

A Seat at the Table

The Role of the Informal Recycling Sector in Plastic Pollution Reduction, and Recommended Policy Changes



Authors:

Maria Tsakona (GRID-Arendal)
Ieva Ručevska (GRID-Arendal)
Sonia Maria Dias (WIEGO)
Delila Khaled (ISWA Women of Waste Task Force)

Contributions and Reviews:

Laurie Krieger (USAID Clean Cities, Blue Ocean), Melinda Donnelly (USAID Clean Cities, Blue Ocean), Aditi Ramola (ISWA), Clever Mafuta (GRID-Arendal), Miles Macmillan-Lawler (GRID-Arendal), Natalia Skripnikova (GRID-Arendal)

Copy editor: Georgina Nitzsche (ISWA Women of Waste Task Force)

Layout: GRID-Arendal

Suggested citation: GRID-Arendal (2022). *A Seat at the Table: The Role of the Informal Recycling Sector in Plastic Pollution Reduction, and Recommended Policy Changes*. GRID-Arendal.



Prepared with funding from the Norwegian Agency for Development Cooperation

Prepared in partnership with the US Agency for International Development Clean Cities, Blue Ocean Program, the global research-policy-action network Women in Informal Employment: Globalizing and Organizing, and the International Solid Waste Association Women of Waste Task Force.

Disclaimer

The ISWA WOW! Task Force has participated in the preparation of this document and endorses ONLY the gender considerations of the informal recycling sector that is needed in the context of the current waste crisis in some places of the world. Any views expressed in this document do not necessarily reflect the views and position of ISWA bodies or ISWA members.

Further information about this policy paper can be obtained from Maria Tsakona (maria.tsakona@grida.no)

A Seat at the Table

The Role of the Informal Recycling Sector in Plastic Pollution Reduction, and Recommended Policy Changes

POLICY PAPER

Introduction	4
The status of the informal recycling sector in plastic waste management	5
Social dimension	6
Geographies and size	6
Structure and organisation	7
Exposure to hazards	8
Gender dimension	10
Economic dimension	12
The economic imperative for integrating the informal recycling sector	12
Labour, income and inequality	12
Global trends impacting informal recycling workers' livelihoods	13
Environmental dimension	14
Environmental service provider	14
Recovery of plastics	15
Climate change mitigation	16
The informal recycling sector in existing policy frameworks	17
International Labour Organization's Decent Work Agenda	18
Basel Convention	18
Minamata Convention on Mercury	19
Domestic policies	20
Recommendations	21
Inclusive governance	22
Gender-sensitive approach and de-stigmatisation of workers	22
Support workers organising themselves	23
Make the informal recycling sector stronger by building its capacity	23
Occupational health and safety and social protection	24
Payment for services	24
Address knowledge gaps – research, documentation and monitoring	25
Access to technology	25
Pro-poor approach to formalization	25
References	26

Introduction

Global concern about plastic pollution has propelled the need for action. As a result, at the fifth session of the UN Environment Assembly (UNEA 5.2) in March 2022, member states agreed to work on an international legally binding instrument on plastic pollution. A fair, just, and inclusive design of this new plastic treaty is essential for ensuring its effectiveness, as well as cohesion with the UN 2030 Agenda for Sustainable Development. In light of this, the ongoing science and policy dialogues need to include the very same group of people that uphold the plastics value chain; namely, the informal recycling sector and its often-marginalised workers.

The informal recycling sector is particularly important in cities along coasts and rivers in the developing world, where the main leakage of plastics into the marine environment occurs. The sector consists of a number of unrecorded individuals, small enterprises and groups who engage in the mostly unregulated collection, sorting, recovery, and valorisation of post-consumer waste streams. Informal recycling sector workers achieve high recovery rates, depending on collection for their livelihoods. Estimates suggest that the informal recycling sector is responsible for 58 per cent of all the plastic waste collected and recycled globally (Lau et al. 2020). These recovery rates also contribute significantly to the reduction of solid waste in

landfills, dumpsites and open burning sites, prevent plastics from escaping into the environment, and mitigate climate change. At the same time, informal recycling activities offer a range of economic benefits, generating crucial income for the informal recycling workers and helping cities to save money by performing most of the urban waste collection and transportation. With global plastic production projected to increase from 348 million tonnes in 2019 to 1,321 million tonnes in 2060 (Geyer 2020; OECD 2022) the informal recycling sector's critical role in moving toward a more circular economy is indisputable.

However, there are limits to what an unsupported and unorganised informal recycling sector can contribute to the circular economy. Despite the significance of their work, informal recycling workers remain under-recognised at national and local levels. Their activity is characterised by unsafe and unhealthy working conditions, low or irregular incomes, long working hours and a lack of access to information, markets, finance, training and technology. They typically experience exploitation, social exclusion and marginalisation, as well as stigmatisation, substance abuse, poverty, harassment, and violence. Another often overlooked aspect is the degree by which the informal recycling sector workers' operations and livelihoods are vulnerable to global trends and events, such as oil price hikes, pandemics (such as the recent Covid-19 health emergency) and the effects of climate change.

If these challenges to the informal recycling sector's activities can be addressed, the people working in this sector will have the potential to become key partners in a global circular economy and could not only contribute to mitigating health and environmental impacts of plastic pollution but also boost their economic and associated human development.

This policy paper provides a summary of our current understanding of the informal recycling sector; its social, economic, and environmental characteristics in national and international contexts; and the challenges the sector faces. It examines international and national efforts to recognise informal workers and involve them in formal frameworks and agreements that could be an inspiration for the upcoming international legally binding instrument on plastic pollution. It also provides a set of high-level policy recommendations inclusive of the informal recycling sector, enabling a just transition and the protection of the informal recycling workers' livelihoods. The proposed recommendations focus on enhancing the role of the informal recycling sector in a circular economy as indispensable partners in the fight against plastic pollution and achieving a healthy environment for all.



Woman sorting plastics at Doko Recyclers' segregation facility, Kathmandu, Nepal, 2022. Photographer: Sabrina Heerema

Part 1

The status of the informal recycling sector in plastic waste management



Social dimension

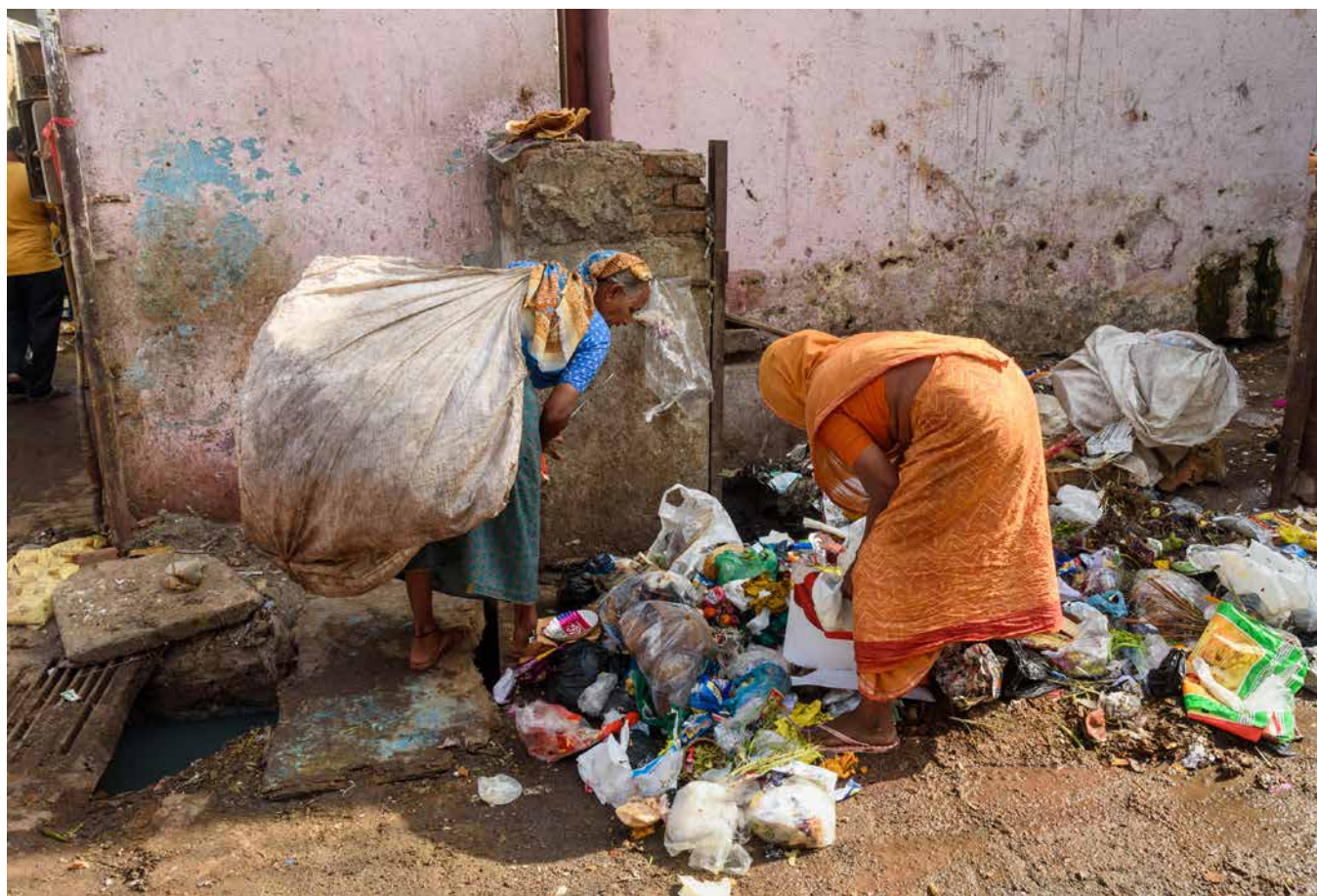
All over the world, and especially across the low- and middle-income geographies, the workforce carrying out solid waste collection, transport and recycling usually represents the most vulnerable and socially disadvantaged groups of society and often faces marginalisation and harassment (Scheinberg et al. 2016, Aparcana 2017). Informal recycling workers may work independently, without being formally organised, or may be part of associations, unions etc. (Awad et al. 2013). Their labour can be characterised as small-scale low-technology manufacturing or services, largely unregulated and unregistered, typically exposing the workers to many occupational challenges and hazards (Wilson et al. 2006).

