WIEGO
Women in Informal Employment: Globalizing and Organizing

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Climate-Change Impacts and Adaptation Strategies: Waste Pickers' Experiences from Brazil

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Unicicla cooperative in Nova União city, January 2020. Poor infrastructure exacerbates the impacts of climate change. Photo credit: Murilo Godoy

Key Points

1. **Experiences of severe weather events:** Many waste pickers – 91% – experienced at least one climate-change-related event in the past year. 85% reported experiencing abnormal heat or heat waves and 39% reported being exposed to flash flooding. Unorganized waste pickers reported more severe impacts than waste pickers who were part of cooperatives and associations.
2. **Perception of climate change:** 98% of interviewees reported that climate change was an important issue for waste pickers' lives and work.
3. **Coping and adaptation:** The mapping details a range of coping and adaptation strategies, though most tend to be individual rather than collective strategies. Individual responses included adaptive strategies to maintain continuity while working around the climate-change event. Collective responses, in contrast, took a more preventive approach, for example the coordination of processes to store waste.
4. **Sources of support:** 30% of waste pickers reported they had not received any type of support from the government, civil society or the private sector to help cope with climate events. Of those who recalled receiving support, this primarily came from the private sector (34%), city government (31%) and non-governmental organizations (23%).
5. **Role of cooperatives:** Cooperatives and other waste picker networks at the local to national level are key sources of access to information on climate change. Cooperatives are central to articulating waste pickers' needs and building government and non-government partnerships.
6. **Priority interventions:** Local governments need to invest in climate-sensitive workplace infrastructure to address heat waves and floods as a matter of urgency. In addition, the channels for institutionalized dialogue among waste pickers, local and national government and the private sector need to be opened and/or strengthened.

Introduction

Climate change is shaping the lives of people worldwide and is accelerating faster than predicted (Intergovernmental Panel on Climate Change, 2023). Cities are simultaneously a disproportionate source of CO2 emissions[1] and are particularly badly impacted by climate hazards – heat waves, flash flooding and drought – that in turn impact water supply, sanitation, transportation, energy provision and other services. Research shows climate events compound existing inequalities in cities (Pörtner et al., 2022) and that residents of informal settlements are particularly vulnerable due to their precarious access to housing and services, and their limited resources to deal with hazards (Castán Broto et al, 2022; Dodman et al., 2022). The impacts of the climate crisis on workers in informal employment, however, is not as well understood.

It is well established that waste pickers contribute to reducing carbon emissions in many cities across the global South and are the sustenance of plastic recycling (ANCAT, 2022; Dias, 2016; Vergara et. al, 2016; King and Gutberlet, 2013). One study found that waste pickers recover over 58 per cent of recycled plastic (Cook and Velis, 2021). These activities improve land use, preserve and extend green areas, prevent floods and facilitate water circulation, remove waste at source, facilitate innovative energy systems such as biogas, and mitigate greenhouse gas emissions (Green Partners and WIEGO, 2019). Despite their critical contributions to urban sustainability, waste pickers are at the front line of climate-change impacts, facing related hazards at work and at home. Understanding how climate change impacts waste pickers, and how they adapt to climate change, is an initial step towards improving dialogue between waste pickers and local governments. Waste pickers' perspectives are essential to influence climate-change adaptation plans that address the specific conditions that make them vulnerable. Moreover, waste pickers develop localized, bottom-up responses to climate change that can be mobilized to deliver city-wide effects on urban resilience, which are relevant to implementing the conditions for a just urban waste transition in Brazilian cities.

From 2022 to 2023, WIEGO's Urban Policies Programme, in collaboration with the Urban Institute at the University of Sheffield, led an exploratory climate-change mapping with waste pickers in Brazil. The project set out to understand waste pickers' perspectives on climate change, map impacts on workers' earnings, work routines and health, as well as waste pickers' knowledge and preparedness regarding adaptation and coping strategies. In addition, the project explored the extent of support among key government and non-government stakeholders, and what resources would be needed to cope with increased climate-change impacts. A final element of the mapping is a dialogue between waste pickers and city stakeholders with the intention of co-creating levers to address gaps in urban resilience. With these insights, the project aims to help rethink urban development paradigms in Brazilian cities and elsewhere in ways that recognize waste pickers' knowledge and demands around climate-change adaptation plans.

