

RESULTS-BASED FINANCING FOR MUNICIPAL SOLID WASTE

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Urban Development Series

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Foreword

Solid waste management is a pressing challenge that an increasing number of cities in developing countries are facing today. Rapid urbanization, new economic activity, and population growth place multiple pressures on solid waste management systems. When basic services such as waste collection and disposal are inadequate, the economic, environmental, and human health effects disproportionately affect the urban poor.

Yet, the solid waste challenge presents us with a tremendous opportunity. Improving solid waste management provides a cleaner environment including in poor and marginalized areas of cities and improves livability for all city residents. A cleaner city helps provide a more attractive environment for investment and tourism which, in turn, improves a city's economic competitiveness, creating jobs and new business opportunities for local entrepreneurs. Solid waste management can also be linked to the development of new sources of energy, helping tackle climate change.

Municipal solid waste management is directly relevant to the World Bank's goals of ending extreme poverty and boosting shared prosperity. We have responded thus far with a solid waste portfolio of over 114 active projects in 58 countries, representing \$1.27 billion in investments, and over 55 analytical and advisory activities. While most investment has provided direct financing for equipment and facilities, there is increasing recognition that this is not enough. Complementary investments are needed to encourage new behaviors toward waste minimization, separation, and recycling.

Results-based financing (RBF) focuses greater attention on measurable outputs in basic service delivery and changes in human behavior. This report presents valuable lessons from the design and preparation phase of eight municipal solid waste projects that innovated in the use of RBF approaches in solid waste. In so doing, we have sought to draw on the range of successful experiences on RBF in other sectors, and to apply some fresh thinking in addressing existing solid waste challenges.

I hope that solid waste management practitioners and policymakers will find this report useful. Given the growing challenge of rapid urbanization, we are committed to improving analytics and tools for local and urban development-related matters. Going forward, we will continue to work in this space, drawing lessons from implementation, and refining the application of RBF principles in the sector.

Marisela Montoliu Munoz
Director, Urban and Disaster Risk Management,
Social, Urban, Rural and Resilience Global Practice

Sustainable financing is a major obstacle for municipalities seeking to improve solid waste management. Municipalities are caught in a vicious cycle; they are unable to generate the necessary fee collection rate until they improve service and, conversely, people are unwilling to pay for poor service. Policymakers need innovative financing mechanisms to increase cost recovery levels, and improve service delivery and outcomes in this basic and critical sector.

The Global Partnership on Output-Based Aid (GPOBA) is at the forefront of this effort. Drawing on more than a decade of global experience using results-based financing (RBF)—particularly output-based (OBA)—to improve access to energy, water and sanitation, health, and education, GPOBA is applying the same innovative thinking to solid waste management projects.

GPOBA is proud to sponsor this report, expanding lessons and analysis of RBF in the solid waste management sector. The report presents case studies of municipalities that adapted RBF principles to fit local contexts and meet individual challenges. It aims to help practitioners apply RBF principles in solid waste management and highlights the role outcome-based incentives could play in improving services and outcomes.

In the report, GPOBA shares customized project designs and lessons learned with other municipalities that encounter similar solid waste management challenges. Since the report leverages existing World Bank Group projects, it also provides opportunity for GPOBA to make a significant contribution to the further exchange of knowledge in this area.

I hope the diverse solutions and recommendations included in this report will encourage other municipalities to incorporate RBF into their solid waste management projects. GPOBA is ready to work with governments and policy makers to build technical knowledge and experience; creating sustainable solutions to solid waste management problems.

Carmen Nonay
Manager, Global Partnership on Output-Based Aid (GPOBA)
Social, Urban, Rural and Resilience Global Practice

Abbreviations

3R	Reduce, reuse, recycle
BPLHD	Environmental Management Agency (Indonesia)
C40	Global Network of Large Cities Taking Action to Address Climate Change
CBO	Community-based organization
CCAC	Climate and Clean Air Coalition
CI	Cleanliness Index (Jamaica)
DCC	Dar es Salaam City Council (Tanzania)
DFAT	Department for Foreign Affairs and Trade (Australia)
DFID	Department for International Development (United Kingdom)
DGIS	Directorate General for International Cooperation (Netherlands)
DLAs	Dar es Salaam Local Authorities (Tanzania)
DMDP	Dar es Salaam Metropolitan Project (Tanzania)
DRACPN	Direction Régionale de l'Assainissement et de Contrôle des Pollutions et Nuisances (Mali)
ETP	Emerging Towns Project (Nepal)
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GIE	Groupement d'intérêt économique (Mali)
GoN	Government of Nepal
GPOBA	Global Partnership on Output-Based Aid
HFC	Hydrofluorocarbon
HMC	High-rise Management Committee (China and Malaysia)
ICDP	Integrated Community Development Project (Jamaica)
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association (World Bank Group)
IFA	Independent fiduciary agent
IFC	International Finance Corporation (World Bank Group)
IFVA	Independent financial verification agent
ITVA	Independent technical verification agent
IVA	Independent verification agent

JSC	Joint Services Council
JSC-B	Joint Services Council – Bethlehem (West Bank)
JSC-H	Joint Services Council – Hebron (West Bank)
JSC-H&B	Joint Services Council – Hebron and Bethlehem (West Bank)
JSIF	Jamaica Social Investment Fund
KMA	Kingston Metropolitan Area (Jamaica)
MIS	Management information system
MoF	Ministry of Finance
MP	Maximum Payment
MPPP	Penang Island Municipal Council (Malaysia)
MPSP	Seberang Perai Municipal Council (Malaysia)
MRF	Material Recovery Facility
MS	Minimum Score
MSW	Municipal solid waste
MT	Metric Ton
M/VC	Municipalities/Village Councils (West Bank)
NEMC	National Environmental Management Council (Tanzania)
NGO	Non-governmental organization
NMPMO	Ningbo Municipal Project Management Office (China)
NSWMA	National Solid Waste Management Authority (Jamaica)
NOS	Neighborhood Overall Score (China)
NPC	National People’s Congress (China)
NRC	Neighborhood-level residents’ committee (China)
O&M	Operations and maintenance
OBA	Output-based aid
PA	Palestinian Authority (West Bank)
PNI	Potential neighborhood incentive (China)
PIU	Project implementation unit (China and Malaysia)
PPP	Public-private partnership
RBF	Results-based financing
SDCM	Strategy for the Development of the Cities of Mali
SDN	Sustainable Development Network (World Bank Group)

Sida	Swedish International Development Agency
SIP	Service Improvement Plan
SLCPs	Short-lived climate pollutants
SSWA	Special Solid Waste Account
SWEMP	Solid Waste and Environmental Management Project
SWMP	Southern West Bank Solid Waste Management Project
SWM	Solid waste management
SWMRMC	Solid Waste Management and Resource Mobilization Centre (Nepal)
SWSMO	Ningbo Municipal Solid Waste Separation Management Office (China)
TA	Technical assistance
TOU	Technical Operations Unit
tpd	Tonnes per day
UGDP	Urban Governance and Development Program (Nepal)
US EPA	United States Environmental Protection Agency
UNEP	United Nations Environment Programme
WTE	Waste-to-energy

Currency Units	Exchange Rates (Effective as of March 17, 2014)	
Chinese Yuan Renminbi	CNY1 = US\$0.16	US\$1 = CNY6.15
Indonesian Rupiah	IDR1 = US\$0.000089	US\$1 = IDR11,295.65
Jamaican Dollar	JMD1 = US\$0.0091	US\$1 = JMD108.93
Malaysian Ringgit	MYR1 = US\$0.305	US\$1 = MYR3.27
Franc CFA (Mali)	XOF1 = US\$0.0021	US\$1 = XOF470.83
Nepalese Rupee	NPR1 = US\$0.010	US\$1 = NPR98.05
Tanzanian Shilling	TZS1 = US\$0.00061	US\$1 = TZR1,630.50
Israeli New Shekel	NIS1 = US\$0.29	US\$1 = NIS3.48

Executive Summary

Municipal solid waste (MSW) management is a crucial service provided by cities around the world, but is often inefficient and underperforming in developing countries.

It is estimated that cities generated approximately 1.3 billion tons of MSW worldwide in 2010, and this is expected to increase to 2.2 billion tons by 2025. The challenges that cities face regarding their solid waste management systems vary, but generally depend on their financial capacities. Low income countries face the most acute challenges with solid waste management. In low income countries, cities collect less than half the waste stream. Of this, only about half is processed to minimum acceptable standards. Improving MSW in cities offers a high economic rate of return and significant environmental and public health benefits which contribute to overall city livability and competitiveness. At the global level, improving MSW also contributes to climate change mitigation through the reduction of methane emissions.

The World Bank's portfolio between 2000 and 2012 included 114 active projects in 58 countries in all regions, representing US\$1.27 billion in investments, with a further 55 analytical and advisory activities. Despite this significant portfolio, the existing global annual US\$40 billion shortfall for MSW requires the World Bank to reconsider its approach to MSW and leverage innovative instruments and partnerships to increase its impact on the sustainability and quality of the MSW sector. In this regard, since 2012 the World Bank has been exploring the application of results-based financing (RBF) in the solid waste sector as an instrument to improve MSW services and outcomes.

Results-based financing for MSW is a financial mechanism through which the payment for solid waste services is conditioned to the achievement and verification of pre-agreed targets. A basic feature of RBF is that financial payments or in-kind rewards are provided to a service provider conditional on the recipient undertaking a set of pre-determined

actions or achieving a pre-determined performance goal. RBF offers opportunities to innovate in the use of development finance in the solid waste sector and to achieve results.

Until recently, RBF principles and designs had not been widely applied in the solid waste sector, apart from the use of some performance-based contracting with private providers of solid waste services and carbon finance for methane mitigation. Given existing weaknesses and the challenges that cities face regarding solid waste management and service delivery, RBF can benefit the sector by ensuring that public funds are used efficiently and transparently.

This report provides eight examples of RBF designs, each tailored to the specific context and needs of the solid waste sector in the specific city or country. These projects are currently in various stages of preparation or implementation; hence, lessons can be inferred only in terms of how solid waste projects can be developed using RBF principles.

The eight examples could be classified into three main categories: (a) **RBF to improve solid waste service delivery and fee collection:** in Nepal and the West Bank, the projects use RBF subsidies to improve the financial sustainability of MSW services by increasing user fee collection while simultaneously improving waste collection services; (b) **RBF to promote recycling and source separation:** in the cases of China, Indonesia, and Malaysia, an “incentive payment” model is used to improve source separation and collection of waste through changes in behavior at the household level; and (c) **RBF to strengthen waste collection and transport in under-served communities:** in Mali and Tanzania, projects were designed to strengthen secondary waste collection and transport for under-served communities. In the case of Jamaica, the project was designed to improve waste collection in inner-city communities and to encourage waste separation as well as general neighborhood cleanliness.

These models could be adapted to the context of other countries. The **RBF model to improve solid waste service delivery and fee collection** is an appropriate model for low income countries where service delivery is poor or non-existent or where fee collection to support waste collection and disposal is a major challenge. It is also an appropriate model to jump start the solid waste services in fragile and post-conflict situations. The **RBF model to promote recycling and source separation** is a good model for cities in middle income countries where the collection of waste is already high but where the effort of the government is focused on improving the financial and environmental sustainability of the sector. The **RBF model to strengthen waste collection and transport in under-served communities** is applicable to both low and middle income cities but is most relevant where the focus is to improve solid waste services in under-served and low income communities and could be part of community and slum upgrading projects.

RBF is not a panacea for the solid waste sector and is more efficient when associated with other instruments such as infrastructure investment, policy reform and technical assistance. The eight RBF examples presented in this report address some of the fundamental problems associated with solid waste management in developing countries, such as: fee collection, behavior change towards source separation of recyclable and organic waste, and access to service in underserved communities. However, RBF alone is not a universal solution to all the challenges that cities in developing countries face regarding solid waste management—it is more effective when associated with other instruments.

Lessons Learned

Several important lessons emerged from the preparation of the eight case studies. This report presents the challenges faced in the design and implementation phases as well as general recommendations on how to address such challenges in future projects. Some of the lessons learned and recommendations are generally applicable to the preparation of any MSW project, whereas others are particular to the design of RBF projects for MSW. The main lessons learned are summarized below:

General Lessons and Recommendations for Using RBF for MSW

- **Collecting sufficient baseline information is essential to developing an RBF design that addresses the needs of the sector.** In all eight case studies, baseline studies provided the team with good insight into the situation and challenges of the solid waste sector before a tailored RBF solution was proposed. Because MSW practices generally vary from one city to another, the design of RBF solutions for the waste sector must include an analysis of the sector as a whole to avoid unintended consequences on the other parts of the system.
- **RBF solutions for MSW require active involvement of all stakeholders from the early stages of project preparation in order to be successful.** The team undertook community and stakeholder consultations and surveys in all eight countries where the RBF was proposed. These stakeholder consultations have appeared to be a valuable tool to engage the service providers and beneficiaries as well as the government.
- **Getting the project prerequisites right, in early project implementation stages, is essential.** Even though RBF is not a panacea for the solid waste sector, it could provide an avenue through which important sector reforms are facilitated. In Nepal for example, these prerequisites included establishing and institutionalizing SWM subject committees and operational units, preparation of SWM strategies and service improvement plans (SIPs), and establishment of performance and service delivery monitoring systems, etc.
- **Improving SWM services does not always require more staff, more vehicles, more equipment, or bigger landfill space.** RBF for MSW could be designed in such a way that enables it to achieve its objectives using the available technical and human resources. This could be achieved by designing simple, robust, and affordable systems that can be easily managed and maintained by current staff.

Considerations for Designing RBF Projects for MSW

- **In the solid waste sector, OBA subsidies may be more effectively targeted at municipalities rather than individual households.** The lesson from the project in the West Bank was that attempting to target low income households for GPOBA subsidies may not be feasible in the solid waste sector because it is a shared, community-based activity. Improving the situation of solid waste management as a whole has a more positive effect on the urban poor—who generally live near improperly disposed solid waste. Also, a large number of informal waste pickers are from poor communities.
- **RBF design should be carefully aligned toward achieving the intended improvements in solid waste outcomes.** Any RBF scheme should be designed, as far as possible, to motivate the right players to achieve the intended outcomes, because misalignment between who is performing and who is being paid could be detrimental to the success of an RBF project. In Indonesia, RBF payments could not be made to waste banks and communities whose behavior change was targeted by the project due to fiduciary arrangements; as an alternative, the RBF was designed to provide payment to municipalities as the closest public entity capable of creating the enabling conditions to stimulate the behavior change.
- **When an RBF scheme is designed as a payment mechanism for solid waste services, the payment should fairly compensate the service received; however, if it is for individual noncommercial behavior change, the payment should be linked to the value of the outcome of the desired behavior change.** RBF projects where the service provider is paid for collection could be based on a competitive bidding process or direct negotiations with the incumbent service provider. RBF projects where residential communities are paid for recycling could be based on how much cost-savings the municipality achieves through reduced costs in solid waste collection, transport, and disposal.
- **Providing up-front financial assistance to service providers with limited access to credit could facilitate the implementation of RBF projects.** An RBF scheme with an unbalanced sharing of responsibility and risks between the public authorities and the private sector could discourage private sector engagement. In Tanzania, it was decided that some equipment for collection would be provided through the investment project to overcome the lack of access to credit. This issue is even more acute in fragile countries where investment presents a high risk to the private sector.
- **RBF projects must be designed with a focus on a set of desired results, allowing the service providers to decide what service delivery model would best achieve those results.** RBF projects for diverse communities should be designed in a manner that allows participating municipalities to design to their specific needs. Additionally, the experience from Nepal has highlighted the need to ensure that any results indicators are under the full responsibility of the implementing agency, that the indicators are well-defined and independently verifiable, and that project designs reflect pragmatic levels of risk transfer.

Monitoring and Independent Verification of RBF Schemes for MSW

- **Balancing simplicity and meaningfulness in the design of the verification process is often a practical necessity for implementation in the solid waste sector.** The verification mechanism for RBF projects should not be so cumbersome that it results in excessive transaction costs. End results should thus be verified through simple and straightforward protocols. For example, the design of any scorecards or formulae to calculate the payments should consider limited local capacities, and therefore be easy for all parties to understand. Also, periodic random performance evaluations could be used instead of daily performance evaluation.

- **A third party independent verification agent (IVA) provides greater transparency but could also be costly; alternative means of verification could be considered to minimize the cost in the solid waste sector.** In

China and Jamaica, alternative verification agents were considered *in lieu* of an independent firm to reduce the transaction cost. A verification process that is very costly cannot be sustainable in the long run, particularly in the solid waste sector which is often struggling with the financial sustainability of operations in the first place. One alternative would be to use a city's own monitoring and verification system, which has the added benefit of strengthening local capacity in this area which is often weak to start with.

Ensuring Successful Implementation of RBF for MSW

- **Supplementing financial subsidies with educational outreach and technical assistance provides greater leverage for RBF projects.** Although RBF is about paying for the results and shifting performance risks to the service provider/implementing agency, experiences from Nepal and West Bank have shown that technical assistance is needed to ensure the achievement of the performance targets. Technical assistance resources should therefore be included as part of any RBF project to enhance the basic capacity for service delivery.
- **Linkages to investment projects provide more leverage for implementation of RBF schemes in the solid waste sector.** All eight of the schemes described in this report were linked at some stage to related solid waste investments. These linkages provided added momentum for implementation, although they also brought the risk of delay or cancellation if the investment projects did not go ahead.
- **The institutional arrangements and flow of funds for RBF projects must be simplified, as much as possible, taking into account the capacity of the implementing agency.** The diagrammatic representation of the institutional arrangements and flow of funds for the RBF project in Nepal is complicated and difficult to explain. Institutional arrangements and flow of funds are important factors during implementation and must be presented in a manner that could be easily understood by the implementing agency, the beneficiaries, and the independent verification agency.

Sustainability of RBF Projects

- **Keeping the big picture in mind helps ensure that the resulting scheme contributes to long-term sustainability in the solid waste sector overall.** The design of any solid waste management interventions, including RBF, should take into account the country's broader solid waste management context, from waste collection to final disposal, to ensure that the problem statement and the proposed solution are appropriate and to avoid unintended consequences or knock-on effects on other sectors. As far as possible, waste reduction, reuse and recycling initiatives should be prioritized.
- **Addressing solid waste challenges often involves fundamental changes in behavior that can take time to establish, so setting realistic targets is important in order to keep stakeholders motivated.** The RBF designs in China, Malaysia and Indonesia attempt to improve solid waste management through the very difficult objective of behavior change among communities, which could take time to be effective. Expectations should be set for gradual improvements over time; otherwise, dissatisfaction and de-motivation may set in among recipients who fail to meet targets despite their reasonable efforts. Setting realistic targets is important in order to minimize the risk that people could go back to their original behaviors, or develop new unexpected ones, after the financial rewards or incentives are ended.

The report recognizes that the eight case studies did not cover some issues or activities such as waste generation, energy recovery or waste picking. There are opportunities to develop additional RBF concepts to address these other issues or to address the same issues from a different perspective. The following additional concepts are suggested for consideration for future RBF projects in the solid waste sector.

- Providing incentives to households to reduce the quantity of waste generated at source (impacting the choice of manufactured products with less packaging);
- Including conditional cash transfers to waste pickers;
- Implementing performance-based operating contracts for the management of waste facilities by the private sector (e.g., landfill, waste-to-energy, compost facility, transfer station, materials recovery facility (MRF), etc.)
- Utilizing performance-based grants to municipalities for reducing methane and black carbon from the solid waste sector; and
- Providing solid waste service fee vouchers to poor households.

This work represents the first phase of a programmatic undertaking to pilot the use of RBF in the waste sector to tackle critical challenges faced by cities with respect to solid waste management. The focus of this first report has been on

the lessons learned from the preparation and design of RBF to address specific solid waste issues. Even though these designs have undergone peer reviews or review by a GPOBA panel of experts, there is a need to see how they will be implemented.

Moving forward, a second phase of this work is planned to start in fiscal year 2015 and will have three main objectives:

- Continue to assess the implementation of the various designs presented in this report to infer lessons revealed during implementation and from the subsequent adjustments made to the designs;
- Design new RBF undertakings in additional cities, some of which would consist of replicating or adapting the existing models while others would attempt to design entirely new solutions; and
- Disseminate the findings from this phase to decision-makers and donors.

1. Introduction

Managing municipal solid waste (MSW) is a critical and basic urban service, but cities face numerous challenges at every stage of the MSW value chain. With rapid urbanization, MSW is growing at alarming rates, and is expected to almost triple in low and lower-middle income countries by 2025. At the same time, MSW is seriously underfunded in most developing country cities. Cities in low income countries spend about US\$1.5 billion per annum on MSW – typically the largest expenditure category on municipal budgets. With an existing global annual shortfall of at least US\$40 billion, MSW budgets in World Bank client cities will need to at least triple over the next 20 years. Most of this funding is needed for operating MSW services, rather than for capital investments. Willingness to pay is generally lower for MSW than it is for water, sanitation, electricity, and cell phones.

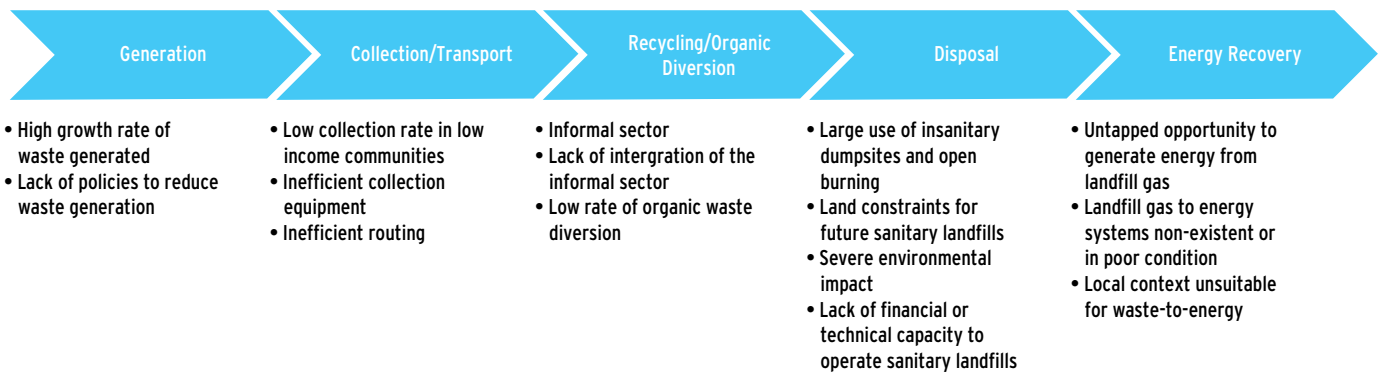
The solid waste management value chain comprises collection, transport, and disposal with the possibility for waste diversion or energy recovery, as illustrated in Figure 1.1. Cities face numerous challenges (Figure 1.2), some of which are beyond the purview of the municipal government. The issue that is creating most of the challenges is the limited financial capacities to cope with the growing demand for good service as a consequence of fast urbanization. Low income countries face the most acute challenges with their MSW systems. As a result, waste collection services are lacking or not reliable and the disposal is primarily through unsanitary dumpsites or open burning. In middle income countries on the other hand, the problem is generally less intense, except in countries where waste management has been disregarded by the government.

In middle income countries, the quality of the service tends to be better with a higher rate of municipal solid waste collection. This is due to the fact that the sector is better financed and equipped with appropriate regulatory, institutional capacity. In these countries, the trend is generally to improve the efficiency of the MSW system, and move towards a more financially and environmentally sustainable system. Among all countries, fragile and post-conflict countries face more severe challenges due to a lack of government capacity, lack of financial capacity and difficulties to engage with private sectors firms because of the risky environment to private investment.

Improper waste management, especially open dumping and open burning, has significant adverse effects on water bodies, air and land resources. It attracts disease vectors and clogs drains, which contributes to flooding. People who live near or work with solid waste have increased disease burdens.

Addressing MSW challenges in cities offers co-benefits at the local and global levels. At the local level, improving MSW could generate high economic rates of return through significant environmental, social and public health benefits, and improvements in overall livability, urban resilience, and city competitiveness. It could reduce unpleasant odors and reduce the reproduction of flies, bugs and mosquitoes which spread diseases such as malaria and dengue. It contributes to attracting tourists and investors who support the local economy. Improving solid waste has also a positive benefit by creating jobs and providing income generation opportunities to local citizens. It can help keep drainage channels open, thus reducing the vulnerability of urban poor living in slums to

Figure 1.1: Common Challenges along the MSW Value Chain

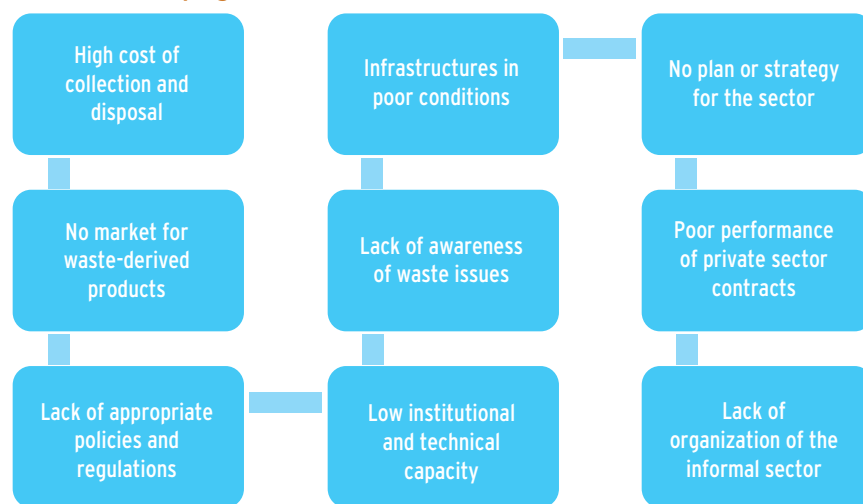




DUE TO RAPID URBANIZATION AND GROWING ECONOMIES, MSW IS GROWING AT ALARMING RATES. IT IS EXPECTED TO ALMOST TRIPLE IN LOW AND LOWER-MIDDLE INCOME COUNTRIES BY 2025.

