



**Women in Informal Employment
Globalizing and Organizing**

WIEGO Working Paper (Urban Policies) N° 23

March 2012

Informal Sector Integration and High Performance Recycling: Evidence from 20 Cities

Anne Scheinberg



WIEGO Working Papers

The global research-policy-action network Women in Informal Employment: Globalizing and Organizing (WIEGO) Working Papers feature research that makes either an empirical or theoretical contribution to existing knowledge about the informal economy especially the working poor, their living and work environments and/or their organizations. Particular attention is paid to policy-relevant research including research that examines policy paradigms and practice. This series includes statistical profiles of informal employment and critical analysis of data collection and classification methods. Methodological issues and innovations, as well as suggestions for future research, are considered. All WIEGO Working Papers are peer reviewed by the WIEGO Research Team and/or external experts. The WIEGO Publication Series is coordinated by the WIEGO Research Team.

This paper was commissioned by WIEGO under the Inclusive Cities Project* and overseen by WIEGO's waste sector specialist, Sonia Dias who is based at the Political Science Department, Federal University of Minas Gerais -UFMG.

About the Author: Anne Scheinberg has worked for over 30 years in waste management and recycling in North America, Europe, the Balkans, Africa, Latin America, and Asia. She has an MSc in Sociolinguistics, a Masters in Public Administration and a PhD in Environmental and Social Sciences. She served as principal editor on the UN-Habitat 2010 prize-winning publication, *Solid Waste Management in the World's Cities*. Her most recent projects involved the 2006/2007 action research study and preparation for publication of the final report *Economic Aspects of the Informal Sector in Solid Waste* (2010), the first study to quantify informal recycling and services. Dr. Scheinberg works in Gouda, The Netherlands at WASTE. She can be reached at ascheinberg@waste.nl.

Publication date: March 2012

ISBN number: ISBN 978-92-95095-15-1

Published by Women in Informal Employment: Globalizing and Organizing (WIEGO)
A Charitable Company Limited by Guarantee – Company No. 6273538, Registered Charity
No. 1143510

WIEGO Secretariat

Harvard Kennedy School,
79 John F. Kennedy Street
Cambridge, MA 02138, USA
www.wiego.org

WIEGO Limited

521 Royal Exchange
Manchester, M2 7EN,
United Kingdom

Copyright © WIEGO.

This report can be replicated for educational and organizing purposes as long as the source is acknowledged.

Cover photograph by: Anne Scheinberg

* Sections of this paper are drawn *without quotation* (and with minor modifications) from the author's 2011 PhD Thesis, *Value Added, Modes of Sustainable Recycling in the Modernisation of Waste Management Systems*. Data for the UN-Habitat reference cities was collected in 2009, and often refers to studies or reports compiled 2-5 years prior to that.

Foreword: A Note on Terminology in this Working Paper

The millions of people worldwide who make a living collecting, sorting, recycling, and selling materials that someone else has thrown away are referred to by many different terms in different regions. These include scavengers, recyclers, reclaimers, ragpickers, binners, or waste pickers. At the First World Conference of Waste Pickers, held in Colombia in 2008, a provisional consensus was reached to use the generic term “waste picker” in English (but, in specific contexts, to use the term preferred by the local waste picking community). While an international consensus is still to be reached amongst activists, waste specialists, membership-based organizations (MBOs) and non-governmental organizations (NGOs), the term waste pickers has been adopted and put into use by WIEGO as a useful generic term that suits the purposes of current global networking.

In this paper, Anne Scheinberg makes use of the concept of “valorization” and refers to “informal valorizers.” An explanation of these terms is included in the Introduction.

Sonia M. Dias, WIEGO Sector Specialist for Waste Pickers

Contents

Abstract	1
Introduction: The Landscape of Recycling and Valorization	2
Research Questions.....	3
Researching Informal Recycling: A Review of Scholarship and Activism	3
Waste Picking and Informal Recycling in the Sociological Literature.....	3
Activism in Support of the Informal Valorization Sector.....	5
Connecting Informal Recyclers to Global Anti-Incineration Discourses.....	6
Social Workplaces and “Jobs from Recycling”.....	6
Methodology: The Idea of Policy Drivers	7
Public Health Driver.....	7
Environmental Protection Driver.....	7
Financial Driver.....	8
Resource Management Driver.....	9
Analysis	10
Part 1: A Tale of Four Cities.....	10
Part 2: Recycling and Valorization in 20 Cities.....	13
Answers to the Research Questions.....	17
Conclusions and Recommendations	21
Conclusions.....	21
Recommendations.....	22
References	26

Abstract

Between 2000 and 2012, the global informal recycling sector came into focus as the base of the industrial value chain. Research, scholarship and activism in this sector has progressed from victimization of waste pickers to a global discourse focused on achieving effective recycling by recognizing, strengthening, and integrating informal valorizers into city waste systems. With few exceptions, existing reports and articles have investigated the activities, condition, and position of the informal enterprises and individuals, but have paid too little attention to the context: the waste management systems in the cities in which informal recyclers work and live. This research report seeks to correct that imbalance by analyzing and contextualizing informal valorization in low- and middle-income countries, and providing recommendations for implementation of *inclusive recycling*. The basis for the empirical research in this paper is the data set of 20 reference cities that was initiated for the 2010 UN-Habitat Third Global Report, *Solid Waste Management in the World's Cities*, for which the author of this paper was principal editor.

Introduction: The Landscape of Recycling and Valorization

The most recent wave of (ecological) modernization of solid waste systems occurred in the 1980s in North America and Europe and other high-income countries, in response to the first generation of environmental protection laws and policies which were passed in the 1970s. Many low- and middle-income countries are now seeking to modernize as a response both to internal policy and environmental pressures and the application of external, globalized standards of best available technology and good environmental practice (Scheinberg 2011; Scheinberg and IJgosse 2004; Chalmin and Gaillochet 2009; ACR+2010).

Modern, “integrated waste management” differs from its antecedents in part because of its commitment to “recycling,” short-hand for organized public-sponsored valorization financed as part of the solid waste system. This commitment is variously communicated in English-speaking countries as “the solid waste hierarchy,” in the Netherlands as “Lansink’s Ladder,” and frequently as “the three Rs” of Reduce, Reuse, Recycle, as, for example, in the Asia Regional 3-R Forum (Scheinberg 2011; Velis, Wilson and Cheeseman 2009; Strasser 1999; Scheinberg and IJgosse 2004).

Valorization, as used here, refers to “the entire process of extracting, storing, collecting, or processing materials from the waste stream in order to extract and divert value and direct the material to a value added stream” (Scheinberg, Wilson and Rodic 2010: 216). The term “valorization” is used, following its original French meaning, to include all activities commercializing materials found in the waste stream. The usual way of referring to this activity, “recycling and composting,” fails to do justice to the extensive commercialization of waste.

In high-income countries, modernization and resulting integration of “recycling” into the solid waste system has led to a virtuous circle of increasing commitments to valorization, a strong organizational learning curve, investments in separate collection and processing, commercial relations with the value chain, and a global network of professionals in *municipal recycling*. Low- and middle-income countries seeking to replicate the contribution of recycling have had less fortunate experiences, which have tended to threaten the livelihoods of hundreds of thousands of people in the informal valorization economy worldwide, who live by extracting value from waste material.

The informal valorization sector consists of women, men and children who collect materials they can use themselves or sell to agricultural and industrial value chains. Recyclers in the informal economy collect from residential houses, from streets and containers, at dumpsites, and in transfer stations, separation plants or at the landfill. These reclaimers are the principal actors at the base of the *recycling value chain*, collecting and valorizing recyclables from households and businesses and extracting usable materials from containers (Scheinberg Simpson and Gupta 2010; Chaturvedi 2007; Dias 2000; Medina 2005).

There is also active informal valorization of organic waste from kitchens, gardens, and markets by an informal sector that uses or commercializes it as food for people, animals, or plants in the *agricultural value chain*. Kitchen and garden waste may be fed to chickens, used to make compost or left to decompose on its own. Organic waste collected from open markets feeds animals or fertilizes crops. Up until 2009, when swine feeding was eliminated in Egypt, international waste companies in Cairo had to compete with the Zabbaleen’s traditional swine feeding operation to claim enough organic materials to run their compost plants in Cairo. In West Africa, partially decomposed mixed waste, called *terreau*, is separated from plastic at informal dumping sites and sold to vegetable farmers. Informal recyclers living and working at dumpsites also search for edibles – especially when they come from commercial kitchens or institutions. Using manure as fertilizer and burning branches and woody plants are other forms of utilization of the organic fraction of urban waste (Anschütz et al. 2005; Gunsilius, Chaturvedi and Scheinberg 2010; Scheinberg et al. 2011b).

Informal valorization is a direct economic benefit to the informal valorizers, many of whom would otherwise have no work. It also creates positive externalities for municipal authorities, by reducing the amounts of materials requiring disposal, diminishing the CO2 footprint of the solid waste system, and improving performance of disposal facilities (Anschütz and Scheinberg 2004; Scheinberg, Simpson and Gupt 2007; Chaturvedi 2009; Scheinberg, Wilson and Rodic 2010; Medina 1997).

These benefits are threatened by modernization, especially when cities think that they can “get rich” off of “the gold in the garbage.” When cities in low-income countries commit to “recycling,” the result is often conflict over resources and access to the waste materials. Instead of a virtuous circle of increasing economic and environmental benefits, modernization may create a vicious circle of competition for resources, conflicts between public and private sector, interrupted supply chain relationships, and a decline in resource recovery and its associated benefits (Scheinberg 2011).

The goal of this paper is to support practitioners and scholars working at the intersection of formal and informal valorization systems, to understand the processes at work, and to design interventions that improve the situation both for cities with waste management problems, and for valorization entrepreneurs in the informal economy. In this, it explores the dynamics that drive modernization processes, and shows how these are likely to influence the landscape in which valorization entrepreneurs in the informal economy extract and trade secondary resources.

Research Questions

This Working Paper seeks to answer the following specific research questions:

1. What key features and aspects of the modernization of waste management systems are important for integration of the informal sector in modern waste management systems?
2. How do differences between high-income and low- and middle-income countries affect intervention strategies for including value chain actors, specifically informal recyclers, in high-performance recycling?
3. What actions can be taken at the system level to increase cooperation and improve outcomes?

Researching Informal Recycling: A Review of Scholarship and Activism

Between 2000 and 2012, the global informal recycling sector ceased to be invisible, and came into focus as the base of the industrial value chain. The points of entry varied considerably, and there was much experimentation as to interventions to “help.”

Waste Picking and Informal Recycling in the Sociological Literature

Christine Furedy (Lardinois and Furedy 1999; Furedy 1997) was one of the first global researchers to focus on the waste pickers she encountered in sociological field work on the Kolkata dumpsite. Furedy initiated investigation of the sector, in parallel with Lilliana Abarca in Costa Rica (Abarca et al. 1998); Sonia Dias in Brazil (1998; 2000); Martin Medina in Mexico (1997); in the global work of Inge Lardinois and Arnold van de Klundert (1997); and in the private sector participation work of Sandra Cointreau (1987; 1989; 1991; 1994).

At the time of this writing there is a considerable body of literature concerning the operations and social circumstances in which the informal sector operates. Work of the International Labour Organization (ILO) in Tanzania created a body of work on micro- and small enterprise (MSE) and community-based organization (CBO) waste collection, which has been connected to waste picking as a kind of diversification strategy for

informal waste pickers. The ILO itself commissioned a desk review of this work to evaluate its effectiveness and impact. Much of the early scientific interest in waste pickers, or informal recyclers, focused on their social weaknesses and potential for improvement through development interventions (Ishengoma and Toole 2003; Ishengoma and Lyimo 2002; Wehenpohl 2005; Simpson-Hebert, Mitrovic and Grajic 2005; IPES 2004; Anschütz and Scheinberg 2004; Medina 1997; Gunn 1992).

Development approaches arising from this point of view make an implicit claim that the informal sector *has a problem*, and tend to focus on *improvement* or *fixing the problem*. Waste picking is problematized as dirty, degrading, work and the lowest possible livelihood. This line of work objectifies waste pickers as victims, and analyzes the source of the problem as a lack of dignity, safety, formal work, power, rights, or proper salaries (Gunn 1992; ILO 2004; Anschütz and Scheinberg 2004).

“Solutions” have focused on “creating livelihoods,” eradicating child labour, or on social improvement strategies to facilitate an exit from waste picking to “something better.” The implicit basis for this is the idea that international organizations have a moral obligation to “help” recyclers in the informal economy to a higher level of dignity. Waste pickers and workers in the informal valorization economy are treated as objects, rather than subjects, in their own lives and work.

In general, these well-motivated scholarly interventions have been effective in establishing the existence and pervasiveness of informal recycling in the landscape of urban waste systems in low- and middle- and high-income countries, and have elevated waste pickers from an invisible actor to a status as problematic but visible actors in the solid waste drama (Medina 1997; Chintan-Environmental 2005).

These approaches share a failure to investigate the role of waste picking in solid waste management systems. Without context, such well-meaning interventions aimed at “helping” pickers to “better work” have been singularly ineffective in leveraging sustainable change. The failure to contextualize waste picking in the solid waste system has blinded researchers and activists to its business models and profitability. The idea that picking may be a rational choice for economic activity, or even that it provides the highest possible income or the best range of options in their circumstances, appears to have been inconceivable to the middle-class academics and development professionals. As a result, the element of income replacement was usually lacking in improvement schemes. This, in combination with failure to consult the waste pickers themselves as to their wishes, resulted in pickers and their families suffering a net economic loss as a result of the “solution” offered to them (Anschütz and Scheinberg 2004).

Action research, such as Christine Furedy’s work with SEWA, the Self-Employed Women’s Association in India, the early work of KKPKP (Kagad Kach Patra Kashtakari Panchayat) in Pune, and Sonia Dias’s work on the role of public policies on solid waste in sustaining livelihoods, has had a somewhat broader focus on governance, solidarity, organizing, and social visibility. The waste and citizenship platform is, as a governance structure, placed in a hybrid place, i.e. it is both within the civil society and in the formal area of governance, following Brazil’s adoption of participatory mechanisms as stated in the 1988 Constitution. The work of CID in developing recycling schools for the Zabbaleen in Cairo, and the work of the waste and citizenship movement in Brazil, seek to combine social improvement with building on recycling and reclamation (Dias 2000; Scheinberg and Anschütz 2007; Iskandar and Shaker 2007; Chikarmane and Narayan 1999).