This Policy Brief presents some of the key findings from the exploratory mapping and concludes with the implications for policy and practices from the research process.

[1] The United Nations Environment Programme estimates that cities are responsible for 75 per cent of global CO2 emissions, with transport and buildings being among the largest contributors.

Exploratory Mapping Methods

The project conducted fieldwork with waste pickers from September 2022 to March 2023 across Brazil (see the map below). Both organized waste pickers – members of cooperatives and associations – and autonomous or non-organized waste pickers[2] were interviewed. As outlined in Table 1, waste pickers participated in a survey, participatory focus group discussions and semi-structured interviews. Semi-structured interviews with other stakeholders provided a more textured understanding of climate-change impacts. The exploratory mapping also involved an analysis of differentiated climate-change impacts on waste pickers in three Brazilian cities – Manaus (Amazonas), Salvador (Bahia) and Belo Horizonte (Minas Gerais).

Figure 1 represents the number and percentage of organized and non-organized waste pickers interviewed for the survey. Project participants started by interviewing key waste picker leaders in each region in Brazil who then introduced them to others, in a process known as purposive snowball sampling. The surveys were conducted by interviewers who read the questions to the waste pickers and recorded their responses. The sample is thus not representative, but rather indicative of experiences and perspectives of waste pickers in different regions across the country.

