



argentina  
recicla

Guidance for the Implementation  
of Integrated and Inclusive Waste  
Management

Ministerio de Ambiente  
y Desarrollo Sostenible

Ministerio de  
Desarrollo Social



Argentina  
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Explanatory note: The integral and inclusive management of solid urban waste should be approached from a gender perspective, aiming at the incorporation and protagonism of all the diversities of people who participate in it. Therefore, it is worth clarifying that the guide is written using nouns, articles, adjectives, participles, and pronouns in masculine gender only to speed up and simplify the reading.

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## GLOSSARY

### • GREEN CENTER:

Place where recyclable dry solid waste is sorted, conditioned, and/or valorized for its subsequent commercialization to the recycling industry under established conditions and scopes. It is synonymous with “MSW Separation Plant” and “MSW Sorting Plant.” In some places, they are also called “Eco-points.”

### • TRANSITORY STORAGE CENTER:

Where waste is stored and/or conditioned for a limited period under established conditions and scopes.

### • LIFE CYCLE OF A PRODUCT:

Process that includes the conception of a product, the capture of raw material from nature, its intermediate industrial states, its different uses, transportation, distribution, final use, and final disposal.

### • CO MANAGEMENT:

Public management systems that result from integrating two sectors: the municipal and the urban waste collectors. The IISWM system of municipal co-management allows the design and implementation of public policies associated with the subject through the active inclusion of the Urban Reclaimers (WP), where the participation of all the IISWM stages is jointly between these actors, considering the experience of the central recoverers themselves to achieve favorable results in the IISWM.

### • TRADER/ DISTRIBUTOR/ INTERMEDIARY:

Any human or legal person, other than the producer, who sells a product to the consumer or who markets it before its sale to the consumer.

### • CONSUMER/USER/GENERATOR:

Any human or legal person, public or private, who generates or possesses waste and disposes of it or is legally obliged to do so.

### • LOCAL RECYCLING NODE:

Green centers with the capacity to treat all or part of the recyclable waste streams, as well as with the infrastructure and actions associated with the integral human development of wastepickers according to education, health, food, childhood, sports, culture, and justice, consolidating the networks of socio-community, economic, and territorial exchange that promote the productive fabric of recycling and IISWM. The Local Node of Basic Recycling refers only to a green center with the minimum capacity for the reception and collection of dry recyclable waste in minimum work safety and hygiene conditions.

### • INITIAL DISPOSAL:

The action by which the generator deposits or abandons the waste; it is carried out by the generator and must be done in the manner determined by the different jurisdictions.

### • FINAL DISPOSAL:

Final destination. Environmentally and technically safe of the residual elements arising from the non-valuable fraction of municipal solid waste.

### • CIRCULAR ECONOMY:

Economic model that proposes to rethink the design and manufacture of products, contemplating their life cycle, prioritizing the use of renewable resources and the recirculation of materials to conserve matter and energy, avoiding or reducing the generation of waste.

### • PACKAGING:

Any element that wraps or contains merchandise, articles, or products for the purpose of containing, preserving, protecting, handling, transporting, distributing, and presenting them.

### • GENERATION:

Refers to the activity of waste generation as a result of the population’s consumption activity or production processes.

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- **INTEGRAL AND INCLUSIVE MANAGEMENT OF URBAN SOLID WASTE (IISWM):**

Articulated and interrelated set of regulatory, operational, financial, administrative, educational, planning, monitoring, and evaluation actions for waste management, from its generation to final disposal, where the social inclusion of urban waste pickers in its management is central to ensure the environmental, economic, and social sustainability of the model.

- **CARBON FOOTPRINT:**

Indicator that describes the amount of greenhouse gases (in carbon dioxide equivalent) emitted during the production of a consumer good or service.

- **IISWM PLAN:**

Plan developed to minimize the social and environmental impacts of local government waste management, promoting environmental awareness, recycling production chains, and social and territorial justice.

- **PRODUCER:**

Any person or legal entity that introduces products in the national market that it manufactures or assembles, by himself or through third parties, under its own brand, or imports, by himself, through third parties or using them, in new or used condition, under its own brand.

- **GREEN POINT:**

Also called "Voluntary drop-off points" or "Recycling Stations." these are spaces for the reception of recyclable materials. It can be containers where neighbors bring recyclable waste. Whether or not attended by urban waste collectors or environmental promoters.

- **RECYCLING:**

Any process by which waste is transformed by physical, chemical, mechanical, or biological methods to take advantage of the materials

that make up the waste for its subsequent use as an input or raw material.

- **URBAN WASTE RECYCLERS:**

All workers who, with their effort, recover waste mainly on public roads through various forms of differentiated collection such as door-to-door, sorting plants, final disposal centers, fulfilling an environmental public service in the process of recovery and valorization of waste. Their work is carried out independently, in work cooperatives, or in other associative forms.

- **SPECIAL WASTE OF UNIVERSAL GENERATION (SWUG):**

All waste generated by mass consumption, which, due to its environmental consequences or hazardous characteristics, requires environmentally appropriate and differentiated management from other waste.

- **RECYCLABLE WASTE:**

Dry materials that can be recycled, such as cardboard, paper, plastics, glass, metals, and mixed packaging, among others, and the organic fraction of solid urban waste.

- **EXTENDED PRODUCER RESPONSIBILITY:**

Each producer has to be objectively responsible for the integral management and financing of the products placed by them on the market that become waste. Compliance with this duty must consider the product's life cycle and respect the management hierarchy. The other parties involved in the management chain must comply, within the framework of the policies and programs, with the obligations specifically assigned to them by the future Law and the regulations to be issued in due course.

- **REUSE:**

Any operation by which waste is conditioned for reuse with the same or different function for

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which it was designed but without modifying its properties and physicochemical composition.

• **COLLECTION ROUTE:**

The area or portion of the determined territory of the waste management system assigned to a group of Urban Reclaimers where they carry out the collection, which may include environmental promotion activities and the cleaning of recycling points.

• **SEPARATION:**

Set of activities aimed at classifying waste into its different types or constituent fractions for subsequent conditioning, recovery, and/or final disposal.

• **LOCAL RECYCLING SYSTEM (LRS):**


System of co-management of differentiated collection of MSW - dry recyclable fraction that aims to organize from the local government the pre-existing recycling activity through a system of co-management of the dry fraction of MSW with the social inclusion of urban waste collectors associated with the stages of environmental promotion, separation at source, differentiated collection, transport, treatment, and recovery. Its central axis is the door-to-door collection that is already being carried out, guaranteeing some elementary labor rights: basic guaranteed income, uniform, PPE, and social monotax. Subsequently, the Municipal Co-Management system, once consolidated, will be extended to other waste streams such as E-Waste, ELT, organic, and WVO. These new systems propose a new paradigm that promotes the development of a productive recycling network, with regional economies, generation of genuine employment, import substitution, development of the recycling value chain, and mainly the social inclusion of urban waste pickers.

• **TREATMENT:**

Any activity of decontamination, disassembly, recovery, or preparation for recovery or final disposal of waste.

• **VALORIZATION:**

Any action or process that allows the total or partial use of waste, generating an input for a new value chain, both in its specific function and in the materials that make it up, and considering environmental and sanitary protection conditions. Reuse and recycling processes are included. Incineration and co-generation are excluded.





## PROLOGUE



By María Castillo

A great leader once said: *“Never forget where we came from, how we were, and what we have achieved,”* and it is true.

I have often wondered why it is so hard for us to find a single path. I look back and think how a crisis was the great cause of so much change. And at the same time, I seek to enumerate them through my own life story, which is similar to many, unfortunately. But they have been part of some conquests. Although, this has just begun.

In 2000, amidst the economic crisis, my life partner lost his job, as did many Argentines. The streets of our country were where many of us found sustenance by walking the streets of Buenos Aires in search of that discarded material, a resource that became our job. This work was declared a crime according to Ordinance 33581/77, sanctioned during the last military dictatorship. We could not recover recyclable materials since they were considered the property of a private company. It was not an obstacle for us despite losing our bags, carts, and trucks, which were continuously being chased for kidnapping. It was the beginning of the organization of the sector that today we know as waste pickers and urban recyclers, among other names.

The organized struggle allowed the sanctioning of Law 992 in Buenos Aires, which meant for us the creation of the first register of waste pickers, recognizing our work as an essential activity for the collection of recyclable waste in the city. This model served as an example for many leaders to organize the work of hundreds of comrades in the different municipalities of the country. The organization of the waste picker sector was and is a great tool to construct a model for the work and management of MSW.

In each place where the activity develops, it is carried out precariously. Open-air dumps, the house of a comrade, rented sheds, and in very few cases, abandoned MSW plants due to lack of public policies but recovered by the workers. We should not fail to mention that they do not have any tools to facilitate collection and classification. Therefore, they sell the recovered material to intermediaries at low prices. There are some experiences where we have been able to develop the implementation of differentiated collection systems, environmental promotion, green points, direct commercialization networks to the industry, and promoting access to banking services for workers.

In some cases, we have been able to articulate a co-management between waste pickers and the municipality, obtaining good results, promoting the social inclusion of the sector, improving the work methodology and the minimization of MSW, and turning the linear economy into a circular economy. These examples drive us to develop a management model with social inclusion, with the commitment of all actors. We cannot let more time go by. We must transform the reality of the more than 150,000 recyclers who minimize MSW in our country. Even more, it is our responsibility to reconvert our country with more social justice and popular environmentalism.

*“A true ecological approach always becomes a social approach; it must integrate questions of justice in debates on the environment, so as to hear both the cry of the earth and the cry of the poor.”*

(Encyclical Letter, Laudato Si of the Holy Father Francis, on the care of the common home, 2015)



# INTRODUCTION





## INTRODUCTION

This guide is a tool for local governments to design and implement projects related to Integrated Municipal Solid Waste Management (ISWM) in a progressive manner and in stages, complementing such management with the recognition of waste pickers that today are part of it, in most cases, informally. Therefore, an Integral and Inclusive Management of Municipal Solid Waste (IISWM) that promotes a circular economy and sustainable local development is proposed.