2.2 BILLION TONS OF MSW BY 2025

Solid waste management remains critically underfunded in developing countries.

Figure 1.2: List of Challenges Undermining Proper Management of Solid Waste in Developing Countries

intense rainfall and sea level rise. On the global level, MSW accounts for about 15 percent of global emissions of methane, a potent greenhouse gas, and MSW could be a channel through which cities can mitigate climate change.

The World Bank’s portfolio between 2000 and 2012 included 114 active projects in 58 countries in all regions, representing US\$1.27 billion in investments, with a further 55 analytical and advisory activities. Bank-managed carbon funds have purchased over US\$1 billion of emissions reduction credits from MSW projects which reduce methane emissions. Despite this significant portfolio, the existing US\$40 billion annual global shortfall for MSW requires the World Bank to reconsider its approach to MSW and leverage innovative instruments and partnerships to increase its impact on the sustainability and quality of the MSW sector. To achieve this goal, since 2012 the World Bank has been exploring the application of results-based financing (RBF) in the solid waste sector as an instrument to improve MSW services and outcomes. The work consists of designing implementable RBF schemes that are customized to each city’s circumstances.

Results-based financing (RBF) is an innovative approach to development finance that is changing the conversation on aid effectiveness. Results-based financing for MSW is a financial mechanism through which the payment for solid waste services is conditioned to the achievement and verification of pre-agreed targets. In a sector that faces budget constraints but also demonstrates demand for good service, RBF appears as a valuable tool to ensure that public funds are used efficiently and transparently. RBF could be used as a payment mechanism for solid waste collectors to ensure that the service provided

is verified and certified as satisfactory before public funds are used to pay the service provider. It could be used as instrument to provide incentives or rewards to community groups to stimulate self-organization for positive behavior change towards source separation of waste, recycling or to improve the cleanliness of their community. RBF in the solid waste sector could also be used to transfer donor funds to countries to provide access to basic services in poor areas.

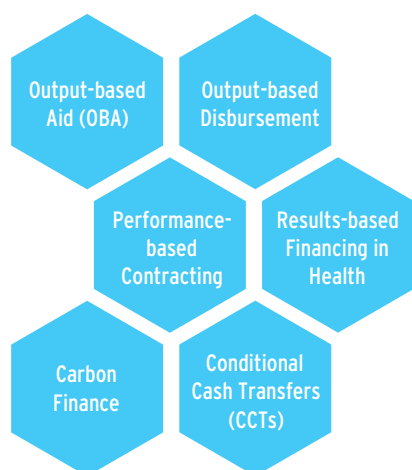
There are a variety of instruments that constitute RBF. While there is no single commonly agreed-upon definition for RBF, the instruments are all designed to enhance the delivery of services or

infrastructure by providing funding only if pre-specified results have been achieved.¹ In contrast to more conventional funding, payments are not based on inputs or expenditures; instead, funds depend on demonstrated and independently verified results. Some examples of RBF include output-based aid, conditional cash transfers, advance market commitments, and carbon finance (Figure 1.3).

The main feature of RBF is that the performance criteria are specified explicitly up-front, clearly tying payment to specific and measurable performance. In this way, RBF increases transparency and accountability in the use of public funds, with the potential of improving the quality of the service delivery or to stimulate behavior change. In much of development finance, there exists a “principal-agent problem” in which the interests of each (i.e., the donor and the service provider) are not necessarily aligned. The result of this misalignment is a degree of performance risk and an increased possibility that development goals are not achieved. RBF creates an incentive structure that harmonizes stakeholder interests to support real and measurable results.

Output-based aid (OBA) is a type of RBF that provides performance-based subsidies to deliver basic services targeted to benefit the poor—water, sanitation, electricity, transport, telecommunications, education, and health care—where policy

¹ Tremolet, Sophie. “Identifying the Potential for Results-Based Financing for Sanitation,” Water and Sanitation Program (World Bank) Working Paper, 2011. Available at: <http://www.wsp.org/sites/wsp.org/files/publications/WSP-Tremolet-Results-Based-Financing.pdf>

Figure 1.3: Potential Results-Based Financing Instruments

concerns would justify public funding to complement or replace user fees.² OBA subsidies encourage service providers to expand service to poor households where otherwise no clear market incentive exists. OBA's explicit identification of subsidies—who they are going toward and for what performance metrics—can reduce the economic distortions that subsidies often create. These subsidies can be one-time, transitional, or ongoing, depending on the unique service and circumstance.

There have been significant RBF projects in the sectors of health, water, and energy. As of October 2013, the Global Partnership on Output-based Aid (Box 1.1) had a portfolio with 40 percent funding in energy, 29 percent funding in water, and 14 percent funding in health (Figure 1.4).³ While projects continue to be designed and tested in these sectors, there has already been notable success. As an example, in 2009, Indonesia embarked on a grant-funded OBA project through the GPOBA. The project's aim was to expand piped water supply to the city of Surabaya's urban poor through subsidies for successfully achieved performance criteria: in-fill connections to existing water mains, expansion of connections to previously unserved areas, and bulk supply ("master meter") connections. The scheme was considered widely successful, such that it subsequently expanded into a national government program called *Water Hibah*.

2 "Output based aid: Supporting infrastructure delivery through explicit and performance-based subsidies," *OBA Approaches*, March 2005, Note Number 05.

3 "A Decade of Supporting the Delivery of Basic Services for the Poor," Sector Brief, *Global Partnership on Output-based Aid*, October 2013.

The basic guiding principles of RBF and its documented successes suggest that it could be applied to improve the service delivery or stimulate behavior change in the municipal solid waste sector. The rationale for considering RBF for the MSW sector is based on the following features that are commonly found in many developing country cities:

- A serious shortfall in the delivery of the basic service of MSW collection and processing, particularly in poorer areas where residents are unable to afford private service provision;
- Few or no incentives for cities to improve MSW services, innovate and increase efficiency in what is often considered to be a low-priority sector; and
- Limited revenue collection, such as user fees, for MSW services, which affects the financial ability of the city to provide these services.

RBF should not, however, be taken as the panacea for the MSW sector, given the extent of the challenges. Rather, it should be viewed as a way to address some of the challenges facing developing countries such as fee collection, waste collection rates or implementation of source separation schemes. Table 1.1 provides an overview of the issues that RBF is more likely to address.

Given these needs, MSW management is a new sector that could learn and benefit from RBF innovation. Over the last two and one-half years, with funding from GPOBA, the World Bank Urban Development and Resilience Unit (UDRUR) took lessons learned from prior RBF projects in other sectors to design RBF schemes for MSW improvements in several pilot cities. The designs were tailored to the specific contexts and needs of cities in Nepal, the West Bank, China, Malaysia, Indonesia, Tanzania, Jamaica, and Mali. Work on these RBF designs involved preliminary baseline assessments of solid waste issues in each city, and in-country stakeholder consultations. Most of the proposed designs focus on specific issues (e.g., fee collection, source separation, etc.), even though these actions have an impact on the entire value chain.

Most of these RBF designs were undertaken as part of the preparation of World Bank investment projects in solid waste. Of these, GPOBA has two grant projects in its portfolio (both of which are covered in this report). The first grant was approved for Nepal in December of 2011, and inspired a second project – in the West Bank – which was approved in 2013. GPOBA also provided technical assistance (TA) funding for preparation of a project in Mali, which was intended to be supported by a grant

Box 1.1: The Global Partnership on Output-based Aid (GPOBA)^a

GPOBA is a partnership of donors working together to support output-based aid approaches. Its mandate is to fund, design, demonstrate, and document OBA approaches to improve the delivery of basic services to the poor in developing countries.

GPOBA has over 10 years of experience and a portfolio of 37 projects in six sectors: energy, water and sanitation, health, solid waste management, education, and information and communication technology (ICT), as depicted in Figure 1.4. Its projects include US\$170 million in subsidy funding and technical assistance and its services have benefitted about 5.9 million poor people throughout Latin America, Sub-Saharan Africa, the Middle East and North Africa, South Asia, Southeast Asia, and Central Asia.

GPOBA was established in 2003 by the United Kingdom’s Department for International Development (DFID) as a multi-donor trust fund administered by the World Bank. Since 2003, four additional donors have joined the partnership: the International Finance Corporation (IFC), the Dutch Directorate General for International Cooperation (DGIS), the Australian Department for Foreign Affairs and Trade (DFAT), the Swedish International Development Agency (SIDA).

^a Global Partnership on Output-Based Aid, October 2013.

Box 1.2: The Climate and Clean Air Coalition (CCAC)^a

The CCAC to reduce short-lived climate pollutants (SLCPs, such as methane, black carbon and hydrofluorocarbons (HFCs)) is a partnership of governments, inter-governmental organizations, representatives of the private sector, the environmental community, and other members of civil society that addresses the challenge of SLCPs in various sectors such as solid waste management, oil and natural gas, brick kiln, heavy duty diesel vehicles and engines, and cook stoves.

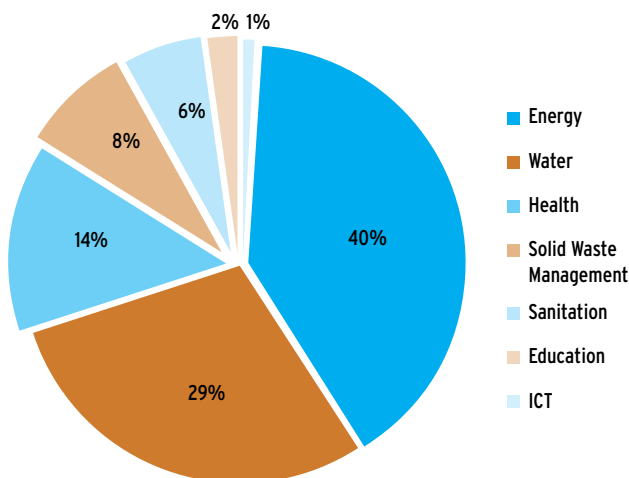
The MSW Initiative of CCAC was launched at the Rio+20 Summit in June 2012. Lead partners of the initiative include: Environment Canada, US Department of State, US Environmental Protection Agency (EPA), C40, United Nations Environment Programme (UNEP), Japan, the World Bank, etc. – and the objective of the coalition is to reduce short-lived climate pollutants in the solid waste sector.

^a Climate and Clean Air Coalition website 2014. Accessible online at: <http://www.unep.org/ccac/>

from GPOBA, but this project was later dropped. In 2014, the Climate and Clean Air Coalition (CCAC; see Box 1.2) provided TA funds to UDRUR to design an RBF solution for

one CCAC participating city, through which work in Penang, Malaysia was undertaken.

Figure 1.4: Sectors in the GPOBA Portfolio (Oct 2013)



Source: Global Partnership on Output-based Aid, October 2013.

This report presents an overview of each of the RBF designs in the MSW sector. Individual RBF designs were subject to World Bank review processes for investment projects or review by a GPOBA panel of experts (Nepal and West Bank) prior to implementation. In most cases, the designs are pending or in the early stages of implementation. Therefore, it is premature to draw conclusions or claim specific results from implementation. Under these constraints, the report serves to describe and critically reflect on the designs, and the unique MSW contexts and thought processes behind them.

This report presents eight case studies to illustrate how RBF could be used to address some of the fundamental challenges that cities in developing countries face in solid waste management. The eight designs could be classified into three main categories: (a) **RBF to improve solid waste service delivery and fee collection**: in Nepal and the West Bank, the projects use RBF subsidies to improve the financial sustainability

Table 1.1: Opportunities for Addressing MSW Challenges in Developing Countries using RBF

Challenge	Potential to address the challenge using RBF
High cost of collection and disposal	Likely
No market for waste-derived products	Unlikely
Lack of appropriate policies and regulations	Unlikely
Low institutional and technical capacity	Unlikely
Lack of awareness on waste issues	Unlikely
Infrastructures in poor conditions	Unlikely
No plan or strategy for the sector	Unlikely
Poor performance of private sector contracts	Very likely
Lack of integration of the informal sector	Unlikely

of MSW services by increasing user fee collection while simultaneously improving waste collection services; (b) **RBF to promote recycling and source separation**: in the cases of China, Indonesia, and Malaysia, an “incentive payment” model is used to improve source separation and collection of waste through changes in behavior at the household level; and (c) **RBF to strengthen waste collection and transport in underserved communities**: in the Mali and Tanzania, projects were designed to strengthen secondary waste collection and

transport for under-served communities. In the case of Jamaica, the project was designed to improve waste collection in inner-city communities and to encourage waste separation and general neighborhood cleanliness.

These models could be considered for replication in other countries. In general, the **RBF model to improve solid waste service delivery and fee collection** is more suited to low income countries where service delivery is poor or non-existent or where fee collection to support waste collection and disposal is a major challenge. It is also a good model to jump start the solid waste services in fragile and post-conflict situations. The **RBF model to promote recycling and source separation** could be a good model for cities in middle income countries where the collection of waste is already high but where the effort of the government is focused on improving the financial and environmental sustainability of the sector. The **RBF model to strengthen waste collection and transport in underserved communities** could be applicable to either low or middle income cities but is most relevant where the focus is to improve solid waste services in under-served and low income communities and could be part of community and slum upgrading projects.

The report concludes by synthesizing the findings that emerged across the eight case studies, and makes recommendations for how RBF/OBA could be used to improve MSW management.

Figure 1.5: Cities Where Work was Undertaken

RBF FOR IMPROVED SOLID WASTE SERVICE DELIVERY AND USER FEE COLLECTION

2. Nepal: Improving Financial Sustainability and the Quality of MSW Services

Box 2.1: RBF in Nepal's MSW Sector "At-a-Glance"

Solid Waste Situation. Nepal's cities are rapidly growing: urbanization rates are more than 3.5 percent per year. This population pressure exacerbates the existing challenges in municipal solid waste services. Of the 700,000 tons of waste that cities generate each year, less than half is collected and most of the collected waste is informally dumped. Waste collection is irregular and done in an *ad hoc* manner, resulting in hazards for both population health and the environment.

Problem Statement. Solid waste collection is defined by low levels of service coverage and weak financial sustainability. Without increasing revenues from SWM services, municipalities cannot finance improvements to service provision. At the same time, there is low willingness to pay among residents.

Design Solution. An output-based subsidy is given to the participating municipalities (Dhankuta, Tansen, Lekhnath, Pokhara, and Lalitpur) to help bridge the gap between the cost (including capital costs, O&M costs, overheads and other expenses) of delivering improved SWM services and the revenues that municipalities collect for SWM services. Payment of the subsidy is linked to improvements in services. The amount of the subsidy is designed to decrease over time, as services improve and fee collection increases to contribute toward final cost recovery. Implicit in this design is the assumption that residents' willingness-to-pay increases as there are visible improvements in service coverage and delivery.

The outputs measured relate to improved quality of services and improved financial sustainability of the service provider. Upon verification of these outputs each year, the amounts of the subsidy are determined based on a pre-established multiplier and are subject to a maximum amount. This multiplier is based on target levels of cost recovery and long-term municipal subsidy levels. Over the project timeline of four years, the multiplier varies so that by the end, there is no subsidy required for the city to continue service provision in a financially sustainable (fee-based) way.

2.1 Introduction

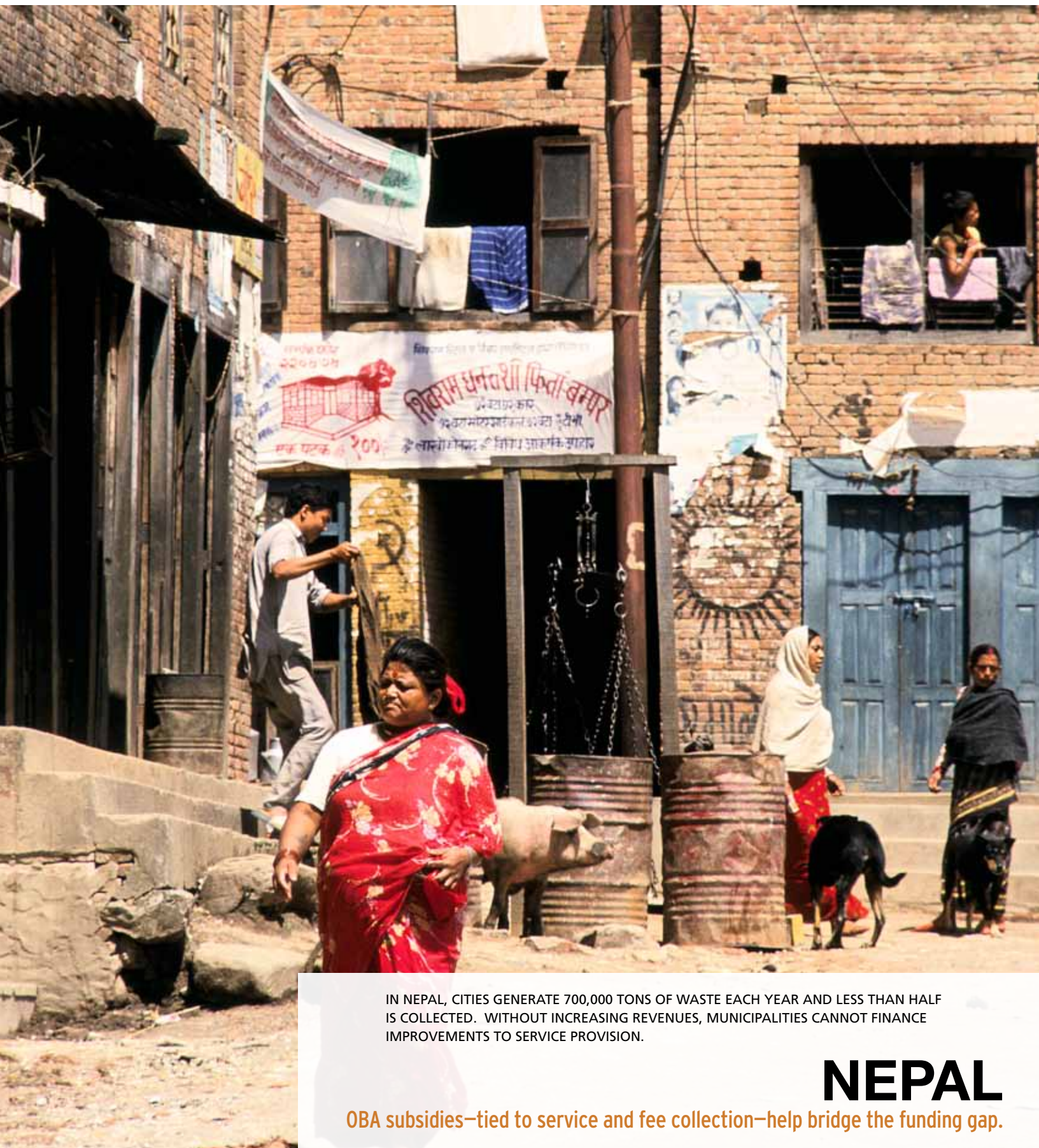
Nepal is predominantly a rural country with only about 15 percent of the population living in municipalities, but has a high rate of urbanization at more than 3.5 percent per year⁴. Between 1991 and 2001, the municipal population increased by 94 percent or 6.8 percent per year. This rapid urbanization is exerting immense pressure on Nepal's urban environment and municipal capacities. Municipalities often lack sufficient

expertise and resources to deal with the rapid growth, and are struggling to deal with pressing environmental problems such as solid waste management, wastewater management, and drainage.

2.2 The Broader Context of World Bank Support

The World Bank approved a project in 2011 to support Nepal's urban governance and development through a combination of technical assistance and investment lending. The Urban Governance and Development Program/Emerging Towns

⁴ National Planning Commission, "Three-Year Interim Plan Approach Paper (2064/65-2066/67)", *National Planning Commission*, Government of Nepal, 2007.



IN NEPAL, CITIES GENERATE 700,000 TONS OF WASTE EACH YEAR AND LESS THAN HALF IS COLLECTED. WITHOUT INCREASING REVENUES, MUNICIPALITIES CANNOT FINANCE IMPROVEMENTS TO SERVICE PROVISION.

NEPAL

OBA subsidies—tied to service and fee collection—help bridge the funding gap.

Project (UGDP/ETP) aims at improving delivery and sustainable provision of basic services and priority infrastructure in the participating municipalities. The RBF project described in this chapter – Output-Based Aid in Municipal Solid Waste Management in Nepal – operates in parallel to the UGDP/ETP, but does not formally constitute a component under it.

2.3 The Problem Statement

The main challenges faced by the SWM sector in Nepal are low levels of service coverage and poor financial sustainability, which are intricately linked. Municipalities in Nepal generally do not earn much revenue from providing SWM services and lack the funds to improve these services. Without increasing revenues from SWM services, municipalities are unable to finance improvements to service provision. At the same time,

Box 2.2: The Solid Waste Sector in Nepal

Waste generation, collection and disposal^a

It is estimated that municipalities in Nepal generate about 700,000 tons of waste per year, but less than half of this gets collected and almost all of the collected waste is dumped in a haphazard manner. On average, households generate 0.33 kilograms (kg) of waste per day or 121.7 kg per year. About 65 percent of this waste is organic, 25 percent is recyclable (i.e., plastics, paper and metal), and about 10 percent consists of inert materials. Even so, composting and recycling rates are low.

The waste collection system in Nepal municipalities is often not properly planned, resulting in poor service quality. Most municipalities do not keep records; however, recent estimates suggest that about 600 tons of waste is collected per day in all 58 municipalities, which represents only about 31 percent of total generation. The most common system of waste collection is street-side collection. Waste generators dump their waste on streets or other public places and municipalities employ sweepers. A few municipalities have set up communal containers at collection points or have door-to-door collection systems. For transportation of waste, most municipalities use tractors with trailers, or non-motorized vehicles, such as handcarts and rickshaws. Waste from these smaller vehicles is transferred to trucks for secondary transportation.

Only four out of Nepal's 58 official municipalities have sanitary landfill sites for waste disposal; others dispose of their waste haphazardly in crude dumping sites. According to the Government of Nepal, 20 municipalities dispose of their waste in riverbanks; 18 dump their waste in temporary open piles on vacant plots; and 9 have dumping sites, where the waste is occasionally covered. The remaining seven municipalities do not have any designated place for waste disposal.^b

Institutional context

Although solid waste management is a critical issue, it has received little attention in Nepal's policy, legal, and institutional framework. The country has some policies and legislation related to waste management but they are not effectively enforced. In 1996, the government adopted a Solid Waste Management Policy for Nepal, which promoted waste minimization and private sector participation, but this has not been followed up with appropriate plans and programs.

The Solid Waste Management and Resource Mobilization Act (1987) created the Solid Waste Management Resource Mobilization Centre (SWMRMC)^c. More recently, the SWM Act of 2011 was passed and articulates that: local governments are responsible for municipal SWM and may competitively contract private service providers; all MSW must be separated into organic and inorganic matter at the source; and local authorities are to promote waste reduction and recycling; a Solid Waste Management Council be formed under the Local Development Minister for policy making and coordination; and a Solid Waste Management Technical Support Center is to be established to assist local governments with technology development and capacity building.

One of the main factors preventing municipalities in Nepal from effectively managing solid waste is the lack of funds. Most municipalities do not earn any revenue from SWM services, yet SWM is a major contributor to municipal expenditure. A survey carried out by SWMRMC estimated that municipalities spend on average 13 percent of their total expenditure on solid waste management. On a per capita basis, municipalities spend on average NPR 97 (US\$1.4) per resident per year to provide SWM services. On the other hand, NGOs and private companies working in this sector charge fees ranging from NPR 30 to NPR 200 (US\$0.4 to US\$2.8) per household per month for waste collection services.

a World Bank, *Municipal Solid Waste Management in Nepal's Emerging Towns - A Situational Analysis and Main Considerations for an Output-Based Aid Pilot Project*, The World Bank, 2011.

b Solid Waste Management and Resource Mobilization Centre, "A Diagnostic Report on State of Solid Waste Management in Municipalities of Nepal", *Solid Waste Management and Resource Mobilization Centre*, 2004.

c Later renamed 'Solid Waste Management Technical Support Centre (SWMTSC)' when the SWM ACT 2011 Act was passed

people have a low level of willingness to pay for SWM services because of the poor service quality.

2.4 The RBF Approach

The RBF approach developed for Nepal is an output-based aid project, through which an OBA subsidy helps participating municipalities to bridge the gap between the cost (including capital costs, O&M costs, overheads and other expenses) of delivering improved SWM services and the revenues that municipalities collect for SWM services. Payment of the subsidy is linked to improvements in services. The project is designed for participating municipalities to improve service quality, become more financially sustainable, and expand SWM services over a four-year period. The key assumption in this design is that as the municipalities increase the quality of SWM services provided, they would also be able to gradually increase the fees charged to beneficiaries for these services.