Since 2006, there is a move to focus more on entrepreneurial characteristics of informal enterprises, in the context of modernizing waste management systems in (primarily) low- and middle-income countries. Dias (2000) argues that the integrated solid waste management (ISWM) framework gives governments practical tools to shape policies that address the multiple dimensions of the waste system. The GIZ (German International Co-operation, which until 2010 was referred to as “German Technical Cooperation,” or GTZ) informal sector study arose from, and itself stimulated, an increased emphasis on the relations between informal waste and valorization activities and the solid waste management systems in their cities (Scheinberg, Wilson and Gupt 2007, summarized in Gunsilius, Chaturvedi and Scheinberg 2010). Wilson,

Velis and Cheeseman (2006) look at itinerant waste buyers (IWBs) as fore-runners of collection crews in municipal source separation systems. Chaturvedi (2009) claims that Indian informal recyclers, through their normal business activities, are reducing greenhouse gas emissions and should be compensated through carbon trading systems; Scheinberg (2009) points out that municipal authorities in many Asian countries are far less able to market materials than are the informal sector recyclers the authorities all too often seek to criminalize or deny access to materials.

These scholarly works have begun a process to contextualize waste picking and valorization in the informal economy and relate them to changes in solid waste management systems undergoing modernization. This system approach, probably first articulated in 2006, looks in a holistic way at the movement of materials through the waste management system, and the economic, environmental, and social impacts on individuals and institutions in that system (Ibid.; Simpson 2008; Gunsilius, Chaturvedi and Scheinberg 2010; Scheinberg and Anschütz 2007; Scheinberg et al. 2011; Chikarmane and Narayan 2005; Chaturvedi 2007; Wilson 2007; Scheinberg 2011; Scheinberg, Wilson and Rodic 2010; Weinberg, Schnaiberg, and Pellow 1997; ILO 2004; Scheinberg and Anschütz 2006).

Activism in Support of the Informal Valorization Sector

Alongside the scholarship, the period 2005-2011 produced several lines of activism to reduce the vulnerability of informal valorization workers in relation to larger projects on waste system development. This has shifted the focus from solving social, governance, health or image problems to bringing informal recyclers and enterprises into a more regularized relationship to the solid waste system. The term “integration” dominates this discourse, and represents a focus on how to design interventions to promote the sustainable integration of informal sector recyclers (and organic waste valorizers) in rapidly modernizing waste management systems, such as those in Brazil, India, South Africa, Turkey, and the Western Balkans.

One line of activism tends to focus on organizing new relationships between workers and enterprises in the informal valorization economy and local authorities, NGO intermediaries, the private waste management sector, enterprises in the agricultural and industrial value chains, and among the workers themselves in terms of forming cooperatives, unions and syndicates, or associations. In this area, important progress on strengthening informal valorization entrepreneurs has been documented in Latin America through formation of associations and cooperatives that build social consensus and are able to influence legislation and policy. Another focus has been on recognition of waste picking as a profession by its inclusion in national classification of occupations as in Brazil (see, for a sampling, Dias 2000; Chaturvedi 2007; 2009; Chikarmane and Narayan 2005; 2007; Samson 2009; Iskandar and Shaker 2007; Dias 2011).

Groups in India and Serbia have followed Columbian and Brazilian examples by using labour organizing to support waste pickers in gaining status and recognition as economic actors who are part of the waste system. A key focus of labour organizing has been the idea of occupational recognition – that is, the inclusion of “recycler” or “collector of secondary materials” in the national registry of official occupations. For example, occupational recognition for waste pickers in Serbia came partly as a result of syndicate organizing in the framework of a project focused on integration of waste pickers (a volume co-edited by Mitrovic, Nestic and Grujic will present this experience sometime in 2012-2013). Along with the regularization comes a range of activities for supporting both individuals and enterprises, such as providing access to health insurance, physical space for recycling activities in the city, and access to (micro-) credit (Scheinberg, Mitrovic and Post 2007; Chikarmane and Narayan 2005; Chintan 2005).

The first signs of a reversal of governorate multi-national privatization policy in Cairo, after nearly 10 years of exclusive modernization, focus on contracting as a sub-category of access to “normal” business niches in the solid waste system for formal and informal recycling entrepreneurs (Iskandar and Shaker 2007; Iskandar, personal communication). Another example is the support given by para-

statal institutions in Brazil, such as Petrobras and Banco do Brazil, to the national movement of waste pickers in supporting and strengthening their networks of cooperatives. This is part of Brazil's strategy to strengthen waste pickers as economical actors by giving support to the creation of commercialization networks which aim to unite local cooperatives under single umbrella organizations responsible for coordinating the sale and value-added processing of recyclable material on the market (Dias and Alves 2008). The International Finance Corporation's Recycling Linkages Programme was one of a very small number of medium-scale development initiatives focusing quite explicitly on strengthening the business aspects of informal enterprises. The programme promoted supply chain strengthening, through a mix of institutional reform and capacity development (see, for example, Popovska 2009; Gibrizi 2008; Scheinberg, Mitrovic and Post 2007).

Connecting Informal Recyclers to Global Anti-Incineration Discourses

A parallel line of activism in the global NGO sector has recently sought to engage waste picker initiatives to strengthen zero waste and anti-incineration campaigns organized by NGO movements such as GAIA (Global Alliance for Incinerator Alternatives/Global Anti-Incinerator Alliance), Greenpeace International, and the Zero Waste International Alliance. Anti-incineration movements seek to "create" employment in socially weak or disadvantaged populations through new recycling initiatives, an idea that is quite common in OECD countries, and to celebrate the importance of informal valorization as an "alternative" to new landfills, large-scale waste incinerators or other large-scale technology. A new line here is researching the contributions of informal recycling to the reduction of greenhouse gases. These initiatives have booked significant political gains, but their impact on the lives and livelihoods of waste pickers is unclear and has yet to be researched and documented (see, for example, Weinberg, Schnaiberg and Pellow 1997; Chaturvedi 2009; and the GAIA and ZWIA websites).

Social Workplaces and "Jobs from Recycling"

Finally, "recycling" is the focus of employment creation and social workplaces in places as different as the USA and southern Africa. This matching of "wasted people" with "waste" (the language was highlighted by Bauman 2004) is also the basis for many semi-formal, semi-charitable second-hand trading and retail businesses in high-income countries, such as the Dutch "kringloop" (circular) system, networks of Finnish second-hand stores, the US-based Goodwill Industries, as well as certain faith-based initiatives for youth and recovering drug or alcohol users such as the global institution of the Salvation Army. These programmes generally focus on "recycling" unemployed or unemployable persons, by introducing them to the activities of formal and informal valorization. There is sometimes cross-over and areas of intersection with informal valorization, especially when rapid modernization activities push informal recyclers out of the system (Strasser 1999; Scheinberg 2011).

A more modern version of the idea of social workplaces can be found in the US Environmental Protection Agency's 1980s "Jobs from Recycling" initiative, or in the large number of community recycling initiatives in North America in the 1970s (Schnaiberg, Weinberg and Pellow 1997; Scheinberg 2011). The development cooperation community is also interested in this, as shown by the Malawi "Waste to Wealth" PPP-ISWM programme. UNDP's name for protected contracting is "pro-poor public private partnerships," also known as "5-P," promoted by UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) and UNDP-PPP-SD (United Nations Development Programme Public-Private Partnerships for Service Delivery). (See, for example, the UNESCAP web page <http://www.unescap.org/pdd/prs/ProjectActivities/> or the LEI publication Scheinberg et al. 2010).

Samson (2010) brings the public-private partnership discussion into the context of development initiatives that add new activities and new sources of income to the work of waste pickers in Africa (Samson 2010, p. 11; see also Ishengoma and Lyimo 2002; Ishengoma and Toole 2003).

Methodology: The Idea of Policy Drivers

This paper departs from these previous discourses, and focuses more on contextualizing waste picking in the solid waste modernization process. In order to understand the dynamics of modernization in a city, we use the lens that Wilson (2007) has called a *policy driver* (Wilson 2007; Scheinberg, Wilson and Rodic 2010). Policy drivers provide a methodology for analyzing modernization that allows us to frame the intervention process. Other methodologies and analytic frameworks, such as the social practices model or ISWM, look more at the characteristics of a waste system at a particular moment in time. Policy drivers help us locate a system in a more or less predictable sequence of crises, priority-setting, introduction of infrastructure, and implementation of new procedures and practices (Scheinberg 2011; Wilson 2007).

Wilson introduces the idea of a policy driver to frame the way that waste is problematized, the domain or policy landscape in which the problematization is located, the prevailing ideas about how to solve the problem, and typical or usual practical actions or technical infrastructure proposed by city administrations, donors, central finance ministries, or a combination of these. While Wilson identifies three policy drivers, or areas of main activity in waste management, a broader consideration of the non-technical aspects of waste management suggests that there is a fourth, as discussed below.

Public Health Driver

Public health problems and outbreaks of disease such as cholera have historically been the first driver for better waste management. The drive is to develop policy that succeeds in maintaining healthy conditions in cities. In relation to this public health driver, cities and private enterprises organize or upgrade and extend waste collection systems and remove waste from urban areas. The key reform associated with the public health driver is development of city-wide collection systems, and sourcing funds to finance them.

The public health driver is generally accepted as the earliest motivation for organized development of city cleaning beyond actions at the level of private to private arrangements in rich areas. De Swaan (1988) credits the threat of cholera epidemics in eighteenth and nineteenth century Europe with stimulating a range of institutional developments that make the modern city a functioning collectivity. The key relevant aspect of the public health driver is that it stimulates system development beyond the boundaries of neighbourhoods, because disease doesn't respect lines on the map. Creating systems for cleaning the whole city – even areas where the households cannot themselves pay for the service – is necessary in order to assure that the central business district and the wealthier areas are not islands of order in a sea of filth. In addition to being a direct driver of city cleaning, we see also that public health drives symbolic political actions, such as the ones that drive street children, beggars and informal recyclers out of a city before Olympic Games or other events (for example the first international meeting on environment and development in Rio de Janeiro in 1992¹).

Environmental Protection Driver

Improved collection produces, over time, cleaner cities at the source of the waste, but it creates a problem in terms of accumulating ever larger volumes of collected waste, which have to be moved outside of the city to be safely disposed. The problem is that burying waste or burning it (often considered to reduce volume and control risks of disease) causes pollution of air, soil, and water. The usual intervention is to upgrade dumps to create controlled disposal facilities or sanitary landfills.

A controlled landfill concentrates waste and is an environmental improvement compared to open dumping. As an environmental sink, a disposal site uses the ground to receive waste and sink it. Weighing and

¹ This insight is thanks to Sonia Dias and Bharati Chaturvedi.

registering waste on arrival, fencing the site, and inspecting incoming vehicles are typical interventions, and geo-textiles or clay are used to prevent waste and associated liquids from entering groundwater. Sanitary landfills go a step further. They are engineered sinks that have a geo-textile liner, and collect and treat leachate, and may recover or flare methane from underground decomposition. They are expensive, both to build and operate, and can serve a large population base. Therefore, to spread and reduce capital and operating costs, engineered disposal is frequently regionalized, with several cities, counties, or even an entire state or province or district closing their own dumps and re-directing the waste to the regional landfill (Bruner 2010). The key reforms associated with the environmental protection driver are regionalization, that is, organizing solid waste disposal at a level that transcends the city boundary, and pricing of disposal, that is, reforming the finances and governance of solid waste to make generators responsible for the costs of sinking their waste in nature (Scheinberg, Wilson and Rodic 2010; Waste Framework Directive and Landfill Directive of the European Union).

Financial Driver

A shift to engineered regional disposal places the entire waste system under enormous financial and governance pressure. The scale requires autonomous local authorities to learn to work together to operate the facility, but also to re-organize their finances to support it. Responding to this pressure results in the emergence of the financial driver, not included by Wilson in his analysis, but anticipated to some measure in the discussion of “financial sustainability” in the UN-Habitat book *Solid Waste Management in the World’s Cities* (Scheinberg, Wilson and Rodic 2010). The financial driver responds to the problem of high costs of operating a sanitary landfill (Ibid.; Scheinberg 2011; Chalmin 2011; Iskandar and Shaker 2007).²

Operating costs are an issue because external capital investment is frequently made by a donor, a national finance or environmental ministry, or a private company. Local authorities “accept” a landfill without understanding that they are obligating themselves to 20 years or more of operating costs, for which they do not have a clear source of funds. This paradox of lacking sources of funds to operate an expensive, state-of-the-art landfill is the essence of what distinguishes low- and middle-income countries from richer ones. In wealthier countries, where there is enough liquidity in the system, landfilling is a priced ecosystem service, paid for by a gate fee based on weighing the incoming waste and charging for it by the ton.

The pricing of the landfill in high- or upper-middle-income countries creates a financial reform that re-organizes incentives throughout the whole system and is the basis for high-performance recycling. Users – the waste collection system providers and their clients – pay for disposal at the landfill on a per-ton or per-volume basis. The more they dispose, the more they have to pay. This creates an imperative at the local authority level to *divert* materials from priced disposal.

Where pricing of disposal does not occur, for political or economic reasons, we see the emergence of a vicious circle of increasing amounts of waste chasing decreasing amounts of money in the system. There is no regular source of funds to operate the new landfill properly, because no one is paying for disposal, which is not the same as paying for collection. Without a source of funds, the landfill which has cost millions will either be abandoned, or it will most likely deteriorate to being operated as a “normal” open dump (Ball & Bredendam 1998; Scheinberg, Wilson and Rodic 2010; Chalmin and Gaillochot 2010; ACR+ 2010).

² In many, if not most, circumstances, the capital costs of building the landfill come from outside of the solid waste system itself. In high-income countries, and many middle-income countries including Balkan and Central European countries during and following accession to the European Union, the source of capital financing is a central government ministry, usually finance or infrastructure or the Ministry of the Interior, or in the EU case, the EU infrastructure funds. In low-income countries, the funds flow through the finance ministry, but their source is usually a bilateral donor or a multilateral development bank.