This work is a synthesis of a set of experiences<sup>1</sup> of different actors recapitulated to date, added to a joint elaboration between the Ministry of Social Development and the Ministry of Environment and Sustainable Development of the Nation. It is not a closed compendium; on the contrary, it is intended to continue to be enriched through its implementation in the territory in such a way that it becomes a dynamic tool that allows the development of new approaches to the problem and strengthening waste recovery systems with social inclusion.

The manual is aimed primarily at public officials at all levels, organizations of urban waste pickers, academic institutions, non-governmental organizations (NGOs), and the community in general. It is also intended to involve other actors in the waste value chain: private companies, large generators, and the recycling industry. Such articulation is essential for them to accompany the implementation processes of the IISWM and contribute from changes in production processes to the development of Corporate Social Responsibility (CSR) programs, deploying actions that strengthen the social inclusion of urban waste pickers.

### Towards an ISWM National Strategy with Social Inclusion

The preparation of this guide was based on the guidelines established in the 2005 National ISWM Strategy, which after 18 years, needs to be updated and complemented based on the experiences that arose in the implementation in the territory from the organization and initiative of urban waste

pickers who promoted a model that has shown significant achievements.

NSISWM establishes, in the first place, that the management of Municipal Solid Waste (MSW) in Argentina is the responsibility of the municipalities, whose governments are in charge of its treatment. At that time, the more than 2,200 municipalities in the country limited their actions to the non-differentiated collection, focusing on urban hygiene and final disposal in most cases in open dumps (OD) with few environmental and technical controls, and with the resulting negative impacts on health and the environment.

In the context of the worldwide trend of increasing waste generation due to population growth and production and consumption patterns, the strategy focused on the principle of sustainable development. Objectives were established to minimize the amount of waste that reaches final disposal through separation at source and differentiated collection; and the eradication of ODs in favor of sanitary landfills with emphasis on regionalization given the high investment costs. At the same time, this strategy rightly points out the informal workers in MSW management as a sector to be formalized and integrated by Law No. 25,916 of Minimum Standards for the Environmental Protection of Household Waste enacted in 2004. Although the methodologies of social inclusion were not established, this made it possible to generate the institutional framework for relevant experiences reflected in this guide.

In the last decade, the Circular Economy paradigm has emerged as a complement to the concept of Sustainable Development. The paradigm focuses on three fundamental aspects, eco-design, which aims to reduce waste and pollution from the design and materials used; keeping products and materials in use with an emphasis on the 3Rs. And the regeneration of natural systems.

This concept influenced the emergence of trends and conceptualizations by the International Labor Organization (ILO), such as the Green Economy and Green Employment

with Decent Work, which makes visible the business and job creation opportunities that open up with the adoption of this paradigm.

Looking back over the 18 years of the implementation of this National Strategy, there is a need for complementary approaches to strengthen the guidelines established therein. Since, beyond NSISWM, waste generation continues to increase, few local governments have implemented recycling programs. There are still more than 5,000 irregular disposal sites, including ODs nationwide. At the same time, policies of inclusion and formalization of workers linked to MSW management<sup>2</sup> have been limited, while this population has grown in number while maintaining high levels of labor and living conditions precariousness. There are also substantial investments in infrastructure with low recycling efficiency that, in many cases, have not been accurately managed due to difficulties in financing, environmental education, and technical training.

In turn, and due to the successive economic crises, including the one generated as a result of the worldwide pandemic of the COVID-19 virus, new impoverished groups expelled from the labor market have turned to the recovery of recyclable waste in the country's urban centers and landfills, increasing the mass of workers engaged in the activity, becoming a massive and fundamental player in the IISWM. According to estimates by the Federation of Waste Pickers, Dumpers and Recyclers (FACCyR), in 2015, there were 150,000 informal workers linked to MSW management, a number aggravated by the subsequent crises. Urban waste pickers, as a whole, collect up to 10,000 tons of recyclable MSW per day, enormously reducing the environmental impact and being central players in the fulfillment of the NSISWM guidelines.

Inclusion strategies promoted by NSISWM fostered the integration of waste pickers in sorting and conditioning plants located in landfills, where, in many cases, they work with mixed waste, eliminating a fundamental link: the differentiated collection by urban waste pickers or, in limited experiences, where they work mainly in the management of large generators but with worse working conditions

(Carenzo, Acevedo, Bárbaro, 2010; Sorroche, 2016). In parallel, the bulk of the sector continues to work with high rates of informality, in a disintegrated, individual or family manner, with very rudimentary tools and low levels of occupational health and safety.

Currently, in the Autonomous City of Buenos Aires (CABA) and in other municipalities of the country, it was achieved the progressive implementation of ISWM plans with Social Inclusion based on the co-management of urban waste pickers' cooperatives and the municipal government, with the main focus on the integration of all waste pickers respecting their role as urban waste pickers and their work areas. For example, CABA was a pioneer in the country, and 14 years after its implementation, this system integrates 6,500 urban waste pickers, recovering more than 400 tons/day of recyclable materials. Based on this experience, this co-management model is being replicated and consolidated throughout the country.

Therefore, the aim is to recover the premises and objectives of NSISWM and complement them with strategies for formalizing and integrating urban waste pickers and consolidating their differentiated collection as the generic bases of IISWM. To this end, technical detail is provided by stages necessary for developing and implementing IISWM Plans based on a **Local Recycling System (LRS)**.

### Local Recycling System (LRS).

The LRS attempts to organize the pre-existing recycling activity from local governments through a system of co-management of the dry recyclable fraction of MSW with the social inclusion of urban waste pickers associated with the stages of environmental promotion for separation at source, differentiated collection, transportation, treatment, and recovery. To this end, it foresees the development of a local system that formalizes the work that currently exists in an unregulated manner while setting objectives that allow its monitoring in the short and medium term. The central axis of the LRS is the differentiated collection, mainly door-to-door and later complemented with voluntary drop-off points and recycling days, among others, guaranteeing some primary



labor rights such as basic income, uniform, PPE, tax regime, and health coverage.

The LRS is the fundamental instance of the IISWM because it allows not only to integrate all the urban waste pickers working in the territory, respecting their role in the recovery and pre-sorting of recyclable materials, but also generating the methodological bases for the implementation of differentiated management of all waste streams existing in the district. Subsequently, the co-management system, once consolidated, was extended to other waste streams such as waste electrical and electronic equipment (E-Waste), end-of-life tires (ELT), organic waste, and used vegetable oil (WVO). In this way, we start from the current levels of dry recyclables recovery, improving working conditions, and integrating urban waste pickers. This allows for a progressive increase in the number of recovered materials and the number of valorized waste streams.

For a consolidated stage of the LRS, the development of Local Recycling Nodes is promoted. It refers to green centers capable of treating different streams of recyclable waste. The nodes incorporate infrastructure and actions associated with the integral human development of waste pickers: education, health, food, children, sports, culture, and justice, under a gender perspective and consolidating socio-community, economic, and territorial exchange networks. It promotes the productive fabric of recycling and the IISWM, implying the expansion of workers' rights and, therefore, improving their working and living conditions, as those of their children.

In conclusion, implementing this strategy allows the municipality to reduce the environmental impact of the waste generated, including urban waste collectors as essential players in recycling. Currently, there are several ways of approaching waste management, with different technologies, but this guide proposes a new system with an approach that promotes the development of a productive recycling network; regional economies; generation of genuine employment; import substitution; development of the recycling value chain; and, mainly, the social inclusion of urban waste pickers. In this way, humanizing the concept of Circular Economy, the principles

of Sustainable Development and Green Employment emphasize the weakest link but with the highest impact in the recycling chain. It intends not only to include urban waste pickers, improving their working conditions but also to install a perspective that allows them an integral human development. This is only possible through public policies that promote **social and environmental justice**.

1. Reference is made to working documents, reports and manuals such as the "Plan ISWM de Comodoro Rivadavia, Chubut" of Fundación YPF.

2. There are no official data to this day, so we work on the basis of estimates from the sector and the National Registry of Workers in the Popular Economy (ReNaTEP).



# INTEGRAL AND INCLUSIVE MUNICIPAL SOLID WASTE MANAGEMENT (IISWM)

1.