Geographies and size

The informal recycling sector (IRS) is present in all geographies worldwide, although its extent, services, and how it is organised, varies greatly. In developing geographies, where waste regulatory frameworks are weaker and public services under-resourced, the IRS's operations are comparatively larger than those of the formal sector (da Silva et al. 2019). At times both formal and informal sectors even amalgamate in these geographies. In developed geographies, the IRS takes a smaller proportion of waste materials and profits.

Informal waste recycling is largely linked to urban areas (UN Habitat 2019). Over-consumption and the increase of waste generation create conditions for the expansion of the IRS, particularly in places where the formal sector does not adequately respond to existing waste management needs.

The IRS is active in all parts of the waste management chain, but its size and contribution is usually not reported. Limited data are available aggregated into management activities or by specific waste streams, and in general the IRS is referred to as a single body of actors. It is estimated that 19–24 million people work in the waste management and recycling sector; 80 per cent of these are informal workers – approximately 15–20 million people (Medina 2008; Binion and Gutberlet 2012; ILO 2013). The vast majority of informal recycling workers are in developing countries, accounting for at least one per cent of the urban population (Medina 2008). In China, for example, 4 million informal recycling workers earn their livelihood as part of the global recyclables supply chain (Chen et al. 2018). In India, 2.2 million individuals rely on informal waste picking as their main income source (Raveendran and Vanek 2020), while Brazil has an estimated number of 281,000 informal recycling workers, constituting 0.30 per cent of the country's total employment figure (Bouvier and Dias



Indian women sorting garbage in Dharavi Slum at Mumbai, India, 2019. Photographer: Elena Odareeva/iStock

2021). For South Africa, estimates range between 60,000 and 90,000 informal recycling workers working on the country's landfills and streets, but rising unemployment and urbanisation may mean that the real number is as high as 215,000 (DST 2012; Linzner and Lange 2013; Godfrey and Oelofse 2017).

Although informal waste management is perceived as an issue affecting developing economies in particular, it is in fact widespread across the globe. Albeit at a smaller scale, it is also present in developed economies (Wittmer and Parizeau 2016; Scheinberg et al. 2016), with Europe alone accounting for at least one million informal workers active in waste management. For example, Italy has as many as 80,000 informal workers, Turkey 71,000, Serbia up to 50,000, and Greece some 20,000 (Scheinberg et al. 2016). The size of the IRS in developing countries may appear large in absolute numbers compared to that of developed countries, but the per capita numbers of e.g. Serbia and Greece are similar or even higher than those of some developing countries.

There are many reasons why it is challenging to estimate the size of the IRS, the most obvious being the absence of official reporting requirements. Where data are available,

it is often anecdotal and inconsistent. For example, 152 scrap dealers (including all waste stream categories) are registered in the IRS in the whole of Nepal, while a recent project-based activity estimated there are 700–800 unregistered kabadis, or waste dealers, in Kathmandu valley alone (UNEP-IETC and GRID-Arendal 2019).

Informal recycling workers are very responsive to market driven conditions, which sometimes leads them to migrate from one occupation in the informal economy to another, making statistical counting efforts very difficult (Dias and Samson 2016). Added to that, the transient nature of the workforce, exacerbated by dynamic factors such as conflicts, disasters, and migration from rural to urban environments, as well as economic migration, makes it difficult to come up with precise estimates of the size of the informal workforce.

Refugees and migrants often take on jobs in the informal waste management sector. A study of 1,500 waste pickers and scrap dealers in Abuja, Nigeria found that approximately 56 per cent of them were migrants, and another 24 per cent were refugees from neighbouring countries, such as Chad and Niger (Ogwueleka and Naveen 2021). Another example is Nepal's Kathmandu valley, where waste collectors working with bicycles are exclusively



Informal collector of plastic waste and recyclables in a residential area in Antalya, Turkey, 2022. Photographer: Evgeniy Kharitonov/iStock

Indian men who leave their families behind in their home country to gain income in neighbouring Nepal (UNEP-IETC and GRID-Arendal 2019). Migrants also form the majority of informal recycling workers in Catalonia, north-eastern Spain, originating from Bulgaria, Romania, sub-Saharan Africa and the Maghreb (Rendon et al. 2021).

Yet another challenge for obtaining correct numbers of the migrant workforce is the fact that they often operate without documentation, such as residency and work permits, or legal citizenship permits. Additionally, it is suggested that the comparatively high numbers of informal recycling workers in Europe is linked to underlying conditions where a lack of citizenship and failure of social integration exclude the labour force from entering formal jobs (Rendon et al. 2021).

Structure and organisation

The IRS typically consists of door-to-door collectors, street and dumpsite informal recycling workers, and small- and medium-scale recyclers and waste traders. Often, they carry names specific to the local languages of the geographies in which they operate. There are also itinerant waste collectors, itinerant buyers, sorters, haulers, scrap dealers, junk shop owners and recyclers.

Around the world, informal recycling workers have established organisations and networks to represent their interests and, in some cases, have partnered with municipalities and the private sector (Gerdes and Gunsilius 2010), although this varies widely between countries and regions. Throughout Latin America, for example, the informal recycling sector is very active and organised in the form of associations and cooperatives, whereas in countries with restrictive labour organising laws, such as Jordan (Khaled and Khateeb 2021; Taher et al. 2022), informal recycling workers are prohibited from forming such entities.

In contrast, Brazil has made considerable progress in recent years to recognise and integrate the IRS. Today, the so-called *catadores* are recognised by national legislation as key actors in the solid waste management sector and the recycling value chain (Dias and Silva 2017; Bouvier and Dias 2021). The IRS's relations with municipalities are regulated through contracts, covenants and arrangements specifically designed according to local circumstances. In some areas, recycling is formally assigned to cooperatives of informal waste and recycling centres, often subsidised by the municipality and sometimes combined with public-private partnerships (Gerdes and Gunsilius 2010; Dias and Fernandez 2020).

In other cases, the IRS can also be organised as small informal enterprises or operate on an individual basis. Informal recycling workers have no or low input costs, and

their assets are usually limited to a means of transportation for the waste, such as a bicycle or a tarpaulin. Small entrepreneurs, on the other hand, can afford a place to store and/or process the recyclables. Interaction between these different actors is very close. For example, in India, informal recycling workers sell their recyclables to so-called *kabadiwalla*, small scrap-shops that process and sell the valorised material further (Hande 2019).

There have been several attempts to formalise the IRS globally supported by general recommendations of the International Labour Organization (ILO 2015). While these recommendations are intended to protect the IRS, when implemented domestically they may negatively affect the most vulnerable workers (Aparcana 2017; da Silva et al. 2019; Skinner et al. 2021). In South Africa, the formalisation of informal recycling workers is supported by governmental guidelines, but there is evidence that formalisation efforts have not been working well (da Silva et al. 2019; Skinner et al. 2021). Other countries, notably Russia and China, do not engage the informal recycling sector, despite its considerable size. India's cultural, ethnic and caste-based divide of society made recent policies aimed at improving informal recycling workers' conditions challenging to enforce (da Silva et al. 2019). Their main barriers to joining the formal sector are lack of education, physical disability, and legal status, plus the informal recycling workers are often exploited and underpaid for the materials they collect, especially in those markets where only one buyer exists (Wilson et al. 2006; Rendon et al. 2021; Taher et al. 2022). Often it is difficult to convince municipal authorities and politicians to recognise the contribution of the IRS and support its integration in the formal waste management system (Wilson et al. 2006).

Exposure to hazards

A serious concern of the IRS is regular exposure to high-risk situations. Work in the waste processing cycle exposes people to health, safety and environmental hazards. A review of the most common occupational hazards and negative health outcomes associated with informal waste picking found the most commonly reported occupational hazards are physical (77.6 per cent), social (70.7 per cent), biological (65.5 per cent), and chemical and safety-related (53.4 per cent) (Zolnikov et al. 2021).

Physical hazards, such as unsafe stacking of waste or leachate from waste, are associated with an unstable and dangerous environment that results in slips and falls. Indeed, such unstable conditions at uncontrolled landfills and dumpsites are a major threat for informal recycling workers. Spontaneous combustion and collapse of mountains of waste have destroyed entire communities of informal recycling workers living on and next to unmanaged landfills and dumpsites. For example, in 2017 at Hulene



An informal recycling worker carrying a large polythene bag filled with empty disposable plastic bottles and other thrown away items is walking in rain, the street is flooded with rain water. Deshapriya Park, Kolkata, 2021. Photographer: Suprabhat Dutta/iStock

dumpsite in Maputo, Mozambique that is surrounded by houses, landslides occurred frequently, accounting for over 150 deaths of which many were informal recycling workers (Kaza and Yao, 2018).

Biological hazards include exposure to bacteria, viruses and insects, which may be spread via plants, rodents and animals. Toxic smoke from burning waste presents a chemical safety hazard (Zolnikov et al. 2021). Informal recycling workers often work with minimal protection equipment and are therefore not always sufficiently shielded against such dangers (Zolnikov et al. 2021). Occupational hazards also include social pressure in the form of strained relations between fellow workers, business partners in the wider market economy, and the public at large.

Environmental hazards will likely increase in future due to a changing climate, with predictions of more extreme weather events, such as very high temperatures, floods and droughts. Such events will most likely disproportionately affect disadvantaged groups, including IRS workers (WWF 2021; UNEP 2021; TARSC et al. 2022). Already, urban areas regularly reach record high temperatures, affecting workers who are mainly operating in cities. Another indirect risk to informal recycling workers are virus outbreaks linked to climate change (Gilbert 2022).

Exposure of workers to these various hazards results in many health complications. Among the most cited health complications feature: epidermal (50.0 per cent), communicable disease (46.6 per cent), musculoskeletal

(44.8 per cent), respiratory disease (41.4 per cent), non-communicable disease (39.7 per cent), physiological (34.5 per cent), gastrointestinal (31.0 per cent) and waterborne disease (17.2 per cent) (Zolnikov et al. 2021).

As a result of the informal nature of their work and their legal status, informal recycling workers often face challenges accessing to health protection schemes, such as health insurance. Treatment costs are unaffordable on a private basis, leading IRS workers to develop chronic health problems. Additionally, many informal recycling workers have no access to basic sanitation amenities, such as drinking water and toilets, to a clean living environment, and to adequate personal protective equipment (PPE) (Schenck et al. 2019).

Informal recycling workers also face a variety of social challenges, such as exploitation, social exclusion and marginalisation, as well as stigmatisation, substance abuse, poverty, harassment, and violence (Schenck et al. 2019). Many studies also indicate that gender-based social pressure leading to discrimination, violence and sexual harassment is widespread in informal recycling sector activities in all structures (WIEGO 2020; Aidis and Khaled 2019). Women in the IRS often do not work in a safe operational environment, both domestically and at their workplace. Advocacy groups and non-profit organisations are working to raise awareness about this problem and introduce protection measures critical to addressing this widespread phenomenon, e.g. ENDA Viet Nam, or ISWA's Women of Waste Task Force.

