbayev, Principal Counsel, Office of the General Counsel Mailene Radstake, Principal Social Development Specialist (Safeguards), EARD Mark Robis, Senior Financial Management Officer, EARD Shotaro Sasaki, Senior Environment Specialist, EARD Jasmin Sibal, Economics Officer, Economic Research and Regional Cooperation Department Gohar Tadevosyan, Social Development Specialist (Safeguards), EARD Ying Yu, Senior Procurement Officer, EARD
Peer reviewer	Jingmin Huang, Principal Urban Development Specialist, South Asia Department

CONTENTS

PROJECT AT A GLANCE

1. Basic Data			**Project Number:** 48443-002
Project Name	Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project	**Department /Division**	EARD/EASS
Country	PRC	**Executing Agency**	Hunan Provincial Housing & Urban-Rural Dev't Dept.
Borrower	People's Republic of China		

	2. Sector	Subsector(s)	ADB Financing ($ million)
✓	**Water and other urban infrastructure and services**	Urban solid waste management	97.50
	Agriculture, natural resources and rural development	Rural solid waste management	52.50
		Total	**150.00**

3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	CO_2 reduction (tons per annum)	155,700
		Climate Change impact on the Project	Medium
Environmentally sustainable growth (ESG)	Eco-efficiency		
	Global and regional transboundary environmental concerns	**ADB Financing**	
	Urban environmental improvement	Adaptation ($ million)	61.46
		Mitigation ($ million)	78.42

4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Institutional development	Some gender elements (SGE)	✓
	Organizational development		
Knowledge solutions (KNS)	Application and use of new knowledge solutions in key operational areas		
	Knowledge sharing activities		
	Pilot-testing innovation and learning		
Partnerships (PAR)	Civil society organizations		
	Implementation		

5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	No	Rural	Low
Household Targeting	No	Urban	High
SDG Targeting	Yes		
SDG Goals	SDG9, SDG11, SDG13		

6. Risk Categorization: Complex

7. Safeguard Categorization **Environment:** A **Involuntary Resettlement:** B **Indigenous Peoples:** B

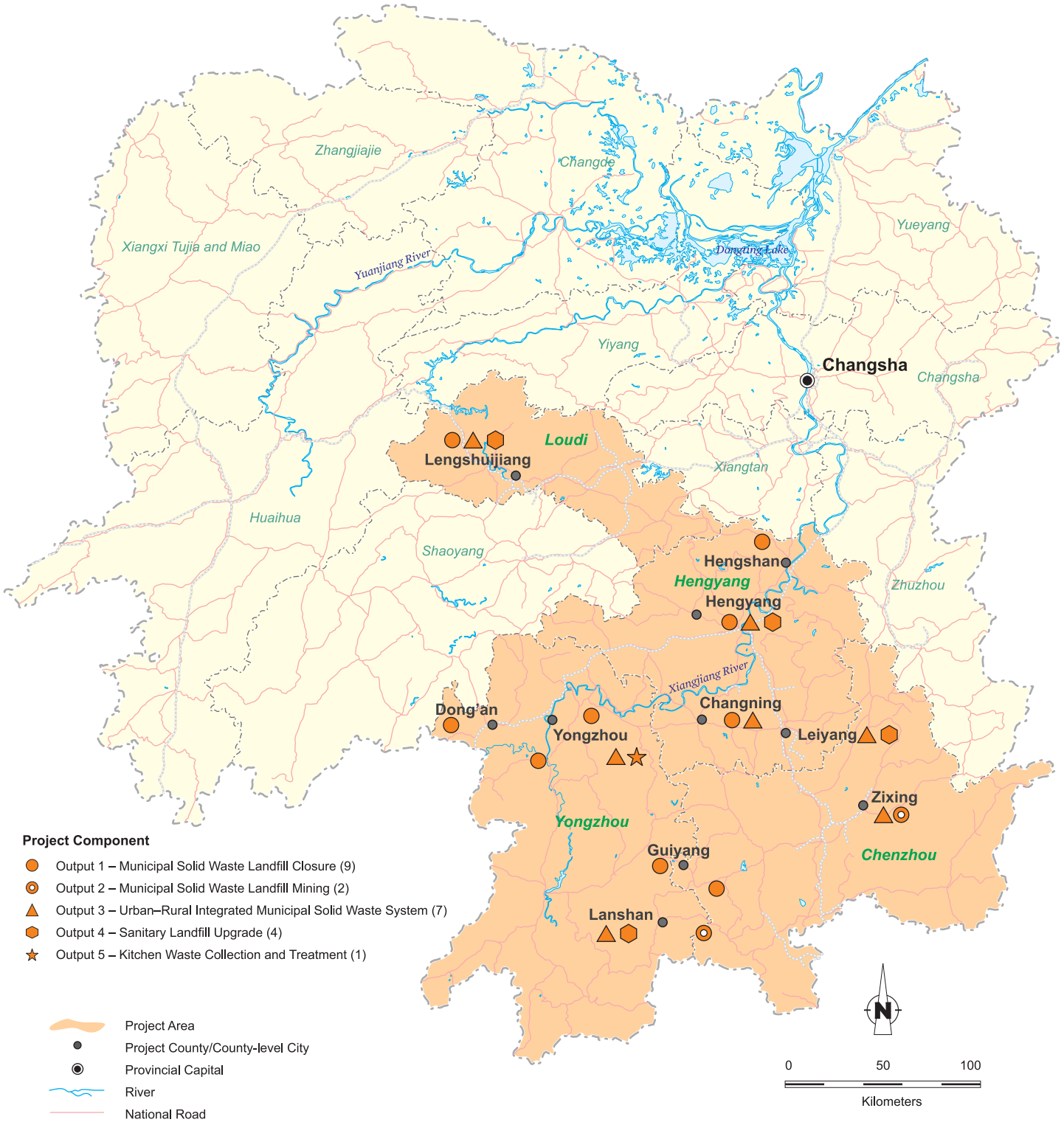
8. Financing

Modality and Sources	Amount ($ million)
ADB	**150.00**
Sovereign Project (Regular Loan): Ordinary capital resources	150.00
Cofinancing	**0.00**
None	0.00
Counterpart	**108.00**
Government	108.00
Total	**258.00**

Source: Asian Development Bank

HUNAN XIANGJIANG RIVER WATERSHED
EXISTING SOLID WASTE COMPREHENSIVE TREATMENT PROJECT

IN THE
PEOPLE'S REPUBLIC OF CHINA



Project Component

- Output 1 – Municipal Solid Waste Landfill Closure (9)
- Output 2 – Municipal Solid Waste Landfill Mining (2)
- Output 3 – Urban–Rural Integrated Municipal Solid Waste System (7)
- Output 4 – Sanitary Landfill Upgrade (4)
- Output 5 – Kitchen Waste Collection and Treatment (1)

- Project Area
- Project County/County-level City
- Provincial Capital
- River
- National Road
- Railroad
- Prefecture/City Boundary
- Provincial Boundary

Boundaries are not necessarily authoritative.