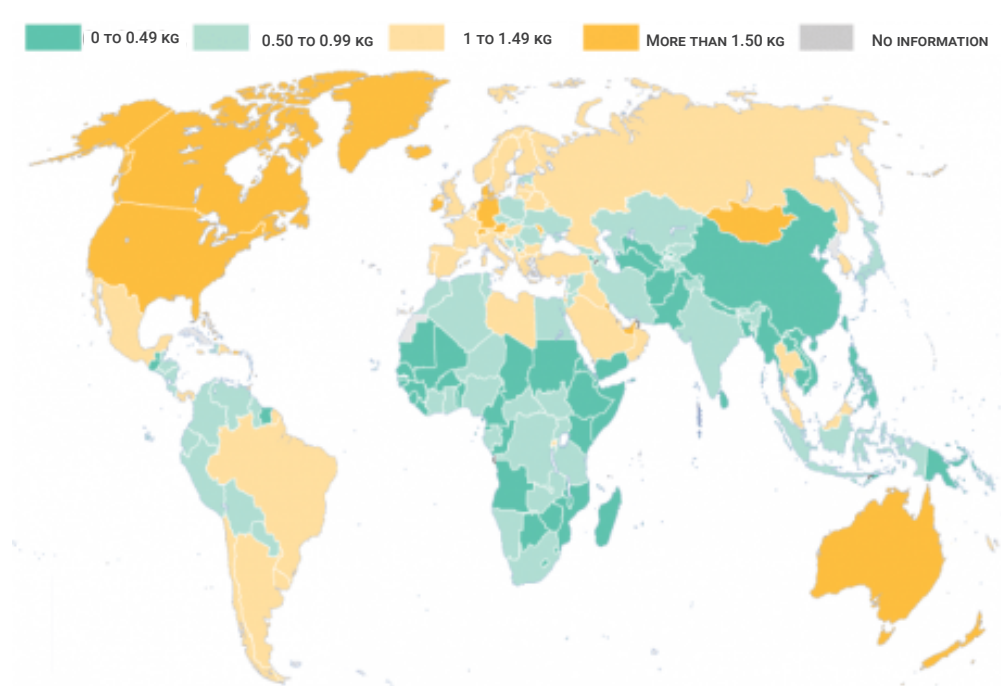
# 1. INTEGRAL AND INCLUSIVE MUNICIPAL SOLID WASTE MANAGEMENT (IISWM)

## 1.1. IISWM 'S CURRENT SITUATION IN ARGENTINA, THE LATIN AMERICAN AND WORLD CONTEXT

ISWM is an MSW management system that, based on sustainable development, has as its principal objective the reduction of waste sent to the final disposal. This derives from the search for the preservation of human health and the improvement of the population's quality of life, as well as the care of the environment and the conservation of natural resources. The ISWM, then, is aimed at reducing the waste generated - an inevitable consequence of human activities- as a suitable means to reduce its associated impacts and the costs of its management. The aim is to minimize the potential damage caused to man and the environment.

According to the latest World Bank report, "Waste 2.0: A Global Overview of Solid Waste Management to 2050," 2.01 billion tons of MSW are generated worldwide. By 2050, global waste is projected to increase by 70% or 3.4 billion tons, if urgent action is not taken. From this information, we can observe the behavior of societies, characterizing those with higher income and consumption, with higher per capita waste generation (USA, European Union, Australia), as opposed to those with medium and low income and lower consumption, such as Sub-Saharan Africa and the Latin American region.

### • WASTE GENERATED BY COUNTRY



• Figure 1: Waste. A global overview of solid waste management to 2050.

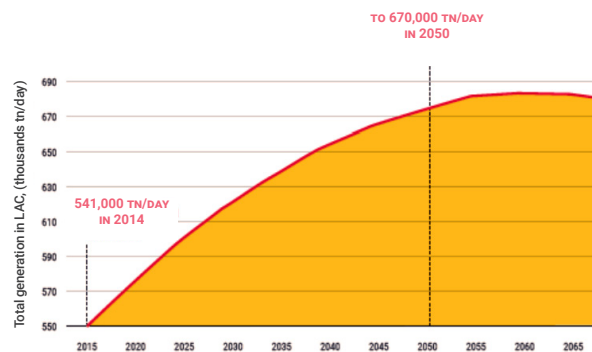
The Latin American region foresees an increase in waste generation of 670 thousand tons/day. There, the informal sector of urban waste pickers has a strong presence of more than 2 million people organized. According to each region, they are known as barequeros, pepenadores, catadores, basuriegos, cachureros, chamberos, and waste pickers. In Colombia, for example, they are recognized as superheroes and providers of essential service to the community.

The modalities of final waste disposal in the region vary. As shown in Figure 3, most tons of waste are disposed of in sanitary landfills, and a significant amount is still disposed of in open dumps (ODs). The current management logic has a common denominator associated with addressing landfills as a specific problem when it is a symptom of a broader diagnosis related to poor waste management, and specific actions for its eradication are not enough. The comprehensive approach in this guide will allow us to think about more than actions aimed at improving disposal conditions in landfills. Furthermore, how to improve the previous stages that prevent them by differentiated collection and treatment of recyclable materials.

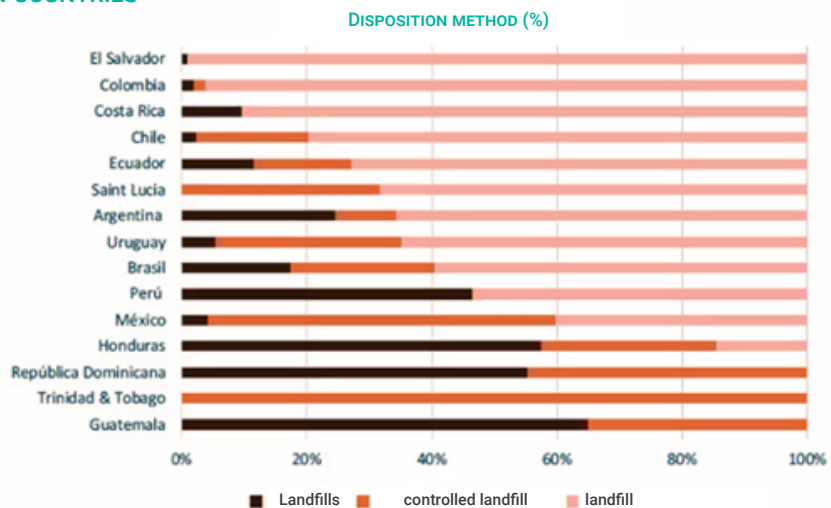


• Figure 2: Promotion of waste pickers as superheroes in Colombia and graph of MSW generation in Latin American countries. Source: Synthesis of the Outlook for Waste Management in Latin America and the Caribbean, ISWA LAC 2020.

• PROJECTION OF MSW GENERATION IN COUNTRIES OF THE REGION



• LANDFILL VS. INADEQUATE FINAL DISPOSAL IN LATIN AMERICAN AND CARIBBEAN COUNTRIES



• Figure 3: Projection of MSW generation in countries of the region.

Argentina generates more than 45,000 tons/day of waste. 40% of it corresponds to the province of Buenos Aires (18 thousand tons/day); followed by CABA (7 thousand tons/day); Córdoba (4.5 thousand tons/day); and Santa Fe 4.3 thousand tons/day. Argentina has more than 2,200 Municipalities, of which only 37% have some separation programs (MAYDS, 2016) -these concentrate mainly in the following areas: center, northeast, and northwest of the country, and they are frequently developed in large cities and with a greater diffusion towards the interior. However, some 350 municipalities with more than 10,000 inhabitants represent 87% of the population. In this sense, waste management in Argentina still requires a planned public policy that integrates regional economies and allows, at the same time, to generate traceability and management systems with social inclusion in the country to reduce the more than 5,000 existing irregular final disposal sites. This situation means that only 6% of waste is recycled, one of the lowest levels in the region.

In the country, more than 150,000 waste pickers work under precarious conditions. They suffer the fluctuations of prices and volume of collected materials; with intermediaries who buy at low prices; difficulty in accessing direct sales to the industry -mainly due to the lengthy payment cycles and requirements, of volume and tax regularity, for the purchase-; and a wide heterogeneity in working conditions: infrastructure, machinery, etc. Despite this, they recover more than 10,000 tons/day, producing great social and environmental benefits for the citizens, generating savings of 9.5 million CO2 eq., added to another 232.5 million CO2 eq. by avoiding burning in landfills, providing an essential service and being a key player in mitigating the impact of climate change<sup>2b</sup>. This population presents different realities depending on how they develop their activity. Whether in landfills or the streets, they have various means of work for the latter, ranging from animal traction to the use of diverse types of carts or elements that allow the collection of recyclable materials.

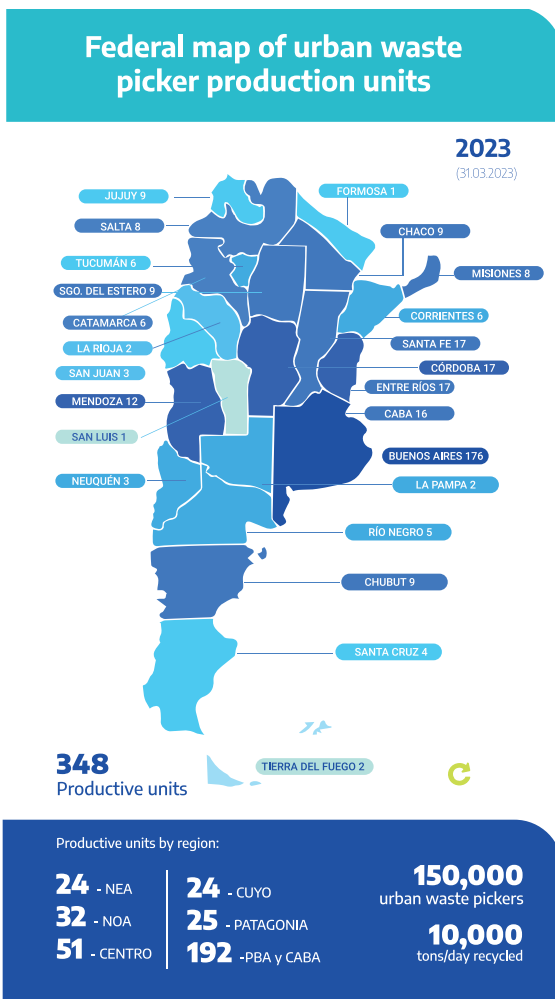


Figure 4: Federal Map of the Productive Units of Urban Reclaimers Argentina Recycles 2023 Source: DNEP

• DIVERSE REALITIES



• GARBAGE COLLECTION



• COLLECTION WITH HORSE-DRAWN CARTS IN URBAN CENTERS



• COLLECTION WITH WALK-BEHIND CARTS IN URBAN CENTERS

Figure 5: Diverse realities of urban waste pickers. Source: FACCyR.