2.4.1 Defining and Measuring Results

Results in the Nepal OBA project are measured in terms of two categories of ‘outputs’: improved quality of services and improved financial sustainability. These outputs, and the specific indicators used, are summarized in Box 2.3.

To measure results, the project provides for two separate and independent stages of verification. The first stage would, through a review of technical scorecards and sample on-site verification of the service provided by an independent technical

verification agent (ITVA), confirm that an acceptable standard of SWM services have in fact been provided. If this condition is met, then the second stage of verification by an independent financial verification agent (IFVA) would be triggered, to confirm the level of fees collected from beneficiaries based on the amounts deposited into the municipality’s account for SWM services.

The technical scorecard was developed as a performance management tool for the OBA project to be used in the Nepal project and beyond, and consists of four sections:

- a. SWM strategy and action plan indicators, which track the development and implementation of the plan;
- b. Performance monitoring system indicators, which track the ability of a management reporting system to capture and track key operational data;
- c. Service provision indicators, which track the provision of collection and disposal services against defined targets; and
- d. Financial performance indicators, which track fee collection, cost recovery, and efficiency of the system.

Within this framework, the first two sections of the scorecard are seen as prerequisites for successful implementation and monitoring of performance, while the latter two sections track actual performance. The intent is to encourage municipalities to first focus on instituting the basic requirements of an SWM system, and then focus on actual performance. Thus, developing

Box 2.3: Outputs and Indicators for the Nepal Project

1. Improved quality of services

- Number of households within the core city area receiving daily waste collection services on a door-to-door curbside basis;
- Number of households outside the core city area receiving at least weekly waste collection services on a ‘bring to truck’ or communal container basis (i.e. households carry their waste to a communal container which is then collected on a weekly basis);
- Percentage of wards/zones within a municipality’s area that are receiving regular SWM services, as per stated service levels in the municipality’s solid waste management service improvement plan;
- Percentage of wards/zones with visibly clean public areas, main streets, and secondary streets following a random visual inspection; and
- Percentage of sampled households who report that waste collection and street cleaning services provided by the municipality have met or exceeded their expectations in the key areas of reliability, frequency, improvement in environmental quality, convenience, and responsiveness.

2. Improved financial sustainability

- Increase in SWM fees charged to all waste generators;
- Annual revenues from collected SWM fees; and
- Percentage O&M (operations and maintenance) cost recovery from SWM fees.

an SWM strategy and implementing an action plan for a municipality, and establishing a system to capture and report key operational data, are necessary actions at the beginning and are assigned a higher weighting for the first year of the project. The actual solid waste collection and disposal services offered and the financial performance of the municipalities are more important to track in the subsequent years and, consequently, have higher weightings in years two to four.

2.4.2 Financing

The OBA subsidy is designed to close the gap between the O&M costs of delivering the expected service improvements, and the SWM fees collected. The subsidy would ‘match’ the SWM fees collected according to an agreed upon multiplier, and would be phased out over four years. Over the life of the project, the multiplier would vary such that the amount of subsidy gradually declines until it is phased out entirely after four years. In addition, there would be a maximum limit of subsidy that a municipality could receive in a given year, regardless of the amount of verified fees collected. The project’s financing model also assumes that apart from the subsidy funding and SWM fees collected, part of the total cost delivering the improved SWM services in each municipality would be covered by government funding (through municipal subsidies, grants from the central government, blended loan/grants, etc.). Overall, the subsidy funding provided for this project as a grant from GPOBA is just over US\$3 million.

2.5 Implementation

The project aimed to cover five out of a total of 58 municipalities in Nepal, five of which have shown interest in participating based on eligibility criteria that they fulfilled. The municipalities were first required prove their commitment to the project objective through a resolution or letter of commitment. In addition, the municipalities need to have access to an operational landfill, in addition to a basic functioning SWM system for collection and disposal and a system to collect fees from beneficiaries for these services. The municipalities were also required to prepare a SWM strategy and action plan. Moreover, small municipalities having less than 50,000 people must already be participants in the broader World Bank-financed UGDP/ETP. Some basic facts on the five participating municipalities are summarized in Table 2.1.

Implementation support to municipalities during project implementation includes financing for technical assistance needed by municipalities to help them successfully implement the project. Examples of this support include preparation of SWM Service Improvement Plans (SWM-SIPs), improving billing and revenue collection systems and performance management systems for SWM services, implementation of “reduce, reuse, and recycle” (3R) activities, and designing contractual arrangements. This component has financing worth US\$580,000. The remaining funding slated for this project, which amounts to roughly US\$700,000, would be used for project management, monitoring and verification outputs and performance of the municipalities. Figure 2.1 summarizes the basic steps in the project cycle.

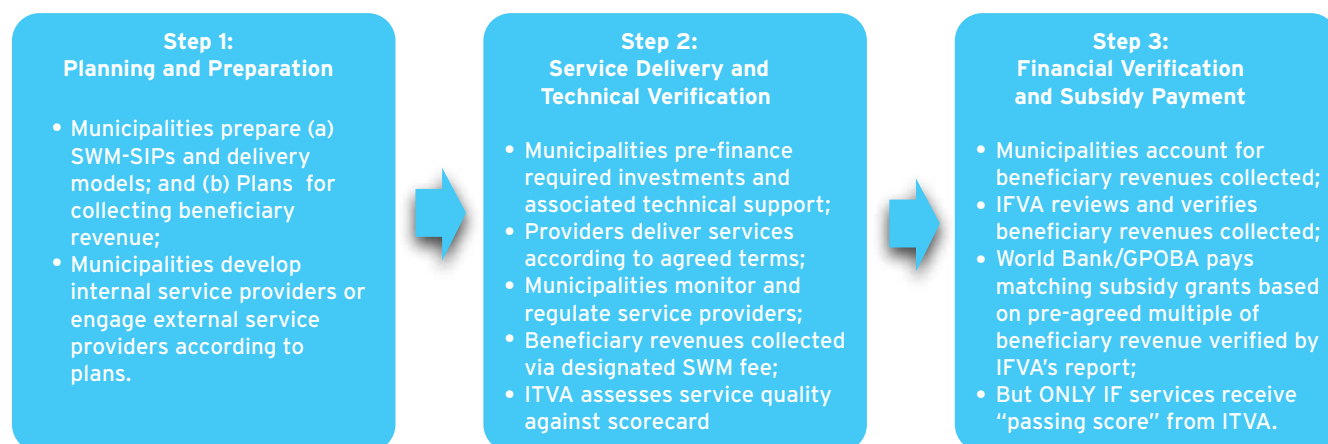
Table 2.1: Summary of Municipalities Selected for the Project in Nepal

Municipality	Dhankuta*	Tansen*	Lekhnath*	Pokhara	Lalitpur
District	Dhankuta	Palpa	Kaski	Kaski	Lalitpur
Population	27,572 (2011/12)	23,299 (2011/12)	55,000 in 2001, 65,000 in 2012 (equal to 12,000 households)	300,000 estimated (156,352 in 2001 census; annual growth 5%+)	400,000
Waste generation (kg/person/day)	0.24	0.18	0.15	0.23 (of which 48% organic, 12% plastic, 18% paper; 2008 waste survey)	0.23 (of which 72% organic, 10% plastic, 6% paper; 2008 waste composition survey)
Waste collected (MT**/day)	8	6	0 Presently no waste is collected; however, the municipality is planning to initiate waste collection services from August/ September in the new budget year	Waste production is assessed at 69 MT/day. Actual waste to landfill is 50-60 MT/day (based on vehicle capacity)	65 (of which 40% or around 25 MT/day is collected by NGOs)

* UGDP/ETP municipalities.

** MT is metric tons.

Figure 2.1: The Basic Project Cycle in Nepal



2.6 Key Risks

The main risks in relation to the project design are the beneficiaries' willingness to pay for services that they have previously not paid for, as well as the municipalities' technical and financial ability to collect fees from the beneficiaries. To mitigate this risk, the project has been designed in such a way as to include parallel and reinforcing features that would improve the likelihood of sustainability once the OBA subsidy has been phased out. For instance, the initial municipal participation criterion allows only municipalities that are willing and able to improve their financial sustainability to participate. The municipalities would be required to create SWM-SIPs, which would clearly delineate the methods they would be using to improve revenue collection.

2.7 Lessons Learned

- **Improving SWM services does not always require more staff, more vehicles, more equipment or bigger landfill space.** Simple, robust, and affordable systems are being rolled out in targeted municipalities that can be easily managed and maintained by current staff. Plans are underway for the municipalities' staff to be trained to perform their duties in a way that contributes to the municipalities' long terms goals. In terms of vehicles and equipment, the project will capitalize on the ongoing improvement plans that the municipalities' set in motion originally to further support SWM system improvement. In terms of landfill space, the project will aim to make the most out of the current space while improving its management and other related practices.
- **Providing tailored technical assistance will help lay the foundation for improving services after the preparatory phase.** Although RBF is about paying on outputs and shifting performance risks to the service provider/ implementing agency, experience from RBF pilots around the world has shown that in cases where the capacity of the implementing agency is low, complementary implementation support funding may be justified. In general, municipal authorities in Nepal have low capacity. Technical assistance included in the project is helping to enhance the basic foundation for service delivery. Despite the cities' current progress, it is difficult to move ahead with the implementation stage of the RBF project without tailored technical assistance. This will include the provision of technical know-how on landfill management to ensure they are being operated in an environmentally sound manner; putting in place basic monitoring systems for SWM service delivery and ensuring their consistent usage; and deploying related communication and advocacy activities at the community level to influence relevant behavior.
- **RBF projects should be designed with a focus on a set of desired results and allow the service providers to decide what service delivery model would best achieve those results.** There is diversity across Nepal's 58 municipalities in terms of size, context, capacity and appetite for reform. This diversity calls for a project design that allows participating municipalities the discretion to deliver SWM services as they see fit, provided that: (a) services meet a set of standards that align with national environmental policy objectives and sound environmental management principles; and (b) services achieve a certain level of financial viability in order to sustain continuous provision given municipal budget constraints.

3. The West Bank: Offsetting the Costs of Improved SWM Services with Increased SWM Fee Collection

Box 3.1: RBF in the West Bank's MSW Sector "At-a-Glance"

Solid Waste Situation. The West Bank generates approximately 1.2 million tons of waste per year, with 34 percent originating from the Hebron and Bethlehem governorates (project area). The collection rate of solid waste is as high as 98 percent but, in the absence of a sanitary landfill, the waste collected is being disposed into 19 unsanitary dumpsites.

Problem Statement. Despite a collection rate comparable to high income countries, the solid waste sector in Hebron and Bethlehem governorates suffers from major issues such as poor planning, high operation and maintenance cost, limited financial resources and unsanitary disposal of waste in 19 dumpsites. The World Bank and other donors are assisting the Palestinian Authority with upgrading the entire solid waste management system in Hebron and Bethlehem governorates, including the construction of a new sanitary landfill which will be operated by a private sector firm. The upgraded waste management system will result in an increase in operation and maintenance cost, which intensifies the need to improve the collection of solid waste fees.

Design solution. In this context, an OBA subsidy project will be provided over a four-year period to partially support increased costs associated with the disposal in the new sanitary landfill. This would allow municipal and village councils to focus resources towards improvement of primary collection. The RBF will also provide an incentive for village and municipal councils to increase efforts to collect solid waste fees to sustain operation in the long run.

The disbursement of RBF funds is made based on an independent assessment of two categories of outputs: (a) access to improved solid waste services; and (b) improved financial sustainability of the sector. Beyond its main purpose of incentivizing service improvement and fee collection, this subsidy represents an additional payment guarantee which attracted an international private sector firm to enter the waste market in West Bank.

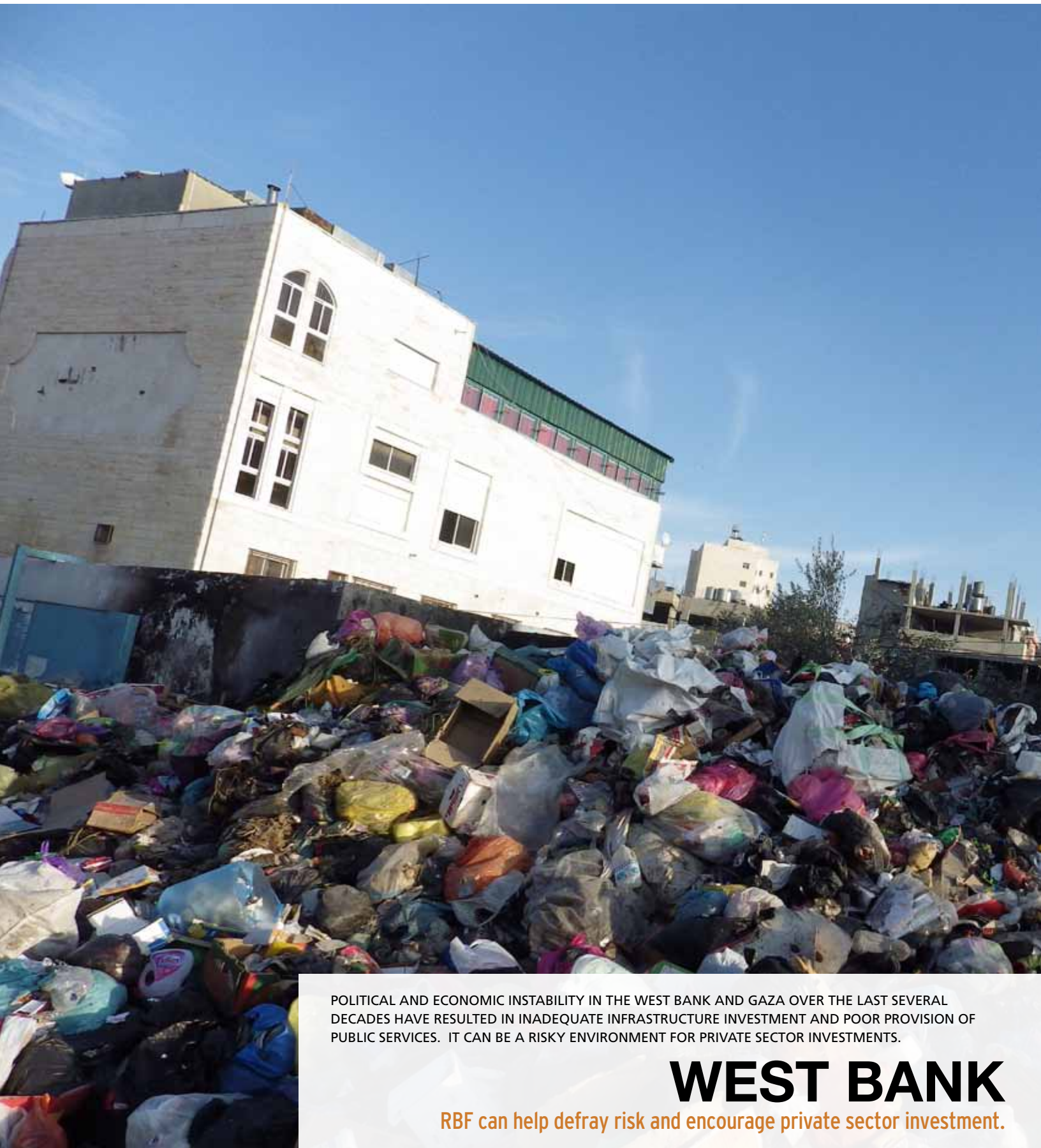
3.1 Introduction

Political and economic instability in the West Bank and Gaza over the last several decades have resulted in inadequate infrastructure investment and poor provision of public services. Although GDP growth has been steadily increasing, the Palestinian Authority (PA) faces a difficult fiscal situation. The total population of Hebron and Bethlehem governorates, which are the target areas of the RBF project described in this chapter, was 840,501 in 2012. Over 85 percent and 70 percent of the population in Hebron and Bethlehem, respectively, live in urban areas while the rest live in rural areas and refugee camps. These two governorates together cover an area of 1,726 sq km and include a total of 92 municipalities, areas, or localities. There is a high degree of variability in the SWM services provided across the two governorates, with some

areas receiving no SWM services while others are completely covered. This raises serious concerns as unsanitary waste disposal practices in the West Bank and Gaza present a serious public health threat and environmental hazard.

3.2 The Broader Context of World Bank Support

The World Bank's initial involvement with the SWM sector in the West Bank began in 2000, with the construction of the Zahrat Al Finjan Landfill in Jenin Governorate. Following the successful implementation of the Solid Waste and Environmental Management Project (SWEMP), the World Bank Group, along with the European Union and other donors, is funding the Southern West Bank Solid Waste Management Project (SWMP). The SWMP, approved in 2009 with total



POLITICAL AND ECONOMIC INSTABILITY IN THE WEST BANK AND GAZA OVER THE LAST SEVERAL DECADES HAVE RESULTED IN INADEQUATE INFRASTRUCTURE INVESTMENT AND POOR PROVISION OF PUBLIC SERVICES. IT CAN BE A RISKY ENVIRONMENT FOR PRIVATE SECTOR INVESTMENTS.

WEST BANK

RBF can help defray risk and encourage private sector investment.

funding of US\$20 million (including a US\$12 million grant from the World Bank), has the development objective of improving solid waste disposal services for communities and businesses in Palestinian municipalities and joint services councils in the Bethlehem and Hebron governorates. This would be accomplished through: (a) strengthening the joint services councils' administrative and technical capabilities for cost-effective management of waste disposal services; (b) improving waste disposal services through provision of a sanitary landfill facility and related infrastructure; and (c) carrying out a public awareness campaign to promote waste minimization, resource recovery, and cost recovery for financial viability.

3.3 The Problem Statement

The main challenges with the current SWM system in the West Bank are the lack of quality in service provision and low financial sustainability. Problems such as inadequate service planning, insufficient distribution of waste bins, and inefficient routing of collection vehicles all result in a lack of cleanliness and overall citizens' dissatisfaction with the SWM services provided. Currently, primary collection services are provided by the Joint Services Council of Bethlehem (JSC-B), Joint Services Council of Hebron (JSC-H), or municipalities/village

councils (M/VCs). In addition, waste was disposed at 19 unsanitary dumpsites, 15 of which have been closed, while the remaining four are expected to close with the commencement of full-scale operations at the Al Minya landfill. Improvements to the overall SWM system and moving towards sanitary final disposal of waste will result in an increase of SWM costs. This, in turn, can exacerbate the challenge of collecting SWM fees. At present, willingness to pay, willingness to bill, and collection of billings are all low. Box 3.2 provides an overview of the solid waste sector in the West Bank.

3.4 The RBF Approach

The RBF approach designed for the West Bank aims to improve access to quality and financially sustainable SWM services in Hebron and Bethlehem governorates. The design for this project was based on the concept developed for Nepal (see Chapter 2). As an OBA project, an OBA subsidy helps to partially support the increased costs associated with an improved level of service, namely the final disposal fees at Al Minya, thereby allowing service providers (M/VCs) to focus resources towards service improvement along other points of the SWM chain such as primary collections. The subsidy would be disbursed over a four year period, based on the achievement

Box 3.2: The Solid Waste Sector in the West Bank

Waste generation, collection and disposal

The West Bank generates approximately 1.2 million tons of MSW per year.^a Thirty-four percent of the total waste in West Bank originates in Hebron and Bethlehem, which are the two poorest governorates in the West Bank.

Waste collection tends to be high, although the service itself is inefficient, thus increasing primary collection costs. Problems with waste collection include poor planning, high operation and maintenance costs, inadequate vehicles and bins, and limited financial resources. It is estimated that over 98 percent of waste is collected in Hebron and Bethlehem governorates.

Approximately 29 percent of the population in Hebron and 53 percent in Bethlehem receive at least partial SWM services. These services are either supported by the M/VCs or the JSC-B / JSC-H.

Waste disposal in the West Bank and Gaza is generally unsanitary, with garbage being disposed in open, unregulated sites. The number of dumpsites ranges from 190 to 420.^b Burning of waste is also common, particularly in rural areas due to a lack of an efficient collection and disposal system.

Institutional context

The SWM sector in the West Bank is regulated by the Ministry of Local Government, as part of its overall responsibility for municipalities, and by the Palestinian Authority Environmental Quality Authority; however, both lack the capacity to properly govern the sector. Municipal capacities, as well as the funds to improve the system, are also lacking, thus contributing to the overall lack of regulatory strength. Nonetheless, the sector is beginning to see improvements through the establishment of JSCs that take responsibility for providing a consolidated service.

The Joint Services Council-Hebron and Bethlehem (JSC-H&B) is a legal entity established by the Ministry of Local Government, and consists of the JSC-H and the JSC-B, as well as other municipal JSCs.

a Sweepnet, 2012. www.sweep-net.org

b Baseline Data Inventory Report, Feasibility and Social Impact Study for the Southern West Bank Solid Waste Management Program, dated May 10, 2008, by DHV Consultants.

of specific service improvement and financial sustainability targets. The expected benefits of this project in the West Bank are: improvements in the quality of SWM services provided; better public health and environmental conditions through the closure of illegal dumpsites and improvement in the level of service; and enabling private sector participation, which would in turn contribute to the long-term sustainability of the SWM system in the region. The expected number of residents who would benefit from the project is approximately 840,000.⁵

3.4.1 Defining and Measuring Results

Results in the West Bank OBA project are measured in terms of two categories of ‘outputs’: (a) access to improved services; and (b) improved financial sustainability of the SWM sector. These outputs, and the specific indicators used, are summarized in Table 3.1.

Under the first output category, two tangible and immediately measurable indicators—“Cleanliness of Areas” and “Total Waste Managed”—were adopted to capture the spectrum of improved services to be provided to households. Cleanliness captures the various characteristics of effective primary collection service; however, it does not address the overarching goal of SWM, which is to ensure the overall handling of waste such that the environment is preserved for all residents. In order to ensure these benefits are received by users, it is important that waste is also managed in a sanitary manner. In addition, development of an SWM strategy for the treatment

of different types of waste (e.g., slaughterhouse and medical waste) and an MIS for reporting, monitoring, and evaluation of results, are also important indicators of results for the project. Improved financial sustainability, the second output category, is a function of the cost of services provided and the revenues generated to cover these costs. Revenue generation is broken down into billings (number of registered users who receive bills and amounts billed to each registered user) and collections (the portion of the amount billed that is actually collected).

The indicators under the two output categories summarized in Table 3.1 would be verified on a semi-annual basis by an independent verification agent (IVA). Verification would include visual inspection of streets, and review of the tonnage of waste received at transfer stations and the landfill in relation to waste generation rates. A technical scorecard, which is central to project monitoring, tracks SWM strategy development and implementation of the MIS, service provision, and financial performance. As in the case of Nepal, the first part of the scorecard checks for project implementation and monitoring systems, which are a prerequisite for proceeding to the latter stage of verifying actual performance of service delivery and fee collection. The indicator on SWM strategy/MIS implementation will be measured at the JSC-H&B level on a yes/no evaluation. The indicator on total waste managed is a measure of the waste treated at the Al Minya landfill. The score for the other indicators is done using a population-weighted average. Targets for individual M/VCs are set in order to achieve aggregate targets and the M/VCs receive the OBA subsidy based on their performance against the targets for each indicator.

⁵ Solid Waste Management in Hebron and Bethlehem Governorates, Assessment of Current Situation and Analysis of New System, SENES Consultants Ldc and ARIJ-Jerusalem, June 2012

Table 3.1: Outputs and Indicators for the West Bank Project

Indicators	Description
Output 1: Access to Improved Services	
SWM Strategy/Management of Information Systems (MIS) Implementation	<ul style="list-style-type: none"> • Develop plans for management and treatment of slaughterhouse and medical waste and closure and rehabilitation of unsanitary dumpsites; and • Design and implementation of management information system for the first year.
Cleanliness of Areas	<ul style="list-style-type: none"> • Measured using a Cleanliness Index (CI), based on visual inspection; scores assigned based on cleanliness characteristics observed.
Total Waste Managed	<ul style="list-style-type: none"> • Three waste streams monitored: <ul style="list-style-type: none"> · Waste deposited at Al Minya sanitary landfill; · Waste diverted from Al Minya through recycling or re-use; and · Waste that is deposited at other dumpsites (e.g., Yatta) and not sanitarily treated.
Output 2: Improved Financial Sustainability	
Improvement in Fee Collection	<ul style="list-style-type: none"> • Fees collected divided by billings.
Improvement in Cost Recovery	<ul style="list-style-type: none"> • Total billings divided by total operating costs.

3.4.2 Financing

The total cost for the OBA subsidy component of the project over the four-year period is US\$8 million. It is expected that the JSC-H&B will contribute approximately US\$5.6 million through improved collection of user fees. Solid waste fees would be charged to households by their respective municipalities to cover primary collection, transport to transfer stations, and operations and maintenance of the sanitary landfill, as well as administrative costs of the landfill operator and JSC-H&B. These fees are expected to increase over time in order to cover the costs of operating a sanitary landfill, which will cost more to operate than the dumpsites in the ‘business-as-usual’ situation. The current average household fee collection rate of 48 percent equates to approximately US\$1.4 million per year; it is expected that by year four the collection efficiency will reach 80 percent, based on the experience in Jenin with improvements to payment mechanisms and enforcement procedures.