18-0706A ABV OpenStreetMap

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project.

2. The project will address urgent environmental and infrastructure needs associated with municipal solid waste (MSW) management in 10 counties and county-level cities in the Xiangjiang River watershed of Hunan Province.[1] It is a milestone for the Asian Development Bank (ADB) because it will be the first in the PRC to focus solely on MSW management. It will also complement the government's efforts to align MSW services with sustainable development. It will support overall strategies to reduce the discharge of long-term pollutants in the Xiangjiang River watershed and has significant potential for wide replication.

II. THE PROJECT

A. Rationale

3. The Xiangjiang River and its watershed are part of the larger Dongting Lake watershed. Both watersheds are integral elements of the downstream Yangtze River watershed. The Yangtze River Economic Belt (YREB) covers nine provinces and two specially administered cities in the Yangtze River Basin. It accounts for over 40% of the PRC's population and has 40% of the freshwater resources. It also serves as the drinking water resource for 400 million people, provides 60% of the total fisheries production, has 20% of the total wetland area, and contributes about 45% of the PRC's economic output. The PRC's YREB Development Plan, 2016–2030,[2] stipulates the prioritization of ecological protection and promotion of green development as the guiding principle for the YREB development. As upstream watersheds, the Xiangjiang River and Dongting Lake play a pivotal role in the water quality of the Yangtze River watershed and in the general maintenance of healthy rivers and waterways. Therefore, the Xiangjiang River watershed is a key water resource in the overall strategic planning for water security in the Yangtze River, and its ecological improvement in turn promotes ecosystem restoration, environmental protection, and water resources management of the YREB and its watersheds.

4. The Xiangjiang River watershed has a total area of about 94,660 square kilometers, with approximately 90% of it located in Hunan and the remaining 10% located in the Guangxi Province. The economic activity and expansion of the human-made surroundings have extensively developed the Xiangjiang River watershed. By 2017, approximately 61% of Hunan's total population, or about 25.1 million people, lived within the watershed. The total gross domestic product for the Xiangjiang River watershed in 2017 was estimated to be 75% of the overall total gross domestic product of Hunan Province. The rapid economic growth experienced countrywide from the mid-1980s until the present, coupled with inadequate environmental protection, contributes to the deterioration of the environment and the increased pollution in Hunan and the Xiangjiang River watershed. By 2000, the surface water of the Xiangjiang River, which met class III quality or better, was less than 70% along the entire river system.[3] Based on the PRC drinking water code, water along most reaches of the Xiangjiang River did not meet the standards to be

[1] The project includes the (i) five counties of Dong'an, Guiyang, Hengshan, Hengyang, and Lanshan; and (ii) five county-level cities of Changning, Leiyang, Lengshuijiang, Yongzhou, and Zixing.

[2] Government of the PRC. 2016. *Outline of the Yangtze River Economic Belt Development Plan, 2016–2030.* Beijing.

[3] Government of the PRC, Ministry of Environmental Protection. 2002. *Environmental Quality Standards for Surface Water.* Beijing. There are five categories, with Class I being the highest quality of water and class V being the lowest quality. Class III is the minimum that can be used as a bulk source of raw water for production of drinking water.

used as a source for raw water. The pollution in the Xiangjiang River had negative impacts on living standards and the health of residents living around the river. The pollution was recognized by the government as a threat to the long-term sustainable growth of industry along the river, an impediment to the maintenance of overall river health, a material risk to the strategic supplies for downstream drinking water, and an unacceptable visual intrusion on the watershed's well-recognized cultural attraction.

5. The main sectors responsible for the Xiangjiang River watershed's environmental degradation are industry, agriculture, and domestic (with domestic sources being primarily municipal wastewater and MSW). In the period 2000–2017, the government adopted an integrated approach to pollution control to protect water quality in the Xiangjiang River watershed. In 2011, the Hunan Provincial Government (HPG) initiated a major program of environmental pollution control to target the major pollution sources.[4] Subsequent environmental regulations and incremental enforcement in Hunan have reduced the impacts from industrial and agricultural sources, and new wastewater treatment plants have reduced pollution from untreated sewage. However, significant challenges remain regarding MSW. Urbanization has left a legacy of substandard landfill sites that were once in outlying rural areas and are now located close to newly created urban areas. Much of the countryside has been urbanized and has become part of the built environment of the counties and county-level cities. With the expansion of MSW services being limited in these areas, the challenge of managing MSW in a sustainable manner has grown.

6. **Addressing the poor management of substandard landfill sites.**[5] Aging landfill sites, which are generally no longer receiving any MSW, are one of the last remaining long-term sources of pollution that have not yet been fully addressed in Hunan. Most of these landfill sites are referred to as substandard MSW landfills, or dumpsites, meaning they were not planned, engineered, constructed, or operated to appropriate standards. They have been left untreated or partially sealed at various locations. They are typically closed in an operational sense. However, they have not been closed and restored in accordance with the best practice for decommissioning.[6] Because they were not closed competently, liquid leachate continues to pollute surface water and groundwater and the waste is also releasing landfill gas.[7] The liquid leachate and waste contribute to long-term pollution of the river system and downstream water quality by raising the biological and chemical oxygen demands, while gross pollution of the soil below the landfills remains unchecked. Without any form of managed closure, they will continue to generate leachate. The landfills pose risks to the health and well-being of people living near them and are a safety risk to anyone accessing them. HPG has identified 59 landfills in the watershed to be treated and improved by county and county-level city governments.[8] While some landfills have been treated under domestically funded projects, there are still untreated sites that continue to generate leachate when rainfall and runoff infiltrates the solid waste body, further generating leachate from the natural process of waste decomposition.