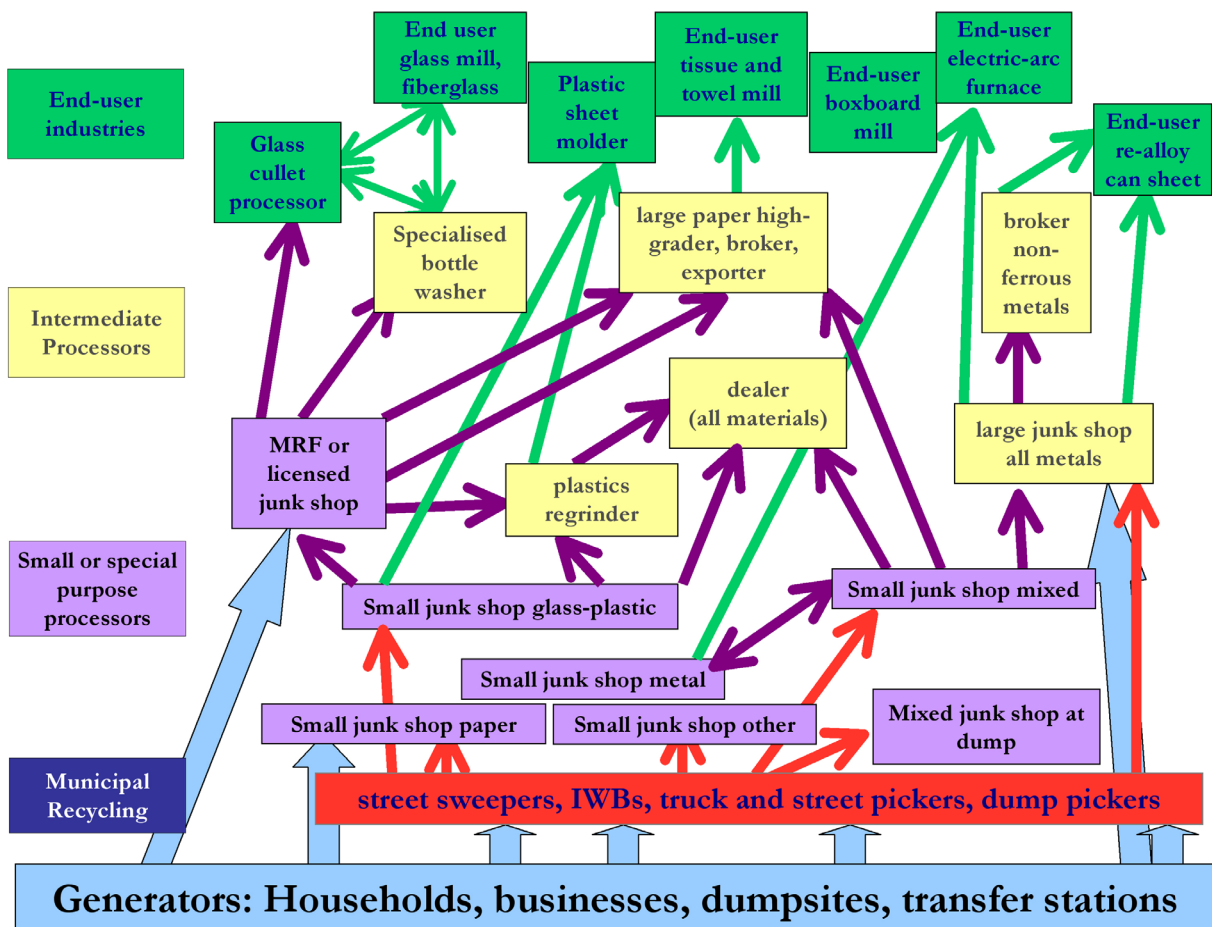
Resource Management Driver

David C. Wilson, in his 2007 paper *Development Drivers for Waste Management*, goes further and identifies a third driver, “resource recovery” (see also Scheinberg, Wilson and Rodic 2010; Scheinberg 2011). The problem is too much disposal, or disposal of the wrong kind, which includes disposing of materials that could be returned to the value chain because they have original or residual value. Before modernization, the resource management driver is the commodities value of the materials, which answers the environmental problem of resource scarcity, and promotes resource conservation. But after modernization the driver switches to being the sink value of the value chains. This dynamic is little understood, so it is worth explaining a bit more.

When disposal is priced, the resource management driver arises or emerges in response to the emergence of the financial paradox of modernized disposal. Not only does recycling avoid depreciation of natural resources, it also avoids *too much disposal at too high a price, together with avoiding depreciation of land as a sink for waste materials*. Here is the source of the “virtuous circle” of municipal recycling, as it can be seen in many high-income countries and cities (Ibid.).

When disposal becomes priced, using a landfill is institutionalized as a *cost*. Local authorities, cities and regional governments in the USA, Canada, Northern Europe, Oceania, and Japan, for example, respond to these costs by looking for alternatives in the agricultural and industrial value chains.

Figure 1:
The Recycling Value Chain – A Complex Reality



Source: Anne Scheinberg, WASTE, 2007.

If disposal is not priced, resource management maintains its pre-modern character, as “commodities-based” or “value chain recycling” driven by resource value of the materials.

Value chain recycling is the oldest and pre-modern form of resource management, and is a private economic activity driven by the economic value of the materials. Informal recycling – irrespective of whether it occurs in New York, Delhi, Dakar, Soweto, or Melbourne, is a value chain activity. At the lowest levels shown in Figure 1, above, it provides livelihoods for as many as 1 per cent of the world’s population: in Cairo 80,000 persons are estimated to live from recycling; in Delhi, 150,000 waste pickers. Modernization is not kind to value chain recycling, and waste pickers suffer. But analyzing the dynamics can lead to identifying strategies and solutions (Velis, Wilson and Cheeseman 2009; Strasser 1999; Medina 1999; Scheinberg 2001a and 2001b; Medina 2004; Wilson 2006, Scheinberg, Simpson and Gupt 2007; Gunsilius, Chaturvedi and Scheinberg 2010; Iskandar and Shaker 2007).

Analysis

Part 1: A Tale of Four Cities

Three very different cities and one regional government analyzed in the Habitat book can be used to illustrate and contextualize the modernization process in relation to solid waste management. The cities are: Rotterdam, the Netherlands, with a GDP (gross domestic product) of US \$46,750 and 528 kilos of waste per person per year; Varna, Bulgaria also a significant port city, with a GDP of US \$5,163 and 435 kg per person per year of waste; and Bamako, Mali, with GDP of US \$556 and waste generation of 219 kilos of waste per person per year; and Tompkins County, New York, USA, a rural regional government with a GDP of US \$45,592 and 577 kg per capita per year waste (Scheinberg, Wilson and Rodic 2010; GDP data from 2009).

Rotterdam, the Netherlands

Rotterdam, with high GDP, has a complete, mature, integrated solid waste system with 100 per cent cost recovery and the relatively high cost per household of US \$364 per year (Rotterdam city report, part of Scheinberg, Wilson and Rodic 2010). The environmental driver and integrated waste management were introduced in the Netherlands in the period 1979-2002, with a heavy emphasis on national level processes, planning, and control.

Landfills are modern but scarce, as the country sits on the delta of the Rhine River, and most of it is reclaimed land from below sea level, meaning there are few places where waste can be kept separate from water. The Netherlands was one of the first countries to introduce landfill bans, which prohibit cities from landfilling materials that can be directed to the value chains. In the 1980s there was a national commitment made to valorizing household organic waste, which results in near-universal curbside collection of *GFT* (a combination of organic kitchen and garden waste) feeding a network of centralized MSW composting facilities. Incineration of waste is an accepted part of the waste management system, and Rotterdam has more incinerators than any other city. The national goal is 83 per cent diversion from landfill, and at the time of this writing it is being re-interpreted as 65 per cent diversion from disposal of residential and small commercial waste.

Households and businesses in Rotterdam have their mixed waste collected once per week at the curb, they can call for pick-up of bulky waste, and they have deposit containers for recyclables and old clothing within easy walking distance.³ Fully 100 per cent of waste is captured by the system and disposed of either in incinerators or a controlled landfill; 30 per cent is recovered through targeted recycling and organics management. The key actors operating waste management in the system represent a mix of the large para-

³ All other Dutch cities also collect compostable *GFT* (vegetable, fruit, and garden waste) from households or depot containers, but Rotterdam does not.

statal ROTEB, and other para-statal, public, and private actors, all of whom are formal, legitimized, and in a transparent relationship to each other. Rotterdam has an abundance of incineration capacity and an imperative to keep the incinerators operating.

Yet in spite of a well-functioning removal system, resource management is weak, especially relative to other Dutch municipalities and the EU guidelines. The source of funds in the Dutch waste management system is the “afvalheffing,” a universal yearly fee of about US \$500 which pays for disposal, but also for a variety of diversion activities, including curbside collection of *GFT* and mixed waste, drop-off of paper, glass, textiles and batteries, and since 2011 mixed plastics, mobile household hazardous waste collection in most cities, and the operation of all infrastructure and facilities. All households have to pay, irrespective of the number of persons, the size of the dwelling, or the amount of waste generated, so they are not sensitive to amounts disposed. Disposal is expensive, but it is not actually correct to say that it is priced, because the costs are covered by the fee no matter how high they go.

Varna, Bulgaria

Bulgaria, like other countries acceding to the European Union, has reformed and modernized the waste infrastructure, institutions and financial structures in its major cities in five to eight years, based on the requirement to re-organize the waste system and fully integrate the environmental and resource management drivers into EU policy and practice. Under the influence of the European Union (EU) accession process, Varna has modernized parts of its solid waste system serving urban areas.

Fully 100 per cent of the urban households in the City of Varna have collection services offered to them at a cost of US \$160 per household per year, and virtually all urban waste is reported to be disposed in the city’s recently re-constructed controlled disposal facility. Yet there are rural and village areas within Varna’s administrative region with only occasional waste collection, where residents use horse-drawn carts to dump the agricultural wastes over a cliff or into a river valley where they are left to decompose, together with plastic wrappers, a quite large amount of construction and demolition waste, and occasional hazardous materials such as asbestos or paint cans. Neither official nor informal disposal is priced. Even though some places have no collection, the main policy driver, under EU influence, seems to be the environmental one, and indeed, the old dumpsite has been reconstructed and improved.

Modern and pre-modern systems clash in the area of resource management. On the one hand, value chain recycling is a lively business, and Varna’s reported 27 per cent recovery is attributed mostly to activities of the informal recycling sector. The sector is split between Roma individuals and micro-enterprises (often with horse-drawn carts) who collect cardboard, metal, and paper from the metal two-cubic-metre street containers, as well as from the dump and from households, and pensioners who collect cardboard and other recyclables from the street to supplement their pensions. Both kinds of reclaimers sell to neighbourhood junk shops and buyers situated near the dumpsite. There is a perennial discussion about the nuisance caused by container picking and the need to criminalize it, but the national waste law does not define principles of ownership of waste so no action is possible. On the other hand, the EU-financed formal packaging organization, EcoPack Bulgaria, has a very large subsidy for placing of drop-off containers and advertising scantily clad women with soft drink packages, yet it collects far fewer materials at a much higher cost per ton (Doychinov 2008; Scheinberg, Wilson and Rodic 2010; Scheinberg and Mol 2010). Without priced disposal, the city authorities talk about recycling but do not invest in knowledge or infrastructure, so it is not really possible to speak of municipal recycling. A municipal recycling plan written in 2001 has never been accepted or implemented. The recycling initiatives in the resort zones operate at a low level of effectiveness. The systems compete with each other, and there is little synergy.

Bamako, Mali

Bamako, Mali, is one of the lowest-GDP reference cities. The public health driver can be said to dominate, with a drive to achieve higher primary collection coverage and increase the payment rate to the micro-enterprises that provide it. The financial driver does not operate, and there is no indication of financial reforms, priced disposal, or municipal recycling. Donor attempts (over a period of more than 20 years) to

support interest in the environmental protection driver have had little effect, the proposed disposal site is 30 km outside the city and there is no payer to cover transport costs.

Among the city's residents, 55 per cent have access to primary waste collection, and a recent law actually requires them to subscribe to service via a micro-enterprise called a *GIE*, an economic interest group, to collect their waste daily with a donkey cart. The official cost is about US \$18 per household per year, but the definition of household is contested and not all households pay. The official fee, even at the current payment rate, fails to cover the cost of operation of collection, and is a source of continual discussion and conflict.

The collected waste is discharged in "transit depots," some officially designated, some informally used. There it may be moved to larger vehicles for transport to the main dumpsite, or left on the ground to decompose on its own, and later removed by the *Voirie* (public works division) vehicles or private entrepreneurs. None of the waste goes to controlled disposal. The main dumpsite is in the middle of one of the six sub-municipalities, extending into the river. It is neither managed nor priced, although some of the *GIEs* pay something to someone in a way that is not transparent. This dump is waist deep in plastics, rubber, and many kinds of partially decomposed materials. The amount of waste reaching the site is not documented, so it is not possible to say what percent is disposed (Scheinberg, Wilson and Rodic 2010; Anschütz et al. 2005; Keita 2002).

Industrial value chains in West Africa are weak, and little can be recycled, although there are indications of a developing demand to recycle PET bottles. Personal reuse combines with small amounts of recycling in a system that is largely informal, but organics recovery is very significant. Periodically, usually before the rainy season, the waste that has accumulated at the transfer sites, which consists mostly of organic wastes and plastics, is removed by the city or private entrepreneurs and sold to peri-urban vegetable farmers. They spread this partially decomposed "terreau" product on their gardens. A second form of organics waste valorization occurs when cattle herders graze their cattle on the waste at the depots. In Mali's dry sahelian climate, the intrinsic value of the nutrients in the waste is enough so that the agricultural value chain "pulls" most of it for recovery. Between 55 and 85 per cent of waste generated is recovered in this way⁴ (Scheinberg, Wilson and Rodic 2010; Anschütz et al. 2005; see also the film "La Vache qui ne Rit Pas" 2007, available on YouTube).

Tompkins County, New York

Tompkins County, a rural regional government with a population of 103,000, of which 40 per cent are in the City of Ithaca and associated with the Cornell University, decided in the beginning of the 1990s not to develop their own landfill, but to invest in valorization and "export" the residuals to a private sanitary landfill 60 km away, in the next county, for a cost of US \$80 per ton. Tompkins County has a highly modernized system, where the resource management and financial drivers dominate policy and practice.