The OBA subsidy grant is fully funded by the International Finance Corporation (IFC) through GPOBA. Because requirements on the use of IFC funds stipulate that such funds must flow to a private party, the grant funds will be used to pay the landfill operator a portion of the final disposal bill on behalf of M/VCs. The projected disposal costs amount to US\$30/ton on a monthly basis, of which 66 percent is expected to be covered by fees from beneficiaries and 34 percent through the GPOBA grant, over the four-year period.

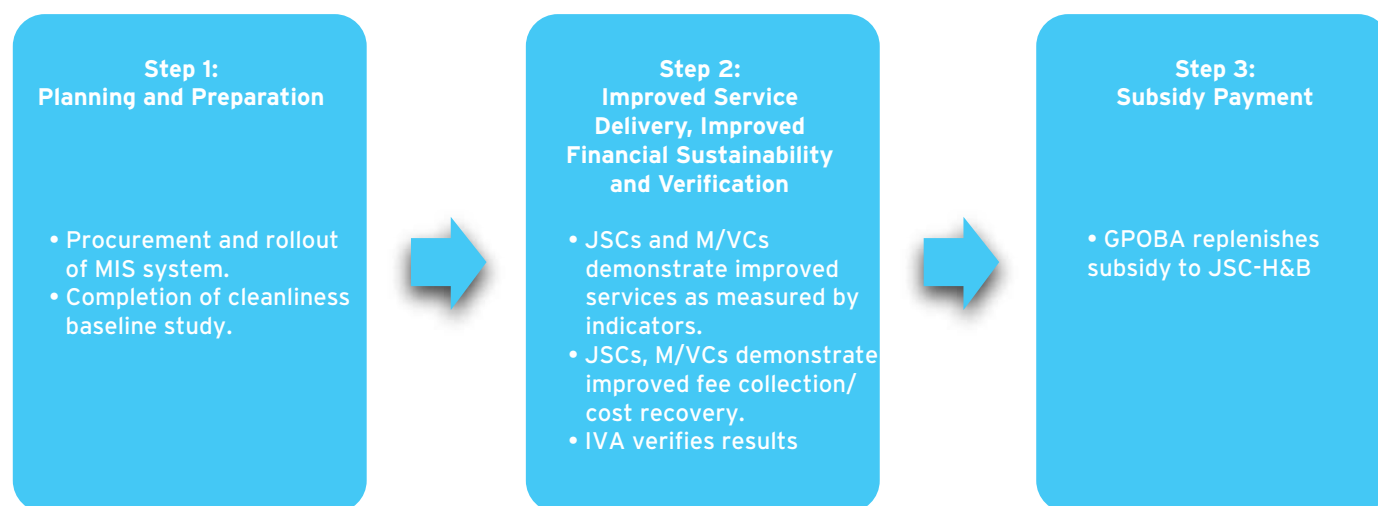
3.5 Implementation

As a first step, the implementation agency, JSC-H&B (with the M/VCs) will be required to develop and implement an MIS for better reporting and conduct a baseline study for cleanliness. This would be essential for the IVA to verify the data reported later in order to disburse the subsidy. The JSCs and M/VCs provide collection, transport, and disposal services and collect fees for the services provided. The JSC-H&B is responsible for monitoring and evaluation of the project and tracks the performance of the M/VCs through the MIS, and compiles performance results. The IVA is hired by the JSC-H&B according to World Bank procurement procedures. The IVA reviews progress made by the municipalities semi-annually and verifies the scores reported based on the pre-agreed indicators. If a minimum score is reached, the JSC-H&B TOU submits a replenishment request to GPOBA; GPOBA then disburses funds through a “Designated OBA Account” housed at the MoF on behalf of JSC-H&B. Figure 3.1 summarizes the basic steps in the project cycle.

3.6 Key Risks

A key risk to the success of this RBF approach is beneficiaries’ willingness to pay for the improved services. Hence, it is important that the subsidy provided over the project period enables service providers to invest the resources needed for improved services in the form of improved primary collection and sanitary final disposal. In addition, there is also the issue of the service providers’ willingness to adopt alternative options to fee collection, such as including solid waste fees on

Figure 3.1: The Basic Project Cycle in the West Bank



electricity bills. In areas where solid waste fees have been tied to electricity bills, fee collection rates have been as high as 90 to 100 percent. As in the case of Nepal, a key assumption in this design is that as the municipalities increase the quality of SWM services provided, they would also be able to gradually increase the fees charged to beneficiaries for these services.

To reduce these risks and increase the likelihood of success, the overall project beyond the OBA component has received institutional buy-in and stakeholder support, and the costly upfront investments of the construction of the sanitary landfill and associated equipment has been funded through a World Bank grant and other donors. The indicators have been designed to enhance operational efficiency and cost savings. The action plans developed by the JSCs include measures to develop a standardized system for setting tariffs, improve fee collection systems, link fees to utility billing systems (where possible), and so on. However, it remains to be seen whether all these aspects can be appropriately and effectively implemented and monitored by the municipalities given their current levels of technical capacity. Lastly, in terms of fee collection, the JSC-H&B is entitled to claim other sources of revenues from municipalities such as taxes and road safety fees. In this respect, the project has been designed in a manner whereby participating municipalities commit to pay JSC-H&B to compensate for any reduction of OBA subsidies that occur if the pre-agreed service and financial targets are not achieved.

3.7 Lessons Learned

- Supplementing financial subsidies with educational outreach and technical assistance provides greater leverage for RBF projects.** In the West Bank, the RBF project aimed to motivate municipal and village councils to take action to improve fee collection in the Bethlehem and Hebron governorates. Introducing new fees particularly for waste management requires some level of public education and outreach for greater acceptance. For the case of West Bank, an outreach program was part of the broader solid waste project that the RBF is supporting.
- RBF subsidies in the solid waste sector are better targeted at municipalities rather than individual households due to the shared nature of the service provision.** In the solid waste sector, poor areas of cities are generally those experiencing low fee collection rates and consequently poor quality of service; these problems justify RBF subsidies to bridge the gap of affordability. Unlike other sectors such as water and energy where the subsidy could easily be targeted to individual households, it is difficult to target a subsidy to poor households since waste disposal is often a shared, community-based activity. In the West Bank, GPOBA approved a grant for Hebron and Bethlehem governorates based on average mean-income criteria rather than segregating poor households or poor neighborhoods within these governorates.
- RBF could be an effective tool to attract the private sector in post-conflict and fragile countries.** The fragile political situation in the West Bank is generally not conducive and highly risky for international private sector investments. The Southern West Bank solid waste project has, however, attracted the international private sector mainly because the RBF project represented a payment guarantee to the international private sector firm. As a consequence, the first public-private partnership (PPP) transaction with an international firm was signed for the management of the new sanitary landfill in Al-Minya landfill. In the context of fragility, transitional subsidies such as those provided by GPOBA are an effective tool to facilitate revenue collection as citizens will immediately experience the value for the fee that they are being asked to pay.

RBF TO PROMOTE RECYCLING AND SOURCE SEPARATION OF WASTE

4. China and Malaysia:

Incentive Payments to Increase Source Separation of Solid Waste in Ningbo, China and Penang, Malaysia

Box 4.1: RBF in China's MSW Sector "At-a-Glance"

Solid Waste Situation. The municipality of Ningbo, China is home to approximately 3.5 million residents (2010) and generates 1.2 million tons of municipal solid waste each year (2009), much of this waste being residential. The city has two waste-to-energy (WTE) facilities and two sanitary landfills, with capacities of 1,600 and 1,300 tons per day (tpd), respectively. By 2015, the city is projected to generate 1.4 million tons of waste per year, which would result in a shortfall of disposal capacity of 1,000 tons per day.^a

Problem Statement. 85.2 percent of Ningbo households indicated that they do not separate waste at home. Even among households that claimed to segregate their wastes, their separated waste was not transported and treated separately due to a lack of facilities for waste separation and treatment. When asked why households did not practice segregation, 21 percent reported they did not know how to separate wastes, 23 percent mentioned a lack of space in their homes, and 14 percent noted a lack of appropriate separation, collection, and treatment facilities.

Design Solution. While Ningbo embarks on financing the facilities for waste separation, an RBF approach is used to address the issue of behavior-change and incentivizing household solid waste separation at source. "Incentive payments" (i.e., cash awards) are given to communities if they successfully separate wastes into the following streams: food waste, recyclables, hazardous waste, and all other wastes. Separated waste will be evaluated on pre-determined quality and quantity measures, such that neighborhoods will receive a final overall score. The neighborhood community, organized around a neighborhood-level residents committee (NRC) that is the lowest level of government, will receive an incentive payment based on this score, subject to both a minimum score and a maximum incentive payment ceiling.

Each program cycle is six months long. During the first month, the program begins implementation and the NRC is responsible for education, out-reach, and advocacy. During months two through five, waste is evaluated. During the last month, final scores and incentive payment amounts are calculated and distributed as grants from the municipal government.

a. World Bank, "Project Appraisal Document—Ningbo Municipal Solid Waste Minimization and Recycling Project", *The World Bank*, December 19, 2012.



BY 2015, NINGBO IS PROJECTED TO GENERATE 1.4 MILLION TONS OF WASTE PER YEAR, WHICH WOULD RESULT IN A DISPOSAL CAPACITY SHORTFALL OF 1,000 TONS PER DAY. SEPARATING AND DIVERTING HOUSEHOLD WASTE THROUGH RECYCLING CAN HELP SAVE VALUABLE LANDFILL SPACE.

CHINA

Incentive payments are given to communities if they successfully separate waste.

Box 4.2: RBF in Malaysia's MSW Sector "At-a-Glance"

Solid Waste Situation. Penang State, Malaysia is comprised of two highly urbanized parts—Penang Island and Seberang Perai on the Malaysian Peninsula. Penang Island's population of 750,000 residents and Seberang Perai's population of about 815,767 residents generate about 288,377 and 528,275 tons of waste per year, respectively.^a Existing landfill capacity is rapidly decreasing with the amounts of waste currently generated, collected and disposed.

Problem Statement. Of Penang's waste, approximately 40-60 percent is organic waste (food and yard wastes).^b Organic waste that is landfilled releases greenhouse gases like carbon dioxide and methane that contribute to global warming. A significant portion of waste is from residential high-rise buildings and yet most residents in Penang, including those in these complexes, do not separate their organic wastes.

Design Solution. "Incentive payments" (i.e., cash awards) are given to participating high-rise communities if they successfully separate organic waste from all other wastes. Separated organic waste will be evaluated on pre-determined quality and quantity measures, such that communities will receive a final overall score. The communities, through organized high-rise management committees (HMCs), will receive an incentive payment based on this score, subject to both a minimum score and a maximum incentive payment ceiling. The program cycle is four months long, with two months of evaluation.

a. Municipal Councils of Penang Island (MPPP) and Seberang Perai (MPSP), 2012.

b. Hung Teik Khor, State of Penang Organic Waste Policy Proposal, 2012.

Ningbo, China

4.1 Introduction

The municipality of Ningbo, China, is home to approximately 3.5 million residents (2010) and generates 1.2 million tons of municipal solid waste each year (2009). The city has two waste-to-energy (WTE) facilities and two sanitary landfills, with capacities of 1,600 and 1,300 tons per day. By 2015, the city is projected to generate 1.4 million tons of waste per year, which would result in a shortfall of disposal capacity of 1,000 tons per day. In an effort to overcome its growing deficit in waste management capacity, the Municipality of Ningbo is initiating a waste separation at source program. Through this program, residents would be required to separate their waste into four streams: organic waste, recyclables, hazardous waste, and other waste. The aim is to divert as much hazardous waste, organic waste and recyclables from the WTE facilities and landfills, thus extending the life of the landfills and enabling the current system to handle increases in waste generation.

4.2 The Broader Context of World Bank Support

Together with the municipal government of Ningbo, the World Bank is funding the Municipal Solid Waste Minimization and Recycling Project in Ningbo to assist the city in increasing the volume and proportion of solid waste recycled through source separation. The total project cost is estimated at US\$248.33 million, with almost 70 percent being financed through the

municipal government and the rest through the World Bank. The project covers over two million urban residents living in Haishu, Jiangdong, Jiangbei, Beilun, Zhenhai, and Yinzhou districts that together make up Ningbo. The project comprises the following components:

- *Component 1:* municipal solid waste separation, collection, sorting and transportation of residential waste and waste in public places;
- *Component 2:* kitchen waste treatment, through the construction of an anaerobic digestion facility;
- *Component 3:* project implementation support to cover community mobilization and raising awareness, MSW pricing policy and drafting of related regulations, a smart SWM information management system, external monitoring and evaluation of performance, and output-based incentives for NRCs to encourage waste separation and for restaurants that install and operate oil-waste separators;
- *Component 4:* capacity building and project management support for advisory services, supervision, project management, monitoring, and training of SWM staff.

4.3 The Problem Statement

A critical element for the success of the overall project in Ningbo is to ensure that source separation actually takes place. The project is financing all the necessary equipment and facilities to support waste separation, such as the new anaerobic digestion facility, several waste collection trucks,

and construction or upgrade of transfer stations. However, all this requires behavior change at the community level to ensure success. Yet, according to a public survey on waste separation prior to project implementation, 85.2 percent of Ningbo households indicated that they do not separate waste at home, except for selling some valuable recyclables to the market. Even for those households that claimed that they did separate waste, their separated waste was not transported and treated separately due to lack of facilities for waste separation and treatment. When asked why households did not practice segregation, 21 percent reported they did not know how to separate wastes, 23 percent mentioned a lack of space in their homes, and 14 percent noted a lack of appropriate separation, collection, and treatment facilities.

4.4 The RBF Approach

The RBF approach designed for Ningbo is an output-based neighborhood incentive payment program, to encourage a high rate and good quality of waste separation according to the four streams of waste under the city's new SWM system. The basic units for promoting solid waste separation are the NRCs. The rationale for working at the NRC level is due to the fact that this is the lowest level of government in China which is in direct contact with residents. Each NRC would be

fully responsible for outreach, education, and mobilization of residents' behavior for source separation as well as the means and methods used to encourage households to segregate their wastes.

4.4.1 Defining and Measuring Results

Each neighborhood would be evaluated based on its outputs, defined as the quality and quantity of source-separated waste. Using the quantity of waste separated as an evaluation criterion would ensure that each NRC strives to get its residents to separate as much waste as possible. However, quantity parameters alone would not provide an accurate and fair evaluation; therefore, a set of quality factors are also used to ensure that the separated waste is of a certain level of purity. The purity of the organic waste is key to the success of the anaerobic digestion plant. Likewise, properly separated recyclable waste would yield a higher price than mixed waste.

4.4.2 Financing

The incentive payments for the NRCs in Ningbo are based on three factors: the Neighborhood Overall Score (NOS), the Potential Neighborhood Incentive (PNI), and the minimum score (MS), of each NRC. The NOS measures the overall quality and quantity of the source-separated waste in a neighborhood, taking into account the quality and quantity of both food waste

Box 4.3: The Solid Waste Sector in China

Waste generation, collection and disposal

Today, China is the world's largest waste producer. In 1980, the amount of municipal solid waste collected and transported in China was about 31 million tons. Following its rapid economic growth and urbanization, by 2009, this amount had increased five-fold to about 157 million tons. Current estimates expect this amount to continue increasing to about 585 million tons in 2030. Aside from the huge environmental costs, the investment needed to collect and dispose of this amount of waste is likely to increase tenfold, from its current budget of RMB 50 billion to RMB 500 billion.

Current residential waste, a large portion of municipal solid waste, is rarely separated at source. While there is some recycling done by through the private sector, most residential waste is mixed and disposed through incineration or landfilling. Public awareness and participation in waste separation is generally low. As living standards increase, recyclable materials will likely increase and need to be separated from the rest of the waste stream.

Institutional context

For comprehensive resource recovery, China needs to develop a stronger waste management system and market for recyclables. It has been inhibited largely by weak institutional arrangements and insufficient investments in waste management technologies and infrastructure.

From a policy perspective, in 2004, the National People's Congress (NPC) passed the national Solid Waste Pollution Prevention and Control Law. This law focuses on supervision, management and pollution prevention, and regulates dumping, collection, transport, reuse/recycling and disposal of municipal solid waste.

In 2009, the Chinese government adopted a "reduce, reuse, and recycle" (3R) strategy, through its Circular Economy Promotion Law. The law aims to promote simultaneous economic growth and resource efficiency and reduced pollution. It has also adopted an experimental approach to testing domestic waste separation through the establishment of pilot or model cities, including Beijing, Shanghai, Guangzhou, and Hangzhou. Results from these pilot projects, however, remain low because of a lack of comprehensive recycling systems and infrastructure, and low public awareness and participation.

as well as recyclables diverted, in addition to the quantity of household hazardous waste diverted.

The incentive payment would also be subject to a ceiling, known as the Potential Neighborhood Incentive (PNI). The PNI is the maximum amount that an NRC can earn if it were to achieve the maximum score of 100. For Ningbo, the PNI should be set at less than the savings in disposal costs that the municipal government would achieve resulting from the separation of the waste. At the discretion of the municipal government, the value of the PNI is determined at the start of the evaluation period and could be steadily decreased before each cycle in order to gradually phase out the incentive program. In order to ensure a minimum level of quality and quantity of source-separated waste, a minimum score (MS) would be established before any incentive would be paid.

The amount of funds available for the incentive payments in Ningbo is US\$4.54 million, funded out of the IBRD loan for the Ningbo project. Each NRC would determine for itself how to use the incentive payment, which would be received by the NRC as a grant from the municipal government.

4.5 Implementation

Each program cycle in Ningbo would be six months long, with two cycles a year. The program cycle can be summarized as follows:

- a. The Ningbo Municipal Project Management Office (NMPMO) is responsible for the overall implementation, coordination, and oversight of the neighborhood incentive program. At the beginning of a cycle, the NMPMO would officially announce the start of the evaluation period, along with the PNI and minimum score required.
- b. NRCs would formally express their interest to participate at least 15 days prior to the start of the evaluation cycle.
- c. The evaluation period starts in the second month and ends in the fifth month. In these four months, the district-level Project Implementation Units (PIUs) would collect data on waste quantities and make random neighborhood visits for physical inspection to determine the waste quality. NRCs would be visited at least once per month. Final quality scores would be based on the average scores assigned during each visit, and quantity scores would be the sum of the quantities recorded during the site visits.
- d. The PIUs would publish mid-term scorecards in order to give the NRCs an indication of how they are performing.
- e. At the end of the evaluation period, the PIC would calculate the final scores and the amount of incentive for each NRC. The PIU reports would be reviewed by the Ningbo Municipal Solid Waste Separation Management Office (SWSMO), which oversees and coordinates the activities of the PIUs. The PIU reports are compiled into a single report that is submitted to the NMPMO within three weeks of the completion of the evaluation period.
- f. Within a week of the SWSMO submission, the NMPMO reviews and approves the report and transmits it to the municipal government for payment.
- g. The results are publicly announced concurrently with the opening of the next cycle.

4.6 Lessons Learned

Incentive payments schemes for behavior change require complementary activities in education, outreach, and advocacy. Strong local ownership of these activities helps build community buy-in and participation. In Ningbo, participating districts and NRCs of the pilot projects organized stand-alone publicity campaigns and created their own promotional materials for dissemination. Stakeholder trainings were provided to waste separation inspectors, instructors, volunteers, and residents. Mass media --ranging from local television, radio, newspapers, and signage in public areas-- was employed. Some communities also conducted their own baseline surveys of to guide the project's roll-out. The Ningbo RBF project began implementation in July 2013, covering initially 6,760 households and 50,000 by March 2014.

Recyclables that are successfully separated by households may not make it as anticipated to their final collection point. This unexpected diversion means that the waste cannot be properly measured and evaluated. The pilot projects in Ningbo show that household-separated recyclables were deposited at neighborhood collection points. However, these sites attracted private waste recyclers that would take the recyclables to independently sell them. While the end goal of recycling was presumably achieved, the waste was not successfully measured for calculation of an incentive payment and, consequently, the municipality is not making the anticipated profit from the sale of recyclables. A future design element should include some mechanism such as locked collection points.

The scores that neighborhoods receive are a function of the theoretical waste composition (expected proportions

of food and recyclable waste in the total waste generated).

The project used estimates of waste composition but it would be more accurate to have real data. The project assumes that food waste is 50 percent of total waste, and that recyclables are 10 percent. Although more labor intensive, it would be helpful to conduct a waste characterization study for the participating pilot projects. From this lesson, advance waste characterization studies were conducted for a similar project in Penang, Malaysia.

Large-scale separation of organic waste may not always be achieved by monetary incentives and education because behavior change is complex and often can take time. In Ningbo, despite the financial incentives provided to communities and the education and outreach performed by NRCs, the scale of the waste separation is still moderate. As of March 2014, the participation rate was only 50,000 households whereas the target by the end of 2014 is 178,000.

Penang, Malaysia**4.7 Introduction**

Malaysia is predominantly an urban country, with almost 75 percent of its citizens living in cities. The World Bank classifies Malaysia as an upper-middle income country; compared to the other countries in this report, Malaysia ranks high in the provision of sanitation facilities to its residents. This case study focuses on one particular area, Penang, which is one of the most developed and economically important states, in addition to being a popular tourist destination in Malaysia. The state of Penang consists of Penang Island and an adjacent area of the mainland, located in the north-west of Peninsular Malaysia near the northern end of the Strait of Malacca. On the island, the Penang Island Municipal Council (MPPP) manages an area of 297 sq km with a population of over 700,000 people. Seberang Perai on the mainland has over 868,000 people in an area of 738 sq km, managed by the Seberang Perai Municipal Council (MPSP).



PENANG'S WASTE IS 40 TO 60% ORGANIC. DISPOSAL OF ORGANIC WASTE IN LANDFILLS GENERATES METHANE, A POTENT GREENHOUSE GAS THAT CONTRIBUTES TO GLOBAL WARMING.

MALAYSIA

Incentive payments catalyze organic waste diversion from landfills.

4.8 The Broader Context of World Bank Support

The World Bank has not had investment projects in Malaysia in over a decade. However, the Bank has provided technical assistance to Penang for RBF in solid waste, under the auspices of the CCAC to Reduce Short-lived Climate Pollutants (SLCPs). CCAC is a coalition of countries and non-state partners formed to catalyze actions to reduce SLCPs in various sectors including solid waste, thereby improving public health, food and energy security, and mitigating climate change in the near- to long-term.

In 2013, Penang became a participating city within the solid waste initiative of CCAC. UNEP, as a lead partner in CCAC, undertook an assessment to identify opportunities to reduce SLCPs in the waste sector in Penang. An action plan for SLCP reduction in Penang was prepared as part of its commitment

to the CCAC to develop a comprehensive organic waste management system, encompassing best practices for SWM, capacity building, and identification of appropriate technologies and PPPs in the sector. As part of this plan, an output-based program to incentivize source separation was envisioned, in order to maximize the quality and quantity of separated organic waste, in the context of Penang's organic waste policy adopted in 2012 which aims to divert as much organic waste as possible from its landfill.

4.9 The Problem Statement

The largest fraction of waste going to the landfill in Penang comprises organic matter, such as food and garden waste. Available data indicate that almost half of the organic waste in Penang Island originates from high-rise residential buildings, so persuading residents in these buildings to segregate their waste into organic and recyclables would go a long way in

Box 4.4: The Solid Waste Sector in Malaysia

Waste generation, collection and disposal

Malaysia's current rate of urbanization is about 75 percent. In 2005, with a population of 26.6 million, the country generated about 19,000 tons per day. In 2012, with a population of 28.3 million, it generated 33,000 tons per day (over 12 million tons per year). Much of this is waste is municipal solid waste, driven by urbanization, increasing income levels, and changing consumption patterns that accompany the country's development. Its waste composition today consists of roughly 45 percent food waste, 24 percent plastic, 7 percent paper, 6 percent metals, 3 percent glass, and 15 percent other materials (2005 data). Among residential waste, the organic fraction is about 51.6 percent of total waste.^{a,b}

Waste is collected and dumped at municipal landfills. Landfills, however, are often controlled dumps that are rapidly filling and in need of upgrading. The country is in the process of building sanitary landfills, closing dumpsites, upgrading others, building incinerators, and considering other technologies. For Penang, all wastes are transported to Pulau Burung Landfill. The landfill is about 33 hectares and will last until 2017. The landfill management is now in the process of expanding the landfill with additional capacity estimated to last another ten years. With the rapid rate of waste generation, another landfill site will soon need to be identified.

Institutional context

Municipal solid waste management falls under the responsibility of the Ministry of Urban Wellbeing, Housing, and Local Government. It supports an integrated national solid waste management policy founded on principles of efficiency, cost-effectiveness, and privatization of services. The policy also emphasizes the importance of environmental conservation and public health. Like other country governments, it supports a 3R approach—through the reduction, use, and recycling of waste materials.

Prior to 2007, state and local government had a much more independent role managing solid waste. In 2007, Act 672 was passed leading to the National Solid Waste Management Department and the increased role of the Malaysian federal government in setting solid waste policies, strategies, plans of action, regulation, and licensing of private service providers. Act 673 (2007) also established the Solid Waste and Public Cleansing Corporation for implementation and enforcement of policies and regulations.