Since their design, the ISWM models have always been conceived as a sequence of procedures: collection, transport, transfer, treatment, final disposal, or as a combination of treatment methods: recovery and recycling, composting, energy recovery, and landfills. In fact, according to NSISWM, integrality refers to reduction at source, household separation, collection and transport, transfer, and regionalization. We should consider that, for many years, waste recovery was considered an illegal activity until 2004, when national regulations incorporated waste recovery and recovery by informal waste collectors as part of the ISWM (Law No. 25.916/04)<sup>3</sup>. The aforementioned Strategy also recognizes unregulated waste collection as an activity not integrated into waste management, and that is developed precariously but being such a widespread practice in Latin America, it denotes a gap between the international principles of waste management and the form it takes in Argentina (Paiva, 2008), where it acquired its own characteristics (Sorroche, 2016a).

However, it is necessary to develop a new approach to waste management that goes beyond: what we have called Integrated and Inclusive Management of Urban Solid Waste or IISWM, where integrality and inclusiveness are defined as follows:

**1.** The articulation between public policies and understanding waste as a problem associated with public health, public space, environmental education, production, research, development, and consumption. And from a gender perspective, it articulates the historically sectorial and fragmented public administration, which competes for resources and responsibilities. The case of this guide refers to an example of an inter-agency approach as a new methodology for approaching public policy.

**2.** Integrality as nodes, networks, nexus, articulation, and links between the intervening actors: public administration, urban waste pickers, the recycling industry, NGOs, universities, large generators, service companies, and citizens. This integrality requires articulation spaces, roundtables, consultative councils, and connection networks between generators and treaters.

**3.** The inclusiveness of the fundamental actors of recycling in the design and implementation: the cooperatives and informal urban waste pickers that today carry out the task of recovering recyclable materials for reinsertion into the industry. These actors, together with neighborhood assemblies, NGOs, and universities anchored in the territories, make it possible to redesign the links in a new integrality and inclusiveness based on the choice of social, economic, and ecological relations, responding to the emergence of new actors.

Inclusive integrality requires promoting new management guidelines, citizen participation processes (dialogue roundtables, advisory councils), new work methodologies, and the democratization of public institutions/companies dedicated to waste management. If we consider waste management from the perspective of final disposal, the capacity to intervene reduces. It dilutes the generator's responsibility, management concentrates on a few actors, and we use expensive infrastructure. If, on the contrary, we approach it from generation, we can identify responsibilities, the intervening actors multiply, and the types of waste to be treated, plus the treatment alternatives multiply as well (Suarez, 2021).

The IISWM consists of the formalization and inclusion of waste pickers in all stages of the ISWM to contribute to the Circular Economy and the development of recycling systems with economic, social, and environmental sustainability that contributes to the improvement of working conditions of urban waste pickers, resulting in a co-management model.

In the case of Argentina, the urban waste pickers' organizations have developed the most successful experiences for recovering dry recyclable waste and social inclusion. Door-to-door collection systems, manual sorting plants, and environmental promotion have shown that, even with scarce resources -and in most cases, the organizations' own- better recovery rates and more inclusive and environmentally sustainable forms have been achieved than those policies designed by state agencies, with abandoned plants or with very high rejection rates, as in the case of social plants or collection systems not developed by



urban waste pickers (Sorroche, 2021).

In addition to these achievements, they have the recognition of public agencies, NGOs, communities, and university and innovation centers.

In this sense, progress has been made in second-tier organizations that bring together several cooperatives and advance in developing sectorial demands and proposals. Among others, we can highlight the creation of the Secretariat of Social Economy (National Ministry of Social Development) and the National Registry of Workers of the Popular Economy (ReNaTEP), where waste pickers and recyclers classify as one of the activities of the Popular Economy and the obtaining of the social status of the Union of Workers of the Popular Economy (UTEPE) by the Ministry of Labor.

## 1.2 BASIS OF ISWM LOCAL RECYCLING SYSTEM (LRS)

The proposed approach recognizes a pre-existing network of workers who, individually, in families, or organized in cooperatives, manage recyclable solid urban waste. These workers, colloquially known as scavengers, waste pickers, carters, bottle-sellers, or recyclers, are, in fact, waste pickers and fulfill an essential environmental function promoted by the Circular Economy.

Although the formalization of this sector of workers is embodied in the current ISWM National Strategy, current implementations aim principally at eliminating the activity of waste pickers and reconvert their work as operators of social sorting plants.

These approaches are limited and fail in their inclusion mainly due to:

- Eliminating the reclaimer’s collection activity reduces the reclaimed material floor in quantity and quality, with a consequent increase in inadequate final disposal.
- In a sorting plant, it is impossible to include all of the pre-existing reclaimers so that a large part of the work of many of them continues to be carried out informally and outside the plant.

2b. Calculation obtained by the National Dir. of Popular Economy MDS using the GHG Emissions Calculator 2.0, mitigated by the activity of waste pickers, from Women in Informal Employment: Globalizing and Organizing (WIEGO).

3. It is noteworthy that, however, in many districts, this continued for a long time until the enactment of local regulations. In the Province of Buenos Aires, for example, this did not occur until 2006 (Sorroche, 2016a).



ISWM Circuit. Source: own elaboration, National Directorate of Popular Economy (MDS).

- Recovery levels in a sorting plant without door-to-door-differentiated collection are low, given the poor quality of the materials received and, in some cases, working with live garbage, worsening the income and working conditions of urban waste pickers.
- The alternative methodologies of mechanized differentiated collection generate much lower recovery levels as they do not make citizens responsible for the separation's quality resulting in processes with high investment values in operating and maintenance costs and poor material quality due to contamination from mixing with other waste.
- All pre-existing waste collectors are integrated, and new jobs are generated through the new tasks.
- Better quality and quantity of recovered material is obtained by performing a pre-sorting in the street by the waste collectors, improving the recycling ratios.
- More efficient truck routes are developed with walking crews and specific logistic posts, limiting gas emissions.

On the contrary, the approach of this guide aims at recognizing and respecting the role already played by waste pickers, integrated and organized within a local IISWM through an LRS based on the door-to-door collection. Thanks to this new approach, advantages are obtained according to:

- The role, knowledge, and pre-existing collection routes of urban waste pickers are respected while maintaining the floor of recovered material and the workers' income. Simplifying the implementation of the co-management system.
- The regulation of the recovery activity allows the implementation of more efficient routes and laying the groundwork for the differentiated collection of other recyclable waste streams (Organic, Waste Electronic, and Electrical Equipment (E-Waste), Used Vegetable Oil (WVO), End-of-Use Tires (ELT)) improving the Municipal IISWM.
- The inclusion of landfill waste collectors is achieved by respecting their recovery tasks and integrating them into the door-to-door collection.
- Increased recyclable waste streams recovered. The inclusive collection methodology is higher in quality and quantity ratios of recovery.
- Direct contact between the urban waste collector and the household generator, strengthening community collaboration through separation at source, complemented with environmental awareness and education tasks.

### 1.3. DESCRIPTION OF THE LOCAL RECYCLING SYSTEM (LRS)

The LRS is based on the implementation of a co-management system between local governments and Urban Reclaimers that covers all the stages of MSW-Recyclables management from generation to sale. These stages are:

Stages of the Local Recycling System  
 Source: Prepared by the authors, National Directorate of Popular Economy MDS.

PROMOTION	DOOR TO DOOR COLLECTION	TRANSPORTATION	CONDITIONING	COMMERCIALIZATION
<ul style="list-style-type: none"> <li>•Environmental promoters</li> <li>•Programs:                             <ul style="list-style-type: none"> <li>-Door to door</li> <li>-Large generators</li> <li>-Public institutions</li> <li>-Green points</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>•Modalities:                             <ul style="list-style-type: none"> <li>-Carts on foot</li> <li>-Horse-drawn carts</li> <li>-Motor-vehicles</li> <li>-Other vehicles</li> </ul> </li> <li>•Assembly of COLLECTION ROUTES</li> </ul>	<ul style="list-style-type: none"> <li>•Modalities:                             <ul style="list-style-type: none"> <li>-Specific fleet</li> <li>-Use vehicles available in the municipality</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>•Warehouse</li> <li>•Machinery</li> <li>•Scales</li> <li>•Baler</li> <li>•Forklift</li> </ul>	<ul style="list-style-type: none"> <li>•COLLECTIVE SALE</li> <li>•DIRECT TO THE INDUSTRY</li> <li>•TRANSPARENCY IN OPERATIONS</li> </ul>
MANAGEMENT				
KEYS	<ul style="list-style-type: none"> <li>• Organize all waste pickers in the district.</li> <li>• Approval of local legislation</li> <li>• Involvement of waste pickers in ALL stages of the process</li> </ul>			

#### • ENVIRONMENTAL PROMOTION

Refers to the awareness and environmental education tasks by incorporating the WP through Waste Pickers Environmental Promoters, coordinated with the local government, and articulated with other actors such as universities and NGOs. Also, use of Green Points (voluntary reception points in institutions and squares) as the basis for environmental promotion teams, door-to-door promotion campaigns, and awareness-raising in institutions, companies, schools, etc.

#### • SEPARATION AT ORIGIN

This is the instance articulated with the differentiated door-to-door collection, which requires a separation into two fractions: wet or garbage and dry recyclables, which facilitates the collaboration of the generators. Awareness-raising is reinforced through promotional campaigns and direct contact with the recyclers.

#### • DIFFERENTIATED COLLECTION

This is the principal instance of waste pickers' inclusion, respecting pre-existing routes. In medium and large cities, it is essential to implement door-to-door collection through the design and implementation of collection routes or zones to include all waste pickers and achieve the highest levels and quality of recycling. In small towns, other types of differentiated collection can be implemented in coordination with waste pickers. It is vitally important, and in already consolidated differentiated collection systems, to implement differentiated collection routes for Large Generators or Special Generators.

## • TRANSPORTATION

Refers to the transportation of the collected material, articulated with the door-to-door collection routes and the establishment of logistic posts, allowing efficient use of fuel and reducing the emissions of the collection system. Transportation may be the responsibility of the municipality or the waste collectors.