In place of investing in a new landfill, Tompkins County stakeholders decided at the end of the 1980s to invest in diversion and recovery. The county developed a materials recovery facility and transfer station, The Tompkins County Recycling and Solid Waste Centre (TCSWC), and financed universal house-on-house collection of source-separated recyclables. All households have separate recycling collection, funded by a US \$56 annual fee that is paid by all households and businesses. Solid waste collection, on the other hand and paradoxically, is a paid private-to-private arrangement, except in the City of Ithaca and three other urbanized villages, where the local authority collects the waste. In the rural areas, many households bring their residuals to a depot themselves, especially since the universal availability of recycling collection reduces their amount of waste by more than half. Residents pay per bag for their non-recyclable waste; at the time of this writing the cost ranges from US \$3.50 to US \$6.00 per 120 litre waste bag or container.

The diversion rate from disposal in Tompkins County was reported as 61 per cent in 2010, with more than half attributed to the curbside collection efforts. Avoided cost of export to private disposal finances not only

⁴ The informal practice of *terreautage* and the established market for *terreau* in the agricultural value chain continue to frustrate efforts to establish a practice of and market for more compost in Mali, the added value of composting isn't clear and there is no demand for something sold as "compost."

curbside collection, but a range of special services to businesses. Subsidies and small grants stimulate many forms of valorization, ranging from deconstruction of houses and re-sale of architectural elements for re-use, to a commercial recycling and composting support programme to businesses, where a public-private partnership (PPP) collects food waste from restaurants and institutions and composts 2,000 tons per year, mixed together with paper plates and compostable plastics (Tompkins County Solid Waste Plan 2012; Scheinberg, Wilson and Rodic 2010).

The county, with its modest population of 100,000, shows other modernized characteristics in combination with municipal recycling. The finances of solid waste are independent of the county budget, based on a dedicated *enterprise fund* built up from income from waste disposal fees, the annual fee, and revenues from sale of recyclables. Financial and administrative autonomy allows the division to invest in knowledge and personnel on the one hand, and to provide advisory services to businesses and communities and develop new diversion initiatives on the other. For a small polity, Tompkins County's seven full-time recycling and waste professionals and three administrators represent a large investment in human resources and knowledge.

Informal activities are present in the form of private collection of kitchen waste for chicken feed, and a wide range of re-use and second-hand businesses driven by the market for second-hand products for the 40,000 students from three universities. These are areas of the waste system which have not yet been touched by municipal recycling.

Part 2: Recycling and Valorization in 20 Cities

The data set compiled from 20 reference cities profiled in UN-Habitat's Third Global Report provides a broader view of the way the drivers interact with solid waste modernization and recovery. All of these cities have some form of recovery and valorization of materials, but under widely different physical, economic, and institutional conditions (Scheinberg, Wilson and Rodic 2010).

Priced Disposal and Valorization Performance

Table 1 explores in detail the way recycling is organized in the cities, as a way of determining whether we are seeing municipal recycling or not. For Bamako, with the top reported recovery rate, it is clear that neither modernization nor municipal recycling is present. For the next four – San Francisco, Tompkins County, Adelaide, and Quezon City – the combination of priced disposal, high recovery rates, high recovery goals, and very limited informal valorization suggests indeed that municipal recycling operates here. Recycling rates in these cities are pushed by priced disposal, and are exceeding their formal recycling goals by a considerable margin.

The upper middle-income countries in Table 1 have the lowest recovery rates: an average of only 15 per cent of materials are recovered. The private valorization activities appear to have been interrupted, but the city authorities don't yet understand how to valorize materials well enough to capture or market them, and if formal recycling is present, it fails to work, confirming the conclusions of the GIZ informal study. In these countries the material well-being reaches a level where the amount of products in use has increased, but reverse supply chains to return used or discarded items to the production processes have been broken or interrupted (Scheinberg Simpson and Gupta 2010; see also Strasser 1999 on this process in the US, or Gille 2007 on state socialist Hungary).

Here it is quite clear: where the cost of disposal is US \$20 per ton or less, informal sector operations dominate – sometimes animal feeding, sometimes recycling, but it is all in the value chain. In cases where there are policies supporting informal recycling in the context of modernization, such as in the Philippines for the designated junk shops, the term "semi-formal" is useful because the enterprises have some formal characteristics but do not operate fully in the formal economy, and may not pay taxes or be registered. In other cases the term "value chain" is used to imply that the operation collecting the most is selling to the agricultural or industrial value chain in a way that appears not to have been (much) affected by the modernization process (Scheinberg, Wilson and Rodic 2010; Velis, Wilson and Cheeseman 2009).

Table 1
GDP, Priced Disposal, and Valorization in 20 Reference Cities

	GDP, per capita, country, DP 2007, HDR 2009	"Recycling Rate" = waste recovered from total MSW generated	Landfill tipping/ gate fee - per ton	Diversion /recovery goal	Tons valorized by the formal sector	Percentage valorized by formal sector of total generated	Percentage valorized by formal sector of total valorized	Tons valorized by the informal sector	Percentage valorized by informal sector of total generated	Percentage valorized by informal sector of total valorized	Type of valorization indicated
Bamako	\$556	85%	None	0%	0	0%	NA	392,893	85%	NA	ag value chain
San Francisco	\$45,592	72%	\$117	75%	366,762	72%	100%	0	0%	0%	municipal recycling
Tompkins County	\$45,592	61%	\$80	50%	35,625	61%	99%	0	0%	0%	municipal recycling
Adelaide	\$39,066	54%	\$22	25%	401,116	54%	15%	0	0%	0%	municipal recycling
Quezon City*	\$1,639	39%	\$6	25%	58,130	8%	20%	229,842	31%	80%	semi-formal recycling
Delhi	\$1,046	33%	NR	33%	165,565	7%	20%	675,505	27%	80%	semi-formal/ industrial value chain
Rotterdam	\$46,750	30%	NR	43%	90,897	30%	100%	0	0%	0%	municipal recycling
Varna	\$5,163	27%	NR	50%	2,207	2%	6%	35,207	26%	94%	industrial value chain
Bengaluru	\$6,855	25%	\$5	50%	277,025	13%	150%	25,185	1%	14%	mixed municipal and semi-formal
Nairobi**	\$645	24%	\$1	0%	NA	NA	NA	NA	NA	NA	information not clear
Managua	\$1,022	19%	\$2	0%	70,445	17%	89%	8,395	2%	11%	semi-formal recycling
Dhaka	\$431	18%	NR	0%	0	0%	0%	210,240	18%	100%	semi-formal recycling
Moshi	\$400	18%	NR	0%	0	0%	0%	11,169	18%	100%	ag value chain
Canete	\$3,846	12%	NR	20%	142	1%	10%	1,270	11%	90%	semi-formal recycling
Belo Horizonte	\$1,046	11%	\$20	16%	134,400	10%	93%	9,900	1%	7%	semi-formal recycling
Ghorahi	\$367	11%	None	0%	65	2%	18%	300	9%	82%	industrial value chain
Sousse	\$3,425	6%	\$3	0%	168	0%	4%	4,000	6%	96%	ag value chain
Lusaka	\$953	6%	\$6	0%	12,027	4%	69%	5,419	2%	31%	mixed municipal and semi-formal
Curepipe	\$5,383	0%	NA	48%		0%	NA	NR	0%	NA	industrial value chain
Kunming	\$2,432	NA	\$13	0%	NA	NA	NA	NA	NA	NA	industrial value chain

NR=not reported for this city; NA=reported as not being applicable to this city; Y=yes, phenomenon is present but there is no further information

* Two points: first, the payment rate is per truck, reported as US \$3 to US \$9. The number here is shown as the median, US \$6. Second, the recycling rate shown here is for 2009, and differs quite dramatically from the one reported in Scheinberg, Simpson, and Gupta 2007. Partly as a result of the study reported in Chapter 4, the Philippines passed a national policy on informal sector integration, which appears to have affected both the real increase in recycling performance, and the way that recycling performance is reported.

** Two points: first, the payment rate is per truck, reported as US \$3 to US \$9. The number here is shown as the median, US \$6. Second, the recycling rate shown here is for 2009, and differs quite dramatically from the one reported in Scheinberg, Simpson, and Gupta 2007. Partly as a result of the study reported in Chapter 4, the Philippines passed a national policy on informal sector integration, which appears to have affected both the real increase in recycling performance, and the way that recycling performance is reported.

Source: Prepared by the author from data collected for the production of Scheinberg, Wilson and Rodic 2010, modified for this report.

Table 2 looks at the relationship between priced disposal and system costs in the modernization of waste management and recycling. This table suggests that pricing of disposal is more important than the costs in determining recycling rates, since the highest recycling rates are associated with the highest prices for disposal, and follow neither for costs per household nor costs per ton. Rotterdam has both the highest costs per ton and the highest costs per household, but is seventh in recovery rate and has no clearly-priced disposal; its relatively low recovery performance, at 30 per cent – very low for the Netherlands – is then not surprising. Quezon City has low costs but priced disposal, and enjoys the highest non-OECD recycling rate. Belo Horizonte, in contrast, has priced disposal and high costs per household but low recovery rates – suggesting that it is operating in a different model or that there are other drivers operating. And indeed, Belo Horizonte was one of the first cities globally to experiment with different models of accepting and partially formalizing the activities of waste pickers in the context of pushing political solidarity via the governance system, but with less of a focus on solid waste system dynamics.

Table 2
Use of Funds, Priced Disposal and Municipal Recycling Performance in 20 Reference Cities

City	Landfill price based on tipping/ gate fee - per ton	Annual city / municipal budget for SWM per household	Municipal / city costs per tonne handled by formal sector	Annual city budget for SWM per capita / GDP per capita	Percentage of family income used for SW services	Percentage of materials prevented or recovered
San Francisco	\$117	\$31	\$21.91	0.03%	1%	72%
Tompkins County	\$80	\$135	\$100.47	0.13%	0%	61%
Adelaide	\$22	\$95	\$58.27	0.10%	0%	54%
Belo Horizonte	\$20	\$146	\$55.95	0.69%	4%	1%
Kunming	\$13	NR	NR	NR	1%	NA
Quezon City*	\$6	\$37	\$43.32	0.45%	0%	39%
Lusaka	\$6	\$0	\$0.01	0.00%	NR	6%
Bengaluru	\$5	\$26	\$243.75	0.71%	0%	25%
Sousse	\$3	\$55	\$36.89	0.40%	NR	6%
Managua	\$2	\$65	\$35.81	1.22%	0%	19%
Nairobi*	\$1	NR	NR	NR	0%	24%
Bamako	None	\$5	NA/NR	0.14%	2%	85%
Delhi	NR	\$37	\$59.46	0.69%	0%	33%
Rotterdam	Y	\$364	\$353.54	0.40%	0%	30%
Varna	NR	\$61	\$72.74	0.46%	1%	27%
Dhaka	NR	\$10	\$15.48	0.52%	2%	18%
Moshi	NR	NR	NR	NR	0%	18%
Canete	NR	\$24	\$31.27	0.14%	1%	12%
Ghorahi	None	\$5	\$29.13	0.31%	0%	11%
Curepipe	NA	\$60	\$52.72	0.28%	0%	NA

NR=not reported for this city; NA=reported as not being applicable to this city; Y=yes, phenomenon is present but there is no further information
*Asterisks for Quezon City and Nairobi from Table 1 apply here as well.

Source: Data collected to produce Scheinberg, Wilson and Rodic 2010.

Identifying Opportunities for Inclusive and Sustainable Valorization Interventions

Moving from analysis to planning or intervention design, the data set helps us understand the structure of existing valorization. The research done on the 20 cities adds to our insights into the structure of the waste management modernization process, and allows us to distinguish where the combination of environmental

and financial drivers, in the presence of priced disposal, provides a “push” to divert materials and avoid disposal costs. This contrasts with the “pull” of the agricultural and industrial value chains, as shown in Table 3.

Table 3
Optimizing Recovery by Building on Successes

City	Tonnes generated -- MSW only	Tons valorized MSW only	Percentage valorized, MSW only Excludes C&D	Tons valorized, all sectors, includes C&D	Percentage recovered by formal sector	Percentage recovered by informal sector	Operation recovering the most	Tons recovered by operation recovering the most	Percent of total recovered by operation recovering the most
Bamako	462,227	392,893	85%	392,893	0%	85%	Formal and informal land application (terreautage)	144,908	37%
San Francisco	508,323	366,762	72%	366,762	72%	0%	Formal recovery for recycling, various materials	254,101	69%
Tompkins County	58,401	35,894	61%	36,495	61%	0%	Formal recycling, universal curbside collection	35,302	97%
Adelaide	742,807	401,116	54%	2,611,214	70%	0%	Formal recycling of C&D waste	1,257,182	48%
Quezon City	736,083	287,972	39%	287,972	8%	31%	Informal IMBs collecting various materials	176,316	61%
Delhi	2,547,153	841,070	33%	841,070	7%	27%	Informal recovery by waste pickers that recover from Dhalaos (waste bins) and improper dumping areas	1,251	0%
Rotterdam	307,962	90,897	30%	90,897	30%	0%	Formal recovery of paper and carton	21,125	23%
Varna	136,532	37,414	27%	37,414	2%	26%	Informal recovery by waste pickers, also from containers for selective collection, various materials	35,207	94%
Bengaluru	2,098,750	524,688	25%	524,688	10%	15%	Informal waste picking, IMBs of various materials	314,813	60%
Nairobi	876,000	210,240	24%	210,240	NA	NA	Formal and informal recovery of paper and plastic	NA	NA
Managua	420,845	78,840	19%	78,840	3%	15%	Informal recovery by dump pickers of various materials	44,530	56%
Dhaka	1,168,000	210,240	18%	210,240	0%	18%	Formal recycling of paper supplied by informal recovery	61,320	29%
Moshi	62,050	11,169	18%	11,169	0%	18%	Informal animal feeding and land application of organic waste	11,169	100%
Carate	12,030	1,412	12%	1,412	1%	11%	Informal IMBs collecting various materials	548	39%
Ghorahi	3,285	365	11%	365	2%	9%	Informal IMBs collecting various materials	300	82%
Lusaka	301,840	17,446	6%	17,446	4%	2%	Formal recovery organized by recycling industry	12,027	69%
Sousse	68,168	4,168	6%	4,168	0%	6%	Informal recovery for animal feeding	1,500	36%
Belo Horizonte	1,296,566	12,200	1%	145,134	6%	0%	Formal recovery of C&D waste	132,934	92%
Curepipe	23,764	NA	NA	NA	NA	NA	Informal recovery of metals (end-user not on island)	NA	NA
Kumming	1,000,000	NA	NA	900,000	NA	NA	Formal metal recycling	890,000	99%

NR=not reported for this city; NA=reported as not being applicable to this city; Y=yes, phenomenon is present but there is no further information
Adelaide, Belo Horizonte, and Kumming includes C&D waste and industrial waste. For this reason, the tons recovered exceeds the MSW tons generated. Tompkins County includes tons prevented and reused.