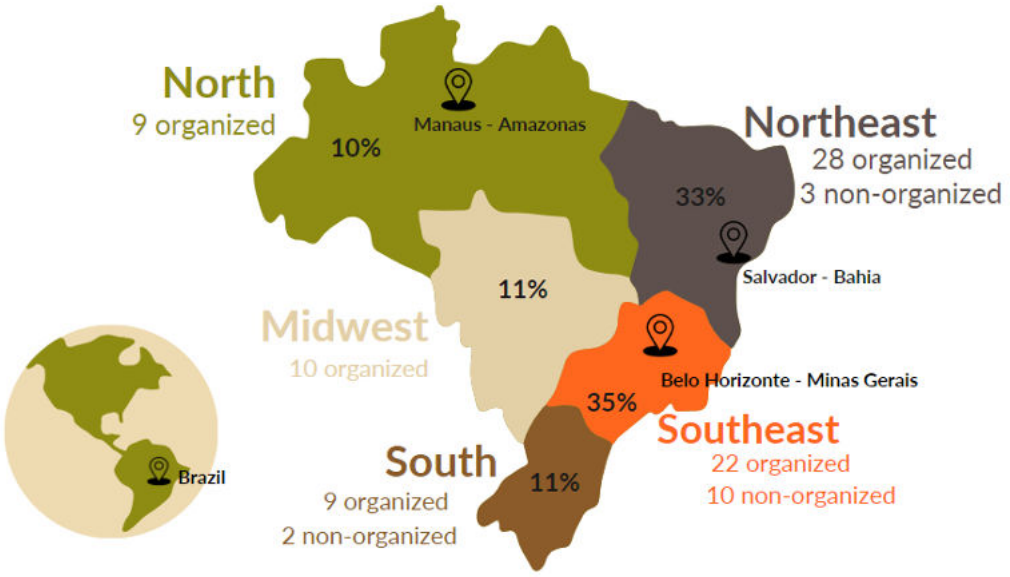
Table 1: Methods and Sample Size

Phase	Method	Location	Sample size	Gender breakdown
Phase 1: Quantitative data collection	Telephonic and in-person interviews[3] Survey (snowball technique)	All regions in Brazil	93 waste pickers 78 organized (84%) 15 non-organized (16%) Higher number of waste picker leaders interviewed	54 women (58%) 39 men (42%)
Phase 2: Qualitative data collection	Participatory focus groups	Metropolitan region of Belo Horizonte, Minas Gerais	5 focus groups 42 participants Higher number of base workers interviewed	35 women (86%) 7 men (14%)
Phase 3: Qualitative data collection	Key informant semi-structured interviews	All regions in Brazil	13 interviews 4 organized waste picker leaders (31%) 2 organized waste pickers (15%) 2 non-organized waste pickers (15%) 3 city officers (23%) 1 NGO representative (8%) 1 private sector representative (8%)	5 women (38%) 8 men (62%)
Phase 4: Document reviews	Three city profiles	Manaus (Amazonas) Salvador (Bahia) Belo Horizonte (Minas Gerais)	–	–

[2] There is debate around the appropriate term to refer to non-organized or autonomous waste pickers. For the purposes of the brief, we use the term non-organized. In some cities, non-organized waste pickers may be involved in projects carried out by non-governmental organizations (NGOs), but they are not part of membership-based organizations.

[3] In order to interview waste pickers from different regions and work sites, including dumpsites, some in-person interviews were conducted at two waste picker events, in October and December 2022.

Figure 1: Survey Participants by Region



Fifty-eight per cent of the waste pickers surveyed were women, 83 per cent declared themselves as non-white, 84 per cent belonged to a cooperative, 56 per cent worked regularly collecting materials on the streets, 42 per cent had completed elementary schooling, and 27 per cent reported living in areas of risk. The sample is overrepresented by cooperative members, women, and waste pickers in leadership positions. Sixty-six per cent of those interviewed reported that cooperatives were their primary place of work, although many alternated this with working at home and in the streets.

The survey findings thus underrepresent the perspectives of the most marginalized groups among organized and non-organized waste pickers. It is noteworthy, for example, that non-organized waste pickers reported higher rates of living in areas of risk (40%) and significantly higher rates (80%) of collecting recyclables on the streets.

Waste Pickers' Perceptions and Knowledge of Climate Change

The survey data suggests a high rate of awareness of climate change among waste pickers, with 83 per cent of those surveyed stating that they have heard about climate change. Primary sources of information about climate change were television (34%) and events, meetings and workshops (30%).

Almost all interviewees – 98 per cent – reported that climate change was an important issue for waste pickers' lives and work. Heat waves particularly were identified as impacting their health, well being and productivity, and thus decreasing their earnings. Droughts and floods were also mentioned.

Answers to open-ended questions show waste pickers' multidimensional understanding of climate change, ranging from its global nature to more local experiences in communities and neighbourhoods. An organized female waste picker from the state of Pará

articulated the connection between climate change and its anthropogenic origin:

> *"I think that climate change is global warming, which is a consequence of what happens with the planet: wildfires, litter thrown on the streets. This all affects nature, climate and the temperature."*

Others noted the complex causes and consequences of climate change. An organized male waste picker from the state of Minas Gerais explained:

> *"Climate change is the effect of what we are doing to the environment. The issue of the Amazon will generate a problem in climate change. The specific issue [for] waste pickers is when we discuss the gases produced in landfills, the burning of material, [and how] incineration affects the climate."*

Interviewees emphasized the multi-dimensional impacts of climate change, including mentioning heat, temperature unpredictability and unstable patterns of rain, which are intrinsically linked to the livelihood opportunities for waste pickers. A non-organized male waste picker from the state of Pernambuco highlighted:

> *"From my point of view, [climate change is] when everything is different with the weather. During the rainy season it doesn't rain. Then the [the volume of] rain is very heavy [with] very strong storms, unseasonably cold weather, these are the climate changes."*

These narratives were complemented by waste pickers noting the role they play in protecting the environment. A female waste picker leader from Minas Gerais portrayed the occupation as one of delivering sustainability:

> *"We know that climate impacts are getting worse every day. [...] Because of our work, we are the doctors of the environment. But we need to make [the environment] healthier and, for that, we need to work together. [...] We need to rush to help, it will be tough."*

In the focus groups, waste pickers presented a more fragmented understanding of climate change. In some groups, waste pickers explained that climate change is infrequently discussed. Moreover, the technical terms associated with climate science prevent waste pickers from further engaging in the issue.