## • CONDITIONING

Refers to recycling centers with the necessary processing capacity for sorting, processing, and collecting recyclable materials. The preliminary stage focuses on the primary dry recyclables streams in a Local Basic Recycling Node, resulting in a green center with the minimum conditions for sorting and conditioning processes. In the second stage, the recycling center is expanded to form the Local Recycling Node where the treatment of different recyclable waste streams is incorporated: E-Waste, organic, ELT, and WVO, as well as the social rights of urban waste pickers associated with healthy food (soup kitchens), health (medical coverage), education (literacy, school completion program, training), childhood (daycare for children), culture, sports, and popular justice.

## • COLLECTIVE COMMERCIALIZATION

Allows legal and direct sales to the recycling industry, eliminating intermediaries, improving the income from recovery by distributing according to the kilos recovered by each person, and banking access to the totality of the WP.

## 1.4 OBJECTIVES, ACTORS AND RESPONSIBILITIES

### 1.4.1 Objectives

The general objective of IISWM and LRS, which complement NSISWM, is to develop public policies related to waste management that include and integrate urban waste pickers and promote the Circular Economy plus sustainable development. Thus, the following specific objectives are promoted:

1. To promote the recognition of the activity of urban waste pickers to grant labor and social security rights for waste pickers, carters, and recyclers, including minimum safety conditions at work, contemplating specific actions for the two populations with particular criticality: waste pickers in landfills and workers who suffer persecution due to the use of animal traction.
2. Strengthen the work of waste pickers, carters, and recyclers in all stages of the IISWM, mainly through the differentiated door-to-door collection as the backbone of the system (environmental promotion, differentiated door-to-door collection, and from large generators, transport, treatment, and recovery in Local Recycling Node).
3. Strengthen the commercialization circuits of recyclable materials collected by urban waste pickers to improve sales prices, income, and quality of life.
4. Promote productive projects for treatment, research, development, and innovation (R+D+i), and the value addition of specific dry recyclable waste streams, including Waste Electrical and Electronic Equipment (E-Waste), household organic waste or pruning waste (OFMSW), end-of-life tires (ELT), used vegetable oils (WVO), among others.
5. Design IISWM Plans that address the problem of waste from new paradigms of socio-environmental management through the implementation of LRS and Nodes. These can be addressed at the local or regional level through the conformation of consortiums or departments when they are less than 20,000 inhabitants.

### 1.4.2.

#### Actors and Responsibilities in IISWM

*“The meaning of the practice and roles of actors/agents in urban environmental management should be interpreted from the dynamics of the actors’ relationship based on a specific environmental issue. To this end, it is necessary to consider that each issue generates scenarios where power relations unfold, in which the different actors/agents participate with their different resources. Consequently, each actor has unequal possibilities of influencing decisions, according to the place they occupy in the web of social and/or political relations that serve as a context for such scenarios”*

(Velásquez et al. 1994: 271).

*“Management is a political-technical activity, explicitly or not, starts from a government policy and implies an orientation of urban processes that involves decisions over interests, at the same time that depends on an adequate instrumental (technical) management for the achievement of its objectives”*

(Pírez, 1994; 55).

In this respect, understanding the actors involved in waste management is fundamental to determining the importance in the context of multiple interests and achieving an integrality of voices and knowledge in pursuit of a synergy of management. The actors involved are detailed below:

- **Urban Reclaimers (WP):** they are in charge of environmental promotion, differentiated collection of recyclable waste separated at source, classification according to the type of material, and its commercialization as an input for the industry. The WP are essential in recycling and should be part of the design of local IISWM plans. This is why governments are encouraged to formalize their work in cooperative organizations, with the necessary resources to support their contribution to waste minimization. The sector is divided into different realities and groupings, from where they should be incorporated into the LRS to unify the work in a single system.

- **Local Government:** plans and implements the Integral and Inclusive Management of Urban Solid Waste in its jurisdiction as the agent in charge of it, providing cleaning and urban hygiene services for the non-recyclable fraction and carrying out co-management with urban waste collectors for the dry fraction recyclable waste. It is recommended that different local public agencies work together to design and implement a comprehensive approach, along with provincial and national agencies that can provide tools and resources for better implementation. Consortiums can be formed in the case of local governments with less than 20,000 inhabitants considering the number of urban waste collectors living or working there.

- **Community:** all those individuals who live in a municipality and generate waste. To achieve a IISWM, the neighbors must change their consumption habits, reducing, opting for reuse, and being responsible in the separation at source to contribute to recycling with inclusion.

- **Civil society organizations:** They promote community participation and awareness through environmental education and carry out work focused on disseminating the problems generated by urban waste and the importance of urban waste collectors. At the same time, they must be involved in implementing these proposals.

- **Educational institutions:** Educational institutions provide guidelines for training and developing content related to the subject to inform, raise awareness, and promote actions to change society. They refer to primary, secondary, tertiary, university, and postgraduate levels.

- **Intermediaries:** Informal buyers of recyclable materials.

- **Recycling industry:** all industries that add value along the recycling chain beyond urban waste pickers.

- **Large Generators/Special Generators:** public and private generators that generate large volumes of waste and thus require differentiated treatment.
- **Provincial and National Government:** public agencies associated with the subject that allows the articulation and consolidation of IISWM plans through working groups, financing lines, and technical assistance, among others.
- **Scientific institutions:** public and private organizations involved in research and development and innovation (R+D+I) on the different waste streams, as of the IISWM, strengthening the development of the recycling value chain.
- **Social organizations:** popular economy organizations that strengthen the organization of the urban waste pickers' sector to improve their working conditions and to expand their rights associated with access to health, food, education, childhood, culture, sports, and justice. They refer to second-tier organizations that bring together several cooperatives and make progress in the development of sectorial demands and proposals, where waste pickers and recyclers come to be identified as one of the activities of the Popular Economy, grouped and formalized through the Social Personality of the Union of Workers of the Popular Economy (UTEPA) by the Ministry of Labor.

• THE FOLLOWING IS A MAP OF ACTORS ASSOCIATED WITH THE IISWM:

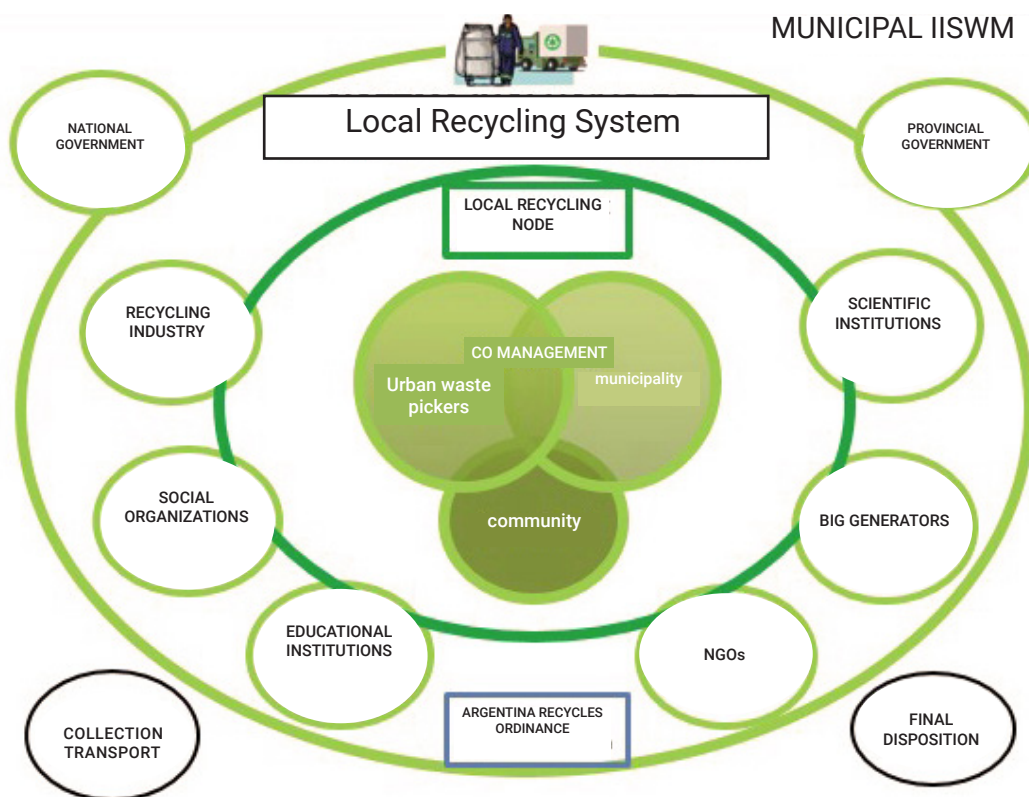


Figure 8: Map of actors associated with the IISWM. Source: Own elaboration, National Directorate of Popular Economy (MDS).

The local ISWM refers to a general institutional framework associated with the management of all waste streams, where the center of the IISWM system is determined by the LRS associated with the recyclable waste stream (GREEN), being its fundamental axis, the co-managed work between the local government and Urban Reclaimers together with the community and accompanied by the other intervening actors, among them also the national and provincial government, with its own regulatory framework contained in the Ordinance oriented to the Argentina Recycles Program (see Annex 1 - Argentina Recycles Program), and where the Node is the green processing center of the system together with the social rights. On the other hand, complementing the ISWM system, garbage management (NEGRO) for its collection, transportation, and final disposal will be addressed.

#### 1.4.2.1. Characterization and integration of Urban Reclaimers into the LRS

The aim is to reach the population of waste pickers, carters, and recyclers working in Argentina. These unrecognized workers perform a vital environmental service, recovering up to 10,000 tons of waste daily. Material that, after passing through a chain of intermediaries, is the raw material for the recycling industry in Argentina.