Gender dimension

All gender roles, as well as children are part of waste management activities but their involvement differs across the entire range of the recovery and valorisation of waste. The gender distribution of the IRS depends on the job and cultural circumstances in the different geographies, with gender inequality and stereotypes manifesting themselves across the various stages of waste management.

An example from Abuja, Nigeria reveals that 93 per cent of waste pickers are male and only seven per cent are female (Ogwueleka and Naveen 2021). Other examples provide an entirely different picture. A recent study of 1,025 informal recycling workers working on large dump sites in Latin America found that the majority of the workers were women (67 per cent) (Cruvinel et al. 2019). Although beyond the scope of this paper's purpose, it is important to highlight that child labour exploitation is common in waste picking, in part due to gendered parenting patterns that leave the burden of caregiving to women, thus forcing many mothers to bring their children to work with them (Cruvinel et al. 2019).

A traditional gendered division of labour is pervasive throughout the male-dominated waste management sector and the IRS globally. Women are represented in greatest numbers at the base of the recycling value chain, primarily working as sorters of recyclables, as well as waste pickers, and typically earning less than their male counterparts (Godfrey et al. 2018; UNEP and GRID-

Arendal 2019; Aidis and Khaled 2019; WIEGO 2020). Men are associated with heavy lifting activities (collecting, loading and hauling) resulting in higher income, while women are associated with tasks that require greater attention to detail, such as the time-intensive work of sorting and separating waste (Aidis and Khaled 2019). In Indonesia, women participate in scavenging, picking out recyclables from dumpsites and litter, but collecting lower value recyclables, which leaves heavier, more valuable materials available to the male workers (Ocean Conservancy 2019).

In India, a higher portion of women work as street sweepers and landfill waste pickers, tasks that require higher levels of concentration and are more informal in nature compared to other tasks within the waste management sector (UNDP 2021). In some Vietnamese cities, women make up 65 per cent of all waste collectors and over 70 per cent of junk shop owners (USAID CCBO 2021a). However, research from other countries found that, compared with men, women generally have less access to equipment, vehicles and the finances to purchase them; as a result, they are less able to access, collect and transport larger volumes of waste, which in turn exacerbates income disparities and diminishes women's upward mobility (Aidis and Khaled 2019). The association, Women in Informal Employment: Globalizing and Organizing (WIEGO), concludes that women working in the IRS are concentrated at the bottom of the economic pyramid (WIEGO 2020).



A group of men compressing PET-bottles at the "Greener Way" transfer station in Thimphu, Bhutan, 2018. Photographer: Ieva Ručevska

Gendered power relations within the IRS further restrict women's access to recyclables and exclude them from the more lucrative intermediary levels of the value chain (Seager et al. 2020; Bouvier and Dias 2021). Contrary to common perception, the IRS is highly organised and often operates in a hierarchical system wherein men control access to landfills and dumpsites in any given city, thereby limiting women's access to higher value recyclables (Aidis and Khaled 2019). In addition, harassment, violation and individual attacks are used as tactics to keep control over women, leading to the physical, mental and sexual exploitation of women – sometimes in exchange for access to waste – especially in locations where gang violence and/or conflict is prevalent (Aidis and Khaled 2019).

As the predominant sorters of waste, women work in dangerous conditions with little to no protective equipment, doing the riskiest work for the lowest pay. Access to sanitary facilities and hygienic conditions is often absent. Despite this critical role, gender integration in the waste management sector globally remains minimal or non-existent in most of the geographies. Experts, governors, donors and other actors working in solid waste management are not typically aware of the gendered dimensions of the sector. This is compounded by the absence of sector-specific gender-disaggregated data, resulting in policies and programmes that do not address the specific conditions and needs of women (Aidis and Khaled 2019).

Some efforts to address gender inequality have been undertaken. Women in Brazil, for example, have been involved in collective struggles for gender equality through the Gender & Waste Project (Dias and Ogando 2015). Moreover, the USAID Clean Cities, Blue Ocean program is working to empower women working in waste, especially in the Philippines, Indonesia, and Peru (USAID CCBO 2021b).

Finally, it should be noted that integration of the IRS should take into account women's disproportionate burden of taking care their children, older and disabled family members and housework in order to provide flexibility to juggle multiple roles. Any efforts toward formalisation of the IRS must carefully consider women's rights and working conditions vis-à-vis men, and give a voice to women in related decision-making processes. Moreover, when waste-picking activity is formalised, women often do not enjoy the same opportunities as men for fair earnings. The case of Brazil's solid waste management serves as an example. A gender analysis of an official database called the Social Assessment Information System (RAIS in Portuguese), which records information of employees of commercial establishments, concluded that among waste pickers, men earn much more than women in all age groups, and no women are found in the highest income groups (those that earn more than 10 times the minimum wage). These discrepancies may be why women are drawn to the cooperative model to find more favourable working conditions (Dias and Fernandez 2013).



Female waste picker at Memelakha landfill in Thimphu, Bhutan, 2018. Photographer: Ieva Ručevska

Economic dimension

Informal recycling activities offer a range of economic benefits, providing crucial income for the IRS and helping cities to save money, by performing most of the waste collection and transportation of waste. However, informal recycling workers struggle to make a living and develop their business income due to social discrimination, economic exploitation and multiple global trends that influence their health and working conditions.

The economic imperative for integrating the informal recycling sector

Many cities in countries with developing economies benefit from the fact that the IRS removes waste of all kinds from areas that are not served by municipal household collection. In addition, the IRS delivers on recycling targets often designed regionally or domestically. It is estimated that in most developing countries, they perform 50 to 100 per cent of municipal waste collection (Scheinberg et al. 2010). The services they provide include the picking, collecting, sorting, aggregating, transporting, and processing of waste (Aidis and Khaled 2019). According to World Bank estimates, waste management costs constitute 20 to 50 per cent of municipal budgets (Kaza et al. 2018). In effect, by helping to fill the critical service delivery gap in waste management, informal recycling workers also help reduce municipal expenses and thereby subsidise municipal solid waste management systems. Additionally, the IRS significantly reduces the amount of solid waste that ends up in landfills, dumpsites, streets and waterways, and thereby helps reduce the costs of final disposal, as well as external costs related to environmental pollution.

In Mexico City, for example, a city of 19 million inhabitants, more than 61 per cent of municipal solid waste is sent to landfills, with a further 13 per cent recovered by the IRS, which remains “the most crucial treatment option in the city” (Galicia et al. 2021). South Africa’s IRS, according to estimates of the Council for Scientific and Industrial Research, saves municipalities up to 748 million South African rands (US\$47 million) a year in landfill space (Godfrey et al. 2016). Without separation at source in South African cities and towns, informal recycling workers have also been key to accessing resources the private sector has struggled to access, due to “gatekeeping” practices by municipalities (Godfrey and Oelofse 2017).

The IRS also provides significant value addition across the waste value chain through the recovery and valorisation of waste, salvaging important resources and converting waste into beneficial materials for resale. For example, informal waste workers contribute to local economies by providing a myriad of reusable materials to other formal and informal

enterprises, such as plastic pellets sold to plastics converters and pre-processors, electrical and electronic waste sold to junk shops, and materials sold to artists for upcycling. Other actors in the waste value chain often profit from the work of informal recycling workers, who not only sell to buyers, but often pay private carriers and drivers to transport collected waste onwards (Dias and Samson 2016).

Labour, income and inequality

The factors that push people into waste picking are fundamentally economic both in developed and developing economies. With limited professional skills, the poorest and most marginalized members of society choose waste picking as one of the only ways to earn an income. For them, it can make the difference between living on the streets and going hungry or being able to sustain themselves and their families. In industrialised countries, changes in economic conditions that result in the loss of manufacturing jobs and cutbacks to government employment are economic factors that drive people to the IRS (Chileshe and Moonga 2017).

Despite the high risk and labour-intensive nature of their work, informal recycling workers receive very little pay, often suffer from poor health, and have no labour protections, thereby reducing their economic productivity and upward social mobility. A good waste picker can on average earn approximately US\$ 10 per day (Agamanthu and Law 2020), but income varies widely across countries and regions. Within Africa, for example, informal recycling workers in Abidjan, Côte d’Ivoire, can earn the equivalent of the legal minimum wage of 60,000 Central African franc (CFA) (US\$ 101 per month, which translates roughly into US\$ 4.80 per day) (Andrianisa et al. 2016), whereas in Nakuru, Kenya, informal recycling workers were found to earn less than US\$ 2 per day (Lubaale and Nyang’oro 2013). In Da Nang, Viet Nam, the UNDP reports that the average informal recycling worker earns between 100,000 and 200,000 Vietnamese dong per day (US\$ 4.25–8.50) (UNDP 2020). Evidence suggests that the difference in informal recycling workers’ incomes appears to be driven by such factors as: the type of work (i.e., picking versus processing), level of organising, and gender. Although in most places, waste picking is the lowest paid job in the recycling chain, in some cities informal recycling workers can earn more than the minimum wage and are able to gain many indirect benefits if they are organised in cooperatives and integrated as service providers in the municipal collection of household and recyclable waste (Dias and Samson 2016).

The IRS is especially dependent on plastic waste as a major part of their income. A study in four major cities in India (Delhi, Pune, Indore and Nainital) found that plastics

constitute 40–60 per cent of informal recycling workers' income (Chintan Environmental Research and Action Group 2021). As plastics are progressively prepared for resale and reuse, they increase in value, leading to the improvement of associated working conditions (Barford and Ahmad 2021). This highlights the inequity that informal recycling workers face at the lowest end of the waste hierarchy.

Global trends impacting informal recycling workers' livelihoods

Multiple global forces constrain the growth of the recycling sector and affect the livelihoods of informal recycling workers. Volatile oil prices, the COVID-19 pandemic and the resulting recession, as well as China's National Sword policy have significantly reduced the demand for plastics and other recyclables and the prices paid for them¹ (Khaled and Khateeb 2021). These trends have profound negative consequences for the IRS, affecting their income and resulting in work stoppages. In addition to this waning market demand for waste, the number of newly unemployed people entering the waste management sector has resulted in a further increase of the competition within the IRS (Dias et al. 2022).