Experiences and Impacts of Climate Change

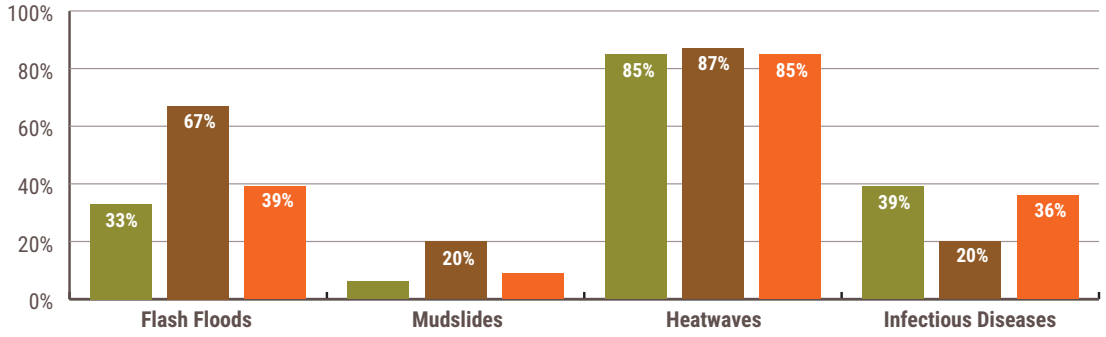
The vast majority of waste pickers (91%) have experienced one or more climate-change-related events in the past year – 85 per cent reporting experiencing abnormal heat or heat waves and 39 per cent reporting being exposed to flash flooding. Over one in every two respondents said flash floods had reduced their ability to move around the city.

A female waste picker leader from the state of Bahia described the effects of excessive heat:

> *"The heat is sometimes unbearable. Being inside a shed, which has a zinc roof, affects everyone. Those who have high blood pressure or low blood pressure, it affects them more immediately. They start to sweat and they get dizzy. [...] There is no water that reduces this heat."*

Figure 2 shows the differentiated experiences of climate-change events from December 2021 onwards. It suggests that non-organized waste pickers were more likely to report being impacted by climate events for all but infectious diseases.

Figure 2: Experience of Climate Events since December 2021



	Flash Floods	Mudslides	Heatwaves	Infectious Diseases
Organized	26	5	66	30
Non-Organized	10	3	13	3
Total	36	8	79	33

Source: Climate Change Exploratory Mapping Survey (2022, N=93)

Waste pickers believe factors such as sex, age, health condition, place of work and integration within existing networks of support all influence their vulnerability. However, they diverge in identifying which of these factors matters most. In the survey, 31 per cent of respondents claimed that non-organized workers are the most impacted, while 23 per cent were concerned about older waste pickers, and 18 per cent about women.

The focus groups shed light on the impacts of heat waves and flash floods on organized waste pickers. Table 2 shows the varied impacts, including effects on physical well being, individual and collective work dynamics, and collective productive assets.

The findings reveal how interrelated the impacts of climate change are on waste pickers' health[4] and work routines, and consequently their productivity and earnings. Most waste pickers working in open-air environments are exposed to all weather conditions and suffer directly from the impacts of floods and heat. Waste pickers who work in closed environments or cooperatives suffer from poor air circulation and air quality, overheating and lack of thermal comfort, and the increased exposure to pathogenic organisms. Many waste pickers reported dehydration, heatstroke and fatigue due to increased temperatures, and not only during extreme heat waves.