Source: Data collected to produce Scheinberg, Wilson and Rodic 2010.

When the goal of the intervention is to increase diversion from landfill or build high performance valorization systems, it is important to know not only how the system is performing, but where the performance is located. For example, in Table 3, Bamako's diversion via the production of terreau is 100 per cent informal; the city has nothing to do with it. But if the city authorities were to be convinced that they needed to divert organic waste through composting, they would quickly find themselves paying quite a lot of money to compete with the terreautage, which is occurring without direct cost to the city. Instead of competition, a strategy to work with the informal terreau producers to improve their working conditions, increase the quality of their product (and keep the plastic out of the fields), would have a higher potential for a good result.

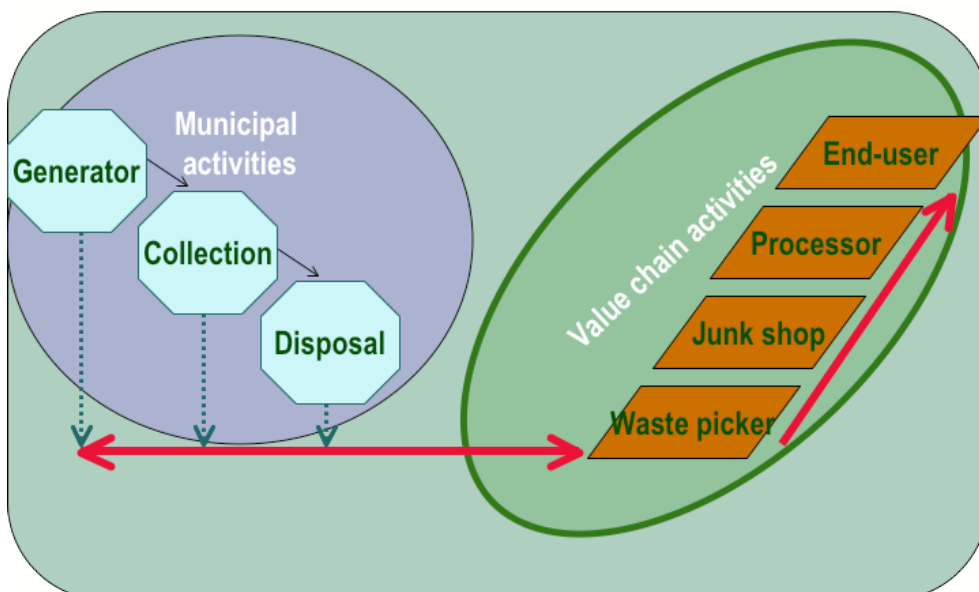
For other high-recovery cities, some form of municipal recycling operates, but there is a difference in how the high performance is distributed. In Tompkins County, there is one operation that is responsible for most of the recovery, universal curbside collection of recyclables, which accounts for 97 per cent of all recovery. Taking this into account, additional interventions should consider whether the potential gains lie in this area, or that other activities should be developed. In San Francisco, formal recycling accounts for just over two thirds of all recovery, suggesting that it is worth investigating which other activities could be maximized. In cities like Bengaluru, Quezon City, Delhi, and Varna, both formal and informal recovery operate, but the informal operations recover more. This suggests that the situation may be similar to that described for Varna, above, where there is competition between the systems. Programme design under these conditions should focus on legitimizing informal operations to stabilize, secure, and optimize their existing level of performance.

Answers to the Research Questions

What key features and aspects of the modernization of waste management systems are important for integration of the informal sector in modern waste management systems?

Before the current wave of modernization, which had its origins in the water and environmental protection laws of the 1970s, value chain recycling going back to the 1600s dominates, as shown in Figure 2. A salient aspect of value chain recycling before modernization is that the municipal and value chain activities do not touch each other, but are distinct and separate. The only connection is that some materials move from the solid waste landscape into the value chain.

Figure 2
Value Chain Recycling Before Modernization



In upper-income OECD countries, such as those in the European Union, the environmental protection driver interacts with the financial driver to turn disposal into a priced service during modernization. Local authorities, especially when they no longer own the dumpsite, pay for disposal on a per-ton basis, which turns a “free” ecosystem service, or even a source of revenue, into a cost. Once disposal is modernized, and priced, the focus of much municipal activity in waste management is on avoiding it. “Municipal recycling” results from interactions between the environmental, resource management, and financial drivers. Diverting material from disposal allows local authorities to focus on using the value chains as a destination for materials that would otherwise be waste. This second service-based kind of recycling creates benefits by minimizing disposal, that is, by keeping materials in circulation for as long as possible (Scheinberg 2011).

This in turn shifts valorization (organic waste recovery and recycling) from being a purely private commercial (or charitable) activity to becoming a part of a modern urban environmental service. Municipal recycling, the third “R” in the catchphrase “three Rs”⁵ emerges in this process as a new hybrid form. Municipal recycling emerges only as a result of a financial reform that results in attaching a price to disposal, thereby incorporating the legal and technical reform in the financing of the solid waste system. The definition of municipal recycling is that it is part of a total provisioning system, and financially integrated into it. When it emerges, valorization shifts from a net system cost to a net financial benefit. Local authorities introduce and pay for municipal recycling as a secondary sink, even if there are no “real” value chain revenues (Scheinberg 2008).⁶ The development of a technological, financial, institutional, and socio-cultural knowledge base, and the creation of separate bureaucratic entities with budget lines for recycling, represent some of the measures that serve to re-embed and institutionalize municipal recycling. At this point, we can speak of an ecologically modernized waste management system.

Municipal recycling generally also implies substantial investments in high-income cities in knowledge and infrastructure for valorization, motivated by the financial pressures from modern disposal, as shown in Figure 3. Here you can see that the municipal activities have expanded to absorb most of the value chain, and that this implies a shift in the “centre of gravity” of recycling from the private to the public sector. The waste pickers and value chain reclaimers at the bottom of the value chain are excluded: their role in primary recycling has been taken over by municipal source separation and separate collection activities. So to these cities, *recycling* means investing in staff, knowledge, and physical infrastructure for valorization. Revenues from sales help, but the main *financial* benefit is the *avoided costs of disposal*. Getting materials to the value chain is simply less expensive than modernized disposal (Scheinberg 2003; Huisman 2008).

Progressively deeper reforms and re-structuring produce a system like that in Tompkins County, Adelaide, or San Francisco. Authorities gain experience, as they progressively divert more and more materials from disposal, reduce costs, and report successes to users. This creates a virtuous cycle of avoiding disposal costs, generating increased “revenues,” and using them for new investments in municipal recycling and organic waste diversion, which in turn diverts more materials and allows financing of new diversion activities. The development of municipal recycling and its embedding in the new discipline of integrated solid/sustainable waste management results in a new hybrid form, which changes the dynamics of the whole solid waste system in a profound way.

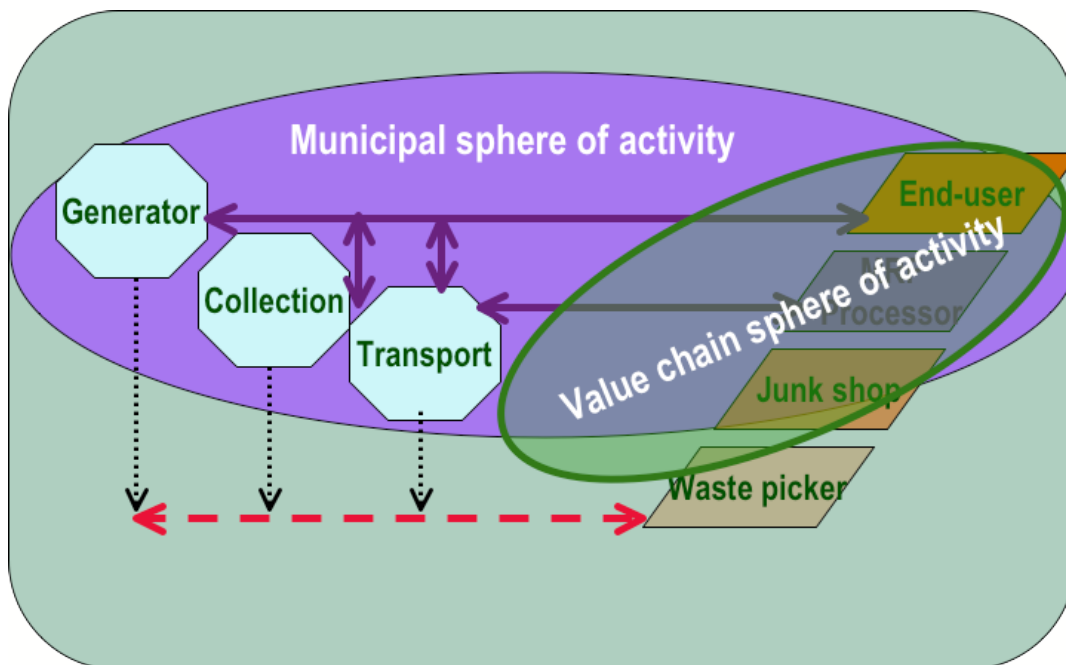
⁵ “3-R” is widely used to refer to “Reduce, Reuse, Recycle,” an English-based way of referring to municipal recycling as covering, beyond recycling, the other two top levels of the hierarchy described in chapter 2.

⁶ By this, it is meant that the inherent value of the materials in the value chain is high enough to cover the costs of extraction, before, during, and after modernization. Ferrous and non-ferrous metals generally meet this criteria in almost all countries, because there is an extensive global value chain that reaches into most local places. Waste paper and secondary fibre meet this criteria in Asia, where the global value chain enterprises are concentrated, and for many countries high-grade sorted papers will usually pay for themselves everywhere except in sub-Saharan Africa, where the combination of distance to markets, poor infrastructure, relatively little paper in the waste stream (and most of what there is coming from imported sources), and few value chain end-users creates a situation where the price seldom covers costs of extraction, processing, and transport. Polyolefine plastics, specifically HDPE, PP, and PET, increasingly pay for themselves and the infrastructure of medium-scale processors is growing – driven primarily by Chinese demand. Glass containers pay for themselves when there is an end-user within 500 km of the point of generation, but this value chain is shrinking and seldom works without some form of subsidy related to producer responsibility, which is why it works in Europe.

Are there key and relevant differences between high-income and low- and middle-income countries, if so, what effects do they have on recycling and on the informal valorization workers and enterprises?

In low- and middle-income countries, the same pressures lead to cities and regional governments claiming an exclusive right to valorize the materials in the waste stream, or at least to get the money from marketing materials. To these cities, recycling means that they are going after the “gold in the garbage,” not to avoid disposal, but rather to finance disposal. And they have an interest in pushing value chain actors out, to increase potential income. In this case, an exclusive recycling strategy fails in three ways: (1) without investment, few materials are recovered and the cost per ton to recycle is much higher than the revenues from the value chain; (2) it competes with waste pickers and other value chain actors and disturbs existing commercial paths for recovery, so the actual amount of materials recovered drops, more materials go to disposal, and the costs of waste management go up; and (3) it creates hostility between the private and public recycling initiatives, so that markets for materials from municipal recycling remain closed.

Figure 3
Municipal Recycling in High-Income Countries



In the absence of priced disposal, municipal recycling fails to emerge, with the result that there is a vicious circle created of competition between informal and public-sector recycling systems, conflict, monopolistic behaviour from municipalities, criminalization of waste picking, and other problems. The modernization histories of Delhi and Cairo are typical, and cities like Varna and Bengaluru, as well as primary and secondary cities in many middle-income countries, are at risk for these dynamics as well. Municipalities seek to take organic waste and recyclables away from waste pickers, organics collectors, swine feeders and the smaller recycling enterprises, and to criminalize private value chain activities. Not only informal recycling, but also animal feeding, may be labelled as illegal. With negative attention, fines, police harassment and outright municipal hostility, the informal sectors lose livelihoods and may stop this work altogether. Industrial value chain recycling and agricultural value chain organic waste utilization are interrupted, so more materials require disposal.⁷

⁷ While outside the scope of this report, it is perhaps useful to note that this cycle of interruption and social stigma for recovery has operated much more completely in sanitation, or the management of human excreta. Public health concerns arising from epidemics in the nineteenth century in practice obliterated the value chain demand for nutrients available in human excreta. Current resource shortages related to phosphate and water and an ecological sanitation movement centred in Northern Europe are now faced with the challenge of restoring these relationships.

Also public sector recycling fails. Without priced disposal, there is no incentive to invest in knowledge, equipment, or re-design of provisioning systems. The city authorities or their private contractors may introduce separate collection schemes, but they are seldom able to get the materials into the value chain; they simply don't know how to valorize materials, don't understand the value chains, and lack commercial contacts or experienced traders to help them. Lack of knowledge hampers the ability of producer responsibility organizations to capture significant volumes of materials and divert them from disposal.

Declining private value chain activity, bungled experiments of inexperienced local authorities, and overcapitalized formal infrastructure have perverse effects. Value chain relationships are broken and frustrated city authorities blame the private sector for their own ignorance in marketing materials. The volume of materials going to disposal increases, and so do costs. More often than not, the attempt to reduce these costs results in a lowering of disposal operations standards: within a short time the landfill develops into a dumpsite – only now the informal valorization systems have been broken, so even more waste goes to disposal.