In 2012, Penang issued an Organic Waste Policy with the ambitious goal of diverting 40 percent of organic waste from its landfill by 2015 and all of it by 2020. The implementation of its policy remains nascent and ongoing.

a. Malaysian National Solid Waste Management Department, Ministry of Urban Wellbeing, Housing, and Local Government. Available online at: http://www.kpkt.gov.my/jpspn_en_2013/main.php?Content=articles&ArticleID=43&IID=

b. Dato' Seri Arpah Abdul Razak, *Solid Waste Management in Malaysia: the Way Forward* presentation at the 2013 International Solid Waste Association World Congress. Available online at: http://www.iswa2013.org/uploads/ISWA2013_ARPAH_presentation_333_EN.pdf

achieving the goals of Penang’s organic waste policy. Diverting organic waste from being disposed into landfill would prolong the service life of the landfill, reducing the costs of solid waste management, and contributing to climate change mitigation by reducing the amount of methane, a potent greenhouse gas.

4.10 The RBF Approach

The basic RBF approach for Penang is based on the approach taken in Ningbo. However, the design for Penang differs in some important ways from Ningbo. First, the basic unit for promoting waste separation in Ningbo is the NRC which can comprise multiple residential buildings, while in Penang it is the management committees of individual high-rise residential buildings. Additionally the program in Penang focuses on organic waste separation, and does not specifically target recycling as a separate waste stream.

4.10.1 Defining and Measuring Results

The ‘outputs’ for the Penang’s program are defined as the quantity of the organic waste fraction, subject to a quality (purity) requirement depending on the specific organic waste processing technology in use in each location in Penang. The program in Penang would work with each high-rise property that has a management committee. Performance would be measured based on the outputs of each building. To begin with, the program would be piloted at six sites across Penang and, if successful, could eventually be scaled-up to operate city-wide.

4.10.2 Financing

At the time of writing, the program in Penang had not yet begun implementation, and the Penang state government and municipal councils had yet to determine the amounts of the incentive payments that would be offered to participating high-rise buildings. However, it has been agreed in principle that the amounts of the incentives would not exceed the cost savings that would be realized by the municipal councils resulting from organic waste separation – by comparison, the average cost of collection, transport and disposal of solid waste in Penang is in excess of MYR 100 (approximately US\$30) per ton.

4.11 Key Risks and Sustainability in Ningbo and Penang

At the outset, the design of the incentive program would seem likely to be a successful approach given the financial benefit awarded to residents for segregating their waste. However, this leads to an obvious risk: would the program be sustainable if the financial incentive is withdrawn? In addition, what if the incentive payments are set too low to make a significant impact on households’ behavior towards waste segregation (i.e., is it the financial incentive or some other goal which encourages households to separate their waste)? One option here would be to encourage NRCs to use the incentive payments received towards the whole community (e.g., funding a festival, upgrading a children’s playground), instead of distributing the proceeds among individual households. This would show households the benefit to the wider community; however, it might also make households consider segregation as a public good where their individual participation would not make a significant impact.

Another risk is related to the subjectivity of the verification process. Guidelines for the visual inspections of the quality of the separated waste are provided for the verification process. Nevertheless, assessments of quality still involve a subjective component. Keeping this in mind, the designers of the project also provide an alternative method, based on measuring separated waste at recycling and anaerobic digestion facilities, to calculate the quality of the recyclable and organic fractions, respectively. However, this would require constant weighing of the segregated material as well as the unwanted material after it has been separated for each NRC. This would not only be time consuming but may also be imprecise if wastes get mixed up.

Finally, the waste source targeted for the incentive scheme is the household. However, many commercial institutions such as schools, restaurants, and malls, generate waste that could benefit from source segregation. Source separation at these establishments is also important as the waste generated by them can be significant.

5. Indonesia: Expanding and Replicating Waste Banks in Tangerang, Balikpapan, and Manado

Box 5.1: RBF in Indonesia's MSW Sector "At-a-Glance"

Solid Waste Situation. In Indonesia, waste banks are community-level intermediaries between household producers of waste and buyers of recyclable wastes. Households separate their waste and bring it to "deposit" into individual accounts at a local waste bank. Waste bank operators sell aggregated deposits to brokers, and return part of the sale proceeds to depositors in the form of cash, in-kind goods, or other services.

Problem Statement. Many households do not recycle their wastes. Of residential waste in the participating cities of Tangerang, Balikpapan, and Manado, about 25 percent is recyclable, but much less is actually recycled.

Design Solution. In this context, the RBF approach is applied to motivate behavior-change and encourage households to recycle wastes using local waste banks. "Incentive payments" (i.e., cash awards) are given to the participating cities if they successfully achieve a minimum percentage of household participation (participation rate) and waste banks operate according to pre-determined criteria. The incentive payments to the city are then devolved for local community development projects. There are three tiers of "participation rate"; pending other criteria, if a city achieves a higher participation rate, it qualifies for a larger incentive payment.

There are three stages for verification spread approximately over three years. Stage one measures planning, implementation, and early operations of waste banks; stage two measures waste banks' growth in operations; and stage three measures maturation and sustainability in operations.

5.1 Introduction

Population growth in Indonesia's urban areas is putting an unprecedented amount of stress on urban governance and infrastructure. Half of the country's population currently lives in cities (over 125 million people) and this is projected to rise to 65 percent by 2025 (178 million people).^{6,7} The existing urban population generates about 97,000 tons of solid waste per day, out of which only 39,000 tons per day (40 percent) is

collected and transferred to landfills.⁸ Over this same period, per capita solid waste generation is expected to rise from 0.52 to 0.85 kg/capita/day.⁹

Poor waste collection and disposal results in environmental pollution and hazards to public health. Open dumping and burning deteriorates air quality. Health risks rise from the air pollution, but also from poor sanitation and uncontrolled leachate that contaminates surface and groundwater. Unmanaged waste also frequently blocks drainage systems and worsens flooding. Even when collected and transported,

6 International Bank for Reconstruction and Development Project Appraisal Document: Solid Waste Management Improvement Project for Regional and Metropolitan Cities (March 1, 2014).

7 "Issues and Dynamics: Urban Systems in Developing East Asia", Urbanization Dynamics and Policy Frameworks in Developing East Asia, East Asia Infrastructure Department, World Bank. Available online at: <http://siteresources.worldbank.org/INTEAPREGTOPURB-DEV/Resources/Indonesia-Urbanisation.pdf>

8 Irma Setiono, "Coordination and socialisation have proved to be key factors in making output-based aid effective", *Prakarsa: Journal of Indonesia Infrastructure Initiative*, Issue 12, October 2012. Available online at http://www.indii.co.id/upload_file/201210121451540.Prakarsa%20Oct%202012%20ENG%20full-colour%20sm.pdf

9 Daniel Hoornweg and Perinaz Bhada-Tata. *What a Waste: A Global Review of Solid Waste Management*, World Bank Urban Development Series Knowledge Papers, March 2012, No.15. Available online at: http://www.wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/07/25/000333037_20120725004131/Rendered/PDF/681350WP0REVISOat0a0Waste20120Final.pdf



HOUSEHOLDS SEPARATE THEIR WASTE AND BRING IT TO “DEPOSIT” INTO INDIVIDUAL ACCOUNTS AT LOCAL WASTE BANKS. WASTE BANK OPERATORS SELL AGGREGATED DEPOSITS TO BROKERS AND RETURN PART OF THE SALE PROCEEDS TO DEPOSITORS IN THE FORM OF CASH, IN-KIND GOODS, OR OTHER SERVICES.

INDONESIA

RBF can encourage more households to recycle using local waste banks.

waste in dumpsites and landfills contributes to greenhouse gas emissions.

5.2 The Broader Context of World Bank Support

Work on the RBF approach in Indonesia was undertaken within the framework of preparation of the Solid Waste Management Improvement Project for Regional and Metropolitan Cities in Indonesia, which the World Bank had been preparing with the Ministry of Public Works. The development objective is to support improvements to SWM systems and services to residents, in participating cities, through selective interventions in waste minimization, separation, treatment and disposal. The project consists of three components: improvements in SWM systems, implementation support and advisory services,

and social development. The project was to have invested up to US\$100 million for improvements to the SWM systems in three cities (kota): Balikpapan, Tangerang and Manado. However, at the time of finalization of this report, preparation of the investment project had been dropped from the Bank's pipeline of projects in Indonesia.

5.3 The Problem Statement

Rates of household waste separation and community recycling awareness remain low in Indonesia and thus contribute to the country's broader problem of SWM. One avenue to encourage household-level waste separation and recycling is through waste banks ("bank sampah" in Bahasa Indonesia). In lower income communities in Indonesia, waste banks serve as community-level intermediaries between household producers

Box 5.2: The Solid Waste Sector in Indonesia

Waste generation, collection and disposal

Approximately 125 million people (or half of Indonesia's population) live and work in urban areas. Collectively, they generate about 97,000 tons of solid waste per day. Of this, only about 40 percent (39,000 tons per day) is collected, transferred to temporary disposal sites, and then ultimately transferred to landfills.

Landfills are of varying quality and size; most are being rapidly filled such that without expansion or a reduction in waste, they will quickly be saturated. In Balikpapan, Manggar was designed and constructed as a sanitary landfill; however, now it is being operated as a controlled landfill since it fails to meet the national guidelines for sanitary landfills. It is 25.1 hectares but undergoing expansion because of it is quickly being filled. In Tangerang, Rawa Kucing is really only a dumpsite with no leachate management system onsite. It is located dangerously close to drinking wells and a river downstream, and 20 of its 34.8 hectares are already filled. In Manado, Sumompo is the city's main landfill and its 7.5 hectares are now almost full.

Around 60 percent of urban waste (or 58,000 tons per day) is simply not collected. Instead, it frequently is informally dumped or burned, which results in environmental degradation and risks to population health. Indonesia is home to frequent flooding – and urban areas are affected by this most visibly along roadways that become dangerous and unpassable. Solid waste that is not disposed of properly exacerbates flooding by blocking drainage and sewerage systems.

Institutional context

The Indonesian government established Waste Law No. 18/2008 to explicitly support a "3R" strategy of waste reduction, reuse, and recycling. The law articulates a policy of household waste handling to include waste separation and integrated waste management. The Ministry of Public Works (PU) maintains a budget of block grants to help local governments achieve the objectives of this law. Nevertheless, recycling rates remain quite low.

The Ministry of Environment promotes waste banks as a key part of the 3R strategy. In 2012, it added waste banks as part of their criteria for the aforementioned Adipura award competition for "Green and Clean Cities" (Permen LH No. 28/2012). Also in 2012, it issued a set of guidelines and regulations (Permen LH No. 13/2012) to oversee the development of waste banks that, to date, have generally arisen in an uncoordinated and unregulated fashion. The regulations demonstrate a national interest in waste banks but their requirements may not match the reality of waste banks in local communities and may not, in fact, be necessary to achieve the ultimate goal of increased household separation of waste and recycling.

The Ministry of Environment plays a strong role in solid waste management at a more local level as well. However, as with many local public services, responsibilities, mandates, and budgets are fractured across different departments. There is a need for greater coordination between the Cleansing and Sanitation Departments (Dinas Kebersihan Kota), the Department of Public Works (Dinas PU Kota), the Regional Development Planning Board (Bappeda), and the Environmental Management Agency (BPLHD).

Figure 5.1: Waste Bank Operational Model In Indonesia

Source: World Bank field research (2014) and the Unilever Foundation Waste Bank System guidebook (2013)

of waste and buyers of recyclable wastes. Households separate their waste and bring it to “deposit” into individual accounts at the local waste bank. Waste bank operators sell aggregated deposits to brokers, and return part of the sale proceeds to depositors in the form of cash, in-kind goods, or other services. The remainder of sale proceeds is, in turn, used to finance the waste bank’s on-going operations. Figure 5.1 summarizes the basic operational model of waste banks.

Waste banks in Indonesia have shown some early success. However, much potential remains to be realized both in terms of the number of available waste banks and the performance of each one. Of those that exist, many only service a small number of depositors and a small amount of recyclables. The low number of waste banks is due to a scarcity of coordinated knowledge-transfer to help new communities’ set-up and operate waste banks. The performance of waste banks is tied to a variety of factors including a generalized lack of awareness or indifference and the age-old problem of moral hazard in economic theory. Noticeably, the individual (household-level) economic incentive from recycling is insufficient to motivate increased participation.

5.4 The RBF Approach

The design of an RBF approach for waste banks in Indonesia intends to catalyze household waste separation and community recycling awareness through the waste bank model. Unlike other waste projects that focus on built infrastructure, the immediate objective in this case is behavior change. This objective is evaluated against concrete results from waste bank performance, and provides incentive payments for measurable behavior change.

5.4.1 Defining and Measuring Results

The performance criteria used to measure results for waste banks are structured into three stages. City governments will be expected to increase available baseline data on city waste banks and to provide fora for waste bank capacity building. Results will also be expected from the community-level waste banks themselves: waste banks will be assessed against pre-established performance metrics related to operations and management, community participation, and sustainability. The stages, and the performance criteria within them, are summarized in Box 5.3.

Box 5.3: Outputs and Indicators for the Indonesia Project**Stage 1: Planning, Implementation, and Early Operations**

- a. The city provides an enumerated list of all existing waste banks with the number of opened accounts at each one.
- b. The city provides attendance sheets for a minimum of three meetings held by a city-wide Bank Sampah Association.
- c. At least 50 percent of all existing waste banks (according to the enumerated, item (a) above) have attended at least one of the Bank Sampah Association meetings.
- d. The city provides an enumerated list of all waste banks in the scheme (waste banks in existence at the beginning of this stage plus communities targeted for waste banks).
- e. Each waste bank has the minimum equipment for operations including a weighing scale, a master account book, and individual account books for each depositor.
- f. Each waste bank meets minimum data collection criteria (provided in a checklist).
- g. Each account-holder's name is associated with at least one deposit (to open an account, a deposit must be made).
- h. Across all waste banks in the city, the aggregate number of opened accounts is greater than or equal to 10 percent of the total number of households in the city.

Stage 2: Growth in Operations

- a. Across all the waste banks in the city, the aggregate number of opened accounts is greater than or equal to 20 percent of the total number of households in the city.
- b. Each waste bank shows a minimum collection of an average of 1 kg per household per month.
- c. Each waste bank has receipts from brokers (buyers of recyclables) that demonstrate that the amount sold equals at least 80 percent of the total amounts deposited.

Stage 3: Maturation and Sustainability in Operations

- a. Each waste bank shows a minimum collection of an average of 2 kg per household per month.
- b. Each waste bank has receipts from brokers (buyers of recyclables) that demonstrate that the amount sold equals at least 80 percent of the total amounts deposited.
- c. Each waste bank shows that at least 80 percent of account-holders are active, meaning having deposited at least once every two months during this twelve-month stage.

The performance criteria, as designed, are somewhat complex. Firstly, they are staged—and failure to meet Stage 1 criteria precludes progression to Stages 2 and 3. Secondly, the criteria involve percentages which thus assume assessment of performance against some baseline data, which is a moving target. Thirdly, multiple actors are assessed: the city government and the waste bank management, and more indirectly through waste bank management, individual account-holders and brokers. In designing this RBF approach, there was a frequent and difficult tradeoff between the significance of the indicator and ease of measurement (see Box 5.4).

It is also evident from Box 5.3 that several of the performance criteria in Stage 1 are, in fact, inputs. The decision to include these was two-fold: there was a need to generate some baseline data against which future performance metrics would be assessed; moreover, there was a desire to guide the waste banks according to what the design team found were ingredients for success. As a whole, however, the design aligns with a results-based approach that rewards outputs and outcomes.

Box 5.4: Simplifying Verification through Random Sampling and a Sequential “One-Out” Rule

In this scheme’s design, there is the frequent and difficult tradeoff between an indicator’s significance and its ease of measurement. The scheme was designed such that if the results are not meaningful, then the whole results-based approach becomes nullified. As a consequence of this prioritization, the verification procedures for this scheme are complex.

For monitoring and verification, the scheme attempts to simplify procedures (and therefore the associated transaction time and costs) wherever possible.

Firstly, instead of having the IVA verify every waste bank or every account-holder (which could be hundreds), the IVA will take a random sample. In Stage 1, if the city shows that it has a city-wide participation rate of 10 percent from its list of account holders, the IVA will verify this by using a random 10 percent sample of waste banks (subject to a minimum of 10 and a maximum of 25). The performance eligibility criterion is that 90 percent of account-holders have to be verified as true within the sample.

Secondly, the verification procedure aims to simplify with a sequential “one-out” rule on the Master Scorecards. Each city must answer affirmatively to 100 percent of the questions in the Master Scorecards. Therefore, the Master Scorecard questions are listed in order of verification difficulty and if the city fails one question, then it has already not passed the entire stage, and there is no need to continue verification of the other criteria. For example, in Master Scorecard 1, there are questions A through G. If the city answers question C incorrectly, the IVA may save valuable time and not continue with questions D through G.

5.4.2 Financing

The scheme’s financial award is not based on subsidies. This is primarily because unlike other schemes that are based on service delivery or infrastructure, there are no significant costs to be subsidized or reimbursed. Therefore, without an input-cost against which to anchor the award, it is quite difficult to determine what particular amount to give.

The scheme, instead, adopts a model of “incentive payments” (i.e., cash awards) that are tied to a pre-determined total budget. In other words, an approximate total amount for incentive payments is budgeted up-front based on 20 percent of current municipal SWM operations and maintenance (O&M) expenditures. Based on current data in participating cities, Tangerang potentially receives US\$780,000; Balikpapan US\$660,000; and Manado US\$480,000. In sum, the budget for incentive payments is US\$1,920,000 and another US\$500,000 is allotted to support verification of performance. The sums budgeted for each city are then allocated across the temporal stages for each city: 10 percent in Stage 1, 40 percent in Stage 2, and 50 percent in Stage 3, thus creating an additional incentive for continuous improvement in waste bank performance over time.

5.5 Implementation

Each city participating in the scheme has approximately three years for full implementation and verification of performance. Because each city may choose a moderately different start date and apply for re-verification, the entire scheme for all three cities is likely to run for between four and five years. The scheme is divided into three stages for verification by an IVA. These stages (see Box 5.3) are purely for verification; ambitious cities may, of course, choose to progress to higher operational levels before the designated verification dates. Regardless, the verification dates and performance eligibility criteria remain fixed.¹⁰

5.6 Key Risks

There are a few risks associated with the design of this kind of financial reward. Firstly, there is the question of whether the full budget (20 percent of municipal SWM O&M expenditures) is significant enough to encourage city participation. What

¹⁰ At the time of finalization of this report, actual implementation of this scheme is uncertain, as preparation of the overall World Bank investment project had been dropped from the Bank’s pipeline of projects in Indonesia.

amount is truly meaningful to the cities? This is especially the case when the probability of achieving this complete budget is not one hundred percent. Secondly, there is the question whether the household (the actors) will be sensitive to an award that is distributed at the city-level, in effect several degrees removed from their personal and community interests.

The scheme design assumes that 20 percent of municipal SWM O&M expenditures represents a significant amount to cities. At the same time, it recognizes that this is merely a budgeted available amount and that cities may only achieve 75 percent of it. This design is chosen in order to mitigate risks of an over-commitment of funds. The design team deliberately chose to prioritize the concern of spending within a limited budget even if this means that the financial incentive to cities is lower.

To address the second risk of whether households will be sensitive to the awards given to city governments, the scheme requires that the financial awards be used for local community development projects and strongly recommends that cities set tangible, salient, and realistic community development goals before the start of the scheme. This is for households to understand what their waste bank participation helps achieve. However, the scheme does not hold cities accountable for this spending and if the spending occurs in one community, another community may not find it sufficiently motivational. The choice to avoid dictating the specific use of funds was based on experience with other projects in Indonesia: there is a need to simplify and limit the bureaucratic and transaction costs that accompany micromanagement; and, there is also a need to respect the autonomy and capacity of the city governments.

5.7 Lessons Learned

Using an incentive payment to induce behavior change assumes that the actor is “price sensitive”; determining price sensitivity and the size of the payment is difficult. This

project tries to incentivize individual household actors, yet the actual incentive payments go to the municipal governments that, in turn, devolve the award through local community development projects. Whether or not the households are sufficiently sensitive to and motivated by these projects is a risk. This choice was made, however, because pooled funds among socially cohesive communities were perceived to provide greater impact (given that individual payments were so small) and, moreover, it would have been logistically difficult to pay individuals.

Incentive payments are best supported with strong education, awareness-building, and “socialization”. These additional tools guide behavior that may be new and unclear to an individual; moreover, they ensure greater sustainability in the behavior change. The incentive payment by itself is unlikely to achieve much success. Community leaders and municipal governments must provide complementary activities to explain how and why to recycle. After the incentive payment scheme ends, this education, and the habit of recycling, can help sustain the behavior into the future.

Waste banks vary in their size, capacity, and operational models. Tangerang, Balikpapan, and Manado are all quite different cities. Without standardization among these actors, and without baseline data related to their existing performance, it is difficult to set meaningful performance indicators. For many RBF designs, there is a clear baseline and a single actor. For example, suppose a specific household does not have a water connection. The actor to change this baseline is a single water utility that delivers this connection in a predictable, uniform way. This project sets indicators lower: in the interest of accommodating many different actors, it chooses a “one-size fits all” model with a level of performance that most should be able to achieve.

RBF TO STRENGTHEN WASTE COLLECTION AND TRANSPORT FOR UNDERSERVED COMMUNITIES

6. Tanzania: Improving Primary and Secondary Waste Collection and Fee Collection in Dar es Salaam

Box 6.1: RBF in Tanzania's MSW Sector "At-a-Glance"

Solid Waste Situation. Over recent years, Dar es Salaam has gone through rapid urbanization to become one of the fastest growing cities in Africa. As a consequence, the quantity of solid waste generated in the city, which was estimated to be 4,200 tpd in 2011, is projected to triple by 2025. The local governments in charge of waste management lack sufficient financial resources to adequately manage the sector and meet the fast growing demand. It is estimated that less than 40 percent of the waste generated is collected and disposed into the Pugu dumpsite. The remaining is disposed into vacant lots or into drainage channels.

Problem Statement. An assessment of the solid waste sector in Dar es Salaam has revealed that primary collection (door-to-door collection to neighborhood collection points) is relatively effective in many communities because residents self-organize to provide door-to-door hand cart collection. The main drawback is the inefficiency of the secondary collection (collection from neighborhood collection points to the dumpsite) and the poor condition of the Pugu dumpsite. The city is also experiencing similar issues related to cost recovery. Most households pay for primary waste collection services but little revenue is generated to pay for the cost of the secondary collection.

Design Solution. In this context, the RBF approach is used to provide a transitional subsidy over a period of time to support the improvement in primary collection within selected low income communities as well as secondary collection city-wide. Payment to hand cart primary collectors is based on an independent assessment of the percentage of households served regularly, improvement in service cost recovery, and proper waste transportation to an approved location. The latter is important to reduce illegal dumping by hand cart collectors. Payment to the municipality for secondary waste collection is based on the percentage of incoming waste removed each day, proof that the waste collected is effectively disposed in a sanitary manner, and the percentage of waste that is recycled and/or diverted for composting.

6.1 Introduction

Dar es Salaam is Tanzania's largest and most important industrial and commercial center with an estimated population of more than 4 million in 2012. Dar es Salaam is an administrative region of the country and is composed of a coordinating Dar es Salaam City Council (DCC) and three physically contiguous Municipal Councils: Kinondoni in the north, Ilala in the center of the region, and Temeke in the south. Together, the four local

governments are commonly referred to as the Dar es Salaam Local Authorities (DLAs).

Dar es Salaam faces a range of challenges, including fragmented governance structures, inadequate financial resources and management, overdependence on transfers from the central government, and a very constrained land and housing market. The city also faces a huge and growing backlog in the provision of basic urban infrastructure such as roads, drainage, and solid



DAR ES SALAAM IS THE FASTEST GROWING CITY IN AFRICA. SOLID WASTE GENERATION IS PROJECTED TO TRIPLE BY 2025. THE LOCAL GOVERNMENTS IN CHARGE OF WASTE MANAGEMENT LACK SUFFICIENT FINANCIAL RESOURCES TO MANAGE THE SECTOR AND MEET GROWING DEMAND.

TANZANIA

RBF can enhance accountability and financial sustainability in the sector.

waste facilities. Solid waste services in general are poor due to increased waste generation without an adequate collection, transport, and disposal system. Flooding is common and persistent, due to storm water drains in poor condition or filled with solid waste.

6.2 The Broader Context of World Bank Support

The World Bank is engaged with the Government of Tanzania to improve urban infrastructure and services in the country, strengthen fiscal decentralization, improve accountability in use of local government resources, and improve management of intergovernmental transfer systems. As part of this partnership, the Dar es Salaam Metropolitan Development Project (DMDP) project is being prepared to: (a) improve municipal and metropolitan management; and (b) deliver urban services in the three Municipal Councils that make up Dar es Salaam. The project will include a number of municipal infrastructure investments including urban roads and drainage systems. SWM is of high relevance to this agenda due to the fact that poor SWM is one of the main causes of flooding in the city. In addition, poor SWM poses a substantial risk to human health and the environment.

The RBF scheme described in this chapter was originally designed as part of DMDP. Due to limitations in the project envelope and the need to prioritize target sectors, solid waste is not currently included in DMDP. This chapter describes the proposed RBF scheme as it was designed as part of the early stages of DMDP preparation.