---

[4] HPG. 2011. *Heavy Metal Pollution Management Project Implementation Plan in the Xiangjiang River Basin: 2011–2015.* Changsha.

[5] Before the mid-1980s, disposal of MSW in Hunan was rarely managed in accordance with best practice, and formal services were rare. MSW was typically disposed of in so-called substandard landfill sites. The sites have become contaminated resulting from gradual decomposition of buried waste, with consequent degradation of soil and water.

[6] Closure and restoration is an MSW industry recognized term, which describes the process of closing a site from an engineering and environmental perspective, including a process of restoration using agreed design standards for future land use. It is not operational closure of a landfill site whereupon materials are no longer delivered to the site.

[7] As waste within a landfill decomposes, it generates leachate which is a highly polluting liquid contaminant.

[8] Hunan Provincial Housing and Urban–Rural Development Department (HURD). 2014. *Existing Solid Waste Landfill Rectification Planning for Xiangjiang River Watershed.* Changsha.

7. **Improvement of inadequate municipal solid waste management services in rural areas.** Efficient MSW management, which promotes reduction (by waste minimization), reuse (of waste materials), recycling, and recovery, is gaining ground in the PRC. However, the management and disposal of MSW generated in rural areas is underdeveloped and inadequate. Most waste is randomly dumped onto open areas without treatment. In some cases, it is burned openly, generating polluting emissions. Randomly dumped MSW allows waste to break down and decompose without the means to prevent leachate from percolating into the groundwater or flowing into surface water bodies; indiscriminately dumped MSW can clog streams and drains. In the PRC, MSW management focuses on urban areas. For vast rural areas, the management of domestic waste is delegated to villagers. In 2016, HPG commenced the implementation of a five-year plan for rural MSW treatment, which targeted the achievement of at least 70% of rural waste being treated by 2020.[9] This builds on rigorous national guidance on controlled treatment and disposal of MSW.[10] It supports the 3-year Action Plan for Rural Settlement Environment Regulation in Hunan Province issued by HPG in 2018 which requires comprehensive implementation of enhanced services for rural sewage and waste treatment. In the rural areas of Hunan, there has been some progress despite remaining limited and inconsistent.

8. **Expansion of municipal solid waste to include collection and treatment of kitchen waste.** HPG is also promoting the treatment of kitchen waste from commercial sources, which is typically disposed of in landfills or in small dumpsites without treatment. However, because of its high water and protein content, kitchen waste tends to generate more leachate and greenhouse gas emissions than other MSW. There is concern about unregulated kitchen waste handling regarding food safety and its impacts on human health.[11] According to a proposal raised in the Hunan People's Congress,[12] eight kitchen waste management projects have been proposed to recover by-products for beneficial reuse, with due regard to public health and overall food safety.

9. **Strategic context.** In the PRC's Thirteenth Five-Year Plan, the government's strategy is to intensify the control of water pollution and the protection of key watersheds.[13] This includes the ecological restoration of resource-depleted areas and the promotion of treating pollutants in contaminated river basins. HPG is committed to meeting these obligations and to eliminating or minimizing pollutants. It has prioritized reducing long-term pollution and promoting the comprehensive treatment and effective management of MSW.[14] HPG focuses on landfill management and MSW collection, transfer, and treatment in urban and rural areas.

10. **ADB support.** The project demonstrates alignment with the operational priorities of ADB Strategy 2030 particularly in terms of environmental sustainability and integrated solutions for livable cities. It closely supports the strategic priorities set out in ADB's country partnership

[9] HURD. 2016. *Hunan Rural Solid Waste Management Implementation Planning, 2016–2020.* Changsha.

[10] Government of the PRC, Ministry of Housing and Urban–Rural Development. 2011. *Notice on Further Strengthening Urban Domestic Refuse Disposal.* Beijing; and Government of the PRC, Ministry of Housing and Urban–Rural Development and National Development and Reform Commission. 2016. *National Plan for Treatment of Municipal Solid Waste.* Beijing.

[11] There is an unregulated business that collects kitchen waste to recover oils for cooking (known as "gutter" oil) and proteins for animal feed. Both uses are strictly prohibited and have serious impacts on human and animal health, yet this traditional form of recycling and reuse continues unabated.

[12] HPG. 2014. *Proposal on Hunan Municipal Solid Waste Separation and Collection for the Hunan People's Congress.* Changsha.

[13] Government of the PRC, State Council. 2016. *The Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China, 2016–2020*. Beijing.

[14] HPG. 2013. *Implementation Plan for the First Three-Year Action Plan for Hunan Xiangjiang River Pollution Control.* Changsha.

strategy for the PRC, 2016–2020; ADB's Water Operational Plan, 2011–2020, particularly in integrating the management of water resources including pollution control; and ADB's Urban Operational Plan, 2012–2020, particularly in improving environmental sustainability, promoting green and inclusive growth, and enhancing urban–rural links.[15] The project is ADB's first MSW investment in Hunan and the only one in the PRC that focuses entirely on MSW management. The project will adopt lessons learned from over 20 years of ADB experience in national dialogue with the government on MSW policies and practices. This dialogue has contributed to an enabling environment that has facilitated policy, regulatory, and operational improvements. Starting in 2000, ADB supported the government in strengthening urban MSW through technical assistance projects, which helped develop a national policy framework and plans for MSW and wastewater management, focusing on small cities and towns. ADB has also provided specific support for the treatment of substandard landfills in the PRC and for the environmental management of watersheds in Hunan. The project supports HPG's approach to urban–rural integrated MSW management, which seeks to address the entire cycle of MSW starting in households with collecting, separating, and recycling; and continuing in counties and cities with transferring and treating the remaining wastes. It covers a large population and various levels of government agencies. The engagement with multiple agencies is designed to drive ownership and build wide-ranging capacity at the lowest administrative level and act as a model project.