Modernisation and privatisation of the waste management sector has led informal recycling workers to lose valuable access to waste when it is no longer dumped in open spaces but instead disposed of properly in large bins, sanitary landfills and incinerators to which access is restricted. In these instances, they are forced to compete for waste with private waste management companies that are paid by the tonne for transporting waste to landfills or incinerators. They also compete with formally employed municipal waste workers who often collect and sell recyclables for supplementary income.

While leading organisations advocate for the closure of dumpsites and landfills, ostensibly for reasons of cost savings and environmental benefits (Agamanthu and Law 2020), such measures come at great cost to informal recycling workers, cutting them off from their main source of livelihood. One such case is the closure of the notorious Akouédo dump in Abidjan, Côte d'Ivoire, in 2019, because of the illegal dumping of toxic waste that harmed the environment and human health (EJAtlas 2020a). In Delhi, India, where the door-to-door collection of waste has



A waste picker sorting plastics from waste that has been dumped on the side of Bagmati River, Kathmandu, Nepal, 2022. Photographer: Sabrina Heerema

been privatised, informal recycling workers lost access to materials (Demaria and Schindler 2015), while in Santiago, Dominican Republic, efforts to privatise the Rafey landfill after 2010 led to hundreds of informal recycling workers being violently displaced from the area, putting their livelihood at risk (EJAtlas 2020b).

Newly installed incinerators also threaten the IRS's activities because they limit access to resources. In India, the Philippines, and Brazil, informal recycling workers, together with environmental groups and residents, have joined together to resist the introduction of new incinerators (Demaria and Schindler 2015; EJAtlas 2019).

It is an important consideration – for governments, donors, policy makers and the private sector – that during these transitions, the exclusion of the IRS can lead to the loss of local know-how, the break-up of recycling value chains, and the disruption of vital income generating activities for the poorest in society. For example, in Egypt authorities witnessed a drop in recovery rates following private sector involvement in solid waste collection and excluding the IRS from collection activities in 2010 (Gerdes and Günsilius 2010).

To mitigate such failures, inclusive consultation and planning processes that directly involve all segments of the IRS can help incorporate their expertise in upgraded solid waste management systems and policies to the benefit of all stakeholders in the ecosystem.

¹ Operation National Sword bans the import of mixed plastics, mixed paper and other recyclables into China, broadly impacting the waste management and recycling industry worldwide. In the US, for example, this policy has resulted in approximately a 50 per cent reduction in revenues received from the sale of recyclables from curbside recycling – over US\$ 400 million per year. Source: Waste Management World, Sept–Oct 2019.

Environmental dimension

The IRS delivers environmental benefits, especially to those populations which lack access to adequate municipal waste management services, and also has great potential to improve end-of-life management of plastics. It prevents plastic waste from accumulating in dumpsites and landfill sites, escaping into the marine environment in the form of litter, or being burned openly. It thereby avoids air pollution and prevents soil and water contamination from hazardous substances (additives) included in plastic products. It also contributes toward reducing greenhouse gas emissions through the recovery of plastics from different waste streams (packaging waste, synthetic textiles, e-waste etc.), and saving energy and preserving natural resources by enabling recycling and reuse (Paul et al. 2012; Barford and Ahmad 2021).

However, the environmental performance of the IRS is influenced by factors such as the sector's technical capacity and the way it operates. The focus of the IRS on plastics of high value may leave problematic plastics uncollected, such as single use plastics that can potentially find their way into the marine environment (McKinsey and Co. and Ocean Conservancy 2015; Samadikun et al. 2020). Release of plastics and hazardous substances in the environment may also occur due to poor practices of the IRS coupled with insufficient environmental protection (Andrianisa et al. 2016).

Environmental service provider

Workers of the IRS play a crucial role as service providers to municipalities in the collection, sorting and recovery of plastics. They could offer a solution to plastic pollution and marine litter, especially in countries that lack robust formal waste management services. With a large portion of the world population – at least 2 billion people – lacking access to solid waste collection systems (Kaza et al. 2018), the activities of the informal recycling labour contribute significantly to the reduction of environmental problems caused by uncollected municipal solid waste, ranging from avoiding the localised flooding of plastic-clogged waterways to preventing the release of greenhouse gases from the burning of plastics (Paul et al. 2012; Barford and Ahmad 2021). In Abidjan, Côte d'Ivoire, for example, informal recycling workers greatly helped improve the environment by preventing the accumulation of waste on the streets, thereby decreasing associated environmental risks; and by recovering municipal solid waste helped reduce the number of illegal transfer stations or dumpsites (Andrianisa et al. 2016).

Informal recycling operations, however, are often marked by an unhygienic environment and poor practices, such as disposing unfavourable waste outside of legal places, which can contaminate soil and aquifers and result in other environmental problems (Sembiring and Nitivattananon



A truck arriving with more recyclable waste to sort, at Doko Recyclers' recycling segregation facility, Kathmandu, Nepal, 2022. Mainly women work with the segregation in this facility. Photographer: Sabrina Heerema

2010; Paul et al. 2012; Andrianisa et al. 2016; Morais et al. 2022). In Ankara, Turkey, street informal recycling workers tend to tear open trash bags to retrieve valuable recyclables, littering the area around the bins (Dinler 2016; Morais et al. 2022). In particular, informal recovery of plastics from e-waste is associated with serious environmental issues due to primitive handling methods to extract electronic components (Yang et al. 2017). The plastic components of e-waste, on the other hand, commonly contain persistent organic pollutants, such as polycyclic aromatic hydrocarbons and brominated flame retardants (Grant et al. 2013; Yang et al. 2017). The IRS's impact on the environment is both positive and negative and would benefit from targeted development intervention.

Recovery of plastics

The IRS plays a critical role in recovering and segregating end-of-life plastics, thereby contributing to the circular economy. In 2016 alone, the informal recycling sector collected 27 million tonnes of plastic waste (Lau et al. 2020). This means that approximately 58 per cent of all the plastic material collected for recycling globally is carried out by the informal recycling sector (Lau et al. 2020). These numbers suggest that current international efforts to establish a circular economy along the plastic value chain cannot be successful if they do not include the IRS.

Overall, the IRS collects a very wide range of plastic materials, the choice of which is based on the economic value the local, regional and international end-use markets create, as well as the waste management systems and plastic industry in place. For example, flexible and multilayer plastics, often used as packaging for fresh food products, are typically not easily recycled because they are more difficult, time consuming and expensive to process (Tacker et al. 2020; De Mello Soares et al. 2022). These plastics are mostly mixed and contaminated with other materials and need to go through a proper cleaning and sorting process before recycling. The effort to collect plastic waste also varies by the plastic type. For example, the collection of one kilogram of plastic bags, according to the Ocean Conservancy (2015), requires 61 minutes, while collecting one kilogram of polyethylene terephthalate (PET) requires only 37 minutes. Therefore, the IRS is less likely to collect low-value, high-bulk plastic waste such as low-density polyethylene (LDPE) films and instead concentrates on high-value plastic waste, such as polyethylene terephthalate (PET) beverage bottles, high-density polyethylene (HDPE) containers (e.g., shampoo and cosmetic bottles), and polypropylene (PP) food packaging (McKinsey and Co. and Ocean Conservancy 2015; Samadikun et al. 2020).

India, Indonesia, the Philippines and Viet Nam, among the top contributors to plastic pollution, share many similarities regarding the state of their waste management



Bags of recyclables on a dumpsite near Dhaka, Bangladesh. Photographer: Shamim ul Islam/flickr (used with permission)

sector, a limited infrastructure and a heavy reliance on the informal sector for collecting and recovering recyclables. All of these countries have relatively high recycling rates of high value plastics such as PET collected by the IRS. The IRS in India, for example, recovers 90 per cent of PET bottles, a percentage much higher than the formal recycling rate for PET plastics in Japan (72.1 per cent), Europe (48.3 per cent) and the United States (31 per cent) (PACE 2018; Choudhary et al. 2019). Similarly, in Indonesia 3.7 million waste pickers collect one million tonnes of plastic waste per year, 70 per cent of which is subsequently recycled (World Economic Forum 2020; UNEP 2021). In the Philippines, 90 per cent of PET bottles and 40 per cent of HDPE products are reclaimed. Low-value plastics are not even being collected in this country because they do not generate sufficient income for the informal sector (McKinsey and Co. and Ocean Conservancy 2015; UNEP 2019a).

However, in Ghana, a sample of 43 informal recycling workers indicated that only two collect PET bottles, illustrating their low value, which can be explained by the lack of a recycling infrastructure for PET in the country (Keesman 2019). In China, a country with a well-established waste recycling industry, roughly 4 million informal recycling workers (Chen et al. 2018) only collect 11 per cent of plastic waste for recycling (McKinsey and Co. and Ocean Conservancy 2015). The low recovery rates of plastics by the IRS may be explained by the fact that roughly 80 per cent of collected waste in the country does not end up in open dumps but in incinerators or sanitary landfills, which restricts informal recycling worker's access to recyclables (McKinsey and Co. and Ocean Conservancy 2015).

Although much of the IRS's activities focus on the recovery of packaging items, all types of materials are handled, including textiles, electric and electronic items.

Approximately 30 per cent of the waste generated annually (by weight) from electric and electronic appliances is plastic waste, with acrylonitrile butadiene styrene (ABS), polypropylene (PP), high impact polystyrene (HIPS), and polycarbonate (PC)/ABS blends the most frequently found (Chaine et al. 2022). Much of the e-waste from developed countries is illegally exported to Asian and African countries, where it is exploited informally. Electric and electronic elements are separated, aggregated and reintroduced illegally into the production chain (Pickren 2014; Morais et al. 2022), while valuable materials are extracted for recycling.

Similar trends can be seen in the processing of synthetic textile waste (Minter 2016; Morais et al. 2022). Synthetic textile fibres in many developing countries constitute an important waste stream, either generated by the local

textile industry, as is the case of Asia's textile production hubs in India, China and Bangladesh (ILO 2018), or by second-hand textile imports from developed countries to countries in Africa, Latin America and Eastern Europe (Griffin 2019). Ghana, for example, receives 15–20 million items of second-hand clothing from Western countries every week, 40 per cent of which leaves the market as waste (Plastic Soup Foundation 2022; DW 2022). Unusable clothing is thrown into sewers or dumpsites and may eventually end up in the sea as a result of floods or other extreme weather events. Informal recycling workers routinely go through this type of waste looking for the very last pieces of usable clothing to wear or to sell (Plastic Soup Foundation 2022; DW 2022).

There is little published information and further research is required to estimate the amount of plastic waste recovered from e-waste, as well as of the amount of synthetic textile materials collected for reuse or recycling by the informal recycling sector.