6.3 The Problem Statement

The main challenge faced by the SW sector in Dar es Salaam is the lack of financial capacity to cope with the growing quantity of solid waste resulting from rapid urbanization of the city. Unlike many cities of similar income level, primary collection (from houses to collection points) in Dar es Salaam is working relatively well in many wards and sub-wards, except for some of the poor areas and slums. Communities generally self-organize to provide basic primary collection either individually, through NGOs, or small private enterprises. These organizations collect fees from residents as compensation for the service provided. The primary collectors generally use rudimentary equipment such as handcarts, which limit the ability of the collector to transport the waste to the final disposal site. As a result, the waste is frequently dumped randomly in nearby streams, drainage channels, or vacant lots.

The other drawback along the collection chain is the serious lack of an efficient secondary solid waste collection system, which is the responsibility of the DLAs. DLAs lack sufficient equipment and financial capacity to adequately perform the service. This inefficiency has transformed most of the collection points into small dumps where open burning is often practiced as a waste reduction measure.

Another important problem with the system is related to financing: the fee charged by primary waste collectors to residents does not flow up to the DLAs for secondary waste collection, which increases the DLAs' financial deficit and increases their dependency on cross-subsidies.

6.4 The RBF Approach

The proposed RBF mechanism provides payments to support solid waste operations for the first few years in a way that it enhances accountability and contributes to a gradual improvement of the financial sustainability of the sector. The payments will be provided at two levels to ensure that all parts of the solid waste value chain that are underperforming are properly incentivized to ensure that the waste is collected and transported to the final disposal site. The subsidies consist of:

- a. A service delivery payment to support improvements in the primary collection system in poor areas and slums. This will be paid to primary waste collection providers in selected wards/sub-wards conditioned to good performance; and
- b. A service delivery payment to support improvements in secondary collection city-wide. This will be paid to the DLAs.

Primary collection is not an issue in most communities. Therefore, the RBF payment for primary collection will be limited to communities in poorer areas of the city where the waste collection service is unreliable due to lack of fee collection or is simply non-existent. These communities will be selected through an income-based mean testing method. In addition, the communities would meet the following basic eligibility criteria:

- Existence of reliable infrastructure and facilities for collection and transport of waste funded through the capital project or through service provider pre-financing;
- Households/neighborhood collection points accessible for waste collection; and
- Demonstrated support from all levels of government.

The service provider (Ward, CBO, or private sector contractor) shall meet the following minimum criteria in order to be certified as a service provider under this program:

- Committed and capable service provider;
- Demonstrated capacity to collect service fees; and
- Trustworthy and transparent accounting system.

6.4.1 Defining and Measuring Results

The outputs and indicators proposed for the Dar es Salaam RBF scheme are as follows:

- Output 1: Payment for Primary Collection
 - Percentage of households served/skipped during a collection event;
 - Percentage of cost recovery; and

- Proof that the waste collected is being delivered to neighborhood collection points (or otherwise diverted for reuse, recycling, or composting).
- Output 2: Payment for Secondary Collection
 - Percentage of waste remaining at the collection point at end of a work day;
 - Proof that the waste collected from neighborhood sites is being disposed in an approved location (or otherwise diverted for reuse, recycling or composting); and
 - Percentage of waste recycled or composted.

The technical scorecard is designed to enable fair and accurate performance assessment. This assessment is done by an Independent Technical Verification Agent (ITVA) and an Independent Fiduciary Agent (IFA).

Box 6.2: The Solid Waste Sector in Tanzania

Waste generation, collection and disposal

It is estimated that approximately 4,200 tpd of solid waste were generated in Dar es Salaam in 2011, and this is projected to increase to over 12,000 tpd by 2025. This tripling of solid waste generation in just 14 years is of particular concern given that the capital and operating budgets of the DLAs are not expected to rise significantly over the same time period.

Less than 40 percent of the total waste generated in the city is collected and disposed in the Pugu dumpsite or otherwise recovered. The remainder is either dumped on the side of roads or into drainage canals, contributing to health problems for local residents, annual flooding events, and methane generation.

In affluent areas of the city, waste is usually collected at curbside from households, commercial establishments, and institutions either by the DLAs or by the private sector and taken directly to the Pugu dump. In less affluent and more congested parts of the city, waste is transported by handcart to neighborhood collection sites or is taken directly to the collection sites by households, where the waste is subsequently picked up by the DLAs or private operators. It is estimated that there are approximately 50 to 60 neighborhood collection sites across the city.

In unplanned areas of the city where wards or community-based organizations (CBOs) have not taken the initiative to collect waste or in areas of the city where collection service is poor, individuals commonly dump their waste into drainage ditches, streams, and by the roadside.

The main disposal site, the Pugu dumpsite was originally intended to operate as a sanitary landfill; however due to budgetary limitations the requirements of such a landfill (e.g., separate cell operations, leachate treatment, landfill gas management, daily soil cover and compaction, and formal perimeter boundaries) have not been implemented. At present, MSW covers a large portion of the 65 hectares approved for the landfill, where open burning of waste is common practice.

Institutional context

Tanzania lacks a single comprehensive legislative framework for the environment. Efforts are underway through a draft of the Environmental Management Act towards an integrated approach to environment policy. Part IX of the draft Act focuses on waste management and assigns local governments the responsibility to manage and minimize solid waste at source, including the use of appropriate waste containers, the commissioning of regular studies on waste quantity and composition, and the establishment of waste transfer and final disposal facilities.

This Act also establishes the National Environmental Management Council (NEMC) as a statutory body to advise and coordinate environmental management issues including evaluating development policies, plans, and activities that could have an impact on the environment. The NEMC is responsible for ensuring that waste management projects meet a reasonable test through Environmental Impact Assessments.

The DLAs have authority under the proposed Environmental Management Act to plan, design, build, establish standards, manage, monitor, evaluate, and report on MSW operations within their respective areas of responsibility. Although the Act is still a draft, local authorities have accepted these responsibilities and have established a basic SWM system for Dar es Salaam consistent with their capacities and available resources.

For verification of primary collection, the process is as follows:

- CBOs, NGOs, Wards and private sector firms perform the primary collection of solid waste using push carts or collection vehicles and deposit the waste at the neighborhood collection points (NCP) or directly at the landfill if feasible.
- In poor neighborhoods participating in the RBF program, the ITVA would verify the performance of the primary collection service providers (using the set of output measures described in earlier sections), which entails data compilation and visual inspection at household level and at the NCPs to ensure that the waste is not dumped randomly in vacant lots or drainage channels.
- The ITVA would issue a report which will be verified and approved by the IFA prior to issuing payment.

For secondary collection, the process is as follows:

- DLAs or their private sector contractor would be responsible for collecting waste from NCPs for disposal into the landfill, a recycling plant or other approved sites.
- The ITVA would verify the regularity of the secondary collection using the set of output measures (described in earlier sections), which entails data compilation and visual inspection at the NCP level and at the final disposal facilities.
- The ITVA would issue a report which will be verified and approved by the IFA prior to issuing payment to the DLA or their private sector service provider.

6.4.2 Financing

The primary collection service is financed through the collection of solid waste fees from households. However, since some residents in these areas will be asked to start paying for the service for the first time, it is expected that the initial rate of collection will be low, but will gradually increase over time. The RBF payment will supplement the revenue stream to ensure that a reliable service is provided starting from Year 1 to increase the willingness to pay. The assumption made is that residents will be willing to pay if the quality of the service is improved. Thus, an affordability and willingness to pay assessment would be necessary to ensure that residents are willing and able to pay for the full cost of the improved service.

A baseline study will be performed to estimate the total cost of the service and set tangible targets for fee collection that the service provider should strive to achieve. The figures related

to the estimated total cost of service are used to calculate the Maximum Payment (MP) in each participating community.

- The actual value of the payment for primary collection is a pro-rated amount of MP based on the total score achieved by the service provider subject to a minimum score, which will be specified before the launch of the program. The MP per year will be calculated and agreed upon during appraisal, taking into consideration the cost to provide reliable secondary collection.
- The actual value of the payment to be paid to DLAs for secondary collection each year will be a pro-rated amount of MP based on the total score achieved by the DLA subject to a minimum score, which will be specified before launch of the program.

6.5 Key Risks

The RBF scheme provides a payment to support primary service improvements. As in the case of both Nepal and the West Bank, gradual improvement in solid waste fee collection is expected to replace the transitional payment over time in order to sustain high-quality service beyond the duration of the RBF scheme. For secondary collection, DLAs will continue to assume a portion of the total cost to provide the service. The proposed scheme incentivizes recycling and composting, which have the potential to divert more than half the waste away from the landfill. This waste diversion, if successfully implemented, will contribute to reducing the overall cost of waste management by reducing the quantity of waste transported to the landfill and providing an additional source of revenue to the DLAs. Waste minimization and diversion is the main avenue by which DLAs will be able to reduce the sector's dependency on cross-subsidies.

There are various risks that go with the assumptions made in the design of this RBF scheme. First, it assumes that as recycling and composting rates increase over time, the cost to collect and transport the waste will be reduced. It is also assumed that the total cost to manage the waste will reduce over time as a result of the municipality having to transport less waste to the landfill, and that the municipality will generate additional revenue from composting and recycling which will offset a portion of the operation and maintenance costs. However, various financial, operational and market risks could affect these assumptions.

Last but not least, the RBF scheme would not be viable unless certain key improvements are first made to the SWM system in

Dar es Salaam, some of which involve significant investments. These are described in Box 6.3.

6.6 Lessons Learned

- **The Efficiency of a solid waste management system should not be defined solely in terms of cleanliness of streets and public areas.** An important aspect of solid waste management in Dar es Salaam is the fact that, aside from poor areas of the city, the primary collection of waste is fairly efficient. Communities are able to self-organize to ensure that the waste is collected and transported away from their residential areas. As a result, major streets, public areas and households appear to be clean and free from litter. However, this apparent cleanliness hides a deeper problem with the collection system. The waste collected through primary collection (handcart collection) is often afterward dumped illegally into vacant lots or drainage channels. Moreover the waste arriving at the NCPs is rarely collected by the local government. As a consequence, NCPs are turning into small dumpsites where open burning is often practiced as a way to reduce the volume of the incoming waste. As an attempt to address these two fundamental issues, the outputs for the primary collection include proof that the waste collected has been taken to an approved location. In addition, the subsidy that is provided to the municipality to support secondary collection is conditioned upon improvements in

secondary collection services.

- **Blending RBF and investment in required equipment and facilities for collection and transport of waste could reduce the risk of cancellation or delays in the implementation of RBF projects.** The RBF scheme for Dar es Salaam was originally designed as part of the World Bank-supported Dar es Salaam Metropolitan Project. Through the DMDP project, it was anticipated that Dar es Salaam will acquire waste collection equipment and facilities as well as upgrade the final disposal facility in Pugu, and the RBF would represent an operational subsidy to support improvements in the collection service and revenue generation. The DMDP project and its solid waste component were delayed, which delayed the entire RBF scheme. This lesson is also applicable to OBA projects funded by GPOBA in the waste sector. So far, the two RBF subsidy projects that GPOBA is implementing in Nepal and West Bank are intended to improve the service and not large solid waste infrastructure such as sanitary landfills or transfer stations. However, these infrastructures are vital for waste collection and transport to become efficient and meet the environmental safeguards. In order to reduce the cancellation of RBF projects, future projects should consider including an investment package for acquisition or rehabilitation of solid waste equipment and facilities to have a significant impact on the solid waste service.

Box 6.3: Conditions Necessary for the Implementation of the RBF Scheme in Dar es Salaam

- **Improvements to the existing collection system.** A large number of communities in Dar es Salaam do not have a waste collection point. In addition, most of the existing collection points are in critical need of improvement to meet minimum health and safety standards. The municipality is in the process of upgrading neighborhood collection sites and constructing new ones. Some of these sites will be equipped with recycling and composting areas to reduce the waste quantities transported for final disposal. The scarcity of land is a major barrier to overcome in many areas, in particular slums and unplanned areas of the city. Having an adequate number of collection points will be necessary to implement the proposed scheme.
- **Construction of waste transfer/material recovery facilities.** One of the biggest difficulties in establishing a cost-effective and efficient waste management collection and transportation system in Dar es Salaam is the travel time from collection points to the Pugu dumpsite. Currently, depending on the time of day, it can take up to two hours for a return trip from certain points in the city to the disposal site. A previous study recommended the construction of three transfer stations in Dar es Salaam to reduce the travel time and transportation cost to the final disposal site.
- **Acquisition of primary and secondary collection equipment.** The waste collection fleet and equipment needs to be upgraded. Typically, RBF requires the service provider to bear the risk by pre-financing equipment. Pre-financing of primary collection equipment may be difficult in some communities.
- **Upgrading the Pugu dumpsite.** Originally designed to be operated as a sanitary landfill, the Pugu site has over the years become a large dumpsite. The rehabilitation of this dumpsite to meet international standards and the World Bank environmental and social safeguard policies is necessary to ensure that the waste collected is disposed in a manner that reduces adverse impact to human health and the environment.

7. Jamaica: Improving Waste Collection, Source Separation, and Community Cleanliness in Inner Cities

Box 7.1: RBF in Jamaica's MSW Sector "At-a-Glance"

Solid Waste Situation. The Kingston Metropolitan Area (KMA) has a population of about 579,137 residents. It generates about 420,000 tons of waste per year. The National Solid Waste Management Authority (NSWMA) is in charge of solid waste collection, but this service is poor due to the authority's inadequate capacity and budget shortfall. Service is notably worse in inner city communities due to an insufficient number of trucks, a lack of storage facilities, and the unplanned nature of these areas.

Problem Statement. There is insufficient and irregular waste collection in inner-city communities. Community and dumpster areas are ill-maintained and unclean. Moreover, waste separation (of recyclables and organic materials from other waste) is limited.

Design Solution. In-kind incentives (waste collection trucks) are given to the NSWMA if they provide sufficient and regular waste collection services. Sufficient collection is defined by visual evaluations of dumpsters to determine if they are less than 75 percent full. Regular collection is defined by comparison of the actual *versus* required number of collection pick-ups. Financial incentives are given to Environmental Wardens and CBOs if separated recyclables and organics meet a targeted weight and if qualitatively, communities and areas around communal waste dumpsters are sufficiently clean. All quality evaluations are conducted visually using pre-established photographs as benchmarks.

The scheme is 36 months long; evaluations are conducted every three months. Subject to their performance, the NSWMA earns a waste truck at year 2 and 5, the Environmental Wardens earn a 10 percent salary bonus every three months, and the CBOs earn between US\$1200 and \$2400 every 6 months.

7.1 Introduction

Jamaica, the largest English speaking country in the Caribbean with a population of 2.7 million in 2011, is an upper-middle income country with a long history of low growth and high public debt. The country's progress on poverty reduction and shared prosperity has been hampered in the recent past due in large part to economic shocks that were amplified by structural weaknesses in the economy. For the past 30 years, real per capita Gross Domestic Product increased at an average of just one percent per annum, making Jamaica one of the slowest growing economies in the world.

Over the same few decades, the island experienced rapid urbanization. As of 2005, 52 percent of Jamaica's population resides in urban areas, an increase of 16.75 percent since 1991.

With an estimated annual increase of 1.31 percent per annum, the urban population of Jamaica is projected to be 1.5 million in 2020 and 1.8 million in 2030.

Many of Jamaica's inner cities are centers of major criminal activity, violence, and social exclusion. Lack of social inclusion and access to basic services in urban areas has additional implications for growth as it leads to inadequate skills, limited job opportunities and low participation rates in the workforce. Based on a 2004 estimate, the cost of violent crime is 4 percent of Jamaica's GDP. During riots in 2010, a community used large uncollected waste items to block police from entering their neighborhood to arrest a well-known drug dealer. Additionally, there have been many instances where waste items were used as weapons against the police.



MANY OF JAMAICA'S INNER CITIES ARE CENTERS OF CRIMINAL ACTIVITY, VIOLENCE, AND SOCIAL EXCLUSION. THIS RESULTS IN LIMITED ACCESS TO BASIC SERVICES THAT CAN HARM GROWTH: IT LEADS TO INADEQUATE SKILLS TRAINING, LIMITED JOB OPPORTUNITIES, AND LOW PARTICIPATION RATES IN THE WORKFORCE.

JAMAICA

In-kind incentives are given for proven waste collection in inner city communities.

7.2 The Broader Context of World Bank Support

The Integrated Community Development Project (ICDP) approved in 2014 builds on a previous urban development and community safety project in Jamaica supported by the World Bank. The US\$42 million loan aims to enhance access to basic urban infrastructure and services, and contribute towards increased community safety in selected economically vulnerable and socially volatile inner city communities. ICDP is designed to help more than 80,000 people in 18 inner city communities live in an improved, healthy and secure environment.

The project comprises the following four components:

- **Component 1: Basic Infrastructure and Access to Services.** This component supports specific infrastructure investments across project communities according to identified community priority plans for civil works.
- **Component 2: Public Safety Enhancement and Alternative Livelihoods.** This component supports the development and roll-out of key programs to enhance public safety and develop alternative employment skills and opportunities.
- **Component 3: Institutional Strengthening for Urban Management and Public Safety.** This component supports institutional strengthening activities and the preparation of strategic policy documents for selected Government of Jamaica entities responsible for issues relating to urban management and crime and violence prevention programs.
- **Component 4: Project Administration.** This component supports the costs associated with program management, including project-related audits, monitoring and evaluation, equipment and training to strengthen the project implementation unit, as well as individual consultancies.

7.3 The Problem Statement

The National Solid Waste Management Authority (NSWMA) is responsible for managing waste on the island. However, due to inadequate capacity and a significant budget shortfall of approximately US\$54M for 2013, it is unable to collect and dispose of waste on the entire island. The problem is particularly worse within inner city communities where collection seldom occurs due to an insufficient number of trucks, lack of storage

facilities within the communities, and the unplanned nature of development in these areas which makes access difficult.

The solid waste management activities under the previous project and for the ICDP include waste infrastructure provision as well as beautification initiatives such as community cleanups and tree plantings. These activities serve to create safe, open and nonthreatening spaces in communities, contributing to reducing crime and violence. A lesson from the previous project was that simple provision of waste infrastructure such as dumpsters and trucks was not sufficient to improve cleanliness in some communities; properly managing waste requires a behavior change. The community has to proactively participate in depositing trash into the dumpsters and keeping their neighborhood clean. This behavior change should happen simultaneously with regular waste collection services; otherwise, the community will not see the value of depositing waste in a dumpster *versus* another area. If NSWMA provides reliable waste collection services, then the community's behavior should be re-enforced and hopefully sustained. The ICDP builds on these lessons learned to enhance community participation and waste collection services through RBF schemes.

7.4 The RBF Approach

Two RBF schemes will be implemented in fifteen communities as a part of ICDP's solid waste management activities—one to incentivize regular and sufficient waste collection and the other to incentivize cleaner neighborhoods. These schemes aim to prove collection services, divert recyclable and compostable waste from the landfill, reduce costs of collecting and transporting waste, and beautify communities to increase safety and ownership of it by community members, thereby reducing crime and violence.

7.4.1 Defining and Measuring Results

Under the first scheme, sufficient waste collection will be measured by the absence of waste in all community dumpsters on a day that NSWMA is required to pick up waste. If each dumpster is less than 75 percent full, then the collection service will be considered sufficient. Regular waste collection will be measured by comparing the actual number of weekly pickups that NSWMA made to the number it agrees on with the community and the Jamaica Social Investment Fund (JSIF). The score will be weighted such that 70 percent of it is based on the sufficient waste collection and 30 percent on the regularity of collection. The expected number of trips per week will differ from community to community. The performance

of NSWMA in each participating community will be assessed by an unbiased independent verification agent appointed for the project. The IVA will randomly evaluate NSWMA once a week on a day that it has agreed to collect waste. The IVA will calculate scores every quarter.

Under the second scheme, both Environmental Wardens and CBOs will be held accountable and evaluated based on how well recyclables and organics are being separated as well as how clean the community and dumpster surroundings are. There is a single shared set of performance criteria for Scheme 2 in each community since Environmental Wardens and the CBO collectively contribute to overall cleanliness and waste management practices. Therefore, both parties get the financial incentive or none of them do. The performance criteria that the Environmental Wardens and CBOs will be evaluated on are both quantitative and qualitative. The diversion of recyclables and organics can be weighed and documented. They will be compared against a target diversion weight for both recyclables and organics which will initially be set at 40 percent of the total weight of recyclables and organics found to be generated in the community from a prior waste audit. The cleanliness of

the community and around dumpsters will require a qualitative assessment from the IVA which will be documented with photographs. Prior to the RBF schemes starting, the IVA will divide each community into ten areas, of which three will be randomly selected each visit for evaluation of cleanliness. This will aid the IVA to randomly assess the cleanliness of each community in a systematic manner. Similarly, the IVA will conduct a visual inspection of each dumpster's surroundings.

7.4.2 Financing

The first scheme entails providing NSWMA with an in-kind incentive consisting of two trucks that would increase NSWMA's fleet and have the longer-term effect of subsidizing collection in select ICDP communities. NSWMA's services will be monitored in the fifteen selected communities over five years. The minimum score they must achieve is 80/100, which requires NSWMA to provide regular and sufficient waste collection services 80 percent of the time. The first truck will be provided at the end of the second year if NSWMA meets the minimum score until that point. The second truck will be provided at the end of the fifth year, again provided

Box 7.2: The Solid Waste Sector in Jamaica

Waste generation, collection and disposal

Studies and surveys undertaken indicate that Jamaicans generate approximately 1.6 million tons of domestic waste annually. Half of this amount originates from the Kingston Metropolitan Area (KMA) alone. In the KMA, households and markets contribute between 50 percent and 70 percent of the waste stream, with the remaining amount generated primarily by industrial, commercial and institutional sources.

It has been estimated that approximately two-thirds of the waste generated in Jamaica is collected. The remaining waste is either dumped in vacant lots, by the roadside or into drainage canals, contributing to major health problems for local residents, flooding and uncontrolled pollution.

There are currently no sanitary landfills in KMA. The Riverton site is located approximately 7.5 km northwest of the Kingston downtown area. The waste collected from various areas of KMA is transported to this dump site for disposal. It is estimated that approximately 60% of the waste stream in the country is ultimately disposed of at the Riverton site which is operated as a dump site. Burning, dust, smoke, odor and vermin problems are frequent at the site.

Institutional context

The National Solid Waste Management Authority was established by Act of Parliament in 2001 with the mandate to "take all such steps as are necessary for the effective management of solid waste in Jamaica in order to safeguard public health, ensure the waste is collected, stored, transported, recycled, reused or disposed of in an environmentally sound manner and to promote safety standards in relations to such waste." The Authority currently collects, treats and disposes of domestic solid waste while simultaneously regulating the sector. This has proven to be difficult given inadequate infrastructure and funding of the NSWMA. Despite NSWMA owning 100 trucks, almost half are non-functional, leading NSWMA to rent 80 units regularly at a cost of US\$8.76 million, annually. The NSWMA is not responsible for the collection, treatment and disposal of commercial, agricultural, industrial or hazardous waste; however, most non-domestic wastes end up at the disposal sites operated by the Authority.

Solid waste services in Jamaica are mainly funded through property taxes. The NSWMA is funded 15 percent from the Consolidated Fund, 80 percent from property taxes, and 5 percent from their own revenue, primarily through commercial collection of waste. Over the last four years the capital budget has ranged from US\$400,000 to zero and NSWMA faced a budget shortfall of US\$54M for 2013.

that NSWMA meets the minimum score. It has the opportunity over the third year to make up for its previous performance if the averaged score over three years is sufficient; otherwise, NSWMA forfeits its right to the first truck by the third year. Provision of trucks to NSWMA as an in-kind contribution under this scheme is, in effect, a contribution to the capital costs that NSWMA would otherwise have to incur. The trucks are an appropriate incentive as they would help NSWMA overcome its fleet shortage. Approximately half of NSWMA's fleet is constantly in repair and it is forced to rent trucks at a high rate to continue operations.

The second scheme will provide financial incentives to Environmental Wardens and CBOs that are directly participating in mobilizing and enforcing cleanliness in their respective communities. The financial incentives for both Environmental Wardens and CBOs differ. The Environmental Wardens will receive a fixed 10 percent of their salary, which is minimum wage, if they achieve the minimum score of 70/100. On the other hand, CBOs have a scalable incentive which starts at US\$1200 for achieving 70/100 and scales up to a maximum of US\$2400 per year for achieving 100/100. There could be a potential misalignment given that both Environmental Wardens and CBOs are evaluated based on a single set of criteria; however, Environmental Wardens will not receive a higher financial incentive if they work harder than what is required to achieve the minimum score. Any additional outreach and enforcement to improve the community would be due to internal motivation.

7.5 Implementation

The fifteen selected communities will be phased into the RBF schemes starting with three communities in the first year, six in the second and six in the third. The communities will be a mix of communities from the previous and current project, based mostly on whether infrastructure and collection services are in place. These fifteen communities will receive the RBF incentive for three years. The RBF incentives (approximately US\$425,000) will be disbursed over these five years if the

service providers meet the pre-determined performance standards.

Each participating community will have a one month grace period to allow everyone to get into a routine when a scheme begins in a community. The IVA will summarize the scores and recommendations as well as submit scorecards to JSIF quarterly. If they meet the minimum score, the Environmental Wardens will receive their financial incentive quarterly, the CBOs will have their financial incentive accrued at JSIF semi-annually, and NSWMA will receive a truck at the end of the second year and fifth year of the schemes.