11. **Value addition of ADB assistance.** The PRC has adequate policies and regulations for MSW management to which ADB knowledge studies and technical assistance have contributed.[16] The implementation of these policies in rural areas, counties, and county-level cities has been a constant challenge. HPG recognizes this and has requested ADB's support to develop an investment project in rural and urban–rural areas, which is intended to show how policy and regulations can be translated into projects that follow best practices. This is intended to keep from duplicating past practices of low-cost interventions that deliver substandard outcomes. This builds on lessons from ADB's past engagements, showing the demand for clear statements on best practice and for robust technical guidance and support. ADB's presence offers a unique opportunity to deliver numerous projects under one overarching project, wholly focused on MSW, to allow collaboration and comparative assessment. ADB's focused support on a chronically underserved sector allows it to be comprehensively addressed. ADB's engagement assists the government in the last stage of providing MSW services and in addressing overlooked aging landfills. The government and ADB have designed the project collaboratively to have a sharper focus on consistent, effective, and innovative approaches with a high potential for replication, based on the best international and national practices. This enhanced design development broadened the project's scope while adopting more holistic and strategic approaches, leading to improved MSW service outcomes and the adoption of appropriate high-level technologies with large-scale demonstration potential, including (i) practical and environmentally sound approaches to landfill closure and restoration, building on recent codes of practice;[17] (ii) robust operational

[15] ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank.* Manila; ADB. 2011. *Water Operational Plan, 2011–*2020. Manila; and ADB. 2013. *Urban Operational Plan, 2012–2020*. Manila.

[16] ADB. 2000. *Technical Assistance to the People's Republic of China for Strengthening Urban Solid Waste Management.* Manila; ADB. 2007. *Technical Assistance to the People's Republic of China for Urban Wastewater and Solid Waste Management for Small Cities and Towns*. Manila; ADB. 2012. *Technical Assistance to the People's Republic of China for Management of Uncontrolled Landfills*. Manila; ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for Hunan Dongjiang Lake Integrated Environmental Protection and Management Project.* Manila; and ADB. 2016. *Technical Assistance to the People's Republic of China for Remediation of Heavy Metal Contamination in Farmlands of Hunan Province.* Manila.

[17] Government of the PRC, Ministry of Environmental Protection. 2017. *GB52210-2017: Technical Code for Municipal Solid Waste Sanitary Landfill Closure.* Beijing.

practices to improve the treatment of leachate from landfills; (iii) the selective adoption and promotion of the reduce, reuse, and recycle (3Rs) principle;[18] (iv) improved operational management with approaches incorporating information and communication technology; and (v) a kitchen waste management system as a large-scale demonstration to appropriately manage this valuable resource.[19] The project has been designed to fit with Hunan's future development goals and service-level needs and, noting past lessons, it has been designed to build ownership and deliver practical outcomes. It is expected to act as a catalyst for further investment projects in Hunan, and the government is keen to promote cross-country learning.

B. Impact and Outcome

12. The project is aligned with the following impact: environment in the Xiangjiang River watershed in Hunan Province improved (footnote 13). The project will have the following outcome: long-term pollutants discharged to the Xiangjiang River watershed reduced.[20] The project will directly benefit an estimated population of 6.9 million and more indirectly in the wider watershed.

C. Outputs

13. **Output 1: Substandard municipal solid waste landfills closed.** The project will close and restore nine substandard landfills, demonstrating at each site the installation of a capping layer and drainage, a leachate collection system, a landfill gas collection and treatment system, and the restoration of vegetation and landscaping.[21]

14. **Output 2: Substandard municipal solid waste landfills mined and remediated.** The project will demonstrate the remediation of two substandard landfill sites through mining, which will include the excavation and transport of waste materials to adjacent sanitary landfill sites. The project will include the closure and restoration of the Xiaowujia site (in Lanshan) and the Zixing site.

15. **Output 3: New urban–rural integrated municipal solid waste management systems established.**[22] The project will establish best practice and well-defined urban–rural MSW management systems in seven project areas. It will support Hunan's strategy for integrated MSW management by piloting the construction of collection and transfer stations in selected locations to demonstrate differing scale and approaches. It will include the procurement of the associated collection and transport equipment and fleet vehicles.[23]

16. **Output 4: Sanitary landfill facilities upgraded.** The project will upgrade the facilities in four sanitary landfill sites. The project will include upgrading and expanding leachate treatment facilities, installing leachate residual treatment facilities, improving site drainage, upgrading landfill cover and associated improvements, and refurbishing and upgrading site infrastructure.[24]

---

[18] Introduced as a concept in the PRC many years ago, the uptake of the 3Rs principle has been slow in rural areas.
[19] Piloting an intelligent management system to monitor operational logistics at all stages to improve efficiency.
[20] The design and monitoring framework is in Appendix 1.
[21] The sites included are Dong'an; Doupi (in Hengyang); Guiyang; Hengshan; Jiufengshan (in Lanshan); Lengshuijiang; Shanglingqiao; Zhugemiao (in Yongzhou); and Tietong (in Changning).
[22] The project will support the (i) construction of large-scale MSW treatment facilities, including collection and transfer stations; and (ii) procurement of MSW equipment.
[23] It will serve urban and rural populations (highlighted by approximation in brackets) in Changning (0.99 million), Hengyang (1.12 million), Lanshan (0.26 million), Leiyang (1.20 million), Lengshuijiang (0.34 million), Yongzhou (1.32 million), and Zixing (0.36 million). The rural populations served by this project do not receive formal MSW services.
[24] The sites included are Hengyang, Lanshan, Leiyang, and Lengshuijiang.

17. **Output 5: A new kitchen waste treatment and management system established.** The project will assist the Yongzhou City Government to establish a kitchen waste treatment and management system for commercial facilities. It will include the collection, transport and treatment, and associated operation and maintenance (O&M) and management systems. The project will develop a well-prepared regulatory framework, appropriate institutional arrangements, a selection of appropriate technology, and a financially sustainable operational model.