Climate change mitigation

The IRS's activities and operations are not only significant because they recover valuable resources but also because they play an important role in climate change mitigation. Recovering plastics during their life cycle, avoiding their disposal in landfills or by open burning, and returning secondary raw materials into the production cycle (which uses less energy than extraction and manufacturing), all contribute to reducing CO₂ emissions (WWF 2021).

According to The Association of Plastic Recyclers (2018), using recycled instead of virgin plastic reduces greenhouse emissions by 67 per cent for PET and 71 per cent for both HDPE and PP. Another study suggests that increasing the recycling rate of non-fibrous plastic resins from the current 18 per cent to 42 per cent would reduce global greenhouse gas (GHG) emissions by 142.3 million tonnes of CO₂ equivalent per year, provided that open burning is not increased, and that the segregation of recycling is improved (Kajaste and Oinas 2021).

In addition, the way the IRS operates usually leaves a smaller carbon footprint than their formal counterparts. The IRS uses comparatively less motorised transportation (instead relying mainly on human or animal transport) and uses numerous transfer points to collect and store recyclables for transportation (Gerdes and Gunsilius 2010). For example, it is estimated that India's SWaCH Cooperative of self-employed waste collectors and other urban poor prevent the emission of 1,424 tonnes of CO₂ equivalent per year simply by operating manual pushcarts rather than conventional waste collection trucks (WIEGO 2021).

Part 2

The informal recycling sector in existing policy frameworks



The informal recycling sector in existing policy frameworks

In the development of an international legally binding instrument on plastic pollution, inspiration can be taken from existing efforts working to recognise and create innovative models that incorporate informal waste workers and aspects into formal international frameworks and agreements. These range from setting high aspirations and trust building exercises, to the design of specific policy. The following examples are most relevant to the IRS and solid waste management.

International Labour Organization's Decent Work Agenda

At a global level, waste picking falls under the International Labour Organization's (ILO) Decent Work Agenda. Informal recycling workers are described as important actors in achieving the UN Sustainable Development Goals. This means informal recycling workers are seen as contributors to the circular economy in developing countries. The ILO has also developed a specific approach toward the issue of an informal economy through the Recommendation 202² document concerning National Floors of Social Protection; the Recommendation 204³ document concerning the transition from informal to formal economy; and the Guidelines for a just transition toward environmentally sustainable economies and societies for all.⁴ With its approach, the ILO has given inspiration to

many international organisations, showing how to address the informal economy, and could also inspire global efforts concerning the just transition of the IRS.

Basel Convention

In 2019, the Basel Convention expert working group "on environmentally sound management (ESM)" decided to include in its work programme provisions for the collection of initiatives to promote environmentally sound management in the IRS.⁵ More specifically, under the ESM tool the group developed "Guidance on how to address the environmentally sound management of wastes in the informal sector"⁶, which at the time of writing was still in the drafting phase. The objective of this document is "to provide guidance on how to address and improve environmentally sound management of waste in the informal sector and describe ways to mitigate the potential for adverse environmental impacts (e.g., open burning, indiscriminate dumping of residual wastes, etc.) and to provide considerations for how to integrate the informal sector". However, this guidance does not look into aspects of labour, social framework, security, or any other non-ESM related issues. In addition, the expert working group has collected several case studies to provide practical examples of measures used to further environmentally sound management in the IRS. These examples have been uploaded onto the Basel Convention website.⁷



Piles of different types of plastics sorted at Doko Recyclers' segregation facility, Kathmandu, Nepal, 2022. Photographer: Sabrina Heerema

² ILO, 2012, Social Protection Floors Recommendation, No 202, www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:3065524

³ ILO, 2015, Transition from the Informal to the Formal Economy Recommendation, No 204, www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:R204

⁴ ILO, 2015, Guidelines for a just transition towards environmentally sustainable economies and societies for all, www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_432859.pdf

⁵ www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Informalsector/tabid/5845/Default.aspx

⁶ UNEP/CHW.14/INF/8, 2019

⁷ www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Informalsector/tabid/5845/Default.aspx

Minamata Convention on Mercury

The Minamata Convention on Mercury entered into force in 2017 as the first new multilateral environmental agreement in over a decade, and is the first multilateral environmental agreement to address an informal sector of the economy (Article 7 – artisanal and small-scale gold mining informal sector) (UNEP 2019b). The Convention is seeking to improve conditions for the world's artisanal and small-scale gold mining communities by advancing solutions to the rampant use of toxic mercury in these mining activities. During the development of the Convention, negotiators recognised the vast importance of informal mining activities to over 15 million miners and their families. To avoid risking their livelihood and health, countries agreed to avoid a ban on the use of mercury in the sector. Instead,

they developed a flexible approach that requires affected countries to reduce and, where feasible, eliminate the use of mercury in artisanal and small-scale gold mining, starting at the community level, and to bring these communities into formalised frameworks. These approaches need to be reflected in National Action Plans on artisanal and small-scale gold mining to allow the delivery of technical assistance and to lead to site-specific solutions.

Since there is no other global policy addressing the inclusion of the IRS in waste collection and recycling, it is crucial that negotiators of the international legally binding instrument on plastic pollution take advantage of the experience gained during the development and implementation of the Minamata Convention on Mercury in such a way that the treaty will be inclusive of the IRS.



A worker handles mercury with bare hands in a small-scale gold mine in Camarines Norte, Bicol Region, Philippines, 2016. Photographer: Minette Rimando/ILO/flickr (CC BY-NC-ND)



Women working at Doko Recyclers' segregation facility receiving new loads of recyclables to separate into different categories. Kathmandu, Nepal, 2022. Photographer: Sabrina Heerema

Domestic policies

In India, the National Action Plan on Climate Change, the Municipal Solid Waste Management Manual issued by the Central Public Health and Environmental Engineering Organisation, and the Solid Waste (Management and Handling) Rules of 2016 are the three main policies that govern solid waste management in the country, aimed at strengthening the capacity of local bodies for segregation and recycling of waste, and giving legal recognition to the IRS. While these policies recognise informal recycling workers and their concerns, there are no actionable elements to these policies. There is, however, a good example in Pune, India, where municipal authorities offer formal recognition to informal recycling workers, providing identity cards and access to health insurance (Gunsilius et al. 2011).

Brazil and Peru strongly support waste picking and encourage informal recycling workers' cooperatives. In Brazil, various federal laws recognise waste picking as an occupation, explicitly mentioning the interests of informal recycling workers and promoting their integration into the official waste collection and recycling sector (Dias 2012). In Peru, Law 29.419, passed in 2010, regulates the activities of informal recycling workers. This law, developed through a participatory process involving informal recycling workers'

representatives, encourages their formalisation through incentives, such as tax reductions and capacity building programmes (Dias 2012).

India, Peru and Brazil offer examples of how informal recycling workers can be integrated into municipal waste schemes, through national and regional laws. This integration brought many benefits to the IRS, including access to materials, the establishment of facilities to sort and process waste, and better prices for waste collected by cooperative members (Chen and Skinner 2014). Within this framework, informal recycling workers have secured a stable monthly income and improved working conditions and welfare. In some cities, the children of informal recycling workers have access to day-care or can apply for an education scholarship, while informal recycling workers themselves can have access to housing benefits or credits for house purchases (Chen and Skinner 2014).

In 2020, the South African government published a Waste Picker Integration Guideline to serve as model for the integration of informal recycling workers into the formal value chain (DEFF and DSI 2020). This guideline explains the importance of integrating informal recycling workers, provides information on their present status and guidelines on how to develop, institutionalise and implement waste picker integration plans.

Part 3

Recommendations



Recommendations

This policy paper provides the background rationale and explains the importance of the IRS to waste management. Informal recycling workers should be actively included as important stakeholders in the negotiation and drafting of the upcoming international legally binding instrument on plastic pollution. The high-level policy recommendations below address some of the key issues outlined in this policy paper, pertaining to integrating informal recycling workers and the concept of a just transition into an international legally binding instrument on plastic pollution.

Inclusive governance

Goal is to give voices to the informal recycling sector in the global and national governance landscape.

Adherence to the principles for a just transition and the oversight of their implementation are important features of effective global governance. The IRS plays an important role in mitigating plastic pollution, and the workers' voices, both male and female, through a consultation process, should be heard in global and national governance. In addition, national plastic policies, regulatory frameworks and other instruments, drafted with the participation of empowered workers, should have clear goals; gradual and

measurable targets; monitoring and evaluation systems in place; and enforcement mechanisms included, in order to encourage the integration of the IRS.

Gender-sensitive approach and de-stigmatisation of workers

Goal is to create an equal and gender-safe operational environment.

A gender-sensitive approach should be an integral part of global and national legislation and policies, which are based on the sound knowledge of gender issues, barriers and gaps in waste management activities. Supporting actors should develop tools, such as guidelines on how national plastic management policies and action plans can promote gender equality and eliminate social pressures manifested through discrimination, violence and sexual harassment. Workers' representatives should include members of all genders, when possible.

In addition, gender-sensitive communication strategies should be applied to de-stigmatise workers and raise awareness on the role and contribution of equal participation in the valorisation of plastics. This should



WIEGO's Action Gender & Waste research workshop: creating space for affection and webs of knowledge through participatory tools. Belo Horizonte, Brazil, 2012. Photographer: Angela Oliveira

be achieved, for example, by creating opportunities for informal recycling workers to be involved in community outreach activities as environmental educators.

Support workers organising themselves

Goal is to increase the safety and stability of the informal recycling sector through organising structures.

Fostering collective action and solidarity can be challenging due to the independent nature of the IRS, but support through legislative frameworks and umbrella organisations in structuring themselves should be a key undertaking. Global and national legislative frameworks should recognise the IRS and its valuable role. Local and national policy makers should consult existing structures representing the IRS, alongside creating legislative recognition.

In the absence of structures representing the IRS, non-governmental organizations should be identified to work with informal recycling workers. At the global level, organisations such as the Global Alliance of Waste Pickers' (and through their "Waste Pickers Around the World" (WAW) database) should be consulted and could serve as a starting point for an institutional mapping of workers' organisations. In political contexts that

are unsupportive of the IRS, international engagement and advocacy are crucial to allow national informal recycling workers to articulate themselves and gain legitimacy.

The aim of organised structures is to allow for crucial input from workers to bring about fair remuneration, improvement of quality controls in the sorting and handling of plastics, and of workers' working conditions, as well as their health and – ultimately – provide them with greater recognition and improved livelihoods.