The Jamaica Social Investment Fund, a part of the Government of Jamaica, works in the beneficiary neighborhoods and will be overseeing the RBF schemes, including disbursements. JSIF will review the scorecards, notify the World Bank of the required disbursement amounts, and make appropriate disbursements as needed within two weeks of receiving the funds. JSIF will also inform the participants of their scores every three months. The purpose of the quarterly scorecard is to give participants an indication of how they are performing and encourage them to strive towards a higher score.

NSWMA will be expected to cover the service cost through revenue from property tax allocation. The trend in the waste quantities is expected to stabilize and potentially decrease over time as frequent waste collection patterns are established and communities take responsibility for disposing of waste properly and diverting recyclables and organics.

If the Environmental Wardens program proves successful over the project, it is the hope that NSWMA finds it economically efficient to absorb the wardens as employees. This could make the incentive model financially sustainable in the long term, and NSWMA and JSIF may elect to sustain, replicate and scale up the model in additional communities beyond the ICDP project.

7.6 Key Risks

The main risks to the program include inadequate participation of those involved in the schemes that could lead to underperformance or collusion, inappropriate evaluation

methods that potentially misrepresent the results, misalignment of incentives, administrative delays and lack of behavior change beyond the life of the schemes.

The risk of underperformance or collusion will be mitigated by the presence of JSIF in the selected communities. JSIF will oversee the schemes and see how the CBOs, Environmental Wardens, NSWMA, and the IVA are performing. JSIF has the authority to dismiss and replace Environmental Wardens and the IVA if they are not fulfilling their responsibilities. They also have the ability, with the approval of the World Bank, to change the selected communities if there is sustained underperformance. Additionally, given CBOs' likely strong interest to ensure that the Environmental Wardens, NSWMA, and the IVA are performing in order to improve their community, JSIF will also rely on the CBOs to report any anomalies in performance.

There is a risk of misrepresented results for both the qualitative and quantitative evaluation methods. This risk will be partially mitigated since the IVA should take photos of randomly selected areas in each community prior to documenting a cleanliness score. However, it is possible that the IVA can be selective about which parts of each area are photographed to misrepresent the overall area cleanliness. For example, if there is an area that is generally dirty but one part happens to be clean, then the IVA can photograph the clean area to help the Environmental Wardens and CBOs get their financial incentive. By dividing each community into ten smaller areas, the intention is that the IVA will have less of a chance of misrepresenting an area. However, there is a risk for misleading the JSIF.

There is a risk of misaligned incentives for Environmental Wardens and CBOs. The Environmental Wardens have a fixed incentive whereas CBOs have a scalable incentive so Environmental Wardens do not have a financial incentive to work harder than necessary to achieve the minimum score. This misalignment of incentives has the potential to generate inefficient results.

Lastly, there is a sustainability risk that the behavior changes that these schemes are inducing might not last beyond the life of the schemes. The schemes have been designed to instill consistent waste management practices in the communities

and NSWMA to create a more positive cycle. However, it is possible that once the Environmental Wardens are no longer employed, that the communities stop taking ownership over their waste management and community cleanliness. Given that the schemes will be for three years in each neighborhood, the hope is that this is sufficient time to create behavior change although a small risk will always exist.

7.7 Lessons Learned

- **When identifying initial pilot communities, it is helpful to select those that have existing waste collection infrastructure and strong CBOs.** Minimum waste collection infrastructure guarantees that the pilot is testing—as much as possible—the effectiveness of the incentives (the independent variables) over another variable like the existence of a waste dumpster. Having strong CBOs helps develop greater local buy-in and participation. Moreover, strong CBOs are more likely to participate in the initial design of the project and provide critical feedback on the feasibility of achieving evaluation criteria and the meaningfulness of the incentive payments.
- **Aligning incentives can help strengthen community networks that are critical to the overall goal.** The Environmental Wardens and the CBOs are evaluated on the same criteria—the quantity of separated organic materials and recyclables, and the cleanliness of their communities—even though their payments are different. By having the same goal, their activities are necessarily cooperative and reinforced.
- **When designing the evaluation of performance outputs, special attention should be given to prevent possible collusion.** With any RBF project, regardless of having an independent verification agent or not, there is always potential that actors may attempt to misrepresent outputs or performance. In Jamaica's project design, actors could always increase the weight of their recyclables or organics artificially. For quality assessments, if the evaluations are not sufficiently randomized, actors could anticipate which areas are evaluated and thus focus their energies on these at the neglect of others.

8. Mali: Improving the Reliability and Financial Sustainability of SWM Services in Sikasso

Box 8.1: RBF in Mali's MSW Sector "At-a-Glance"

Solid Waste Situation. Sikasso is Mali's second largest city with a population of 225,000. In 2012, the city generated 46,770 tons of waste, and this quantity is projected to increase to 59,127 tons by 2017. Sikasso is one of the few cities in Western Africa equipped with a state-of-the-art sanitary landfill, built in 2002 with the assistance of the Belgian government.

Problem Statement. Despite the large investment in a modern sanitary landfill, there was no significant improvement in the collection service. The rate of households waste collected and transported to the new sanitary landfill was about 25 percent. The remainder of the waste was disposed into illegal dumpsites or storm water drains. The main contributing factor to this inefficiency was the lack of a sustainable revenue stream for the city to manage solid waste.

Design Solution. In this context, an OBA subsidy project was proposed in 2010 to improve the reliability of the solid waste service and introduce a solid waste tax to enable the municipality to contract with a private sector firm to provide collection service and management of the sanitary landfill.

Under the proposed OBA project, the disbursement of OBA funds were to be made based on an independent assessment of two categories of outputs: (a) the amount of funds collected from the Solid Waste Tax that are transferred to a special account; and (b) the quantity of solid waste delivered and disposed at the landfill.

The OBA pilot project was originally designed to support an IDA operation, the Strategy for the Development of the Cities of Mali (SDCM). Although the existence of the sanitary landfill in Sikasso and the low rate of waste collection made RBF appealing, the IDA urban project did not include a solid waste component in the end, and the OBA project was subsequently dropped.

8.1 Introduction

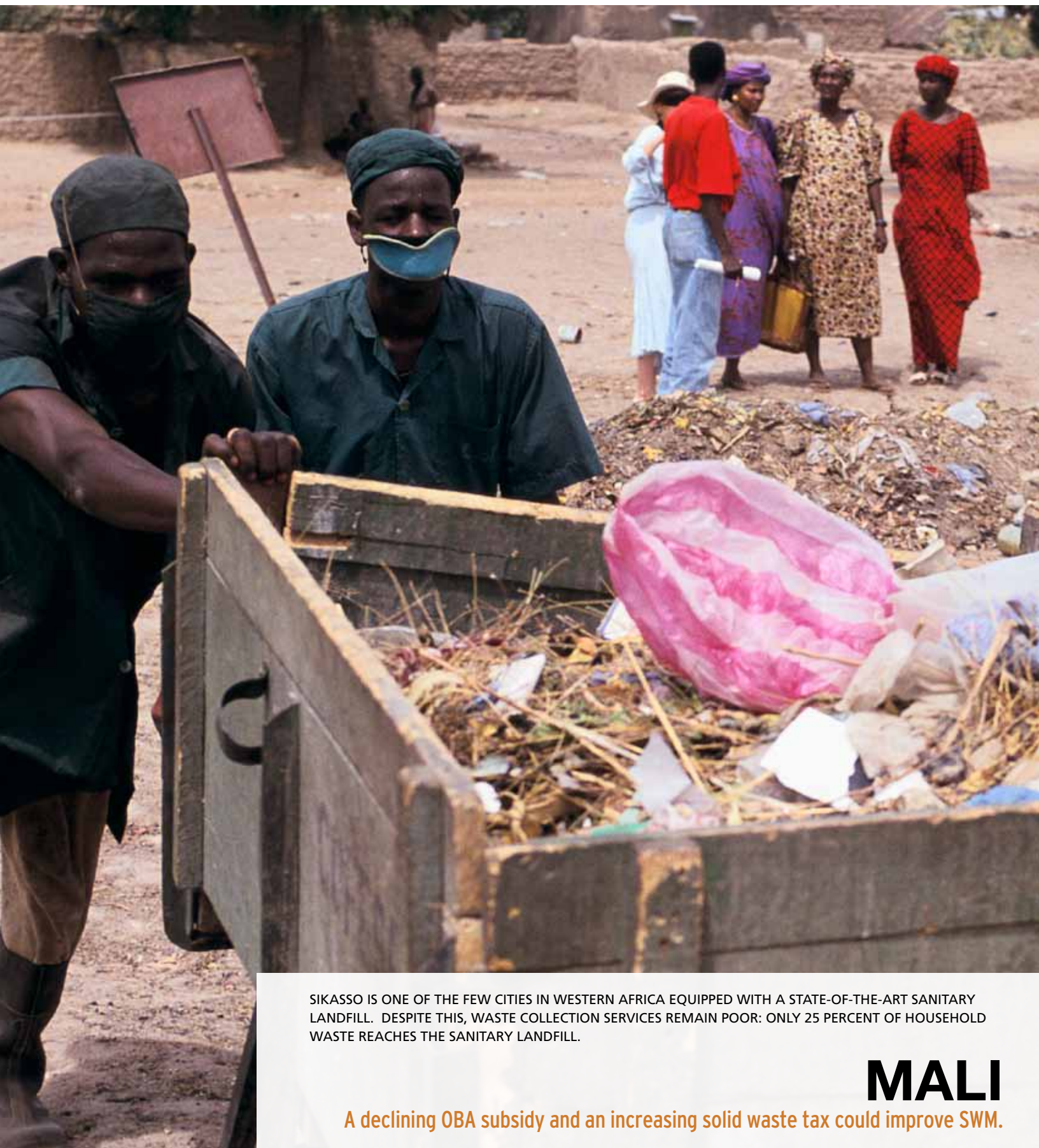
Mali is a land-locked country in western Africa with a population of over 14.5 m people (2009) and a Gross Domestic Product (GDP) per capita of less than US\$700¹¹. The city of Sikasso, which is the focus of this chapter, is located in the south of Mali and is the capital of the Sikasso Cercle and the Sikasso Region. It is the second largest city in Mali, with a population of 225,000 (2009).

8.2 The Broader Context of World Bank Support

The World Bank supports the Government of Mali's efforts to implement the Strategy for the Development of the Cities of Mali (SDCM), which focuses on poverty reduction and economic growth with a focus on improving basic services delivery, coverage and quality, including environmental management.

This project was prepared for implementation as a GPOBA subsidy project for the city of Sikasso, because the presence of a unique sanitary landfill made RBF appealing. However, the GPOBA project was dropped because the broader IDA (International Development Association) urban project did not include a solid waste component. GPOBA-funded projects

¹¹ World Bank Data Indicators. 2013. Available at <http://data.world-bank.org>



SIKASSO IS ONE OF THE FEW CITIES IN WESTERN AFRICA EQUIPPED WITH A STATE-OF-THE-ART SANITARY LANDFILL. DESPITE THIS, WASTE COLLECTION SERVICES REMAIN POOR: ONLY 25 PERCENT OF HOUSEHOLD WASTE REACHES THE SANITARY LANDFILL.

MALI

A declining OBA subsidy and an increasing solid waste tax could improve SWM.

are generally implemented in conjunction with World Bank investment projects, as opposed to being implemented as stand-alone projects. This chapter presents the Sikasso design as it was proposed in order to draw lessons from the design of this project. The Sikasso design was, in fact, a precursor to the designs later developed for Nepal and the West Bank, as described in earlier chapters of this report.

8.3 The Problem Statement

Sikasso is one of the few cities in western Africa that boasts of a state-of-the-art landfill, built in 2002 and jointly financed by the Belgian government and the Government of Mali. This US\$5 million project has not resulted in the improvement of the provision of solid waste services. The municipality of Sikasso is responsible for collecting and safely disposing the solid waste generated in its territory. At present, only 25 percent of households in Sikasso benefit from door-to-door waste collection services. Moreover, only 25 percent of the total waste generated in the city is transported to the landfill, with the remaining being left at illegal dumpsites in most neighborhoods, street corners, and in storm water drains.

Box 8.2: The Solid Waste Sector in Mali

Waste generation, collection and disposal

Sikasso is Mali's second largest city with a population of 225,000. In 2012, the city generated 46,770 tons of waste, and this quantity is projected to increase to 59,127 tons by 2017.

As of 2010, only about 25 percent of households currently benefit from a door-to-door collection service provided by small private contractors (*groupement d'intérêt économique*, or GIEs) and only about 25 percent of the solid waste generated in the city is transported from transfer stations to the sanitary landfill. The remainder goes to illegal dumpsites that can be spotted at the fringes of most neighborhoods as well as in many streets and storm water drains. Low income households that tend to live closer to these illegal dumpsites suffer the most from this poor sanitary environment.

The Municipality of Sikasso is responsible for collecting and safely disposing the solid waste generated on its territory, but the Direction Régionale de l'Assainissement Contrôle Pollution et les Nuisances (DRACPN), the local branch of the central government department in charge of pollution control, still operates the landfill and two trucks that transport the solid waste from transfer stations.

Institutional context

The 1992 Constitution in Mali provides the basic tenets of decentralization while the law on decentralization (Loi 93-008), adopted in 1993, provides a general framework for decentralization. The law establishes *régions* (regions), *cercles* (districts), and *communes* (communes) as *collectivités* (territorial units) in rural areas.^a

In the context of the decentralization in Mali, the central government has transferred authority to local governments for urban development and management. Under this arrangement, the national government is responsible for large infrastructure for transfer and disposal (landfills) whereas municipalities are mainly responsible for infrastructure for transfer sites, waste collection, as well as operation and maintenance of the disposal sites. According to the sanitation strategy, solid waste collection, transport and final disposal can be contracted out to the private sector. Private sector firms are largely used for waste collection and for the operational management of landfills.

a. Kelsey Jones-Casey, Ailey Kaiser Hughes, and Anna Knox "The Challenge of Decentralization in Mali," Feb 2011 edition of "Focus on Land in Africa Brief" published by the Global Protection Cluster.

8.4 The RBF Approach

The main objective of the RBF project was to improve the reliability and financial and environmental sustainability of SWM services while still making it affordable for low income households to pay for and receive SWM services. This would have been done through the establishment of a "Solid Waste Tax" and having the municipality contract with private parties. The contractors would transport waste collected from transfer stations and from illegal dumpsites to the landfill as well as manage the landfill. The RBF scheme would have promoted this objective by complementing the collection of the Solid Waste Tax and the beneficiary collection fees with a subsidy payment. The subsidy would be phased out over a six-year period according to a *pari passu* formula. This project was to be implemented across all households, and hence was expected to cover the entire expected population of 330,000 people by 2017.

8.4.1 Defining and Measuring Results

Results in Sikasso would have been assessed in terms of two primary outputs: the amount of funds collected from the

Solid Waste Tax that is transferred to the Special Solid Waste Account (SSWA), and the quantity of solid waste delivered and disposed at the landfill. The first output would be measured by the amount of funds received in the SSWA, which would be regularly monitored by auditors appointed by the municipality. The second output would be measured by the disbursements made from the SSWA. A more detailed set of indicators for the project is summarized in Table 8.1.

Two disbursements were envisioned in order to boost the quantity of MSW brought to and disposed at the landfill: an “Unloading Bonus” to transport contractors for each ton of solid waste delivered and weighed at the landfill, and a “Management Fee” paid to the landfill operator, based on the actual quantity of solid waste treated according to contractual specifications.

A potential risk here would have been that payment based per ton of waste received at the landfill could have been manipulated by the service provider by transporting bulky items such as construction and demolition waste and stones to maximize his return. The design could have been improved by measuring the cleanliness of streets and the environmentally-friendly disposal options, rather than the quantity transported for disposal. In addition, quantity-based rewards dis-incentivize recycling and diversion of organic wastes, which could contribute to the financial sustainability of the solid waste sector in the long-run.

8.4.2 Financing

It was estimated that the total budget required to fund improvements to SWM services over a six-year period would be US\$12.2 million. Given the expected valuation from collection fees paid by beneficiaries, the Solid Waste Tax that would be introduced, and funding from the municipal budget, a transitional subsidy of US\$3.7 million from GPOBA would have been required to meet the objective of this project. During

the six-year period of the OBA project, it was expected that beneficiaries would contribute to 60 percent of the SWM budget through collection fees and the solid waste tax.

Funding from GPOBA, including project supervision costs, would have amounted to approximately US\$4.5 million. The actual subsidy would have been disbursed on a declining basis according to a *pari passu* formula. It was assumed that after six years, the SSWA would have sufficient funds through beneficiary collection fees and the Solid Waste Tax to finance private contracts for transporting waste and managing the landfill. The subsidy was designed in such a way that in the first year, for every US\$10 deposited into the SSWA, GPOBA would have contributed US\$90; in year 2, the ratio would have been 25/75; and so on such that by year 6 the ratio would have become 85/15.

8.5 Implementation

At present, the Municipality of Sikasso is responsible for collecting and safely disposing of MSW generated within its boundaries, while the *Direction régionale de l'Assainissement et de Contrôle des Pollutions et Nuisances* (DRACPN), the local branch of the central government department in charge of pollution control, is in charge of the operation of the landfill and related equipment, including trucks to transport the waste from transfer stations to the landfill.

For the purposes of this project, it was envisioned that the municipality would bear full responsibility for the collection, transportation and safe disposal of solid waste generated. This would have included providing licenses to the private operators (GIEs); organizing the selection of GIEs, transportation contractors, and landfill managers; regulating the collection fees charged by the GIEs and making payments to contractors from the SSWA; employing an “Engineering Supervisor”

Table 8.1: Performance Indicators for the Sikasso Project

Reliability	<ul style="list-style-type: none"> – Number of households benefitting from door-to-door collection; – Volume collected and transported at transfer stations; – Number of active transfer stations, tractors and trucks; and – Volume of solid waste delivered at the landfill.
Financial Sustainability	<ul style="list-style-type: none"> – Replenishment of the Special Account; – Billing and collection of the Solid Waste Tax; – Transfer from the municipal general budget; and – Payment to contractors.
Environmental Sustainability	<ul style="list-style-type: none"> – Operation of the landfill (compacting, backfilling, leachate treatment); and – Removal of illegal dumpsites.
Affordability	<ul style="list-style-type: none"> – Collection fee charged and collected by GIE; – Solid waste charged and collected by Municipality; and – Average and mean SWM budget of household benefitting from door-to-door collection.

to oversee the performance of the contractors; and hiring an auditor to certify the operations of the SSWA. The municipality would have received technical assistance for preparation of all these activities.

The GIEs and transportation contractors would have been granted collection and transportation licenses respectively for a period of three years. While the GIEs would have contracted with households individually in a specific service area for waste collection and handling, the transportation contractors would have entered into agreements with GIEs for maximizing primary collection and minimizing the performance risk. The transportation contractor would have been awarded an “Unloading Bonus” for the waste taken to the landfill.

The landfill operator would have been awarded a six-year contract to operate and maintain the landfill and equipment that is currently operated by DRACPN. It was expected that the landfill operator would contract with transportation contractors to maximize the quantity of waste delivered. The landfill operator would have been paid a “Management Fee” from the SSWA based on the quantity of waste treated.

DRACPN’s role would have shifted to a more regulatory role, from operating the landfill to monitoring overall SWM tasks, such as landfill operations, removal of illegal dumpsites, and treatment of hazardous wastes.

The SSWA would have been replenished by a few sources: beneficiary collection fees paid to GIEs, a Solid Waste Tax, and transfers from the municipal general budget. The SSWA would have also received funds from GPOBA for the initial six years of the project, upon verification by the auditor employed by the municipality.

8.6 Key Risks

A number of risks are foreseen with the proposed project design in Sikasso. First, in order to strengthen secondary waste collection services, an implicit assumption is made here

that primary waste collection services are effective and well managed; however, only a minority of households received door-to-door collection services and the rest do not seem to receive any primary collection services at present.

Second, it is assumed that the municipality has the technical and financial capabilities in order to initiate a Solid Waste Tax, as well as “willingness to charge” households for provision of SWM services. How the tax would be implemented and collected from individual households was not well elaborated. At present, most households pay nothing for SWM services. The project was designed with the assumption that households would need to pay two separate charges: a collection fee to the GIE and a Solid Waste Tax. This may have added significant financial burden to households, not to mention that they may not have been willing to pay for services they might not even have expected to receive. At the same time, it is unclear whether residents were expected to bear the full cost of SWM services or if private enterprises (e.g., hotels, factories, stores) would also contribute to the Solid Waste Tax and, if so, in what proportion.

There were three options to collect the Solid Waste Tax, which was estimated to cover almost 35 percent (US\$4.1 million) of the total SWM budget over the six-year period of the project. The tax could have been collected through municipal taxes; as a line-item in the power or water bill issued by the public utility; or by requesting the GIEs to collect it during their door-to-door waste collection. Each of these three options has its drawbacks: in the first case, the municipality has a poor track record of collecting municipal taxes (about 5 to 10 percent only) and limited instruments to enforce payment by defaulters. It is unlikely that including another item on the municipal tax bill would have encouraged households to begin paying their local taxes. In the second case, it would have required the utility to first agree to provide a service that is not part of its core activities. It also would have required establishing contractual provisions and fund transfers from the utility to the municipality. The third option would be dependent on the commercial and financial

management capacity of the GIEs not only to collect their own fees but also the tax. It also included contractual arrangements and implementing fund flows between the GIE and the municipality. This option also implies that only a door-to-door collection system would be suitable, instead of another method such as the use of community bins. More broadly, it is unclear what proportion (if any at all) of the beneficiary fees collected by GIEs would go into the SSWA. Moreover, given the limited overall budget of the Municipality of Sikasso, it is doubtful whether the transfers from the municipal general budget to the SSWA would have been sustained not only over the six-year period but also beyond the length of the OBA subsidy.

Finally, further clarification on the indicators would have been useful in order to appropriately track the fees both collected from beneficiaries and through the Solid Waste Tax as well as those disbursed as bonuses to transportation contractors and landfill operators. Furthermore, how the “Unloading Bonuses” and “Management Fees” would be priced for transportation contractors and landfill operators, respectively, was not well elaborated upon. In order to streamline the contractors’ roles in the future, it would have been prudent to require that the concept of receiving bonuses be phased out altogether, or at least over the same period of time as the subsidy exists.

8.7 Lessons Learned

- RBF Payments based on sole quantity measures may not provide sufficient guarantee and transparency: A second level of verification is needed.** In the Mali project design, payment for solid waste collection is based on the quantity of solid waste measured through the weighbridge, a set of scales used to measure the contents of vehicles. While this could be perceived as a fair way to compensate the service provider and an incentive to collect
- more waste, contracts based only on the quantity of waste collected provides opportunity for manipulation of the quantities of waste in order to maximize the payment.
- Improving one activity along the solid waste value chain does not always result in a transformational change in the solid waste system.** Solid waste management is a chain, and all parts of the chain must be in a good working condition for meaningful improvement of the service. In Sikasso, the construction of the new sanitary landfill did not result in the expected service improvement because the primary and secondary collection was not properly addressed. Likewise, the OBA project was proposed to improve the secondary collection and the management of the landfill but there was very little focus on primary collection.
- Incentivizing collection and disposal without any provision for recycling may not lead to long-term financial and environmental sustainability.** A large proportion of solid waste is organic and recyclable waste, which can be used beneficially instead of disposed into landfills. Recycling and reuse is generally done in developing countries by the informal sector; where feasible, organic waste could be used in anaerobic digesters to generate electricity. Composting is an alternative to the large investment that anaerobic digestion may require. The main barrier to the success of large composting facilities in developing countries is the availability of market for the end product; however, backyard or community composting activities could be supported through technical assistance and incentives. RBF solutions should not discourage recycling and composting.

LESSONS LEARNED AND THE WAY FORWARD

9. Lessons Learned in Using RBF for MSW

RBF is an effective tool to improve MSW but is not a panacea for the sector. The eight RBF designs presented in this report address some of the fundamental problems of solid waste management in developing countries, such as: fee collection, behavior change towards source separation of recyclable and organic waste, and access to service to underserved communities. By conditioning the payment to the achievement of results, RBF provides an assurance of the value-for-cost and makes the use of public funds more efficient and impactful. However, RBF alone is not a universal solution to all the challenges that cities in developing countries face regarding solid waste management. Some challenges—such as lack of planning and strategies, lack of institutional capacity, and weak legal and regulatory frameworks that contribute to the poor performance of the MSW sector—cannot be directly addressed by RBF. It is a good tool that is more effective when associated with other instruments such as infrastructure investment, policy reform and technical assistance.

Some of the advantages of using RBF for the solid waste sector include:

- RBF appears to be a promising tool to address some of the fundamental issues of the MSW sector such as fee collection, behavior change towards recycling and source separation of organic waste;
- RBF could be a good tool for cities to provide access to basic service for the poor and to reduce the adverse impact of uncollected or inappropriately disposed waste on low-income residents;
- RBF offers the advantage of increasing transparency and accountability in the use of public funds through the independent verification process; and
- In fragile countries, RBF could be a useful tool to help achieve rapid results in the quality of solid waste services and increase the willingness of residents to pay solid waste fees. It could also provide a payment guarantee to attract

the involvement of private sector firms.

The rest of this chapter presents various lessons learned from the experience of applying RBF for MSW in the eight case studies. Some of the lessons learned and recommendations are generally applicable to the preparation of any MSW project, whereas others are particular to the design of RBF projects for MSW.

9.1 General Lessons and Recommendations for Using RBF for MSW

The following recommendations are generally applicable to the preparation of any MSW project, and their relevance was confirmed through this work.