18. **Output 6: Capacity for environmentally sustainable municipal solid waste management enhanced.** The project will support capacity development and institutional strengthening. This will include support for project management and implementation, and training. The project will prepare operationally focused studies on MSW policies and best practice, accompanied by research on innovation and technology and pilot projects as inputs to developing knowledge products and guidelines and/or procedures to guide future investments in Hunan.[25]

D. Summary Cost Estimates and Financing Plan

19. The project is estimated to cost $258 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).[26]

Table 1: Summary Cost Estimates
($ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	Output 1: Substandard MSW landfills closed	75.59
	Output 2: Substandard MSW landfills mined and remediated	12.67
	Output 3: New urban–rural integrated MSW management systems established	90.74
	Output 4: Sanitary landfill facilities upgraded	23.57
	Output 5: New kitchen waste treatment and management system established	14.94
	Output 6: Capacity for environmentally sustainable MSW management enhanced	4.00
	Subtotal (A)	**221.51**
B.	**Contingencies**[c]	**27.34**
C.	**Financial Charges During Implementation**[d]	**9.15**
	Total (A+B+C)	**258.00**

MSW = municipal solid waste.

[a] Includes taxes and duties of $21.96 million to be financed from the Asian Development Bank and government resources. The Asian Development Bank loan will finance taxes and duties of $15.53 million; such amount does not represent an excessive share of the project cost. The government will finance taxes and duties of $6.43 million through cash contribution.

[b] In early-2018 prices as of 11 January 2018.

[c] Physical contingencies computed at 8% for civil works; and 6% for field research and development, training, surveys, and studies. Price contingencies computed at an average of 1.6% on foreign exchange costs and 2.4% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

[d] Includes interest and commitment charges. Interest during construction for the OCR loan has been computed at the 5-year US dollar fixed swap rate plus an effective contractual spread of 0.5% and maturity premium of 0.1%. Commitment charges for the OCR loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

20. The government has requested a regular loan of $150 million from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years; an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a commitment charge of 0.15% per year; and such other

[25] The range of system for MSW management and the variations in landfill conditions and engineering solutions will allow wide-ranging engineering and operational lessons to be collated and disseminated in Hunan and in the PRC.

[26] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

terms and conditions set forth in the draft loan and project agreements. Based on the straight-line repayment method, the average maturity is 15.25 years, and the maturity premium payable to ADB is 0.10% per year. The PRC is the borrower of the loan and will make the loan available, through HPG, to the project county and county-level city governments, which will assume the foreign exchange and financial interest risks on the same terms and conditions as those of the ADB loan.

21. The summary financing plan is in Table 2 with details for each project county or county-level city government in the PAM. ADB will finance expenditures in relation to civil works, goods, consulting services, and capacity development activities. The government has assured ADB that counterpart funds will be provided in a timely manner, including for any shortfall or cost overruns.

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	150.0	58.1
Government[a]	108.0	41.9
Total	**258.0**	**100.0**

[a] Comprising (i) five county governments of Dong'an, Guiyang, Hengshan, Hengyang, and Lanshan; and (ii) five county-level city governments of Changning, Leiyang, Lengshuijiang, Yongzhou, and Zixing.
Source: Asian Development Bank estimates.

E. Implementation Arrangements

22. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 26).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	December 2018–December 2023		
Estimated completion date	June 2023		
Estimated loan closing date	December 2023		
Management			
(i) Oversight body	Hunan Provincial Government		
(ii) Executing agency	Hunan Provincial Housing and Urban–Rural Development Department		
(iii) Key implementing agencies	Five county governments of Dong'an, Guiyang, Hengshan, Hengyang, and Lanshan; and five county-level city governments of Changning, Leiyang, Lengshuijiang, Yongzhou, and Zixing		
(iv) Implementation unit	The project management office has been established under the Urban Construction and Management Division of the Hunan Provincial Housing and Urban–Rural Development Department with four full-time staff.		
Procurement	International competitive bidding	8 goods contracts	$55.74 million
	National competitive bidding	24 works contracts	$126.62 million
	National competitive bidding	12 goods contracts	$15.64 million
	Shopping	1 goods contract	$0.09 million
Consulting services	Quality- and cost-based selection	203 person-months	$2.85 million
	Consultants' qualifications selection	36 person-months	$0.55 million
	Individual consultant selection	11 person-months	$0.10 million
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing of up to the equivalent of 20% of ADB loan, for eligible project expenses incurred not earlier than 12 months before loan signing.		
Disbursement	The loan proceeds will be disbursed following ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank.
Source: ADB.

III. DUE DILIGENCE

A. Technical

23. Technical due diligence included a review of the feasibility study report, preliminary engineering designs, and cost estimates. The appraisal included a consideration of rationale and relevance, benefits, proposed designs, life cycle costs, capital and operational expenditure, and ease of implementation and operation. The due diligence confirmed the project is technically feasible and addresses key issues and complies with the PRC guidelines and regulations.

B. Economic and Financial

24. **Economic analysis.**[27] An economic analysis was prepared for the overall project and all subprojects following ADB guidelines. The benefits considered are (i) improved environment and health valued by project beneficiaries' willingness to pay for landfill works and MSW services, (ii) reduced health risks measured by savings in disability-adjusted life years, and (iii) the resale value of waste byproducts.[28] The estimated economic internal rates of return are 15.3% for the project and 10.8%–19.7% for the individual subprojects, higher than the economic opportunity cost of capital estimated at 9.0%, indicating significant economic returns. A sensitivity analysis confirms rates remain robust under various downward risk scenarios, with the project likely to be economically viable even under combined risk scenarios because unquantifiable benefits were not included in the analysis.[29]

25. **Financial analysis.**[30] A financial analysis was prepared for the overall project and all subprojects following ADB guidelines, which included the financial evaluation of the revenue-generating components and assessments of financial management and sustainability.[31] The financial evaluation result indicated that only the kitchen waste and three out of the seven MSW components are financially viable because Hunan municipalities are still embedding the MSW fee in the water bill;[32] for these four, the financial internal rates of return (4.02%–5.22%) are higher than the respective weighted average costs of capital (2.76%–3.11%). The municipalities will fund the financial gap to cover the O&M costs of the components. Financial sustainability was based on the fiscal impact of (i) counterpart funding; and (ii) incremental recurrent costs, including O&M expenditure. The analysis confirmed the financial sustainability of the project, with fiscal impacts, well within the governments' projected revenue capacities.