Table 2: Impacts of Heat Waves and Flash Floods on Organized Waste Pickers

Event	Physical impacts on individual	Impacts on work dynamics	Impacts on productive assets
Heat waves	Malaise, headaches, loss of appetite, shortness of breath, dizziness, lack of patience, anxiety, exhaustion, increased thirst, excessive sweating, body rashes	Reduction in individual and group productivity, absenteeism, group conflicts	Degradation of infrastructures
Flash floods	Flu/colds, increase of infectious diseases, lower physical immunity, increased physical effort	Difficulty in collecting materials on the streets or at designated generators of waste	Loss of work equipment, including scales and compressors, wet recyclables lead to reduced selling price, damage to important documents

Source: Focus groups (5 focus groups, 42 participants)

[4] For interrelated impacts on health and work routines, see Rajão (2018).

In periods of heavy rainfall, paper and cardboard can become damaged. This reduces their value, with a subsequent decrease in waste pickers' income. It also increases exposure to health risks. For example, water makes the material softer, increasing the adherence of glass fragments and other sharp objects and also making it more difficult to detect these hazards through fine touch or noise. In addition, water and heat breed fungi and bacteria, which attract rodents and disease-carrying insects. Also, when rainfalls are heavy, waste pickers have difficulties getting to their workplace or are unable to work.

Climate change compounds pre-existing challenges related to workplace infrastructure. Many warehouses used by waste pickers are improvised spaces for recycling. In the focus group interviews, waste pickers outlined the changes needed to climate-proof the warehouses they use for processing the waste they collect. Suggestions included appropriate drainage infrastructure, designation of refuge spaces and safe storage locations, improvements in ventilation and air quality, and the installation of water fountains. Waste pickers also said they needed ergonomically appropriate personal and collective equipment to handle waste. These are all long-standing concerns. Adequate and decent workplace infrastructure and equipment determines the degree of climate-change impact on waste pickers' health, well-being, productivity and earnings.

Waste Pickers' Adaptation and Coping Strategies

Waste pickers were asked to detail their adaptation and coping strategies for the events they experienced in the past year. The findings are summarised in Table 3.

These findings suggest the dominance of individual and private adaptation and coping strategies. Such strategies tend to be reactive and ad-hoc, with limited impact on the drivers of vulnerability such as poverty, poor services and deteriorating infrastructure. Individual responses often relate to the need to maintain continuity while working around the climate-change event. Collective responses, in contrast, may take a more preventive approach. For example, waste pickers mentioned how they coordinate processes to store waste and materials either in cooperatives or on the streets. Lastly, some strategies relate to dealing with reduced earnings, which result from hours of work lost or from the decrease in the value of collected materials.

Table 3: Main Adaptation and Coping Strategies by Climate Event

Heat waves (N=79) • Increase water intake (41%) • Use fans (21%) • Change work hours (21%) • Use sunscreen (14%) • Adapt clothing (12%)	**Flash floods (N=36)** • Use rain protection strategies/equipment (44%) • Stop working (42%) • Change commute to work (11%)
Infectious disease (N=33) • Disseminate public health campaigns (33%) • Stop working (33%) • Visit doctor/health centre (18%) • Improve hygiene and cleaning (18%)	**Mudslides (N=8)** • Alert people to leave homes based on public warning alerts (50%) • Do nothing (38%) • Stop working (13%)

Source: Survey data (N=93)

Sources and Forms of Support

Waste pickers were asked whether they had received support in the face of climate events. Seventy per cent of those surveyed said they had, while the rest had not received any type of support.

Of those who had received support, as reflected in Figure 3, this came primarily from the private sector (34%), followed by the city government (31%) and NGOs (23%). Only 7 per cent recalled any form of support from national government institutions. Regarding the data on the city government, 25 per cent cited the support of the institution in general, 12 per cent cited civil defence and 7 per cent cited the Municipal Basic Sanitation Agency. The most commonly cited form of support was ad-hoc donations from institutions, NGOs or private actors, sometimes in the form of material support. Since cooperatives often mediate partnerships, non-organized waste pickers tend to be excluded from support offered by local institutions.