- **Collecting sufficient baseline information is essential to develop an RBF design that addresses the needs of the sector.** In all eight cases, preliminary baseline studies were done and appeared as a valuable step that facilitated the understanding of the issues that the sector is facing. This process led to proposing RBF design solutions tailored to the challenges and needs in each city or country. In Dar es Salaam, for example, the baseline assessment has revealed that the main issue that the solid waste sector was facing is not inefficiency of primary collection but rather inefficiency of secondary collection. Thus, the team developed a design that includes solutions for secondary collection. In general, MSW practices vary from one city to another. Within the same city, it could also vary from one neighborhood to the next. In some locations, solid waste collection is provided by a public entity, whereas in others it is provided by private sector firms, NGOs, community-based organizations, informal waste collectors or a combination thereof. The type of equipment used to collect solid waste could also vary, ranging from rudimentary equipment such as hand carts, bicycle carts or donkey *charettes* (carts) to waste collection vehicles.

Methods used to treat and dispose of MSW are also location-dependent and could consist of a sanitary landfill, waste-to-energy facility, controlled or uncontrolled dumpsite, or open burning. Likewise the policies and regulations governing solid waste management could vary from one location to the other. Therefore, it is therefore important to perform an advanced assessment of the solid waste sector in a city to identify how the RBF approach could contribute to improving solid waste services. The solid waste data collection tool provided could be used to support data collection and to assess the potential for using RBF to improve solid waste management in a city.

- RBF solutions for MSW require active involvement of all stakeholders, from the early stages of project preparation, in order to be successful.** In all eight countries where RBF design work was performed, communities and stakeholder consultations were undertaken, providing useful resources in guiding the design of the RBF solution. In Nepal, the consultations carried out as part of the scoping work revealed that municipal authorities were keen to gradually increase charges for solid waste services, both to ease the burden on households and to demonstrate improvements in service performance before a significant portion of the costs of those improvements are passed on to the households. This enabled the pursuit of the proposed RBF design to gradually increase fee collection and provide a reliable service. In Indonesia, the survey of waste banks in the participating cities revealed that the barrier to the development of waste banks is not financial, but lack of community mobilization. It is this important that any RBF design for MSW starts with a thorough consultation of stakeholders and actors through workshops or/and targeted surveys to ensure that all views are taken into consideration. This could generally involve the national and municipal governments, private and informal waste collectors, and community members and leaders. In addition, it is important to discuss the proposed design in a final stakeholder workshop where each actor is given the opportunity to voice their opinions. The involvement of all stakeholders and actors is crucial to ensure that they are in agreement with the RBF design and that the implementation arrangements are known to all actors.
- Getting the project prerequisites right is essential in early project implementation stages.** Even though RBF is not a panacea for the solid waste sector, it could provide an avenue through which important sector reforms could be introduced. In Nepal, much emphasis has been placed

on getting the targeted municipalities to meet a set of criteria deemed necessary for the project to go forward. These prerequisites constitute the basis for the project activities in terms of having the right systems, capacities and buy-in all in place. The regular follow-up on the part of the implementing agency helped targeted municipalities make significant progress on those pre-agreed technical and institutional actions necessary for successful implementation and monitoring of the project. These included, for example: establishing and institutionalizing SWM subject committees and operational units, preparation of SWM strategies and service improvement plans (SIPs), and establishment of performance and service delivery monitoring systems, etc.

- Improving SWM services does not always require more staff, more vehicles, more equipment or bigger landfill space.** In Nepal, the project is designed in a way that will enable it to achieve its objectives within almost the same technical and human capacities available with limited supplements. Simple, robust, and affordable systems are being rolled out in targeted municipalities that can be easily managed and maintained by current staff. Plans are underway for the municipal staff to be trained to perform their duties in a way that contributes to the municipalities' long-term goals. In terms of vehicles and equipment, the project will capitalize on the ongoing improvement plans that the municipalities set in motion originally to further support SWM system improvement. Likewise, in the West Bank, an assessment of the inefficiencies of the solid waste system in the Governorate of Bethlehem revealed that the main issue is not the lack of equipment, but rather the poor use of these assets. In response, the World Bank team provided technical assistance to the governorate to improve the collection system by optimizing the use of existing collection vehicles. In short, improvement in SWM service delivery is possible without massive investments in assets.

9.2 Considerations for Designing RBF Projects for MSW

- In the solid waste sector, OBA subsidies may be more effectively targeted at municipalities rather than individual households.** In the West Bank, the US\$8 million grant from GPOBA was intended to provide access to solid waste collection to poor households. During the preparation of the project, it was recognized that because low and high income communities were mixed, it would

not be possible to target poor households only for the subsidy. As a consequence, the project was approved based on the average mean income criteria of the municipalities rather than attempting to segregate poor households or poor neighborhoods within these municipalities. The challenge associated with targeting low income households is that solid waste management is a shared, community-based activity with strong externality effects. Even though the solid waste subsidies are provided to citizens regardless of income, improvements in waste collection and disposal tend to have a greater direct benefit for the urban poor, who typically live nearby improperly disposed solid waste.

- RBF designs should be carefully aligned toward achieving the intended improvements in solid waste outcomes.** In Indonesia, the RBF design provides cash payment to the municipalities for the achievement of a minimum percentage of household participation and waste banks in operation according to pre-determined criteria. The design could not provide direct payment to waste banks and communities, whose behavior change is crucial for the success of the project due to fiduciary arrangements. The rationale for providing payment to municipalities in the absence of a possibility to provide payments to waste banks or communities is guided by the fact that the municipalities could put the enabling conditions in place to stimulate the creation and proper operation of waste banks. As a general principle, any RBF scheme should be designed as far as possible to motivate the right players to achieve the intended outcomes. Misalignment between who is performing and who is being paid could be detrimental to the success of an RBF scheme. This lesson from the solid waste sector emphasizes the importance of ensuring that individuals or households benefit directly or indirectly from their behavioral change that contributes to improved solid waste management, even as incentives may be targeted at an aggregated level.
- When an RBF scheme is designed as a payment mechanism for solid waste services, the payment should fairly compensate the service received; however, if it is for individual noncommercial behavior change, the payment should be linked to the value of the outcome of the desired behavior change.** In Malaysia and China, the determination of payment amounts was challenging. This was because the amounts were rewards to stimulate behavior change and were not directly tied to the cost of a service. In China, the method used was to set the reward below the estimated saving that the municipality would make for not having to transport diverted waste for disposal. On the other hand, for RBF projects which consist of paying a service provider to collect, transport, treat or dispose waste, the payment could be based on a competitive bidding process or negotiated with the incumbent service provider based on an estimation of the cost incurred to provide the service.
- Providing upfront financial assistance to service providers with limited access to credit could facilitate the implementation of RBF projects.** One of the basic principles of RBF is that the service provider bears most of the financial risks by pre-financing equipment and labor to provide the service, and payment the flows after the service has been verified. In Tanzania, community-based organizations and wards which were incumbent solid waste service providers had limited financial capacity and access to credit to pre-finance new equipment. Thus the design solution provided for some equipment for collection to be provided through the investment project, with CBOs assuming the risk associated with the cost of labor. In general the issue of risk-sharing in RBF projects should be carefully assessed. Designing an RBF scheme with an unbalanced risk-sharing between the public authorities and the private sector could discourage private sector engagement. This issue is even more acute in fragile countries where investment presents a high risk to the private sector. It is thus important to perform due diligence during the preparation phase of the project to assess the extent to which the private sector is willing to pre-finance the service in a particular city. In the West Bank, for example, the well-balanced risk sharing between the private sector and the public sector has led to the establishment of the first PPP in the solid waste sector in the West Bank. Given the volatile environment, instead of requiring the private sector to finance the heavy equipment (which would have represented a high investment risk for the private sector given the fragile political context), the SWMP project financed all major equipment for the landfill and the transfer station.
- RBF projects should be designed with a focus on a set of desired results, allowing the service providers to decide what service delivery model would best achieve those results.** In Nepal, there is diversity across 58 municipalities in terms of size, context, capacity and appetite for reform. This diversity calls for a

project design that allows participating municipalities the discretion to deliver SWM services as they see fit, provided that: (a) services meet a set of standards that align with national environmental policy objectives and sound environmental management principles; and (b) services achieve a certain level of financial viability in order to sustain continuous provision given municipal budget constraints. Furthermore, recent experience with RBF initiatives has highlighted the need to ensure that any results indicators are under the full responsibility of the implementing agency, that the indicators are well defined and independently verifiable, and that project designs reflect pragmatic levels of risk transfer. These findings have been fully incorporated in the design of this project by: (a) establishing a key set of indicators (i.e., scorecards) that measure milestones along the way to achievement of the project objectives and are under the control of the municipality; (b) ensuring that achievement of the milestones will be verified by an independent verification agency; and (c) shifting performance risk to the municipality by way of a matching subsidy grant that will only be available if the municipality achieves pre-agreed performance standards.

9.3 Monitoring and Independent Verification of RBF Schemes for MSW

- **Balancing simplicity and meaningfulness in the design of the verification process is often a practical necessity for implementation in the solid waste sector.** Independent verification is one of the most important features of any RBF scheme. It provides assurance to the service provider that the disbursement of funds is based on an independent and unbiased assessment of achievement rather than arbitrary measurement by the funding authority. At the same time, verification should not be so cumbersome that it results in excessive transaction costs. End results should thus be verified through simple and straightforward protocols. For example, the design of any scorecards or formulae to calculate the payment should consider limited local capacities, and therefore be easy for all parties to understand. Also, periodic random performance evaluations could be used instead of daily performance evaluation. However, there is generally a difficult trade-off between simplicity in the verification of indicators and measuring indicators that are meaningful. Verification also needs to be designed to minimize the risk of fraud. For instance, using the quantity of waste

transported as the only indicator for payment could lead to potential fraud since it would encourage the service provider to mix foreign items into the waste to maximize earnings. To address this concern, such schemes should include verification of the origin of the waste to ensure that it comes from the service area and visual inspection of loads to ensure that what is transported is indeed solid waste.

- **A third party independent verification agent provides greater transparency but could also be costly; alternative means of verification could be considered to minimize the cost in the solid waste sector.** During the preparation for the RBF project in China, it was decided that using an independent verification agent would add to the cost of the project and, as a consequence, it was proposed to use the Project Implementation Unit for verification. Likewise, in Jamaica there were concerns that using a private firm for independent verification could result in significant cost to the project. As an alternative, there was a preference to use an NGO for the verification process. In general, while independent verification through a third party is a good practice to ensure an unbiased performance evaluation, it is also important to keep in mind that a verification process that is very costly cannot be sustainable in the long run, particularly in the solid waste sector which is often struggling with the financial sustainability of operations in the first place. The transaction cost for the verification process could be minimized by having a public entity perform most of the “heavy lifting” in solid waste data collection, and have the third-party IVA perform the secondary verification prior to payment. This alternative has the added benefit of building local capacity in monitoring and evaluation, which is often weak in the solid waste sector. Strengthening this capacity would contribute to sustainability and support replication in other sectors. Yet, care should be taken to avoid direct conflicts of interest, such as service providers verifying their own performance. This is one of the risks of having a public entity perform the verification.

9.4 Ensuring Successful Implementation of RBF for MSW

- **Supplementing financial subsidies with educational outreach and technical assistance provides greater leverage for RBF projects.** Although RBF is about paying for the results and shifting performance risks to the service provider/implementing agency, experience

from Nepal and the West Bank has shown that technical assistance is needed to ensure the achievement of the performance targets. In Nepal and the West Bank, the RBF projects aimed to motivate municipalities to take action to improve fee collection. Introducing new fees, particularly for waste management, requires some level of public education and outreach for greater acceptance. However, the capacity of the implementing agencies was low. Complementary implementation support through technical assistance or additional funding for capacity building is needed in such situations to ensure that the municipalities achieve their targets. In general, municipal authorities have low capacity to manage the waste, and the shift to a results-based system would only increase the willingness and not the capacity unless it is supplemented with technical assistance. It is important for any RBF project for MSW to ensure that municipalities or the implementing agencies have a basic level of capacity for implementing OBA as evidenced by: (a) having some form of existing SWM services; (b) collecting some level of beneficiary revenues; (c) having access to sanitary landfill disposal facilities; and (d) having a good accounting system to enable financial audits. Technical assistance resources should be included in the project to enhance the basic capacity for service delivery.

- **Linkages to investment projects provide more leverage for implementation of RBF schemes in the solid waste sector.** In most developing country cities, the financial need is for solid waste operations rather than capital investment. Development banks however rarely finance operations, because such expenses are expected to be covered by user charges or the city's own resources to avoid indefinitely increasing their debt. At the same time, the collection of the user fees or charges is a major challenge for many developing countries, which in turn limits the ability of the city government to provide a reliable service to its citizens. The two OBA projects funded by GPOBA (West Bank and Nepal) help address this need by providing a financial subsidy to the city governments for a defined period of time while, at the same time, requiring the city to gradually move towards a financially sustainable system. These two projects did not directly support the procurement of large infrastructure and equipment, which were necessary to improve the service, but were designed with the expectation that the physical equipment and infrastructure would be in place by the time the OBA projects became effective, in part through related investment projects. This was also the

case for the RBF projects in China, Jamaica and Tanzania, where the implementation of the RBF components were contingent upon the implementation of the capital investment projects to which they were linked. The reliance on capital investment projects could result in project delays and potential cancellation if the required infrastructure or equipment does not move forward as planned. As an example, preparation for the two RBF projects in Tanzania and Mali was halted by the removal of the solid waste component from the IDA projects that they intended to support.

- **The institutional arrangements and flow of funds for RBF projects must be simplified as much as possible taking into account the capacity of the implementing agency.** The diagrammatic representation of the institutional arrangement and flow of funds for the RBF project in Nepal is complicated and difficult to explain. Institutional arrangements and flow of funds are important factors during implementation and must be presented in a manner that can be easily understood by the implementing agency, the beneficiaries and the independent verification agents. In general, no solid waste project could be considered as easy to implement, but RBF projects are even more complex since their success depends predominantly on how they are implemented. At the city level, it is very important for there to be a local champion who is willing to facilitate the preparation and implementation of the project, thus maximizing the chances of success.

9.5 Sustainability of RBF Projects

- **Keeping the big picture in mind helps ensure that the resulting scheme contributes to long-term sustainability in the solid waste sector overall.** The design of any solid waste management intervention, including RBF, should take into account the country's broader solid waste management context, from waste collection to final disposal, to ensure that the problem statement and the proposed solution are appropriate and to avoid unintended consequences or knock-on effects on other sectors. As far as possible, waste reduction, reuse and recycling initiatives should be prioritized. For example, it is sometimes tempting to simplify the design of an RBF scheme for solid waste by only linking the payment to the quantity of waste transported by the service provider for disposal. This approach may sound like a fair way to compensate the service provider based

on the level of effort made to collect the waste and keep communities clean. However, in addition to leaving the door open to the manipulation of results, this approach could also dis-incentivize initiatives for waste reduction, reuse and recycling – initiatives that would otherwise contribute to the solid waste sector’s overall environmental and financial sustainability by reducing disposal costs and the quantity of greenhouse gases emitted. Most of the case studies presented in this report are relatively micro-level interventions or address a specific issue, although some do take a city-wide approach with the municipal government as implementer. The bigger question is whether any of this can be truly transformational and be replicated in many cities around the world. This has yet to be seen, but project replication or adaptation is found to some extent in the similar project designs for Nepal and West Bank, China and Malaysia, and finally Tanzania and Jamaica.

- **Addressing solid waste challenges often involves fundamental changes in behavior that can take time to establish, so setting realistic targets is important to keep stakeholders motivated.** The RBF designs in China, Malaysia and Indonesia attempt to improve solid waste management through the very difficult objective of behavior change among communities, which could take time to be effective. For example, it could take several

years for a community that has been disposing its waste into a single bin to move to fully separating waste at source. Likewise, establishing a new solid waste fee in a community that has never paid for such service will take time due to inability or unwillingness to pay for a service that had hitherto generally been perceived as being free. Therefore, the design of RBF projects that involve behavior change must set realistic targets, with expectations set for gradual improvement over a period of time. If the targets are not realistic, the recipient may be unable to achieve the target despite reasonable efforts, and this could lead to dissatisfaction and demotivation. There is a risk that people could go back to their original behaviors, or develop new unexpected ones after the financial rewards or incentives are terminated. Moreover, human behavior is often complex and motivated by multiple factors; change cannot always be obtained by providing financial incentives or by demonstrating improved service. It is therefore important to ensure that any RBF or OBA project that targets behavior change is coupled with the public awareness campaigns on solid waste management and fee payment issues, simple behavioral nudges, and enforcement of solid waste laws and regulations. Including competition in RBF schemes can be a good way to drive inclusiveness and increase motivation for higher levels of performance.

10. The Way Forward

This final chapter presents further opportunities to use RBF to address MSW issues. It also includes recommendations to bolster the use of RBF in the solid waste sector and presents the way forward following the publication of this report.

Figures 10.1 and 10.2 present the activities along the MSW value chain and sector issues, respectively, that the eight designs have covered. It shows that the designs did not cover some of the activities along the value chain or some fundamental issues. This is mainly due to the fact that they were not identified as the main challenges in the solid waste sector in their respective locations.

Some issues or activities—such as waste generation, energy recovery or waste picking—were not addressed in the eight RBF designs profiled. There are opportunities to develop additional RBF designs to address these other issues or to address the same issues from a different perspective. The following additional concepts are suggested for consideration for future RBF projects in the solid waste sector (Table 10.1 provides additional details on each of these concepts):

- Incentives to households to reduce the quantity of waste generated at source (impacting the choice of manufactured products with low packaging);
- Conditional cash transfers to waste pickers;
- Performance-based operating contracts for the management of waste facilities by the private sector (landfill, waste to energy, compost facility, transfer station, MRF etc.);
- Performance-based grants to municipalities for reducing methane and black carbon from the solid waste sector; and
- Solid waste service fee vouchers for poor households.

10.1 Recommendations to Scale up the use of RBF in the Solid Waste Sector

Even though RBF is not a panacea for the solid waste sector, it presents the opportunity to address some fundamental issues of the solid waste sector. This would directly contribute to the World Bank's twin goals of ending extreme poverty and boosting shared prosperity. It would also result in a cleaner environment, particularly in poor and marginalized areas of large cities; this, in turn, could help attract investments and create jobs.

In order to facilitate the use of RBF concepts in future World Bank projects, (either as part of World Bank investment projects or subsidy projects funded by GPOBA), the following actions are recommended:

- **Use a systematic project diagnostic.** The RBF approaches could be integrated into many World Bank investment projects to increase the efficiency of the projects and the focus on results. Indeed, most of the World Bank investment projects for solid waste focus on infrastructure, whereas RBF provides the opportunity to address the issues of service quality and sustainability. To minimize missed opportunities, a systemic diagnostic is recommended at the project concept note stage to assess whether any project component could be delivered using an RBF approach. In particular, the RBF concept could be a tool that could be leveraged in the World Bank's slum and community upgrading portfolio.
- **Simplify the preparation and implementation monitoring process for RBF-type projects, to increase their use as part of World Bank investments.** There is often a separate preparation, approval and monitoring

Figure 10.1: Activities Along the Value Chain Addressed by the Case Studies

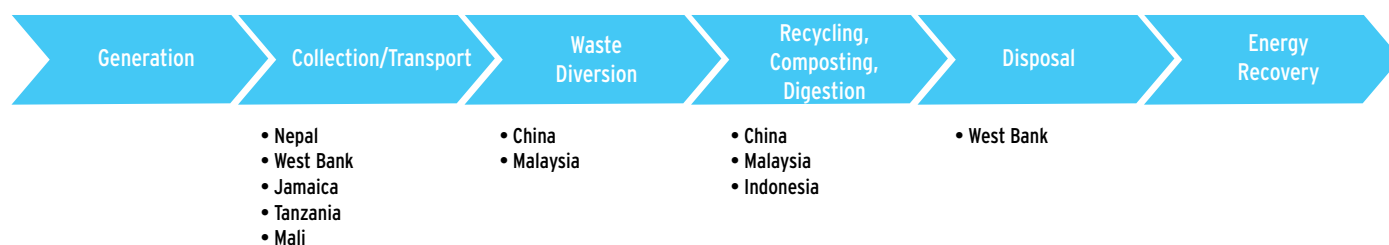
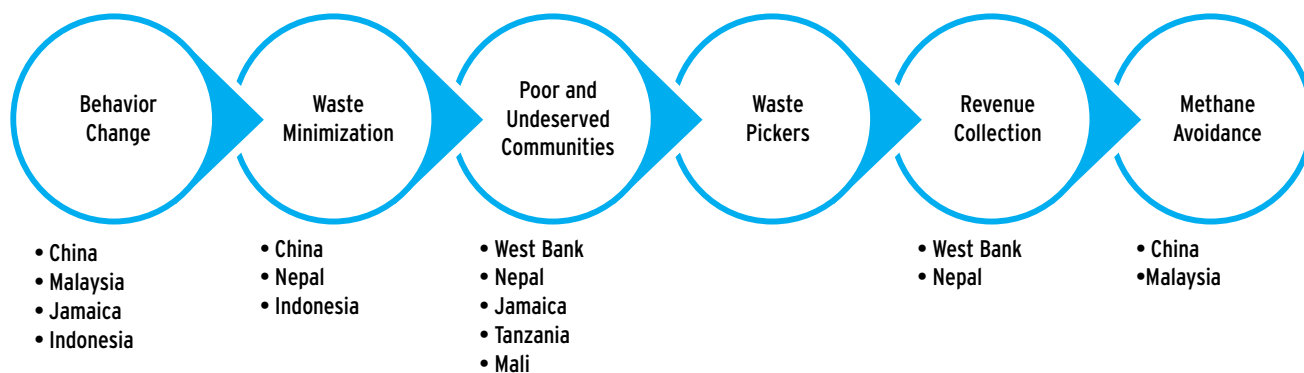


Figure 10.2: Sector Issues Addressed by the Case Studies

process that project teams have to undergo, if an RBF project is also funded by other donors. The level of effort required to prepare, implement and monitor such projects needs to be further assessed for simplification while maintaining the focus on results. For example, specific grants prepared as part of larger IBRD or IDA investments could be fully integrated as part of the IBRD/IDA project and undergo a single World Bank approval and implementation monitoring process, to minimize the transaction costs for what often represents a small amount compared to the envelop of the World Bank investments.

10.2 The Way Forward

This work represents the first phase of a programmatic undertaking to pilot the use of RBF in the solid waste sector, in order to tackle critical challenges faced by cities with respect to solid waste management. The focus of this first report has been on the lessons learned from the preparation and design of RBF schemes to address specific solid waste issues. Even

though these designs have undergone peer reviews or review by a GPOBA panel of experts, there is a need to see how they will be implemented, and to evaluate the results following implementation.

Moving forward, a second phase of this work is planned to start in fiscal year 2015 and will have three main activities:

- Continue to assess the implementation of the various designs presented in this report to infer lessons during the implementation and subsequent adjustments made to the design;
- Design new RBF initiatives in additional cities, some of which would consist of replicating existing models, while others would attempt to apply the additional concepts proposed in Table 10.1; and
- Disseminate the findings from this phase to decision-makers and donors.

Table 10.1: Additional RBF Design Options

Objective	Description	Outcome	Output	Major risks
Incentives to households to reduce the quantity of waste generated at source	Households would receive financial rewards (in the form of cash back or store discount) for selecting goods with a low quantity of packaging over those with a large quantity.	Waste generated is reduced across municipal areas.	Credit is given based on the quantity of qualified items purchased.	Retail stores unwilling to participate. Complaints from manufacturers.
Conditional cash transfers to waste pickers	Waste pickers receive cash incentives for positive behavior changes such as wearing personal protective equipment, not bringing minors to the work site, etc.	Health and social risks associated with waste picking are reduced. Livelihood of waste pickers is improved.	Size of the cash incentive is inversely proportional to the number of times bad behavior is observed.	Behavior change is complex and not always motivated by money. Sustainability of the behavior change after the program is uncertain.
Performance-based operating contract for management of waste facilities by private sector	Private sector firm compensated based on pre-agreed performance measures. Example: for management of a sanitary landfill, the payment could be conditioned upon placement of daily cover, waste compaction etc.	Waste management facility managed properly.	For landfills, frequency of placement of daily cover, density of waste in place. For composting facility, this could be the quantity and quality of the compost generated.	The contractor may find this too risky.
Performance –based grants to municipalities for reducing methane and black carbon from the solid waste sector	Performance-based grants provided by the national government to municipalities for verified quantities of methane or black carbon reduced from its solid waste operations.	Methane and black carbon emissions from the solid waste sector are reduced.	Difference between baseline emissions of methane and black carbon and current emissions.	Accuracy of the methodology to measure emissions from the solid waste sector at the city level.
Solid waste service fee vouchers for poor households	This is an alternative to the Nepal and West Bank models, where vouchers or rebates are provided to households that are below a specified income level to subsidize the solid waste fee. The waste collector provides the service and is paid directly by households using a combination of cash and vouchers. The IVA verifies that the vouchers are used to pay for a genuine service.	Poor households are able to afford solid waste services. The municipality or private sector service provider is able to recover its cost.	Vouchers provided based on household income. The service provider will be able to convert the vouchers to cash only if the IVA confirms that the service has been provided.	Difficulty in verifying income levels of households. Vouchers could be sold to the service provider for a fraction of the value.

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