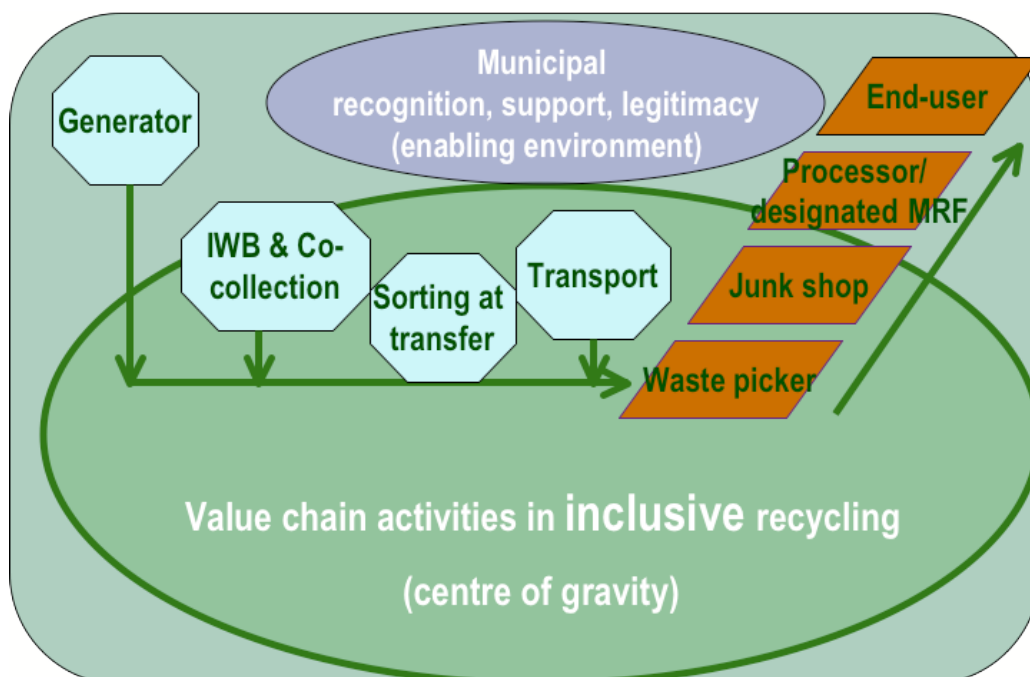
Instead of a virtuous circle of increasing costs of disposal, driving ever higher levels of valorization through new structural relations between local authorities and value chain markets, the modernization process in low- and middle-income countries produces a vicious circle of competing claims for rights to valorize materials, disenfranchisement of the least powerful value chain actors, and disruption of materials cycles. The whole modernization experiment is at risk of becoming a failed import from the North.

What actions can be taken at the system level to increase cooperation and improve outcomes?

Instead of municipal recycling, actions can be taken in low- and middle-income countries for supporting and institutionalizing inclusive recycling, a low- and middle-income country alternative to municipal recycling, as shown in Figure 4 (see also Scheinberg, Wilson and Rodic 2010; Chaturvedi 2009; and www.inclusivecities.org).

In inclusive recycling, the main responsibility and “centre of gravity” for valorization remains in the private value chain, which may be able to diversify and take responsibility for separate collection, transfer, or processing. Examples include involving itinerant waste buyers (IWBs) as part of modern source separation, or the designation of private junk shops as official material recovery facilities (MRFs) in Quezon City (Wilson 2006; Scheinberg, Simpson and Gupt 2007; Cardenas et al. 2007).

Figure 4
Emerging Model of Inclusive Recycling in Low- and Middle-Income Countries



Inclusive recycling maintains private value chain control over valorization of recyclables and organic wastes, but involves municipalities as facilitators of the activity. Municipalities recognize, appreciate, authorize, and take credit for the performance of the private value chain and in return get the continued and increasing benefit of reduced materials to manage in the formal provisioning system and increased positive environmental and economic externalities of private valorization. In some cases there may be explicit risk- and revenue-sharing.

Inclusive recycling reverses the relationship of public authorities to environmental externalities. Inclusive recycling relies on private actors being able to earn private benefits that have positive environmental externalities for the municipal waste provisioning system. These positive externalities are the basis for creating a relationship of shared risks and responsibilities, but the emphasis remains on the private sector actors, who in some sense – in the absence of priced disposal – continue to finance most if not all valorization activities.

Conclusions and Recommendations

Conclusions

The first conclusion is that while many aspects of the solid waste system during modernization look the same in low-, middle-, and high-income countries, there are some key differences that produce different outcomes. In wealthy countries, where governance and tax systems have a longer history, the response to rising disposal costs is (usually) to re-organize institutions and push financial reforms which make the waste system sustainable over the long term. The financial reform of pricing disposal creates the new institution of municipal recycling, with its virtuous circle of internal financial incentives for more recovery, as shown in Figure 3. In low- and middle-income countries, the need to price disposal is not seen as critical, especially since many potential payers are perceived as unable to pay the costs. The result is a vicious circle that creates high risks for waste pickers, leaving them out of the picture. In the absence of priced disposal, a commitment to “recycling” seldom works, even when there is apparent political interest in environment or resource conservation. Like certain kinds of gender interventions, interest is not enough – it is reforming finances and institutions that introduce change in how the system functions.

Related to this, we can also conclude that effective and fair valorization systems are in some sense discourse-dependent. This explains in part why the early ILO interventions based on social outrage at labour conditions of waste pickers didn't work very well. They sought to make change at the level of rights of the workers or improvement of the conditions of work, or eliminating child labour, without understanding pickers' relation to the entire system. With a social focus, they perhaps didn't even *see* that waste picking is part of the pre-modern system at all, nor understand its place in it.

The Brazilian Waste and Citizenship Movement is a global leader in reforming governance, because that is where it has its focus. But it has, in some sense, missed reforming the financial base of the solid waste system, and so, in Belo Horizonte, in spite of the high level of attention to waste pickers and political solidarity with them, recycling rates are low. In Bamako, the main discourse is about making solid waste affordable for residents, which means that there has been a strong emphasis on primary collection, but that disposal – priced or not – remains outside of the discourse. The EU approach to producer responsibility in Bulgaria has also produced meagre results, in part because it has ignored the existing recycling within the system, and based its ambitions on symbolic politics rather than on institutional and financial reforms.

Recommendations

If these conclusions are correct, then the main recommendation from this investigation is that a focus on the dynamics of the solid waste system is critical for effective action, both in the area of support to recyclers in the informal economy and in relation to ambitions for high-performance and effective recycling. For this to work, understanding the dynamics of inclusive recycling is essential. Three emerging inclusive recycling models can be distinguished in current practices in low- and middle-income countries.

The first inclusive recycling model can be labelled a *service model*, as informal recyclers are paid for a service and as such become part of the provisioning system of solid waste management. The expansion of the green oval in Figure 4 and the addition of sorting at transfer stations represent service elements in inclusive recycling.

To implement the service model, the recommendation is to add service elements to value chain activities and to document their economic and operational (and CO₂) benefits. This was the approach taken in the GTZ informal sector study (Scheinberg, Simpson and Gupt 2007). Service models create a basis for some types of support and funds transfers from the solid waste system to support valorization. By expanding value chain recycling beyond extracting value from commodities, it should be possible to claim that the local authority is benefiting by diversion of waste from disposal, and on this basis to claim that the local authority should cover some of the costs. An example is the insuring of waste pickers by the city of Pune, India.

Inclusive recycling in a service model can also be seen in Cairo, where the Zabbaleen are paid for collecting waste and, incidentally, valorizing it so it never enters disposal. Community-based organizations in Lusaka and Lima come close to a service model because they are paid for *both* the service of collecting and the effect of recycling (Ibid.; Gunsilius, Chaturvedi and Scheinberg 2010).



Licensed waste pickers operate a hybrid model of separate recyclables collection in Lima, Péru, 2006.
Photos: J. IJgosse

The second inclusive recycling model can be labelled a commodities model. Here value chain actors collect materials and valorize them, and keep the revenues. Commodities models leave the value chain in charge of valorization, and encourage local authorities to share the risks and claim both credit and key benefits.

To implement the commodities model, the main recommendation is to require that informal valorization be included in the calculation of recycling rates, and that its impacts on total waste requiring disposal be taken into account in all consulting studies, waste planning, and technical feasibility studies for waste infrastructure. In the Netherlands and in other wealthy countries, a strategy that looks very much like commodities

model inclusive recycling is used to increase and reward private valorization that falls outside of the range of recognized municipal recycling, for example, by paying *diversion credits* to private clothing collection charities in Rotterdam, the Netherlands or subsidizing the activities of re-use and repair businesses in Ithaca, New York or San Francisco, California, USA (Scheinberg, Wilson and Rodic 2010; Scheinberg and IJgosse 2005).

The second recommendation, as in the recent Peruvian solid waste law, is to require that informal (as well as semi-formal and formal) actors in the value chain be invited to participate in modernization and upgrading plans. Middle-income countries, specifically India and Brazil, and large Latin American cities like Lima and Bogotá, have done some experiments with this model. Quezon City, Philippines, authorizes private sector junk shops as receiving points for recyclables as part of the work packages that are contracted to the micro-private sector in each barangay.⁸

**Table 4:
Examples of Inclusive Recycling**

City / Country	Project or intervention in line with the ideas of inclusive recycling
Brazil Philippines	Municipalities give informal recyclers/junk shops concessions to collect or receive materials /to operate recycling centres (ASMARE and Quezon City MRFs).
Mali (W. Africa)	Communes give local platforms concessions to operate recycling transfer and community disposal and sell the decomposed soil to farmers (COGEVAD, Mali) (Anschütz 2005).
Egypt Columbia	Informal recyclers use city land for post-collection sorting, tip areas (Colombia, Cairo); mostly they don't pay but they have no rights to stay there if the city changes its mind.
Bangalore, India	An NGO introduces waste pickers to large business generators. Each waste picker gets a service fee for cleaning, and guaranteed access to that business's materials (Bangalore, India).
Tanzania Bulgaria micro-franchise	Cities and municipal districts allow micro-and small enterprises to tender in order to have exclusive rights to waste collection and in some cases recyclables (Dar, Tanzania), sweeping (Bulgaria). But the MSEs and CBOs have to collect money from households.
New York USA, South Africa	Private companies hire waste pickers to work while they excavate, sieve, and reconstruct the old landfill, shift to a cell pattern, add recycling and composting areas.
Bangladesh, India, Malawi, Kenya, PPPs	CBOs and MSEs pay market managers for the right to collect market waste, separate and wash plastics, compost organics from markets.
Brazil China PPPPPs	State and city governments organize collection privatization tenders require working with the informal sector.
Costa Rica, Honduras, India	NGOs work on PPPs with bank sector & finance ministry and cities to make loan guarantees which require longer contracts to MSEs/CBOs.
USA, Canada, Netherlands PPPs	Cities collect organic waste and bring it to private compost producers to process for a fee. Same cities agree to use a certain volume of compost for parks, road berms, cemeteries, public spaces; pay a lower fee for composting.
Sri Lanka, Belgium PPPs	The agriculture ministry provides subsidies and technical assistance to farmers to accept source separated organics and make and use compost from municipal collection.
Netherlands	NGO second-hand shops and clothing collectors also function as a workplace for former collectors. The shops can claim an output-based payment per ton from the municipality, for the tons that they have recycled or repaired and sold.

⁸ "Barangay," the Tagalog word for village, is used in urban settings to mean the lowest level of political division, similar to a "ward" in India.

Table 4 continued

City / Country	Project or intervention in line with the ideas of inclusive recycling
India, Brazil, Mali, Columbia, & globally	Global organizations pay local organizers to support informal recyclers to form, unions, NGOs, cooperatives; platforms; associations, and get health care from the city.
PPP Philippines, USA, Canada, Costa Rica	Recycling cooperatives rent warehouses so they can store material, and share transport to better markets. They get a subsidy from the municipality, the port authority, or other public entities, as part of economic development. The official diversion rate includes these materials.
Philippines; Colombia; USA	Recycling cooperatives and associations organize collective transport, storage, and/or marketing cooperatives; municipalities authorize the cooperatives and may give them land or a building in which to operate.
Indonesia, Canada & California USA, Bangladesh	Community development officials support and pre-finance recyclers to develop hybrid or new businesses combining services with valorizing the materials; respectively: composting, deposit return, carbon financing.
Costa Rica, Netherlands, Canada	National governments make laws requiring producers to take their products back and recycle them (EPR). In Costa Rica, the producers hire informal recyclers to dismantle the computers in a workshop with good working conditions.
Costa Rica, Brazil, Cairo, India	NGOs get funds from the municipality to train waste pickers and value chain actors; give them income support; keep children in school; teach parents to read; pay health insurance.
Peru, New York (NY Times); Brazil, Manila	Informal recyclers organize themselves to manage waste at sorting events, outdoor concerts, fairs, and markets. They get a fee from the organizers but get to keep the recyclables.
Peru, India, Brazil, Philippines	The city authorities provide waste pickers and value chain actors with uniforms, shoes, gloves, eye protection, and ergonomically correct carts. They provide insurance and give them ID cards which allow them to enter residential areas and collect recyclables without being harassed, or to manage municipal depots to which the private informal recyclers have a key. The collectors keep the recyclables and sell them; do not receive any salary. The city claims the diversion as part of their reporting to the environmental authorities.
Source: Elaborated for Scheinberg 2011, WASTE 2010.	

Thirdly there are hybrid models, where the municipality and collectors share responsibilities and also share benefits and revenues in recycling and solid waste management. The local authority goes beyond recognition and tolerance of value chain activities, towards active support of these activities.

For hybrid models, in addition to the recommendations above, the main recommendation is to change the boundary conditions and definitions of ownership and rights in the waste system itself. This includes protecting access to recyclables in law, defining ownership clearly, and changing or eliminating legal definitions of informal or value chain recycling as theft. For example, the Austrian waste law that defines “waste” as anything the owners might intend to give to the solid waste system, should be changed to say that waste is any item which has entered the waste system or is placed in the infrastructure of the waste system. Promoting or requiring source separation as a part of primary collection is also a key intervention in this area, because it creates economic niches for itinerant waste buyers in the modern system (Wilson, Velis and Cheeseman 2006).

A related recommendation is to pro-actively authorize legal and physical spaces for informal activities in valorization, and to improve valorization infrastructure (Chintan-Environmental 2005). The improvement of infrastructure means that working conditions improve, the quality of materials improves, and value chain actors improve their status. Specific examples in a pro-active authorization are the granting of concessions or franchises or district monopolies, facilitating value chain access to credit and government assistance programmes, or providing city land, buildings, or equipment to value chain actors to reduce their costs and increase their efficiency.

Finally, for all types of interventions, there is a recommendation to clarify the nature of the intervention and how it positions the formal and informal systems in relation to each other. Table 5 offers a first classification of interventions for this purpose.