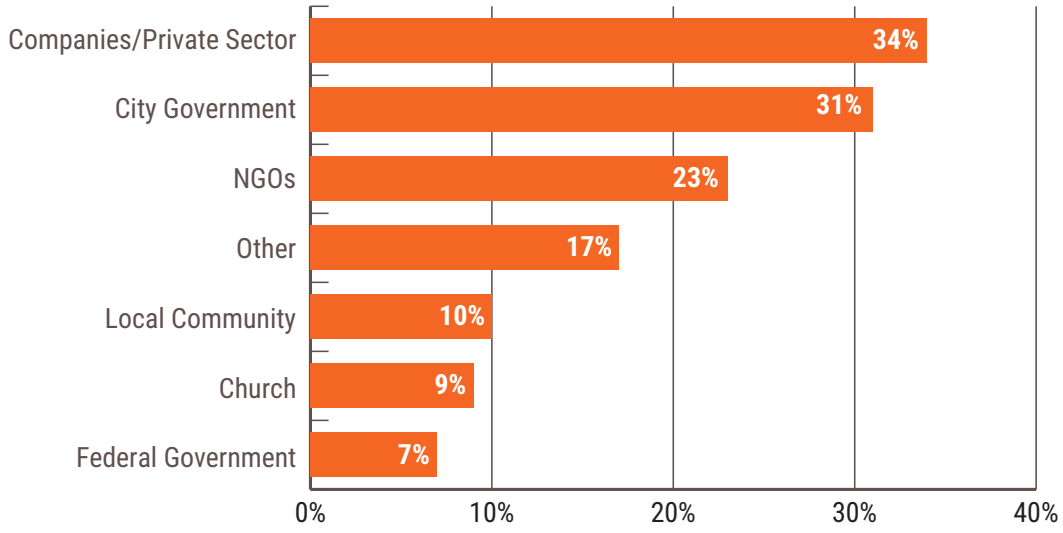
Many interviewees underscored the role city governments could play in strengthening institutional support networks to enable waste pickers' work. In addition, waste pickers emphasized the city government's role in providing a workable legal framework to facilitate inclusive solid waste management policies. An organized male waste picker from Bahia, for example, stated:

> *"City governments should sign contracts with the cooperatives to establish solid waste collection and pay waste pickers for service provision, including for non-organized waste pickers. With solid waste collection, we are reducing public spending given how there is a decrease in waste sent to landfills."*

In some cases, the city government is also seen as a potential advocate to challenge structural conditions of capitalist and racial exploitation. A female organized waste picker leader from Minas Gerais highlighted this clearly:

> *"[The city government plays a key role in] hiring waste pickers and complying with the National Policy on Solid Waste. For those of us who are black and poor, we don't have access to the means of production. The city government's support is not charity. [...] Our challenges have to be addressed in the economic sphere, not only the social one."*

Figure 3: Sources of Support Received when Experiencing a Climate-Change Impact



Source: Climate Change Exploratory Mapping Survey (2022, N=93)

Recommendations for Policy and Practice

Building waste pickers' resilience to climate change builds resilience for the whole city. Waste pickers' lived experience and knowledge are already shaping crucial responses to climate change, but building resilience requires concerted actions by a range of stakeholders that influence inclusive solid waste management policies and practices. The following policy and practice interventions are most urgent:

Improve awareness and establish early warning systems: As a matter of urgency, governments need to invest in systematic monitoring of extreme weather to establish effective early warning systems. This needs to be combined with training in response procedures – including in emergency measures – as well as self-care and collective-care skills. Local governments and civil society could fund peer-to-peer support programmes for organized and non-organized waste pickers. Cooperatives and other waste picker networks play a key role in facilitating access to information for waste pickers and should be a partner in these initiatives.