Make the informal recycling sector stronger by building its capacity

Goal is to increase and strengthen the capacity of the informal recycling sector in both their day-to-day operations and in the national and global governance landscape.

The IRS has demonstrated a high level of resilience. However, building capacities of key IRS actors on governance, protection measures and technical issues is required. The informal recycling workers and those who represent them should understand their roles and responsibilities in the global and national governance landscape, and should be informed about their right to protection.



WIEGO's Action Gender & Waste Research workshop: women waste pickers discuss gender differences. Belo Horizonte, Brazil, 2012. Photographer: Sonia Dias

In addition, capacities should be built to master day-to-day operations along the waste value chain activities. Some of the skills that need to be developed include building the capacity of women informal recycling workers, training informal recycling workers as environmental stewards for cities, training them in quality collection and sorting of plastics, as well as in the semi-processing of plastics; and building their capacity in the governance of workers' organisations, entrepreneurship, and occupational health and safety. A comprehensive capacity-building programme can lay the foundations to strengthen the workers' knowledge and skills so they can improve their profitability and operate at the frontline of curbing plastic pollution.

Occupational health and safety and social protection

Goal is to prioritise health, safety and social protection of the informal recycling sector.

There should be a strong commitment to these protections in the international legally binding instrument on plastic pollution, by recognizing the workers' need for adequate PPE; access to health services, and to education on occupational health and safety, and on malpractices in solid waste management (open burning and others), as well as to

emergency cash grants and to childcare. All these are essential elements of a just transition. Protection and mitigation measures should be established to include newly evolving risks to the informal sector from the effects of climate change.

Some basic indicators need to be established to assess the performance of countries and of industry on these aspects of the ILO's Decent Work Agenda, and to evaluate their progress over time. In addition, a key recommendation is to conduct research on as well as to develop suitable PPE for informal recycling workers, and provide educational programmes to increase workers' awareness on operational safety.

Payment for services

Goal is a fair and reliable remuneration system for informal labour.

Informal recycling workers need fair and reliable payment to ensure that their services are sustainable in the long term. Since they provide services both in the service chain (to cities) and in the value chain (to industry), setting out contracts that contain clear rules on how to calculate the value of their work in both these areas is key for a just transition addressed by the international legally binding instrument on plastic pollution.



Informal trade workers at a scrap yard in Thimphu, Bhutan, 2018. Scrap is collected and exported to India. Photographer: Tina Schoolmeester

Extended Producer Responsibility (EPR) policies should be developed in tandem with the concept of payment by governments and/or the industry for the costs of collection, sorting and processing. Such policies should be designed in ways that do not restrict access to materials and by creating resources for the infrastructure and equipment necessary to enable informal recycling workers to collect, sort, process and sell plastic materials, as done in Brazil and Argentina. While there is much room for improving the policies of these two countries, they are both examples of inclusivity.

Address knowledge gaps – research, documentation and monitoring

Goal is to increase formal sector understanding of the operation and needs of the informal recycling sector, and to monitor the informal recycling sector's efficacy.

Although there has been an increase in the visibility of the role and contributions of informal recycling workers to the urban environment and economy in the last 20 years, there are important knowledge gaps. Little is known about the scale, collection capacity, network structures, and the contribution of informal recycling workers to reaching the Sustainable Development Goals.

Action-oriented research is crucial to building impactful global, national and local policies. Research is also of central importance for the mapping of the main characteristics of each system, the impacts on livelihoods in the case of policy measures, and the documentation of Best Practice schemes. Mapping all informal actors in the value chain is equally critical to understand the system and to design inclusive consultation processes leading to effective policies.

In addition, there is a need to develop new models or to build on existing ones, to measure the efficacy of the IRS in recovering plastics and limiting leakage into the environment. The UN-Habitat Waste Wise Cities Tool (WaCT) and ISWA Plastic Pollution Calculator are two such existing models, which may be expanded to map and monitor the IRS's activities.

Access to technology

Goal is to enhance the financial and technological capacity of the informal recycling sector.

The IRS's operations are limited to recovery, sorting and reselling of plastics. Their financial background also does not permit them to operate in higher value activities. Long-term projects and investment systems should financially support the development of the IRS, enabling workers' organisations to access machinery for plastics processing. In addition, policies should be designed to shield waste pickers from the volatility of material pricing by setting out price floor mechanisms.

Pro-poor approach to formalization

Goal is sustainable livelihoods for the informal recycling sector and improved plastic waste management.

The concept of a just transition for the IRS in the international legally binding instrument on plastic pollution is associated with an expansion of formal employment opportunities and better integration into formal waste recycling systems. It makes sense to create plastic systems that are built on the creativity, innovative power, entrepreneurship, adaptability, and expertise of the IRS wherever possible. This will make it possible to improve the recovery of plastics while at the same time improving the livelihoods of people working in the IRS.

However, it is necessary to take a pro-poor approach to formalisation, which ought to take into consideration the creation of incentives for informal enterprises to formalise or to organise themselves; the creation of incentives for firms to hire workers with standard contracts and social benefits instead of focusing on legalisation only; the support for informal workers by designing plastic collection systems that adopt a mixed approach to modernization (locally adapted technologies instead of capital intensive ones); the promotion of policies for increased assets and earnings through fair policies and regulations, as well as fair contracts; financial, business and training services; legal and social protections to reduce risk; and to offer informal recycling workers a seat at the table, to participate in.

References

- Agamanthu, P. and Law, H.J. (2020). Do We Need Landfills? Waste Management and Research, The Journal for a Sustainable Circular Economy, Special Issue: Landfill Management, Volume 38, Issue 10, October 2020. Available at: <https://doi.org/10.1177/0734242X20943036>
- Aidis, R. and Khaled, D. (2019). Municipal Waste Management and Recycling Gender Analysis Report (USAID Women's Economic Empowerment and Equality Technical Assistance). U.S. Agency for International Development. DOI: 10.13140/RG.2.2.34571.64808
- Andrianisa, H.A., Brou, Y.O.K, Séhi bi, A. (2016). Role and Importance of Informal Collectors in the Municipal Waste Pre-collection System in Abidjan, Côte d'Ivoire. Volume: 53, Magazine: Habitat International. DOI: 10.1016 / j.habitatint.2015.11.036
- Aparcana, S. (2017). Approaches to Formalization of the Informal Waste Sector into Municipal Solid Waste Management Systems in Low- and Middle-income Countries: Review of Barriers and Success factors. Waste Management, Volume 61, 2017, Pages 593-607, ISSN 0956-053X. Available at: <https://doi.org/10.1016/j.wasman.2016.12.028>
- Awad, A.B., de Medina, R., Vanek, J. (2013). Women and Men in the Informal Economy: A Statistical Picture, 2nd ed., International Labour office: Geneva, Switzerland. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_234413.pdf
- Barford, A. and Ahmad S.R. (2021). A Call for a Socially Restorative Circular Economy: Waste Pickers in the Recycled Plastics Supply Chain. *Circ Econ Sustain*.1(2):761-782. doi: 10.1007/s43615-021-00056-7. Epub 2021 Jun 11. PMID: 34888563; PMCID: PMC8192276. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8192276>
- Binion, E. and Gutberlet, J. (2012). The Effects of Handling Solid Waste on the Wellbeing of Informal and Organized Recyclers: a Review of the Literature. *International Journal of Occupational and Environmental Health* 18(1): 43-52
- Bouvier, M., and Dias, S.M. (2021). Reducing Greenhouse Gas Emissions through Inclusive Recycling: Methodology and Calculator Tool. Available at: www.wiego.org/ghg
- Chaine, C., Hursthouse, A.S., McLean, B., McLellan, I., McMahon, B., McNulty, J., Miller, J., Viza E., (2022). Recycling Plastics from WEEE: A Review of the Environmental and Human Health Challenges Associated with Brominated Flame Retardants. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8775953>
- Chen, F., Luo, Z., Yang, Y., Liu, G.J., Ma, J. (2018). Enhancing Municipal Solid Waste Recycling through Reorganizing Waste Pickers: A Case Study in Nanjing, China. DOI: 10.1177/0734242X18766216
- Chen, M. and Skinner, C. (2014). The Urban Informal Economy: Enhanced Knowledge, Appropriate Policies and Effective Organization. In the book: *The Routledge Handbook on Cities of the Global South*
- Chileshe, B., and Moonga, M.S. (2017). Alternatives for Dumpsite Scavenging: The Case of Waste Pickers at Lusaka's Chunga Landfill. DOI: 10.20431/2349-0381.0406006
- Chintan Environmental Research and Action Group (2021). Plan the Ban. A guiding document to make an inclusive plastic waste reduction policy.
- Choudhary, K., Sangawn, K.S., Goyal, D., (2019). Environment and Economic Impacts Assessment of PET Waste Recycling with Conventional and Renewable Sources of Energy. *Procedia CIRP*, Vol. 80, 2019, P. 422-427. Available at: <https://doi.org/10.1016/j.procir.2019.01.096>
- Cruvinel, V.R.N., Marques, C.P., Cardoso, V. et al. (2019). Health Conditions and Occupational Risks in a Novel Group: Waste Pickers in the Largest Open Garbage Dump in Latin America. *BMC Public Health* 19, 581. Available at: <https://doi.org/10.1186/s12889-019-6879-x>
- da Silva, C.L., Weins, N., Potinkara, M. (2019). Formalizing the Informal? A Perspective on Informal Waste Management in the BRICS through the Lens of Institutional Economics. *Waste Management*, 99, 79-89. DOI: 10.1016/j.wasman.2019.08.023
- De Mello Soares, C.T., Monica, Ek., Östmark, E., Gällstedt, M., Karlsson, S. (2022). Recycling of Multi-material Multilayer Plastic Packaging: Current Trends and Future Scenarios. *Resour. Conserv. Recycl.* 176, 105905
- Demaria, F. and Schindler, S. (2015). Contesting Urban Metabolism: Struggles Over Waste-to-Energy in Delhi, India. Available at: <https://onlinelibrary.wiley.com/doi/10.1111/anti.12191>
- Department of Environment, Forestry and Fisheries and Department of Science and Innovation (DEFF and DSI) (2020). Waste Picker Integration Guideline for South Africa: Building the Recycling Economy and Improving Livelihoods through Integration of the Informal Sector. DEFF and DSI: Pretoria. Available at: <https://www.gtac.gov.za/wp-content/uploads/2022/02/Waste-Picker-Integration-Guideline-for-South-Africa.pdf>
- Department of Science and Technology (DST) (2012). South African Waste Sector-2012. An analysis of the formal private and public waste sector in South Africa. In *A National Waste RDI Roadmap for South Africa: Phase 1 Status Quo Assessment*; Department of Science and Technology: Pretoria, South African, 2013. Cited in: Godfrey, L. and Oelofse, S., (2017). Historical Review of Waste Management and Recycling in South Africa. Available at: <https://www.mdpi.com/2079-9276/6/4/57>
- Deutsche Welle (DW), (2022). Used Clothes Choke Both Markets and Environment in Ghana. Available at: <https://www.dw.com/en/used-clothes-choke-both-markets-and-environment-in-ghana/a-60340513>
- Dias, S.M. (2012). Waste and Development – Perspectives from the Ground. Available at: <https://journals.openedition.org/factsreports/1615>
- Dias, S.M. and Fernandez L. (2013). Wastepickers: A Gendered Perspective, in *Powerful Synergies: Gender Equality, Economic Development and Environmental Sustainability*, UNDP, pages 163-165. Available at: <https://www.undp.org/publications/powerful-synergies-gender-equality-economic-development-and-environmental-sustainability>
- Dias, S.M., and Ogando, A. C. (2015). Rethinking Gender and Waste: Exploratory Findings from Participatory Action Research in Brazil. *Work Organisation, Labour & Globalisation* Volume 9, Number 2
- Dias, S.M. and Samson, M., (2016). Informal Economy Monitoring Study Sector Report: Waste Pickers. WIEGO, Cambridge, MA and Manchester, UK. Available at: <https://www.wiego.org/sites/default/files/publications/files/Dias-Samson-IEMS-Waste-Picker-Sector-Report.pdf>
- Dias, S.M., and Silva, V.A.C. (2017). Wastepickers in Brazil: Recognition and Annual Bonus in Informal Workers and Collective Action. A Global Perspective. New York, USA: Cornell University Press. Available at: <https://doi.org/10.7591/9781501707964>
- Dias, S.M., and Fernandez, L. (2020). Formalization from the Ground: The Case of Waste Pickers Cooperatives. In: *Charmes*,