C. Governance

26. A financial management assessment was conducted for the Hunan Provincial Housing and Urban–Rural Development Department (HURD) and the implementing agencies. The financial management risk is *moderate* mainly because of the (i) financial position of the implementing agencies to independently finance counterpart funding; (ii) project management

[27] Economic Analysis (accessible from the list of linked documents in Appendix 2).
[28] During implementation, the final determination will be made on the type of commercial product to be developed for resale. Biofuel for the aviation sector has potential and is being implemented successfully in Changsha City, Hunan.
[29] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.
[30] Financial Analysis (accessible from the list of linked documents in Appendix 2).
[31] ADB. 2005. *Financial Management and Analysis of Projects*. Manila; ADB. 2009. *Financial Due Diligence: A Methodology Note.* Manila; and ADB. 2015. *Financial Management Technical Guidance Note: Financial Management Assessment.* Manila.
[32] In urban areas, the municipal government usually adds a small charge in the water bill for MSW and wastewater services. In rural areas, fees are not typically collected, and services are provided by municipal governments.

office and implementing agencies' unfamiliarity with ADB financial management policy and procedures; and (iii) implementing agencies' lack of accounting staff for review procedures. A procurement capacity assessment concluded that the overall procurement risk for the project is moderate. The project is not the first externally financed development project in Hunan. However, it is the first for HURD and all of the implementing agencies except for Zixing. HURD confirmed it will receive advice and support from other HPG agencies, which have experience implementing ADB projects. The procurement of civil works and goods, including the recruitment of consultants, will follow ADB's Procurement Guidelines (2015, as amended from time to time) and Guidelines on the Use of Consultants (2013, as amended from time to time).[33]

27. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and HURD. The specific policy requirements and supplementary measures are described in the PAM (footnote 26).

D. Poverty, Social, and Gender

28. The project will directly provide benefits to the project communities by (i) improving the living conditions and public health of residents, (ii) enhancing awareness of sustainable MSW management, and (iii) providing access to employment opportunities created by the project.

29. The project is categorized as some gender elements. The social and gender impact assessment showed that since women are responsible for cleaning, laundry, food preparation, and overall family and environmental health, they are more exposed to health risks and they carry the burden of personal and family illness. A social and gender action plan has been prepared to ensure that (i) women are continuously consulted, and gender concerns and suggestions are incorporated in the design and implementation of MSW systems; (ii) women are actively participating in community awareness raising, education programs, and training on the 3Rs principle; and (iii) project benefits are maximized by providing better access to employment opportunities associated with the project. The social and gender action plan aims to minimize health risks and sexual harassment during construction by including clauses in the contracts to limit HIV/AIDS and other sexually transmitted infections and to prohibit sexual harassment. This will be supported by robust activities to prevent HIV/AIDS, sexually transmitted infections, and sexual harassment and complemented by a carefully targeted education campaign.

E. Safeguards

30. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[34]

31. **Environment (category A).** The project is classified *category A* for environment. An environmental impact assessment (EIA), including an environmental management plan (EMP), was prepared by HURD.[35] The EIA incorporated findings of the domestic feasibility study and domestic EIAs, climate risks and vulnerability assessment, biodiversity assessment, site visits, and consultations with stakeholders. The EIA identified potential direct, indirect, cumulative, and induced environmental impacts and risks for preconstruction, construction, and operation phases of the project.[36] The EMP identifies the avoidance of adverse impacts through design and site

[33] During implementation, the executing agency will have the option to change to ADB's new Procurement Framework.
[34] ADB. Safeguard Categories. https://www.adb.org/site/safeguards/safeguard-categories.
[35] The EIA main report, with appendixes 1–3, was disclosed on 25 May 2018, and appendix 4 on 28 May 2018.
[36] These include anticipated impacts from excavation; handling of leachate and solid waste; groundwater and surface water pollution; and closure of landfill sites with potential for air, soil, and water pollution.

management and mitigation measures under construction management. The landfill closures and new MSW systems have been considered in detail, including potential impacts for landfill gas collection and treatment. During the EIA process, HURD conducted an assessment to determine the significance of project impacts and risks on biodiversity and natural resources, and the EMP includes adequate measures to avoid, minimize, or mitigate potential impacts and risks. The climate change assessment (para. 33) identified precipitation and flooding as the most important risks affecting the project, and key recommendations have been incorporated in the EMP.

32. The EMP includes a plan for internal monitoring to be conducted by contractors during construction and by O&M units during operation. The project management office will recruit an external monitoring entity to evaluate and assess implementation and compliance with the EMP during all stages of the project.[37] Environmental management, and capacity development and institutional strengthening activities are included under the project to mitigate risks. Two rounds of meaningful consultations have been conducted with all relevant stakeholders during project preparation, and the findings have been incorporated in the project design. Any potential environmental complaints or disputes will be handled in accordance with the grievance redress mechanism established for the project. The EIA concluded that the anticipated environmental impacts and risks can be mitigated to acceptable levels by adherence to prescribed training and capacity-building measures and effective implementation of the EMP.

33. **Climate change assessment.** According to defined projections for 2046–2065 and 2081–2100 and the global climate model representative concentration pathways, the major climate risk for the project is intense precipitation, with more frequent flooding.[38] Although the behavior of landfill emissions under regular operating conditions is well known, it is unclear how they behave during flood events. During such events, closed and operational landfills may release pollutants originally entombed in the waste body. Project outputs 1, 2, and 3 are an investment response to the climate vulnerability of the watershed, and these adaptation measures will reduce the risk of pollutant diffusion in extreme climatic events, mainly flooding.[39]

34. **Involuntary resettlement (category B).** The project will require the acquisition of about 23.5 ha of land for the project facilities. Based on the principle of avoiding, if not minimizing, impacts and, in consultation with the communities, only three households will be marginally affected because of the partial loss of their garden and forest lands. The rest of the facilities will be located on common land (wasteland or unallocated arable and forest land) owned by villagers. There will be no impact on houses or structures except for one abandoned village office. There are six resettlement plans that have been prepared in accordance with the PRC laws and regulations, and ADB's Safeguard Policy Statement. For the existing waste transfer stations, landfill sites, and kitchen waste sites, due diligence has been completed and no outstanding issue was found.