Invest in climate-sensitive workplace infrastructure: This research has spotlighted that climate-change impacts are exacerbated by existing infrastructure and workplace equipment deficits. Waste pickers identified the need for improved water-drainage systems, flood-resistant storage spaces and improved ventilation, as well as the need for better designed recycling equipment. Given waste pickers' contributions, this should be funded and supported by local, state and national governments and the private sector through Extended Producers' Responsibility (EPR) policies. The Pro-Catador Programme[5] and Brazil's Caixa Econômica Federal[6] could create climate-change funding lines to channel resources for these infrastructural improvements. Waste pickers, civil society and academia need to provide direct inputs into the design of these interventions. Special attention should be paid to supporting the needs of street pickers (autonomous and organized), such as water fountains and sheltered workspaces.

Strengthen access to climate-sensitive social protection and services: Local, state and national governments need to plan and coordinate effectively for climate-change risk management. As extreme weather events intensify, it is important to consider safety nets that reduce climate-related risks, such as emergency cash and food transfers, as well as longer-term safety nets, such as child grants and pensions. A climate-sensitive social protection system needs to be integrated with early warning and emergency systems. Climate-change impacts on workers' health will require robust health systems capable of integrating climate-change-related illnesses in primary health-care services.

Provide waste pickers with information on climate-change realities and best-practice adaptation strategies: Climate science lexicon is a barrier to building awareness of climate change. Local governments, academia, civil society and waste pickers would benefit from co-producing content on climate change

[5] Pro Catador is a programme re-created by President Lula in this current term of government (March 2023) to coordinate actions from multiple agencies and channel funds for inclusive recycling.

[6] Caixa Econômica Federal (CEF) is a Brazilian national bank in charge of urban infrastructure, including for urban solid waste management.

that is accessible and credible to multiple audiences. Popular education principles and techniques are effective tools for building awareness, not only among waste pickers but the community as a whole. Breaking down technical lexicon would enable waste pickers to gain authority over an issue that directly affects their livelihoods.

Establish a system of monitoring climate-change impacts on waste pickers: The lack of data presents a barrier to a more nuanced understanding of how climate change impacts different groups of waste pickers and their workplaces. An ongoing monitoring system would help better map, plan and monitor the effectiveness of adaptations. Multiple stakeholders could provide their expertise in setting up the system, including city government, civil defence, local and national environment secretaries, academia, civil society allies, as well as organized and non-organized waste pickers.

Commit to institutionalized participatory forums: All levels of government and the private sector need to commit to ongoing, institutionalized dialogue with organized and non-organized waste pickers and other key allies in civil society to plan effectively for climate adaptation solutions. Stakeholders should take advantage of municipal and state waste and citizenship forums, as well as sectoral committees at the national level, to place climate change as an ongoing priority.

Build ecosystem of support networks: City governments play a key role in facilitating the recognition of waste pickers as service providers, implementing inclusive solid waste management practices, and mediating access to social protection schemes, thus catalyzing a robust recycling culture. Cities should bring together a range of stakeholders to commit to building an institutional ecosystem of support networks to withstand climate shocks, including for waste pickers.

Officially acknowledge waste pickers' contributions to reducing greenhouse gas emissions: The Paris Agreement on Climate Change provides targets for reducing greenhouse gas emissions through national, regional and locally determined contributions.[7] These target indicators provide a roadmap for governments to reduce emissions. Waste pickers' contributions to achieving these targets at city, state and national level need to be modelled and incorporated both into the plans and in monitoring progress. This is critical for accessing **climate finance** for waste management interventions in tandem with recognition of waste pickers' needs. This is also important in challenging the prevalent idea that workers in informal employment are an impediment to achieving the agreed targets.

[7] Known as Nationally Determined Contribution (NDC) and Regionally and Locally Determined Contribution (RLDC).

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About WIEGO

Women in Informal Employment: Globalizing and Organizing (WIEGO) is a global network focused on empowering the working poor, especially women, in the informal economy to secure their livelihoods. We believe all workers should have equal economic opportunities, rights, protection and voice. WIEGO promotes change by improving statistics and expanding knowledge on the informal economy, building networks and capacity among informal worker organizations and, jointly with the networks and organizations, influencing local, national and international policies. Visit www.wiego.org