- J. (ed). *Research Handbook on Development and the Informal Economy*. Available at: <https://doi.org/10.4337/9781788972802.00021>
- Dias, S.M., Abussafy, R., Gonçalves, J. (2022). *Inclusive Recycling in Waste Picker Cooperatives in Brazil: Impacts of COVID-19. Comparative Analysis 2020-2021*. WIEGO Resource Document No. 24. Manchester, UK: WIEGO
- Dinler, D.S. (2016). *New Forms of Wage Labour and Struggle in the Informal Sector: the Case of Waste Pickers in Turkey*. *Third World Q.* 37 1834–54
- Environmental Justice Atlas (EJAtlas) (2019). *Protesters in Quezon City, Resist Planned Incinerators despite National Ban, Philippines*. Available at: <https://ejatlas.org/conflict/protesters-in-quezon-city-philippines-resist-planned-incinerators-despite-national-ban>
- Environmental Justice Atlas (EJAtlas) (2020a). *Trafigura's Toxic Waste Scandal and the Closure of Akouédo Dump, Abidjan, Côte d'Ivoire*. Available at: <https://ejatlas.org/conflict/toxic-waste-dumping-in-abidjan-ivory-coast#:~:text=The%202019%20closure%20of%20Abidjan's,health%20of%20over%20100%2C000%20people>
- Environmental Justice Atlas (EJAtlas) (2020b). *Waste Pickers Fight Exclusion at Santiago's "Eco-Park Rafey", Dominican Republic*. Available at: <https://ejatlas.org/conflict/waste-pickers-fight-exclusion-from-recycling-work-at-santiagos-eco-park-rafey-dominican-republic>
- Galicia, F.G., Coria-Páez, A.L., Tejeida-Padilla, R., and Galicia-Haro, E.F. (2021). *A System for the Inclusion of the Informal Recycling Sector (IRS) in Mexico City's Solid Waste Management*. *Sustainability* 13(22):12490. DOI: 10.3390/su132212490
- Gerdes, P., and Gunsilius, E., (2010). *The Waste Experts: Enabling Conditions for Informal Sector Integration in Solid Waste Management. Lessons learned from Brazil, Egypt and India*. Technische Zusammenarbeit (GTZ) GmbH Partnerships for Recycling Management. Available at: <https://www.giz.de/en/downloads/gtz2010-waste-experts-conditions-is-integration.pdf>
- Geyer, R. (2020). *Production, Chapter 2 - Production, Use and Fate of Synthetic Polymers in Plastic Waste and Recycling*. Letcher, T.M. (ed.). Cambridge, MA: Academic Press, pp. 13-22
- Gilbert, N. (2022). *Climate Change will Force New Animal Encounters - and Boost Viral Outbreaks*. DOI: 10.1038/d41586-022-01198-w
- Godfrey, L., Strydom, W., Phukubye, R. (2016). *Integrating The Informal Sector Into The South African Waste And Recycling Economy In The Context Of Extended Producer Responsibility*. Briefing Note, February 2017. Council for Scientific and Industrial Research
- Godfrey, L. and Oelofse, S. (2017). *Historical Review of Waste Management and Recycling in South Africa*. Available at: <https://www.mdpi.com/2079-9276/6/4/57>
- Godfrey, L., Tsakona, M., Jones, F., Nitzsche, G.M., Garcés-Sánchez, G. (2018). *Mapping the Status of Women in the Global Waste Management Sector*. Available at: www.researchgate.net/publication/357556659_Mapping_the_status_of_women_in_the_global_waste_management_sector/citations
- Grant, K., Goldizen, F.C., Sly, P.D., Brune, M., Niera, M., van den Berg, M. (2013). *Health Consequences of Exposure to E-waste: a Systematic Review*. *Lancet Glob Health* 2013;1:e350–e361. Available at: [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(13\)70101-3/fulltext#:~:text=Findings,behaviour%2C%20and%20decreased%20lung%20function](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(13)70101-3/fulltext#:~:text=Findings,behaviour%2C%20and%20decreased%20lung%20function)
- Griffin, C.H. (2019). *Second-Hand Clothing in the Developing World: A Saving Grace or Lasting Burden?* Available at: http://www.internationalresearchjournaloffinanceandconomics.com/ISSUES/IRJFE_175_06.pdf
- Gunsilius, E., Chaturvedi, B., Scheinberg, A. (2011). *The Economics of the Informal Sector in Solid Waste Management*. Collaborative Working Group on Solid Waste Management in Low- and Middle-income Countries and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- Hande, S., (2019). *The Informal Waste Sector: a Solution to the Recycling Problem in Developing Countries*. *Field Actions Science Reports* [Online], Special Issue 19 | 2019, Online since 01 March 2019. Available at: <http://journals.openedition.org/factsreports/5143>
- International Labour Organization (ILO) (2013). *Sustainable Development, Decent Work and Green Jobs*. International Labour Conference, 102nd Session, 2013. ISBN 978-92-126868-0 (Web pdf)
- International Labour Organization (ILO) (2015). *Transition from the Informal to the Formal Economy Recommendation, No 204*. Available at: https://www.ilo.org/dyn/normlex/en/f?p=NO_RMLEXPUB:12100:0::NO::P12100_ILO_CODE:R204
- International Labour Organization (ILO) (2018). *From Obligation to Opportunity. A Market Systems Analysis of Working Conditions in Asia's Garment Export Industry*. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---ifp_seed/documents/publication/wcms_628430.pdf
- Kajaste, R. and Oinas, P. (2021). *Plastics Value Chain - Abatement of Greenhouse Gas Emissions*. *AIMS Environmental Science*, Volume 8, Issue 4: 371-392
- Kaza, S. and Yao, L. (2018). *Landslides, Dumpsites, and Waste Pickers*. *World Bank Blogs. Sustainable Cities*. Available at: <https://blogs.worldbank.org/sustainablecities/landslides-dumpsites-and-waste-pickers>
- Kaza, S., Yao, L., Bhada-Tata, P. (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/30317/211329ov.pdf>
- Keesman, B. (2019). *Market Report Waste and Circular economy Ghana*. Available at: www.rvo.nl/sites/default/files/2019/08/Ghana-Market-Survey-Waste-Circular-Economy.pdf
- Khaled, D. and El Khateeb, M. (2021). *Recycling in Jordan: Gender Analysis*. U.S. Agency for International Development. DOI: 10.13140/RG.2.2.25223.32160
- Lau, W.W.Y., Shiran, Y., Bailey, R.M., Cook, E., Stuchtey, M.R., Koskella, J., Velis, C.A., Godfrey, L., Boucher, J., Murphy, M.B., Thompson, R.C., Jankowska, E., Castillo, A., Pilditch, T.D., Dixon, B., Koerselman, L., Kosior, E., Favoino, E., Gutberlet, J., Baulch, S., Atreya, M.E., Fischer, D., He, K.K., Petit, M.M., Sumaila, U.R., Neil, E., Bernhofen, M.V., Lawrence, K., and Palardy, J.E. (2020). *Evaluating Scenarios Toward Zero Plastic Pollution*. *Science*. 2020 Sep 18; 369 (6510):1455-1461. DOI: 10.1126/science.aba9475. Epub 2020 Jul 23. PMID: 32703909
- Linzner, R. and Lange, U. (2013). *Role and Size of Informal Sector in Waste Management – A Review*. *Waste and Resource Management*. Volume 166 Issue WR2
- Lubaale, G.N. and Nyang'oro, O. (2013). *City Report: Informal Economy Monitoring Study: Waste Pickers in Nakuru, Kenya*.