Urban waste pickers work within the framework of five fundamental realities, from which it is necessary to integrate them into the LRS towards a local IISWM that groups and includes all these realities equally.

- **URBAN RECLAIMERS:** these are formal<sup>4</sup> and informal workers who walk the streets of the cities, recovering recyclable materials using carts and bags pulled by their strength. They carry out their task of recovering door-to-door in homes, stores, offices, and buildings. And also contribute to promoting the separation at source. This work is largely unrecognized, and even in several municipalities of the country, it is still prohibited and prosecuted under the legal figure of “scavenging,” involving many hours

a day carrying a weight ranging between 100 and 400 kg. On the other hand, street recovery allows the development of local differentiated collection systems with large recovery volumes and social inclusion. The work is done individually, in a family, or in small groups, and the sale of the collected material is individual and is made to intermediaries. In the case of cooperatives, in some cases, they have advanced in collective sales and, to a lesser extent, directly to industry. Their integration into the LRS is simple and agile by organizing individual routes in work zones/ collection routes.

- **URBAN COLLECTORS WITH CARTS AND HORSES:** the task of urban collectors who work with carts and horses is similar to the one mentioned above but generally carried out in areas farther away from urban centers. In addition to working without recognition and on the verge of subsistence, they suffer generalized persecution resulting from the growth of protectionist associations that promote the eradication of animal traction. Their integration into the LRS is simple as long as a coercive policy is not established concerning equine ATVs. The eradication of equine ATVs should be carried out progressively with implementing the LRS as an alternative.

- **DUMPSITE RECUPERATORS:** they work in the worst conditions. They carry out their tasks directly at the final disposal sites on the outskirts of cities throughout the country. Invisibilized by the public and without minimum health, safety, and hygiene conditions. In many cases, the activity is governed according to the logic of some leaders who distribute access to trucks or intermediaries who pay waste pickers to collect material for them. For the integration of these reclaimers, it is necessary to focus on the progressive implementation of the LRS and to work in a unified manner with the WP from the beginning of the process.

4. Formalization in that they belong to a cooperative and, within this framework, they have some labor rights, however, incomplete in that there is no full recognition of these rights, thus they are incompletely granted.

• **SOCIAL PLANT COLLECTORS:** they are the most visible but smallest sector that, thanks to state investment in infrastructure for waste sorting, managed to generate social plants. In some cases, this implied the isolated recognition of small groups of waste pickers who formed autonomous cooperatives outside the municipal differentiated collection system. Particularly the social plants built at Final Disposal Sites as part of the “sanitation” of landfills have been abandoned for the most part. In the case of pre-existing autonomous cooperatives, they work almost exclusively with large generators. Some of them are reluctant to integrate the LRS and the WP. They should be integrated by recognizing the pre-existing classification centers as an accessory part of the LRS and respecting the pre-existence of their work with large generators. On the other hand, the defining factor of the LRS is to guarantee the three aspects that make up the income of urban waste pickers, to respect not only the role, the way of working, and the pre-existing routes but also the economic logic of the activity.

### Complementary wage

As all workers in the Popular Economy, the waste pickers carry out their activity under extreme working conditions and over long working hours for a subsistence income. To move forward in the formalization of the sector and guarantee the functioning of the LRS, the WP should have a Social Complementary or Supplementary Wage that, combined with the income from the sale of recyclable materials, would generate earnings above the subsistence level. This wage supplement can be provided at the local, provincial, or national scale. This, in Argentina, is the Program Potenciar Trabajo. Which is part of the National Ministry of Social Development.

### Collective trading of recovered materials

The recyclers carry out their activity with a subsistence economic logic, through Street routes or OD recovering recyclable materials and selling them on a daily or weekly basis, requiring immediate income, which encourages the development of intermediaries and non-formalized transactions. For this reason, to consolidate the LRS, it is necessary to develop commercialization considering the following criteria:

#### • Exclusivity of the recycled material.

The material is for the exclusive use of the Urban Recycler, who participates in its direct collection, making it impossible for the local government and the Cooperative, of which he is a member, to force the WP to dispose of these materials to their detriment. The commercialization of the materials within the LRS should be voluntary. Integration into the collective commercialization system with higher economic incentives through direct sales to the industry should be encouraged.

#### • Collective commercialization.

The WP organized in cooperatives or any other type of association do not become buyers of the material but carry out a collective sale of the materials collected by the group. The sale of materials should be distributed according to the kilos recovered by each WP. This sale must be made formally, and the income's distribution must be made by bank transaction to the account of each of the reclaimers.

#### • Complementary tasks.

The core of the LRS is the role of the waste pickers and the differentiated collection, even though they also participate in complementary activities necessary for the implementation of the system: WP environmental promoters, route coordinators, plant operators (loading and unloading, sorting, baling, machinists, clark operators, etc.).

These workers do not participate directly in MSW collection and need to supplement their income with some of the following measures that can be applied alternatively or in combination:

✓ **Distribution of 10%** of the sale of the material collected by the WP. This does not affect the economic logic of the system and guarantees an income for complementary tasks.

#### ✓ Large Generators (LG):

Given that this input of material usually involves a large volume with little participation of the WP, a distribution of the income from the sale of the LG can be implemented to guarantee general costs, bonuses for all the reclaimers, savings for emergencies and complementary salary for the workers dedicated to complementary tasks.

✓ **Double Supplementary Social Salary (SSS):** Guarantee a higher fixed income



equivalent to double the salary of the SSS. This extra supplement can be provided locally, provincially, or nationally. Currently, many municipalities combine different allowances for these functions.

- **Incentive per kilo.**

A fund can be created to reinforce the economic incentive for the recovery of materials to distribute within the LRS based on the kilos recovered for each WP. This is in addition to the amount distributed from the sale of the material. In this way, the system's effectiveness is sustained and increased. This resource can also be implemented selectively for specific waste streams to extend the differentiated collection to streams that are not yet within a Preliminary ISWM or whose market value results in a low level of collectability but which have a slow degradation in the biological system (polystyrene, E-Waste, WVO, ELT, organic, etc.).

## 1.5. PROGRESSIVITY. STAGES OF IISWM IMPLEMENTATION

The design, implementation, and monitoring of the ISWM is divided into 2 stages. The stages are conceived considering the principle of municipal progressivity to generate instances of implementation design according to the situation in the local ISWM, considering mainly the degree of integration of urban waste pickers, the map of actors, its infrastructure, environmental promotion, citizen participation, regulations, indicators, etc.

These 2 stages correspond to:

### 1. Preliminary IISWM.

Mapping of resources and pre-existing informal work and implementation of the LRS. It refers to the design and development of the LRS for integrating urban waste pickers of the district into a co-management system of dry fraction recycling with social inclusion, determining the basic guidelines for its start-up, implementation, and monitoring in the short term. The central axis here is the local door-to-door recycling system since it is the instance that allows the inclusion of all the pre-existing waste pickers without modifying the basis

of their current recovery work, allowing it to be the foundational axis to develop the basic methodology in the treatment by subsequent waste streams. This first stage is based on the current routes of urban waste collectors and on improving the treatment and commercialization of the streams that already recover WP according to the market for recyclable materials. The collection circuits should be systematized in differentiated collection routes or zones, and the processing capacity for treating recovered materials in a recycling center should be generated. The WP should transition to work organizing themselves into crews, consolidating collections, establishing collection schedules and days, and adopting safety elements and tools.

### 2. IISWM. Expanded Local Recycling System and Local Recycling Node.

This second stage is intended to implement the IISWM Plan for household, commercial, and industrial waste similar to household waste. Developing its general guidelines, planning, and monitoring in the medium and long term. The plan is directed to consolidate the LRS as a basis for a broader differentiated collection of all waste streams to be recovered (organic, ELT, E-Waste, WVO). To treat these materials, local or regional recycling nodes will be created. In this way, the LRS becomes a driving force to manage the totality of waste streams. This possibility depends on the Node's capability to process all these streams.

At this stage, it is contemplated to guarantee the labor rights established in the legislation (medical health coverage, retirement, pension, uniform, PPE, guaranteed basic income) and progressively work on access to social benefits that allow integral human development. Spaces that promote and improve access to healthy food (canteens), education (literacy, access programs to different educational levels), child care (child care center), culture, sports, and social justice. Following the national characterization of waste management and to advance in the development of all the possibilities offered by waste management for the development of a Circular Economy, the IISWM Plan is determined to progressively incorporate other waste streams (organic, ELT, E-Waste, WVO, among others), establishing the guidelines in depth, allowing

its planning in the medium and long term.



Figure 10: Implementation strategy of the Argentina Recycles Program. Source: Own elaboration, National Directorate of Popular Economy (MDS).

## 1.6. FINANCING AND TECHNICAL SUPPORT.

The development and implementation of provincial and municipal programs that support these objectives may be financed by different national lines of the Ministry of Social Development (see Annex 1. Argentina Recycles Program) and the Ministry of Environment and Sustainable Development, or others that may be created for this purpose, such as the Law of Packaging with Social Inclusion. For this purpose, an example is the Law of Packaging with Social Inclusion.

In this sense, the strengthening of municipal waste co-management systems is foreseen, starting with:

- Institutional strengthening through technical assistance, training and education for employees, medical coverage, retirement, pension, and the participation of WP in the design and development of all stages of an IISWM Plan (environmental promotion, differentiated collection, transportation, treatment, commercialization, and final disposal).
- Strengthening all IISWM stages through delivering infrastructure, equipment, tools, personal protective equipment (PPE), and work clothes as appropriate (green points, trucks, forklifts, scales, precision balances, baling machines, supplies, etc.).
- For implementing IISWM, it is advisable to implement a Supplementary Social Salary (SSS), which can be guaranteed locally, provincially, or nationally to bolster and accompany the co-management IISWM systems. It is recommended the establishment of Provincial Strategies for Inclusive Waste Management that propose, according to the guidelines indicated here, the sanctioning of provincial regulations following the realities of each federative entity.