35. **Indigenous peoples (category B).** In the project areas, there are 0.64 million ethnic minorities, accounting for 10% of the total ethnic minority population in Hunan. The Miao, Yao, and Zhuang are the main ethnic minority groups that are concentrated in the remote upland areas of Lanshan County under the prefecture of Yongzhou City. There will be no adverse impact on ethnic minorities (i.e., no involuntary resettlements and no impact on ethnic minorities' beliefs,

[37] More comprehensive site assessment and monitoring will be conducted during detailed design to characterize the waste and to monitor groundwater quality and soil contamination in and around the landfill sites.

[38] Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Synthesis Report.* Geneva. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, R.K. Pachauri and L.A. Meyer [eds.]). p. 151.

[39] Adaptation costs allocated: $27.30 million for output 1, $2.06 million for output 2, and $32.10 million for output 3.

customs, languages, land use, and other properties). The project will improve living conditions and public health since there will be regular MSW collection services in remote upland areas. An ethnic minority development plan has been prepared to ensure the participation of ethnic minority groups in public consultation as well as in all project implementation stages.

F. Summary of Risk Assessment and Risk Management Plan

36. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[40] The project does not have any unusual technical risks, and integrated benefits and impacts are expected to outweigh costs and risks.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
The project encounters delay in procurement and implementation because of the lack of experience of executing and implementing agencies in ADB-funded projects.	Engage experienced loan implementation consultants to assist executing and implementing agencies, complemented by training and capacity development to improve management capacity, supported by enhanced monitoring and guidance and loan implementation consultants during implementation.
The project encounters delay in implementation because of the weak management and coordination capacity of the PMO and implementing agencies.	Secure assurances from the Hunan Provincial Government and the executing and implementing agencies on the availability of adequate staffing for the PMO and PIUs to manage daily and ensure operation function in a timely manner, supported with institutional strengthening.

ADB = Asian Development Bank, PIU = project implementation unit, PMO = project management office.
Source: ADB.

IV. ASSURANCES AND CONDITIONS

37. The government and HURD have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and loan documents.

38. The government and HURD have agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement and project agreement.

V. RECOMMENDATION

39. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of $150,000,000 to the People's Republic of China for the Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

5 September 2018

[40] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with Environment in the Xiangjiang River watershed in Hunan Province improved (PRC Thirteenth Five-Year Plan, 2016–2020)[a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting**	**Risks**
Outcome Long-term pollutants discharged to the Xiangjiang River watershed reduced	By 2024: a. Landfill sites closed and restored and/or remediated at 11 localities, with 32.85 ha of MSW landfill area (2017 baseline: 0)[b] b. Integrated MSW management systems established in seven localities with a capacity of 4,340 tons per day (2017 baseline: 0)[c] c. Replication of project's best practice at three landfills for closure and restoration and/or remediation and/or upgrading and at two localities for the establishment of MSW systems in up to five locations (2017 baseline: Not applicable)	a–c. Hunan EPD environmental statistics; provincial, city, and county statistical yearbooks; environmental monitoring reports; and quarterly reports	Ineffective environmental monitoring and enforcement by environmental authorities
Outputs 1. Substandard MSW landfills closed	By 2023: 1a. Nine landfills of 31.75 ha site area (approximately 497,600 m^3 solid waste material) closed (2017 baseline: 0) 1b. 362 jobs created (108 full-time managerial and technical positions and 254 part-time unskilled jobs) during construction, of which at least 30% are women and 20% from low-income households (2017 baseline: 0)[d]	1a–b. Hunan EPD environmental statistics; project progress reports, environmental monitoring reports, and social action plan monitoring reports	Staff assigned to the project by the government are frequently rotated, including staff trained under the project before project completion and commencement of initial O&M activities
2. Substandard MSW landfills mined and remediated	2a. Two landfills of 1.1 ha site area (approximately 170,000 m^3 solid waste material) mined and remediated (2017 baseline: 0) 2b. 63 jobs created (19 full-time managerial and technical positions and 44 part-time unskilled jobs) during construction, of which at least 30% are women and 20% from low-income households (2017 baseline: 0)[d]	2a–b. Hunan EPD environmental statistics; project progress reports, environmental monitoring reports, and social action plan monitoring reports	
3. New urban–rural integrated MSW management systems established	3a. Seven urban–rural MSW collection and transport systems with 4,340 tons per day capacity established (2017 baseline: 0) 3b. 377 jobs created (113 full-time managerial and technical positions and 264 part-time unskilled jobs) during construction; in addition, 659 jobs created (274 full-time managerial and technical positions and 385 part-time unskilled jobs) during operation, of which at least 30% are women and 20% from low-income households (2017 baseline: 0)[d]	3a–b. Hunan EPD environmental statistics; project progress reports, environmental monitoring reports, and social action plan monitoring reports	
4. Sanitary landfill facilities upgraded	4a. Four sanitary landfill facilities of 55 ha site area (approximately 12.1 million m^3 capacity) upgraded (2017 baseline: 0)	4a–b. Hunan EPD environmental statistics; project progress reports, environmental monitoring	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	4b. 87 jobs created (26 full-time managerial and technical positions and 61 part-time unskilled jobs) during construction, of which at least 30% are women and 20% from low-income households (2017 baseline: 0)[d]	reports, and social action plan monitoring reports	
5. New kitchen waste treatment and management system established	5a. A kitchen waste treatment and management system in Yongzhou City with 100 tons per day capacity established (2017 baseline: 0) 5b. At least 100 staff in the concerned bureaus report improved knowledge and skills for O&M of the project facilities, of which at least 40% are women (2017 baseline: 0) 5c. 24 jobs created (7 full-time managerial and technical positions and 17 part-time unskilled jobs) during construction; in addition, 23 jobs created (1 full-time managerial and technical position and 22 part-time unskilled jobs) during operation, of which at least 30% are women and 20% from low-income households (2017 baseline: 0)[d]	5a–c. Project progress reports, environmental monitoring reports, and social and gender action plan monitoring reports	
6. Capacity for environmentally sustainable MSW management enhanced	6a. Loan implementation consulting services mobilized; 5 training workshops provided; 4 studies on MSW management and implementation, and O&M delivered; and at least 500 staff in the concerned bureaus report improved knowledge and skills for environmentally sustainable MSW management, with at least 40% women participants from bureaus; 100% staff of implementing agencies receive SGAP training (2017 baseline: 0) 6b. 2,500 participated in 3Rs awareness-raising activities, with at least 50% women participation and 20% from low-income households (2017 baseline: 0) 6c. Residents participated in public consultations during design of project components, and public consultations on tariff, of which at least 50% are women and 20% are from low-income households (2017 baseline: 0)	6a. Project progress reports and training reports 6b–c. Project progress reports, and social and gender action plan monitoring reports	