**Table 5:
Towards a Vocabulary of Interventions**

Access	Access refers to legal capacity of the enterprises or individuals (a) to extract materials from the waste system for their private valorization activities or (b) legal availability of debt or equity capital for improved equipment or facilities from banks or financial institutions.
Formalization	The mirror image of legalization, formalization implies that the informal enterprises take the initiative to change their status to that of formal enterprises, NGOs, cooperatives, unions, or companies. The specific form is not important, as long as it is a priori recognized as a formal legal model. Formalization generally moves these enterprises in the direction of a business and tax registration. There is an implicit promise in formalization that the businesses will then be able to have official contracts (among other things) from local authorities, but it puts the emphasis on the enterprises and informal workers themselves to create a relationship to the formal system and adapt themselves to fit into it (Schmied et al. 2010).
Inclusion	Inclusion reaches towards a policy and governance principle that allows room for private valorization activity within the public waste management system. An inclusive waste system or policy is one where at the level of planning or conception, there is an expectation of informal or formal micro private sector participation.
Integration	Integration implies the willingness of public authorities to re-define the solid waste system so that it can include the activity of valorizers and waste enterprises in the informal economy. Unlike legalization, integration implies that both waste system and informal workers and enterprises shift towards each other, and that the nature of the waste management system changes as a result of this shift. Integration is a tricky concept, though, because in order to succeed, real modifications on both sides are necessary.
Legalization	Legalization requires public authorities to take steps to modify the formal, legal solid waste system so that the economic activities of informal sector enterprises and individuals in the informal economy are de-criminalized. The main area of activity is by the public authorities.
Professionalization	Professionalization includes actions taken by institutions and/or collections of individuals in the informal economy do modernize and improve the way they do their work. Professionalization can refer to specific methods, equipment, knowledge, and behaviour in general. Professionalization tends to focus on knowledge and skills of the human beings. Examples include using protective equipment and tools, increasing numeracy and literacy among waste pickers, strengthening negotiating skills, providing training on marketing materials, introducing techniques for maintenance of vehicles or care of draught animals, and the like.
Recognition	Recognition refers to the way that formal authorities see and treat informal enterprises, both before and during periods of modernization, and in a mature waste management system.

If the frame of reference for investigating and integrating informal recycling is a system approach to solid waste management, there is some chance of producing system change. The focus needs to be on understanding the specific solid waste system and working together with formal and informal stakeholders on identifying reforms that can work. If priced disposal isn't politically possible, then the focus is on achieving the financial reforms in other ways.

References

- Abarca Guerrero, Lilliana, Brauny Bogantes and Enrique Hernández. 1998. *Estudio Social Y Económico De Los Recuperadores Del Botadero En Rio Azul, Curridabat.* Unpublished study, provided by the authors.
- ACR+ (The Association of Cities and Regions for Recycling and Sustainable Resource Management). 2009. *Municipal Waste in Europe*. Collection Environnement. Paris: Victoires Editions.
- Anschütz, Justine (ed.). 2005. *UWEP City Case Studies. City Case Studies of Bamako, La Ceiba, Bangalore and Batangas Bay, the Four “PPS” Cities of the UWEP Plus Programme, 2001–2004.* Gouda, The Netherlands: WASTE. Available at www.waste.nl.
- Ball, Jarrod and L Bredenhann. 1998. *Minimum Standards for Waste Disposal by Landfill, Second Edition*. Pretoria, Republic of South Africa: Department of Water Affairs & Forestry.
- Bauman, Zygmunt. 2004. *Wasted Lives. Modernity and its Outcasts*. Cambridge, UK: Polity Press.
- Bruner, Paul. 2010. Keynote speech given at the International Solid Waste Association (ISWA) Annual Conference, Hamburg, Germany, 15-17 November 2010.
- Chalmin, Philippe. 2011. Keynote presentation given at the CSD 19 Intersessional Ministry of Environment of Japan, Tokyo, Japan, 17 February 2011.
- Chalmin, Philippe and Catherine Gaillochet. 2009. *From Waste To Resource, World Waste Survey 2009*. Paris: Economica.
- Chaturvedi, Bharati. 2007. *Privatization of Solid Waste Collection and Transportation in Delhi: The Impact on the Informal Recycling Sector*. Paper prepared as partial fulfilment of course on Urban Issues in Developing Countries, School for Advanced International Studies, Johns Hopkins University, Washington DC, USA.
- Chaturvedi, Bharati. 2009. *Cooling Agents: The Impact on the Informal Recycling Sector on Carbon Emissions*. Delhi, India: Chintan-Environmental.
- Chaturvedi, Bharati, Irmada Handayani, Malati Gadgil, Prakash Shukla and Jai Prakash Choudhury. 2009. *City Presentation Document for Delhi/New Delhi, India*. Unpublished report used in the production of Scheinberg, Wilson and Rodic 2010. New Delhi, India: Chintan-Environmental.
- Chikarmane, Poornima, and Laxmi Narayan. 2005. *Organising the Unorganised*. A Case Study of the Kagad Kach Patra Kashtakari Panchayat (Trade Union of Waste-pickers), KKP KP, Pune, India. Available at <http://wiego.org/wiego/kagad-kach-patra-kashtakari-panchayat-kkp kp>.
- Chikarmane, Poornima, and Laxmi Narayan. 2007. *City Report for the City of Pune, India*. Unpublished report used in the production of Scheinberg, Simpson and Gupt 2010. KKP KP, Pune, India. Available at www.giz.de.
- Chintan-Environmental. 2005. *Space for Waste*. Pamphlet. New Delhi, India: Chintan-Environmental.
- Chintan-Environmental. 2009. *Wastepickers and Climate Change: Greenhouse gas mitigation by the informal recycling sector in Delhi*. Unpublished study. New Delhi, India: Chintan-Environmental.
- Cointreau, Sandra. 1987. *Solid Waste Recycling: Case Studies in Developing Countries*. Washington, DC: World Bank.
- Cointreau, Sandra. 1989. “Provision of Solid Waste Services in Developing Countries.” Resource Paper presented at the International Seminar on the Provision of Municipal Public Services in Developing Countries, 21-29 August 1989 Assenovgrad, Bulgaria.
- Cointreau, Sandra. 1991. “Conceptual Issues and Experiences in Developing Countries.” Washington, DC: World Bank.
- Cointreau Sandra. 1994. *Private Sector Participation in Municipal Solid Waste Services in Developing Countries, Volume 1 The Private Sector*. Washington, DC: World Bank, Urban Management Programme.
- D’Alisa, Giacomo, David Burgalassi, Hali Healy, and Mariana Walter. 2010. “Conflict in Campania: Waste Emergency or Crisis of Democracy.” *Ecological Economics*, Vol. 70, Issue 2, pp. 239–249.
- Dias, Sonia M. 2011. “Recognition of Waste Picking as a Profession in Brazil and Its Impacts.” In GIZ, Recovering Resources, Creating Opportunities: Integrating the Informal Sector Into Solid Waste Management. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit.

- Dias, Sonia M. 2010. *Overview of the Legal Framework for Social Inclusion in Solid Waste Management in Brazil*. Cambridge, Massachusetts, USA: WIEGO. Available at http://wiego.org/sites/wiego.org/files/publications/files/Dias_BN8_.pdf.
- Dias, S.M & F.C.G Alves. 2008. "Integration of the Informal Recycling Sector in Solid Waste Management in Brazil." Study Prepared For GIZ's Sector Project "Promotion Of Concepts For Pro-Poor And Environmentally Friendly Closed-Loop Approaches In Solid Waste Management." Available at www.GIZ.de.
- Dias, Sonia M. 2000. "Integrating Waste Pickers for Sustainable Recycling." Paper delivered at the Manila Meeting of the Collaborative Working Group (CWG) on Planning for Sustainable and Integrated Solid Waste Management, Manila, Philippines. Available at www.cwgnet.net.
- Dias, Sonia M. and H.S. Andrade. 1998. "Street Scavengers: Partners in the Selective Collection of Inorganic Materials in Belo Horizonte City." *International Directory of Solid Waste Management 1998/9. The ISWA Yearbook*. London: James & James.
- Dimino, Resa. 2010. *Beyond Waste, A Sustainable Materials Management Strategy for New York State*. Albany, New York, USA: New York State Department of Environmental Conservation.
- Doychinov, Nicola. 2008. "The Bulgarian EcoPack Experience." Presentation given at the International Finance Corporation's Recycling Linkages Summit, Belgrade, November 2008. IFC PEP SE, IFC, Ulica Makedonija 9-11/III, 1000 Skopje, Macedonia. Available at www.ifc.org/pepse.
- Eerd, M. van. 1996. *The Occupational Health Aspects of Waste Collection and Recycling: A Survey of the Literature*. UWEP Working Document 4, Part I. Gouda, The Netherlands: WASTE.
- Folz, David. 1998. "The Many Important Ways Recycling Has Changed." *Resource Recycling*, September 1998, pp. 26-30.
- Furedy, Christine. 1997. "Reflections on Some Dilemmas Concerning Waste Pickers and Waste Recovery." *Source Book for UWEP Policy Meeting 1997* (revised April 1999). Gouda, The Netherlands: WASTE.
- Giddens, Anthony. 1994. *Beyond Left and Right, the Future of Radical Politics*. London: Polity Press.
- Gille, Zsuzsa. 2007. *From the Cult of Waste to the Trash Heap of History: The Politics of Waste in Socialist and Postsocialist Hungary*. Bloomington, Indiana, USA: Indiana University Press.
- Gunn, Susan, and Zenaida Ostos. 1992. "Dilemmas in Tackling Child Labour: The Case of Scavenger Children in the Philippines." *International Labour Review*, Vol. 131, No. 6, p. 629 *et seq.*
- Huisman, Herman. 2009. *History of Waste Management in the Netherlands*. PowerPoint presentation delivered for the first meeting of the Serbian Recycling Platform, Belgrade, Serbia, 2009. The Hague, The Netherlands: Agentschap NL.
- IFC (International Finance Corporation). 2008. "The IFC Recycling Linkages Programme." Presentation given at the CWG Workshop in Cluj-Napoca, Romania, February 20-22, 2008. Available at www.greenpartners.ro.
- Ijgosse, Jeroen, J. Anshütz and A. Scheinberg. 2004. *Putting Integrated Sustainable Waste Management into Practice: Using the ISWM Assessment Methodology as Applied in the UWEP Plus Programme (2001-2003)*. Gouda, The Netherlands: WASTE.
- ILO (International Labour Organization)/IPEC. 2004a. *Addressing the Exploitation of Children in Scavenging in Latin America: a Thematic Evaluation of Action on Child Labour. A Synthesis Report on Latin America for the ILO* prepared by IPES, Lima, Péru. Geneva, Switzerland: ILO.
- ILO/IPEC. 2004b. *Addressing the Exploitation of Children in Scavenging: A Thematic Evaluation of Action on Child Labour. A Global Synthesis Report for the ILO* prepared by WASTE, Gouda, the Netherlands. Geneva, Switzerland: ILO.
- Inclusive Cities website at www.inclusivecities.org
- International Solid Waste Association (ISWA). 2010. *Waste and Climate Change*. ISWA White Paper. Vienna, Austria: ISWA.
- Ishengoma Alodia, and K. Toole. 2003. "Jobs and Services that Work for the Poor: Promoting Decent Work in Municipal Service Enterprises in East Africa; the Dar es salaam Project and the Informal Economy." Paper presented at the Knowledge-sharing Workshop organized by INTEGRATION. ITC Turin Italy; 28 October – 1 November 2003.
- Ishengoma, Alodia, and T. Lyimo. 2002. "The Dar es Salaam Experience to Reduce Poverty – Promoting Employment Through Urban Services." Paper presented at the World Urban Forum; Nairobi Kenya, 29 April – 4 May 2002.

- Iskandar, Laila, Berti Shaker et al. 2007. City Report for Cairo. Background document prepared by CID, Cairo Egypt, summarized in Scheinberg, Simpson and Gupt 2010. Available at www.giz.de.
- Keita, Modibo M. 2003. *Diagnostique de la Filiere de Recuperation de Dechets dans la Commune IV du District de Bamako*. Rapport Final, COPIDUC, and Commune IV of Bamako. Gouda, The Netherlands: WASTE.
- Kreuzberg, Georg. 1988. *Decision-makers Guide for Recovering GFT in the Netherlands*. Delft, the Netherlands: CE, the Centre for Energy Conservation and Environmental Technology.
- Landelijke Afval Programma (LAP). 2004. "Official National Waste Management Plan of the Netherlands." The Hague, the Netherlands: Ministry of Housing, Land-Use Planning and Environment (VROM).
- Lardinois, Inge and Arnold van de Klundert. 1994. "Informal Resource Recovery: The Pros and Cons." Gouda, The Netherlands: WASTE.
- Lardinois, Inge and Christine Furedy. 1999. *Separation at Source*. Gouda, The Netherlands: WASTE.
- Lifuka, Rueben. 2007. *City Report for Lusaka*, resource document for Scheinberg, Simpson and Gupt 2010. Lusaka, Zambia: Riverine Associates.
- Linzner, Ronald and Peter Beigl. 2003. "Analysing the Waste Generation in the City of Belgrade." Vienna, Austria: BOKU, University of Natural Resources and Applied Life Sciences.
- Marchand, Rogier. 1998. *Marketing of Solid Waste Services in Bauan, The Philippines*. Gouda, The Netherlands: WASTE
- Medina, Martin. 1997. *Informal Recycling and Collection of Solid Wastes in Developing Countries: Issues and Opportunities*. UNU/IAS Working Paper Number 24. Tokyo, Japan: The United Nations University/Institute of Advanced Studies.
- Medina, Martin. 2001 "Scavenging in America: Back to the Future?" *Resources, Conservation, and Recycling*, Vol. 31, pp. 229-240.
- Medina, Martin. 2005. "Serving the Unserved: Informal Refuse Collection in Mexico." *Waste Management and Research*, Vol. 23, pp. 390-397.
- Medina, Martin. 2009. *Global Supply Chains in Chinese and Indian Industrialization: Impact on Waste Scavenging in Developing Countries*. UNU/WIDER Working Paper., Tokyo, Japan: The United Nations University/Institute of Advanced Studies.
- Melosi, Martin. 1981. *Garbage in the Cities, Refuse, Reform and Environment, 1880-1980*. College Station, Texas, USA: Texas A&M Press.
- Mitrovic, Aleksandra, and Gradimir Zajic. 1998. "Social Position of the Roma in Serbia." in *The Roma In Serbia*. Belgrade, Republic of Serbia and Montenegro: Council for Human Rights of the Centre for Anti-War Action, pp. 9-68.
- Mitrovic, Aleksandra, J. Nestic, and M. Grujic. 2012. "Pandora's Container, Research and Activism at the Boundary of Formal Waste Modernisation and Informal Recycling in Serbia." In preparation.
- Mol, Arthur P.J. and Gert Spaargaren. 2000. "Ecological Modernisation Theory in Debate: A Review." *Environmental Politics*, Vol. 9, No. 1, pp. 17-49.
- Mol, Arthur P.J. and David Sonnenfeld. 2000a. "Introduction." In Mol and Sonnenfeld 2000, *Ecological Modernisation Around the World*, pp. 3-17.
- Mol, Arthur P.J. and David Sonnenfeld, (eds.) (2000. (First published as a special issue of Environmental Politics, Spring 2000). London: Frank Cass Publishers.
- Mol, Arthur P.J., D.A. Sonnefeld and G. Spaargaren (eds.). 2009. *The Ecological Modernisation Reader*. Oxford, UK: Routledge.
- Morris, Jeffrey. 2000. "What Works Best to Increase Waste Diversion?" *Resource Recycling*, January 2000, pp. 37-40.
- Pellow, David N., Allan Schnaiberg and Adam S. Weinberg. 2000. "Putting the Ecological Modernisation Thesis to the Test: The Promises and Performances of Urban Recycling." In Mol and Sonnenfeld 2000. *Ecological Modernisation Around the World*. London: Frank Cass Publishers.
- Post, Charles. 1990. *A Critical Look at Recycled Content Legislation*. MSc thesis, Antioch New England Graduate School of Environmental Studies, Keene, New Hampshire, USA.
- Poulussen, Peter. 1987. *Van Burenlast tot Milieuhinder: het stedelijk leefmilieu 1500-1800*. Kapellen, Belgium: DNB/Uitgeverij Pelckmans.