- WIEGO. ISBN: 978-92-95095-79-3. Available at: <https://www.wiego.org/sites/default/files/publications/files/IEMS-Nakuru-Waste-Pickers-City-Report.pdf>
- McKinsey and Company and Ocean Conservancy (2015). *Stemming the Tide: Land-based strategies for a Plastic-free Ocean*. Available at: <https://www.mckinsey.com/~/-/media/mckinsey/business%20functions/sustainability/our%20insights/saving%20the%20ocean%20from%20plastic%20waste/stemming%20the%20tide%20full%20report.ashx>
- Medina, M. (2008). *The Informal Recycling Sector in Developing Countries: Organizing Waste Pickers to Enhance their Impact*. Gridlines, No. 44. World Bank Group. Available at: <http://documents.worldbank.org/curated/en/227581468156575228/The-informal-recycling-sector-in-developing-countries-organizing-waste-pickers-to-enhance-their-impact>
- Minter, A. (2016). *How we Think of E-waste is in Need of Repair*. *Anthropocene Magazine*. Available at: www.anthropocenemagazine.org/ewaste-repair
- Morais, J., Corder, G., Golev, A., Lawson, L., Ali, S. (2022). *Global Review of Human Waste-picking and its Contribution to Poverty Alleviation and a Circular Economy*. *Environ. Res. Lett.* 17 063002. Available at: <https://iopscience.iop.org/article/10.1088/1748-9326/ac6b49>
- Ocean Conservancy (2019). *The Role of Gender in Waste Management*. Available at: <https://oceanconservancy.org/wp-content/uploads/2019/06/The-Role-of-Gender-in-Waste-Management.pdf>
- OECD (2022). *Global Plastics Outlook. Policy Scenarios to 2060*. Available at: <https://www.oecd.org/publications/global-plastics-outlook-aa1edf33-en.htm>
- Ogwueleka, T.C. and Naveen, B.P. (2021). *Activities of Informal Recycling Sector in North-Central, Nigeria*. *Energy Nexus*. Vol 1. p. 100003. Available at: <https://doaj.org/article/3a4cd02b5f8849de85661381da90561a>
- Paul, J.G., Arce-Jaque, J., Ravena, N., Villamor, S.P. (2012). *Integration of the informal sector into municipal solid waste management in the Philippines—What does it need?* *Waste Management*. Vol. 32, Issue 11, Nov. 2012, pp. 2018–28. Available at: <https://doi.org/10.1016/j.wasman.2012.05.026>
- PET Packaging Association for Clean Environment (PACE), PACE India (2018). Available at: <http://paceindia.org.in/index.html>
- Pickren, G. (2014). *Geographies of E-waste: towards a political ecology approach to e-waste and digital technologies*. *Geogr. Compass* 8 111–24
- Plastic Soup Foundation (2022). *Come on EU! The Massive Dumping of Discarded Clothing in Ghana and Chile Must Stop*. Available at: www.plasticsoupfoundation.org/en/2022/03/the-massive-dumping-of-discarded-clothing-in-ghana-and-chile-must-stop
- Raveendran, G. and Vanek, J. (2020). *Informal Workers in India: A Statistical Profile*. Statistical Brief No 24 August 2020, WIEGO. Available at: www.wiego.org/publications/informal-workers-india-statistical-profile
- Rendon, M., Espluga-Trenc, J., Verd, J., (2021). *Assessing the Functional Relationship Between the Formal and Informal Waste Systems: A Case-study in Catalonia (Spain)*. *Waste management* 131 (2021) 483-490. Available at: <https://doi.org/10.1016/j.wasman.2021.07.006>
- Samadikun, B.P., Rezagama, Ar., Ramadan, B.S., Andarani, P., dan Rumanti, E.D., (2020). *Understanding Informal Actors of Plastic Waste Recycling in Semarang City*. Available at: https://www.academia.edu/70927505/Understanding_Informal_Actors_Of_Plastic_Waste_Recycling_In_Semarang_City
- Scheinberg, A., Wilson, D., Rodic-Wiersma, L. (2010). *Solid Waste Management in the World's Cities*. UN-Habitat. Available at: www.researchgate.net/publication/48199927_Solid_Waste_Management_in_the_World's_Cities_UN-HABITAT
- Scheinberg, A., Nestic, J., Savain, R., Luppi, P., Sinnott, P., Petean, F., Pop. Fl. (2016). *From Collision to Collaboration – Integrating Informal Recyclers and Re-use Operators in Europe: A Review*. *Waste Management & Research: The Journal for Sustainable Circular Economy*. Available at: <https://journals.sagepub.com/doi/abs/10.1177/0734242x16657608>
- Schenck, C.J., Blaauw, P.F., Viljoen, J.M., Swart, E.C. (2019). *Exploring the Potential Health Risks Faced by Waste Pickers on Landfills in South Africa: A Socio-Ecological Perspective*. *Int. J. Environ. Res. Public Health* 2019, 16, 2059. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6603953>
- Seager, J., Ručevska, I., Schoolmeester, T. (2020). *Gender in the Modernisation of Waste Management: Key Lessons from Fieldwork in Bhutan, Mongolia, and Nepal*. Taylor and Francis. Available at: <https://doi.org/10.1080/13552074.2020.1840155>
- Semiring, E. and Nitivattananon, V. (2010). *Sustainable Solid Waste Management Toward an Inclusive Society: Integration of the Informal Sector*. *Resour. Conserv. Recycl.* 54 802–9
- Skinner, C., Barrett, J., Alfors, L., Rogan, M., (2021). *Informal Work in South Africa and COVID-19: Gendered Impacts and Priority Interventions*. WIEGO Policy Brief No. 22. Available at: https://www.wiego.org/sites/default/files/publications/file/WIEGO_PolicyBrief_N22%20UN%20South%20Africa%20COVID%20for%20web.pdf
- Tacker, M., Pauer, E., Krauter, V. (2020) *Sustainability of Flexible Multilayer Packaging: Environmental Impacts and Recyclability of Packaging for Bacon in Block*. DOI: 10.1016/j.cesys.2020.100001
- Taher, R., Abu Safe, F., Patchett, H. (2022). *Uncovering the potential. The Role of Informal Actors in Solid Waste Management in Jordan*. Oxfam in Jordan.
- Training and Research Support Centre (TARSC), ZCTU, ZCIEA (2022). *Supporting Informal Economy Workers and Residents in Preventing and Mitigating Climate Change Effects*. Available at: <https://www.tarsc.org/publications/documents/ZIMINFO-Climate%20brief%202022.pdf>
- The Association of Plastic Recyclers (2018). *Life Cycle Impacts for Postconsumer Recycled Resins: PET, HDPE, and PP*. Available at: <https://plasticsrecycling.org/images/library/2018-APR-LCI-report.pdf>
- United Nations Development Program (UNDP) Accelerator Lab Research (2020). *Mapping Informal Waste Sector in Da Nang, Understanding the Informal Waste Sector, its Workers and Dynamic during COVID - Da Nang Case Study*. Available at: www.vn.undp.org/content/vietnam/en/home/library/MappingInformalWaste.html
- United Nations Development Program (UNDP) India, Urban Social Protection Programme (2021). *Baseline Analysis of the Socio-economic Situation of Safai Sathis*. Available at: www.in.undp.org/content/india/en/home/library/poverty/Baseline_analysis_of_the_socio-economic_situation_of_Safai_Sathis.html
- United Nations Environment Programme, Coordinating Body on the Seas of East Asia, and Stockholm Environment Institute (2019a). *Marine Plastic Litter in East Asian Seas: Gender, Human Rights and Economic Dimensions*. Bangkok: UNEP
- United Nations Environment Programme (UNEP) (2019b). *Minamata Convention on Mercury. Text and Annexes*. Available at: www.mercuryconvention.org/sites/default/files/2021-06/Minamata-Convention-booklet-Sep2019-EN.pdf

- United Nations Environment Programme (UNEP) (2021). Drowning in Plastics – Marine Litter and Plastic Waste Vital Graphics. Available at: <https://www.grida.no/publications/749>
- United Nations Environment Programme (UNEP-IETC) and GRID-Arendal (2019). Gender and Waste Nexus: Experiences from Bhutan, Mongolia and Nepal. Arendal: UNEP-IETC and GRID-Arendal. Available at: <https://www.grida.no/publications/454>
- UN Habitat (2019). The Informal Waste Economy and Migration: Thematic session. Global Observance of World Habitat Day. Monday 7 October 2019, Mexico City
- USAID CCBO (2021a). Gender Equality and Women's Economic Empowerment. Available at: https://urban-links.org/wp-content/uploads/USAID_CCBO_FS_Gender_2021.12.pdf
- USAID CCBO (2021b). Quarterly Progress Report. Fiscal Year 2021. Quarter 1 – October 1 to December 31, 2020. Available at: https://pdf.usaid.gov/pdf_docs/PA00XWP7.pdf
- Wilson, D.C., Velis, C., Cheeseman, Ch., (2006). Role of Informal Sector Recycling in Waste Management in Developing Countries. *Habitat International*, Volume 30, Issue 4, Pages 797-808, ISSN 0197-3975. Available at: <https://doi.org/10.1016/j.habitatint.2005.09.005>
- Wittmer, J., and Parizeau, K., (2016). Informal Recyclers' Geographies of Surviving Neoliberal Urbanism in Vancouver, BC. *Applied Geography* 66 (2016) 92-99
- Women in Informal Employment: Globalizing and Organizing (WIEGO) (2020). Violence and Informal Work. WIEGO. Available at: <https://www.wiego.org/sites/default/files/publications/file/WIEGO%20Briefing%20Note%20on%20Violence%20at%20Work%20for%20Web.pdf>
- Women in Informal Employment: Globalizing and Organizing (WIEGO) (2021). Reducing Greenhouse Gas Emissions through Inclusive Recycling: Methodology & Calculator Tool. Available at: <https://www.wiego.org/ghg>
- World Economic Forum (WEF) (2020). Plastic in the Time of a Pandemic: Protector or Polluter? Available at: www.weforum.org/agenda/2020/05/plastic-pollution-waste-pandemic-covid19-coronavirus-recyclingsustainability
- World Wide Fund for Nature (WWF) (2021). Plastics: The Costs to Society, the Environment and the Economy. Available at: <https://europe.nextbook.com/nxteu/wwfintl/tcops/index.php#/p/1>
- Zolnikov, T. R., Furio, F., Cruvinel V., Richards, J. (2021). A Systematic Review on Informal Waste Picking: Occupational Hazards and Health outcomes. *Waste Management* 126 (2021) 291–308. DOI: 10.1016/j.wasman.2021.03.006. Epub 2021 Mar 29. PMID: 33794442
- Yang, H. Ma, M., Thompson, J.R., Flower, R.J. (2017). Waste Management, Informal Recycling, Environmental Pollution and Public Health. *J Epidemiol Community Health*. 2017; 0:1–7. DOI: 10.1136/jech-2016-208597

This policy paper provides a summary of our current understanding of the informal recycling sector; its social, economic, and environmental characteristics in national and international contexts; and the challenges the sector faces. It examines international and national efforts to recognise informal workers and involve them in formal frameworks and agreements that could be an inspiration for the upcoming international legally binding instrument on plastic pollution. It also provides a set of high-level policy recommendations inclusive of the informal recycling sector, enabling a just transition and the protection of the informal recycling workers' livelihoods. The proposed recommendations focus on enhancing the role of the informal recycling sector in a circular economy as indispensable partners in the fight against plastic pollution and achieving a healthy environment for all.