Key Activities with Milestones

1. Substandard MSW landfills closed

1.1 Prepare preliminary design, Q2–Q3 2018.
1.2 Prepare construction drawings, Q3–Q4 2018.
1.3 Implement land acquisition and resettlement, Q3 2018.
1.4 Implement SGAP and EMDP, Q2 2018–Q4 2021.
1.5 Prepare bidding documents, Q3–Q4 2018.
1.6 Procure and award contract, Q3 2018–Q2 2019.
1.7 Construction, Q1 2019–Q4 2021.

2. Substandard MSW landfills mined and remediated

2.1 Prepare preliminary design, Q2–Q3 2018.
2.2 Prepare construction drawings, Q3–Q4 2018.
2.3 Implement land acquisition and resettlement, Q3 2018.

Key Activities with Milestones 2.4 Implement SGAP and EMDP, Q2 2018–Q4 2021. 2.5 Prepare bidding documents, Q3–Q4 2018. 2.6 Procure and award contract, Q3 2018–Q2 2019. 2.7 Construction, Q1 2019–Q4 2021. **3. New urban–rural integrated MSW management systems established** 3.1 Prepare preliminary design, Q2–Q3 2018. 3.2 Prepare construction drawings, Q3–Q4 2018. 3.3 Implement land acquisition and resettlement, Q3 2018. 3.4 Implement SGAP and EMDP, Q2 2018–Q4 2021. 3.5 Prepare bidding documents, Q3 2018. 3.6 Procure and award contract, Q3 2018–Q2 2019. 3.7 Construction, Q1 2019–Q4 2022. 3.8 Purchase equipment, Q1 2020–Q4 2022. **4. Sanitary landfill facilities upgraded** 4.1 Prepare preliminary design, Q2–Q3 2018. 4.2 Prepare construction drawings, Q3–Q4 2018. 4.3 Prepare bidding documents, Q3–Q4 2018. 4.4 Procure and award contract, Q4 2018–Q2 2019. 4.5 Construction, Q1 2019–Q4 2022. 4.6 Purchase equipment Q1 2020–Q4 2022. 4.7 Implement SGAP and EMDP, Q2 2018–Q4 2021. **5. New kitchen waste treatment and management system established** 5.1 Develop legal and institutional proposals, Q3–Q4 2019. 5.2 Prepare preliminary design, Q3–Q4 2020. 5.3 Prepare construction drawings, Q1 2021. 5.4 Prepare bidding documents, Q2 2021. 5.5 Procure and award contract, Q3 2021. 5.6 Purchase and install equipment, Q4 2022–Q1 2023. 5.7 Construction, Q4 2021–Q4 2022. 5.8 Commissioning, Q2–Q3 2023. 5.9 Implement SGAP and EMDP, Q2 2018–Q4 2021. **6. Capacity for environmentally sustainable MSW management enhanced** 6.1 Recruit and mobilize consultants, Q4 2018. 6.2 Establish PPMS, Q1 2019. 6.3 Establish environmental impact assessment, resettlement plan, and PPMS monitoring, Q1 2019. 6.4 Support project implementation, Q1 2019–Q4 2023. 6.5 Conduct studies and research, workshops, and trainings, Q4 2019–Q4 2022. 6.6 Implement SGAP and EMDP, Q2 2018–Q4 2021.
Inputs ADB: $150 million – ordinary capital resources (regular loan) Government: $108 million
Assumptions for Partner Financing Not applicable

3Rs = reduce, reuse, and recycle; ADB = Asian Development Bank, EMDP = ethnic minority development plan; EPD = Environmental Protection Department; ha = hectare; m^3 = cubic meter; MSW = municipal solid waste; O&M = operation and maintenance; PPMS = project performance management system; PRC = People's Republic of China; Q = quarter; SGAP = social and gender action plan.

[a] Government of the PRC, State Council. 2016. *Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China, 2016–2020.* Beijing.

[b] Landfills restored (with geomembrane capping) at 11 localities with a total area of 32.85 ha (without baseliners and no containment of pollutants) or remediated (with waste removal) in accordance with best practice, offsetting leachate generation estimated at 185,000 m^3 of leachate per year (based on a "business as usual" scenario). The leachate generation was assessed in accordance with Government of the PRC, Ministry of Environmental Protection. 2013. *GB50869-2013: Technical Guidelines for Municipal Solid Waste Landfills.* Beijing.

[c] MSW management systems, including collection and transport facilities, that diverts solid waste from substandard disposal to conforming disposal and treatment facilities with leachate and landfill gas treated in compliance with the relevant effluent and emission standards, with baseline established as substandard disposal of 4,340 tons MSW per day generating an estimated 225,000 m^3 of untreated leachate per year (based on "business as usual" scenario).

[d] About 40% of jobs first made available to women, with at least 30% hires being for women.

Source: ADB.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=48443-002-3

1. Loan Agreement: Ordinary Operations
2. Project Agreement
3. Sector Assessment (Summary): Water and Other Urban Infrastructure and Services
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Risk Assessment and Risk Management Plan
12. Climate Change Assessment
13. Social and Gender Action Plan
14. Environmental Impact Assessment
15. Resettlement Plan: Leiyang Subproject
16. Resettlement Plan: Zixing Subproject
17. Resettlement Plan: Hengyang Subproject
18. Resettlement Plan: Yongzhou Subproject
19. Resettlement Plan: Changning Subproject
20. Resettlement Plan: Lanshan Subproject
21. Resettlement Due Diligence Report: Guiyang Subproject
22. Resettlement Due Diligence Report: Dong'an Subproject
23. Resettlement Due Diligence Report: Hengshan Subproject
24. Resettlement Due Diligence Report: Lengshuijiang Subproject
25. Ethnic Minority Development Plan