On the other hand, these strategies could encourage the development of cooperatives and the recycling industry in their territory, in addition to lines of technical assistance, financing, and specific subsidies for the activity.



Figure 9: Conceptual map of the Local Recycling Node of the Argentina Recycles Program. Source: Own elaboration, National Directorate of Popular Economy (MDS).

## 1.7. REGULATORY FRAMEWORK. NATIONAL LAWS AND EXTENDED PRODUCER RESPONSIBILITY LAW.

Within the national legislation, on the one hand, article 41 of the Argentine Constitution establishes the right of all inhabitants to a healthy, balanced, and suitable environment for human development where productive activities satisfy present needs without compromising those of future generations, establishing the duty of the authorities to provide for the protection of the right, the rational use of natural resources, the preservation of the natural and cultural heritage and of biological diversity, and environmental information and education.

In addition, General Environmental Law No. 25,675 establishes the minimum requirements for the achievement of sustainable and adequate management of the environment, the preservation and protection of biological diversity, and the implementation of sustainable development.

Specifically, the Household Waste Management Law No. 25,916 establishes the minimum environmental protection requirements for the integral management of household waste, whether of residential, urban, commercial, health care, sanitary, industrial, or institutional origin, except for those regulated by specific regulations. According to Art. 5°, each province must determine the competent authorities in the local jurisdictions. From this 2004 Law, the recovery and valorization of waste by informal waste collectors are incorporated as part of the ISWM since this activity was not recognized, and, for many years, it was considered illegal (Sorroche, 2016b).

For their part, the different provinces and the Autonomous City of Buenos Aires must establish their own waste management law based on the minimum requirements established by the national law.

### 1.7.1 Law on Environmental Education.

The Environmental Education Law No. 27,621 of 2021 establishes the right to comprehensive environmental education (CEE), understood as “a permanent educational process with specific and transversal thematic contents, whose general purpose is the formation of environmental awareness, which articulates and promotes comprehensive educational processes aimed at the construction of a rationality, in which different knowledge, wisdom, values, and practices converge and contribute to citizen training and the exercise of the right to a healthy, dignified and diverse environment” (Art. 2).

The same Law establishes a National Strategy for Comprehensive Environmental Education (NSCEE) whose responsibility is shared between the Ministries of Environment and Sustainable Development and Education. This Strategy will be made operational through permanent interministerial, inter-jurisdictional, and intersectoral articulation through the Executive Coordination of the National Strategy for Comprehensive Environmental Education (ECNSCEE), assisted by an Advisory Council made up of civil society organizations (Art. 10), including representatives of recyclers’ and waste pickers’ organizations (Art. 15).

The relevance of this Law in terms of the IISWM is given by including environmental issues, including waste management, in the different educational levels and non-formal education areas. In addition, creating an Advisory Council for implementing the IISWM, with the participation of Urban Waste Management Organizations, promotes the inclusive perspective of the IISWM. In this line, the guide is a tool for the promotion of Comprehensive Environmental Education through the Environmental Promoters Program, which promotes the principles

indicated in Article 3, especially that of equality from a gender perspective, as well as the contents presented here as tools for the design and development of environmental communication plans, institutional strengthening, and other training and technical assistance activities related to the contents of the chapters of this guide.

### 1.7.2

#### **Proposal for a socially inclusive packaging law.**

The Law of minimum budgets for the environmental management of packaging and promotion of inclusive recycling is an environmental policy still in the discussion phase. It incorporates the concept of Extended Producer Responsibility (EPR), where the producer's responsibility over its product extends to the post-consumption stage. The objective of the Law is to establish minimum environmental protection requirements for the management of packaging and post-consumer packaging throughout the national territory, to prevent and reduce its impact on the environment and people's health. Packaging management systems are declared essential public services to achieve this objective. In this sense, the EPR aims to increase the quantity and variety of materials recovered from products and minimize the environmental impact of waste, encouraging producers to assume the extended responsibilities of collection, recycling, and design of products and packaging with a higher level of recyclability, since the externalities generated from this production are environmental liabilities paid by the citizens. At the same time, to implement financing for Municipalities and/or Consortiums of Municipalities to access the necessary resources to strengthen or deploy Local Urban Solid Waste Management Systems with the Social Inclusion of Urban Waste Collectors.



## 2.

### **PRELIMINARY IISWM PLAN: LOCAL RECYCLING SYSTEM (LRS) AND LOCAL RECYCLING NODE.**



## 2. PRELIMINARY IISWM PLAN: LOCAL RECYCLING SYSTEM (LRS) AND LOCAL RECYCLING NODE.

### OBJECTIVES

The general objective is to design and implement preliminary IISWM plans based on the development of LRS and Basic Nodes capable of articulating the first instance for the consolidation of a local co-management system with social inclusion of WP, mainly for dry fraction recyclable waste, through differentiated collection based on the pre-existing work already carried out by WP in the territory.

The priority will be to integrate WP into the different stages of municipal management in the short term, emphasizing and prioritizing the development of differentiated collection routes and primary green centers for collection and classification. In this way, the foundations and the structural management framework are laid, from which complementary tools will be progressively applied to improve management and promote the development of definitive IISWM Plans that incorporate new streams of recyclable waste and expand labor rights for urban waste pickers.

### 2.1. IISWM PRELIMINARY DIAGNOSIS

Before any preliminary design of an IISWM Plan, it is necessary to realize a survey of the current situation based on available general information to prepare a primary diagnosis of the municipality's waste management with social inclusion. This set of organized data will determine the overall parameters that will be the starting point for the subsequent strategies in pursuit of the design and implementation of correct, efficient, and inclusive integrated management of solid urban waste. For this purpose, the IISWM Questionnaire tool is presented, which will be valuable to typify the management.

#### 2.1.1 IISWM Questionnaire.

The questionnaire makes it possible to characterize the current state of affairs of the IISWM in a general manner with all the information necessary for its analysis. This tool complements the criteria established in this guide, making it possible to organize, according to the initial diagnosis, a study of each stage to determine where there are shortcomings and possibilities for management improvement, which will be addressed in the following section for its proper design and implementation. This questionnaire is divided into 5 parts: General Information, Environmental Promotion, Waste Collection, Valorization/Processing, and Final Disposal/Marketing. Each section of the questionnaire is characterized by a series of questions that will allow, in this case, to outline the lines of action for the LRS' development and the Preliminary IISWM Plan (See Annex 2 - Municipal IISWM Diagnosis).

### 2.2. DEVELOPMENT AND IMPLEMENTATION OF LRS AND PRIMARY NODE

This section seeks to provide a working guide accompanied by the elementary technical tools for the design and implementation of the Preliminary IISWM Plan through the implementation of LRS and Primary Nodes between local governments and urban waste pickers, promoting the differentiated management of dry recyclables with social inclusion. The design and implementation of the Preliminary IISWM Plan will be addressed through the initial implementation of the LRS with the participation of urban waste pickers in each of its stages: generation/environmental promotion, separation at source/initial disposal, collection/transfer/transport, treatment, and commercialization. See Figure 5: Stages of the Local Recycling System.

## 2.3. REGULATIONS AND INSTITUTIONAL FRAMEWORK

The survey and compliance with national and provincial regulations are essential for the LRS' development. It also requires local regulations' design and development that complement the current management systems to strengthen the recycling circuit with social inclusion. In the first instance, the development and application of **Annex 3 - Model Ordinance Argentina Recicla** is foreseen, which will formalize the work of urban waste collectors as an essential service related to the recyclable waste treatment of dry fraction. Secondly, the local government and cooperatives must sign a public service lease agreement for the dry recyclable fraction to create a legal working tool between both parties (see Annex 4 - Model Co-Management Agreement between the Municipality and urban waste collectors' cooperative). Finally, in those municipalities where these regulations are stricter, the development of legislation associated with the generation and recovery of waste for large generators or special generators is foreseen, which will make it possible to supplement the income of urban waste collectors and the expenses associated with the IISWM with these materials.

On the other hand, it is fundamental to generate the institutionalization within the municipal organization charts from where the correct design and implementation of the IISWM Plans can be carried out, focusing on the integrated work of the areas involved considering the public policy that addresses the environmental and social problems integrally. For this purpose, **Annex 29 - Model Municipal IISWM Organizational Chart** proposes the baselines to generate these areas and responsibilities.

## 2.4. GENERATION

One of the keys to determining a preliminary IISWM Plan through the LRS concerns the estimated and agile determination of the quantity and quality of waste generated throughout the local government.

The dimensioning of the waste flow to be treated and its characterization by waste stream makes it possible to develop suitable strategies for each of the subsequent stages of the IISWM since it will make it possible to establish criteria and parameters associated with equipment, machinery, technology, logistics, initial, and final disposal areas, valorization, human resources, markets, and other aspects of management. In short, accurate information on the characteristics of current MSW generation and composition and calculations that allow for future projections will make it possible to evaluate the technical, economic, social, and environmental feasibility of implementing new MSW management alternatives, with the incorporation of urban waste collectors at the different stages of the system.

To develop the Preliminary IISWM Plan, through the LRS, it is recommended that the following calculations and surveys be carried out as a first step in the development of the Preliminary IISWM Plan:

1. **Demographic and characterization data.**
2. **Census of Urban Recoverers.**
3. **Census of Large Generators.**

### 2.4.1. Relevant data to be measured by the local government.

Relevant data to be measured by the local government. The first stage of the design and implementation of a LRS and Primary Node is focused on collecting the basic information needed to build a differentiated waste collection plan addressing all the actors and sectors involved. The most representative indicator regarding the amount of waste produced is the "per capita generation" GPC, equivalent to the amount measured in kilograms (Kg) produced by inhabitants daily, to quickly determine the annual municipal generation of MSW in tons/month.