- Price, Jorge, A.R. Rivas, and I. Lardinois (eds.). 1998. *Micro and Small Enterprises, The Case of Latin America*. Gouda, The Netherlands:WASTE.
- Robinson, Marguerite, Michael Simpson, and others. 1990. Unpublished documents related to working with the informal sector to develop community composting in Jakarta, Indonesia. Harvard Institute for International Development (HIID), Cambridge, Massachusetts, USA.
- Rosario, Anselm. 2004. "Reduction of Child Labour in the Waste Picking Sector, India: Review and Findings of an Evaluative Field Study in Bangalore and Kolkata." Available at www.ilo.org/childlabour.
- Saarikoski, Heli. 2006. "When Frames Conflict: Policy Dialogue on Waste." *Environment and Planning C: Government and Policy*, Vol. 24, pp. 615-630.
- Samson, Melanie (ed.). 2009. *Refusing to be Cast Aside: Waste Pickers Organising Around the World*. Cambridge, Massachusetts, USA: WIEGO. Available at www.wiego.org.
- Samson, Melanie. 2010. *Reclaiming Reusable and Recyclable Materials in Africa, A Critical Review of English Language Literature*. Urban Policies Research Report, No. 6. Cambridge, Massachusetts, USA: WIEGO. Available at www.wiego.org.
- Sawiris, Yousriya L. 2000. "Pilot Project for Integrated Solid Waste Management." Paper presented at the World Bank Conference on Municipal Solid Waste Management in the MENA Region, 10–12 April 2000, Cairo, Egypt.
- Schall, John, and Anne Scheinberg. 1986. *The Massachusetts Regional Recycling Strategy*. Boston, Massachusetts, USA: Commonwealth of Massachusetts Department of Environmental Management.
- Scheinberg, Anne. 1992. "Penny Wise, Pound Foolish, the Dangers of Laissez-faire Collection Systems." Paper delivered at the 6th National Recycling Congress in Boston (USA), October 1992.
- Scheinberg, Anne. 1999. "Worse Before It Gets Better." *WARMER Bulletin*, No. 68, September 1999, pp. 18-20.
- Scheinberg, Anne (ed.). 2001. *Integrated Sustainable Waste Management. Set of Five Tools for Decision-makers - Experiences from the Urban Waste Expertise Programme (1995 - 2001)*. Gouda, The Netherlands: WASTE.
- Scheinberg, Anne. 2001a. *Financial and Economic Issues in Integrated Sustainable Waste Management*. In Scheinberg 2001, *Integrated Sustainable Waste Management, Set of Five Tools for Decision-Makers*. Gouda, The Netherlands: WASTE.
- Scheinberg, Anne 2001b. *Micro and Small Enterprises in Integrated Sustainable Waste Management*. In Scheinberg 2001, *Integrated Sustainable Waste Management, Set of Five Tools for Decision-Makers*. Gouda, The Netherlands: WASTE.
- Scheinberg, Anne. 2003. "The Proof of the Pudding: Urban Recycling in North America as a Process of Ecological Modernisation." *Environmental Politics*, Vol. 12, No. 4, pp 49-75.
- Scheinberg, Anne. 2011. *Value Added: Modes of Sustainable Recycling in the Modernisation of Waste Management Systems*. PhD Thesis, Wageningen University and Research Centre, The Netherlands. Gouda, The Netherlands: WASTE.
- Scheinberg, Anne and Jeroen IJgosse. 2004. "Waste Management in the Netherlands." Report prepared for UNITRABALHO, Recife, Brazil. Gouda, The Netherlands: WASTE.
- Scheinberg, Anne and Arnold van de Klundert. 2005. *ISWM Case Study: Developing the Dar es Salaam – UNIDO Recycling Processing Centre*. Vienna, Austria: UN Industrial Development Organisation (UNIDO). Available at www.waste.nl.
- Scheinberg, Anne, and Justine Anschütz. 2007. "Slim pickin's: Supporting Waste Pickers in the Ecological Modernisation of Urban Waste Management Systems." *International Journal of Technology Management and Sustainable Development*, Vol. 5, No. 3, pp 257-270.
- Scheinberg, Anne, Aleksandra Mitrovic, and Valentin Post. 2007. *Assessment Report: Needs of Roma Collectors and Other Stakeholders in the PEP SE Region for Training, Technical Assistance, and Financial Services and Recommendations for Programmatic Response*. Prepared for the Recycling Linkages Private Enterprise Programme South East Europe (PEP SE) of the International Finance Corporation, Skopje, Macedonia.
- Scheinberg, Anne, D. C. Wilson and L. Rodic. 2010. *Solid Waste Management in the World's Cities*. UN-Habitat's Third Global Report on the State of Water and Sanitation in the World's Cities. Newcastle-on-Tyne, UK: Earthscan Publications.

- Scheinberg, Anne, Michael H. Simpson, and Yamini Gupt. 2010. *Economic Aspects of the Informal Sector in Solid Waste, Final Report and Annexes*. GIZ (German International Co-operation), the CWG (Collaborative Working Group on Solid Waste Management in Low- and Middle-income Countries), and the German Ministry of Foreign Affairs, Eschborn, Germany. Available at www.GIZ.de.
- Scheinberg, Anne and A.P.J. Mol. 2010. "Multiple Modernities: Transitional Bulgaria and the Ecological Modernisation of Solid Waste Management." *Environment and Planning C*, Vol. 28, No. 1, pp. 18-36.
- Scheinberg, A., N. Agathos, J. W. Gachugi, P. Kirai, V. Alumasa, B. Shah, M. Woods, and Y. Waarts. 2011b. *Sustainable Valorisation of Urban Organic Wastes, Insights from African Case Studies*. Wageningen University, The Netherlands.
- Schnaiberg, Allan. 1980. *The Environment from Surplus to Scarcity*. Oxford, UK and New York, USA: Oxford University Press.
- Shields, Mary. 1984. *The New Jersey Mandatory Recycling Law*. Trenton, New Jersey, USA: State of New Jersey.
- Shove, Elizabeth. 2003. *Comfort, Cleanliness, Convenience, the Social Organisation of Normality*. Oxford, UK: Berg.
- Simpson, Michael. 1993. "Lapaks and Bandars Convert MSW in Indonesia." *Biocycle*, June 1993.
- Simpson, Michael. 2008. *Reconstructing Waste Management in Monrovia, Liberia*. St. Gallen, Switzerland: CWG.
- Simpson-Hebert, May Ling, A. Mitrovic, and G. Zajic. 2005. *A Paper Life*. Loughborough, UK: Loughborough University, WEDC.
- Skumatz, Lisa. 1999. "Achieving 50 Percent Recycling: Program Designs And Policy Implications." *Resource Recycling*, September 1999, pp. 19-24.
- Skumatz, Lisa A, and Robert Moylan. 1999. "How to Re-Energize Recycling Progress." *Resource Recycling*, June 1999, pp. 13-16.
- Skumatz, Lisa A., E. Truitt, and J. Green. 1997. "The State of Variable Rates: Economic Signals Move into the Mainstream." *Resource Recycling*, August 1997, pp. 29-35.
- Slater, Rachel, J. Fredrickson, C. Thomas, D. Wield and S. Potter. 2007. "A Critical Evaluation of Partnerships in Municipal Waste Management in England." *Resources, Conservation and Recycling*, Vol. 51 Iss. 3, pp. 643-664.
- Smink, Carla K. (2002). *Modernisation of Environmental Regulations. End-of-Life Vehicle Regulations in the Netherlands and Denmark*. PhD Dissertation, Aalborg University, Aalborg, Denmark.
- Soos, Reka. 2006. Proposal to the MATRA programme of the government of The Netherlands for a project on solid waste governance in Northwest Romania. Green Partners, Cluj-Napoca, Romania.
- Soos, Reka, and Ciprian Popovici. 2008. *Planning In the Real World, Challenges of Sustainable and Affordable Modernisation in the Solid Waste Sector*. Report of the CWG International workshop, Cluj-Napoca, Romania, 22 - 23 February, 2008. Green Partners, Cluj-Napoca, Romania. Available at www.greenpartners.ro.
- Spaargaren, Gert. 1997. *The Ecological Modernization of Production and Consumption. Essays in Environmental Sociology*. PhD thesis, Wageningen University, Wageningen, The Netherlands.
- Spaargaren, Gert and Bas van Vliet. 2000. "Lifestyles, Consumption and the Environment: Ecological Modernisation of Domestic Consumption." *Environmental Politics*, Vol. 9, No. 1 pp. 50-77.
- Spaargaren, Gert, P. Oosterveer, J. van Buuren, and A.P.J. Mol. 2005. "Mixed Modernities: Towards Viable Urban Environmental Infrastructure Development in East Africa." Position Paper, Environmental Policy Group, Wageningen University and Research Centre, Wageningen, The Netherlands.
- Stanev, Noemi, Ralph Veraart, and Ciprian Popovici. 2004. "Thematic Evaluation on Projects Related to Addressing the Issue of Child Labour in Waste Picking, Cluj-Napoca and Baia Mare, Romania." Unpublished report. Cluj-Napoca, Romania: Green Partners. Available via www.greenpartners.ro.
- Strasser, Susan. 1999. *Waste and Want: A Social History of Trash*. New York, USA: Henry Holt and Company.
- Swaan, Abram de. 1988. *In Care of the State, Health Care, Education and Welfare in Europe and the USA in the Modern Era*. Cambridge, UK: Polity Press.

- Tompkins County, New York. 1995. Tompkins County Solid Waste Management Plan.
- UNDP. 2005. Improving the Lives of the Urban Poor: Case Studies on the Provision of Basic Services Through Partnerships. Available at <http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/PPPPP/p-pppp.asp>.
- UWEP Plus. 2005. *Reports of the Urban Waste Expertise Programme Plus, 2001-2004*. WASTE, Advisers on Urban Environment and Development, Gouda, the Netherlands. Available at www.waste.nl.
- Velis Costas A., D.C. Wilson and C.R. Cheeseman. 2009. "19th century London Dust-Yards: A Case Study in Closed-Loop Resource Efficiency." *Waste Management*, Vol. 29, pp. 1282-1290.
- Vliet, Bas van. 2002. *Greening the Grid. The Ecological Modernisation of Network-bound Systems*. PhD Dissertation, Wageningen University, the Netherlands.
- Vliet, Bas van, Heather Chappels, and Elizabeth Shove. 2005. *Infrastructures of Consumption*. Newcastle-on-Tyne, UK: Earthscan Publications Ltd.
- Weinberg, Adam S., David N. Pellow and Allan Schnaiberg. 2000. *Urban Recycling and the Search for Sustainable Community Development*. Princeton, New Jersey, USA: Princeton University Press.
- Whiteman, Andrew. 2008. "Implementing EU Waste Management Directives at the Local Level in Bulgaria." CWG Workshop: Planning in the Real World, Cluj-Napoca, Romania, February 2008. Available at www.cwgnet.net and www.greenpartners.ro.
- WIEGO (Women in the Informal Economy: Globalizing Organizing) website at www.wiego.org.
- Wilson, David C, Anne Scheinberg, and Ljiljana Rodic. 2010. "Comparative Analysis Of Solid Waste Management In Cities Around The World." Paper Delivered at the UK Solid Waste Association, November 2010.
- Wilson, David C. 2007. "Development Drivers for Waste Management." *Waste Management and Research*, Vol. 25, pp. 198-207.
- Wilson, Sir David C., C. Velis, and C. Cheesman. 2006. "Role of Informal Sector Recycling in Waste Management in Developing Countries." *Habitat International*, 30, pp. 797-808.
- Zero Waste International Alliance (ZWIA). 2010. Website and principles, 2009-2010. www.zwia.org or <http://www.zerowaste.org/case.htm>.
- Zon, Henk van. 1986. *Een zeer onfrisse geschiedenis*. ("A Very Dirty Affair"). PhD thesis, Royal Groningen University, Groningen, The Netherlands.

About Inclusive Cities: The Inclusive Cities project aims to strengthen membership-based organizations (MBOs) of the working poor in the areas of organizing, policy analysis and advocacy, in order to ensure that urban informal workers have the tools necessary to make themselves heard within urban planning processes. Inclusive Cities is a collaboration between MBOs of the working poor, international alliances of MBOs and those supporting the work of MBOs. For more information visit: www.inclusivecities.org.

About WIEGO: Women in Informal Employment: Globalizing and Organizing is a global research-policy-action network that seeks to improve the status of the working poor, especially women, in the informal economy. WIEGO builds alliances with, and draws its membership from, three constituencies: membership-based organizations of informal workers, researchers and statisticians working on the informal economy, and professionals from development agencies interested in the informal economy. WIEGO pursues its objectives by helping to build and strengthen networks of informal worker organizations; undertaking policy analysis, statistical research and data analysis on the informal economy; providing policy advice and convening policy dialogues on the informal economy; and documenting and disseminating good practice in support of the informal workforce. For more information visit: www.wiego.org.



Women in Informal Employment
Globalizing and Organizing