Therefore, using the data from the last census regarding the number of inhabitants of the



district and taking the average GPC, we can quickly determine the annual municipal generation in tons/month.

Therefore, using the data from the last census regarding the number of inhabitants of the district and taking the average generation per capita, we can obtain the number of tons/month of MSW generated by the whole. The average GPC in the Argentine Republic is 1 kg/day per person.

It is also possible to determine the recyclable potential of the dry fraction of waste (mainly cardboard, paper, plastics, glass, ferrous, and non-ferrous metals), applying it to the monthly generation value in tons/month of waste. In Argentina, the average characterization at the national level indicates that **25% is recyclable waste**.

✓ **Municipal dry fraction recyclable potential** =  $N^{\circ}\text{hab} * 1.1 \text{ kg/day} * 30 \text{ days} / 1000 \text{ kg} * 25\%$  = X tons/month.

✓ **Daily collection capacity per WP** is estimated between 50 and 120 kg depending on the type of area (urban/rural - commercial/residential), urban density, type of MSW to be collected, working hours, and distance to be covered. If no data is available, this value can be estimated at 80 kg as an initial parameter, then adjusted according to the information collected.

✓ **Estimated amount of WP needed** =  $X \text{ tons/month} / (\text{Daily collection capacity per WP} * 21 \text{ days})$ .

#### 2.4.2.

##### Census of urban waste pickers.

As a second instance, it is necessary to census the population of informal workers who recover recyclable materials in the streets of urban areas and in the OD. For this census, a methodology was designed and converted into a system for data uploading, which can be found in the corresponding Annex. It will be necessary to carry out this census with the participation of the organizations of urban waste pickers and other public state agencies, as well as other local agencies associated with the environment, education, and production. From this census, it is possible to obtain information on:

- ✓ Personal Identification
- ✓ Family Group
- ✓ Health
- ✓ Education
- ✓ Work
- ✓ Income

At the end of the survey, a summary of information will be prepared for presentation to the Mayor and the Deliberative Council. The data will be available to all municipal authorities. The model can be found in Annex 5 - Model Census of Urban Waste Pickers. In this way, the number of urban waste pickers to be formalized will be determined, prioritizing the integration of those who work in the landfill and on the streets.

#### 2.4.3.

##### Census of Special Generators.

In a third instance, and if the local government has the technical and administrative tools, it is recommended that a census of special generators be carried out to ascertain the available amount of MSW -the recyclable fraction assimilable to household waste-produced in industrial establishments, distribution centers, stores, and supermarket chains, among others. A census called Special Generators will be carried out. This will make it possible to improve the income of urban waste collectors by supplementing the earnings from the commercialization of the dry household recyclable fraction. In this sense, we will proceed as in the rest, completing the load in a program allowing access to information for assembling differentiated collection routes.

## 2.5. ENVIRONMENTAL PROMOTION

Achieving sustainable MSW management with social inclusion requires a cultural change. To this end, it is essential to achieve an efficient communication of the entire waste circuit from its generation to its recovery or disposal, and the appropriation of this objective by a wide range of actors, mainly urban waste pickers, who have the most information and experience on the subject. In waste management, the awareness and participation of neighbors are fundamental.

The role played in the correct separation and initial disposal requires dedicating time and effort to the education and communication of MSW management. Environmental education and communication allow us to break down some notions installed in the social imagination of “why separate? if everything ends up in the same place” and the stigmatization of waste pickers as conflictive actors or those who litter the public road, to include them as essential actors in local recycling. Environmental communication should contemplate their participation in the recycling circuit, what happens to the separated recyclable materials, the positive impact of recycling on the environment, and the social impact generated by the creation of formal jobs. Environmental education refers to awareness-raising, motivation, and education activities, both formal (at all educational levels), non-formal (neighbors, businesses, institutions), and informal (mass media, public roads).

For the development of the Preliminary IISWM Plan through the LRS, it is necessary to have a previous diagnosis indicated previously, to understand the current situation in terms of communication, and then generate a first program of environmental promoters, which will then be integrated with the design and implementation of the Communication and Environmental Education Plan.

### 2.5.1. IISWM Communication Plan and Environmental Women promoters program. (EPP)

The objective of an IISWM's Communication Plan should promote actions to minimize the waste generated, encouraging households and institutions to separate waste at source and improving habits related to urban hygiene. Environmental promotion is fundamental for the recovery of potentially recyclable materials since its purpose is to educate and make the population aware of the importance of separation at source and how it should be done. In this sense, implementing an **Environmental Promotion Program (EPP)** is recommended as a preliminary step.

In Argentina, the prevailing waste management system has established a relationship of total distance, ignorance, and even repulsion towards waste management in households and in general (Carenzo, 2014).

The construction of a consumption-discard model under an indiscriminate collection system has made waste separation a task that is not developed and is mainly ignored by most citizens.

In this sense, developing a program of environmental promoters that includes part of the waste pickers surveyed in the previously described census in concrete environmental awareness actions should be the prevailing program in any local IISWM communication plan. On the one hand, it will make it possible to raise awareness and educate the public on the correct ways of separating, conditioning, and delivering waste while educating on the importance of separation, both for the generation and formalization of employment of waste pickers and in environmental terms. At the same time, the EPP will make it possible to carry out surveys to learn about the situation in the area to be addressed, making it possible to reformulate the policies deployed, analyze new strategies, and evaluate their development.

Finally, and most importantly, it will promote the link between the neighbors and the waste pickers so that they collect the material directly and do not leave it in the street at the risk of contamination or spoilage. According to several studies, the success of separation at source and increased participation of neighbors lies in fostering citizen awareness, expanding it, and generating what has been called environmental citizenship. At the same time, the research referred to above has shown that if this work is carried out by urban waste collectors, a close link is generated, exponentially increasing the results and scope of these programs (Carenzo, 2014).

The program seeks to reinforce central points necessary for a paradigm shift in waste management in Argentina. We often talk about “Cultural Change,” yet we do not explain how to carry out this fundamental issue to improve our relationship with waste and, therefore, the environment. In this sense, it seems necessary to highlight that, according to our estimates, 93% of Argentines are predisposed to carry out a correct separation at the origin. Ninety-one percent consider the protagonist in this matter to be the State, which should guarantee actions along these lines. If, on the one hand, we have the interest of the citizens in advancing with the sanctioning of local regulations that are oriented in this direction, it is necessary to deploy policies that allow us to go deeper into this problem. To this end, the formation of a group of women and the formalization of the EPP is determined, being the first public policy with a gender perspective for waste collectors, where the work of environmental education is developed by them, who, in addition to knowing the materials, developed their activities for years touring and establishing links with neighbors and merchants. Incorporation of women waste pickers into environmental education programs makes it possible for them to contribute their invaluable experience in the management of urban solid waste and their relationship with neighbors, contributing to separation at source and strengthening the links between citizens and recycling cooperatives.

At the same time, the possibility of carrying out awareness-raising tasks constitutes a concrete job opportunity for the hundreds of women waste pickers, which is their primary source of income for their families. On the other hand, it has been demonstrated that by making waste pickers and promoters visible and personalized, the levels of separation and recovery of recyclable materials are highly improved, and the social ignorance about waste is reversed.

Four lines of work related to environmental promotion are proposed:

- **Door to door:** the promoters will disseminate the new differentiated collection campaign to each household, conduct a brief survey, hand out brochures, and discuss in detail the objectives, benefits, and operation of the program.
- **Large generators:** meetings will be organized with large generators to present the program, including training for all personnel.
- **Public institutions:** different public institutions, government buildings, schools, and hospitals will be visited to coordinate training and discuss the details of the program.
- **Green points:** another axis of the environmental promotion campaign could be the green points, usually located in squares or other places within the public space. There, neighbors bring recyclable material voluntarily, and at the same time, environmental promotion is provided, as well as talks open to the community about the importance of separation at source and the work of the WP.

The EPP integrates a series of materials -both audiovisual and pedagogical- that allow the transmission of this knowledge at all educational levels and for civil society, articulating with specialists in pedagogy to develop materials and activities to generate greater adherence of the recipients of the workshops and materials of the program. Finally, we can see in Annex 6 - Environmental Promoters Program the contents of the promoters program, which should be articulated as in all stages of the IISWM with the urban waste collectors, whose experience in methodologies, topics, and experiences is fundamental for its design and implementation.

This guide plans to deepen - initially - the Environmental Promoters Program at the national level, which will have two levels of training: Environmental Promoters and Multipliers. Once the EP course has been approved, this second course will seek to train women workers from all over the country

so that they can replicate the EP training, establishing local EPP training centers in each of their provinces or local governments.

The EPP training before its implementation consists of two levels:

- **Environmental Promoter Course:** Developed in 10 lectures, with a total of 20 hours, provides the primary and necessary tools for everyday environmental promotion work. See contents in Annex.

- **Course for Trainers and Multipliers:** this course, developed in 15 lectures, with a total of 30 hours, supports the formation of trainers who can replicate the Environmental Promoter course throughout the country. This course is more intensive, with more content and specific attention to popular education tools and the development of activities so that the training of new environmental promoters can be carried out. Among others, there is a workshop on popular communication to carry out awareness campaigns.

### WHO ARE WE?

We, the environmental promoters, are women waste pickers who carry out the task of making the residents of our city aware of the separation at the source and the importance of the work carried out by the waste pickers.

In our country, we generate 400,000 tons of waste per day, of which 300,000 tons end up in open dumps, landfills, or oceans. The other 100,000 tons are recovered by the 200,000 WEP, carters, and recyclers, workers of the popular economy who travel the streets providing the differentiated collection service of our city.



CONTACT  
WP ENVIRONMENTAL PROMOTERS

### WHY IS IT IMPORTANT TO CARRY OUT SEPARATION AT THE SOURCE?

- It reduces the volume of waste generated
- It takes advantage of the resources present in recyclable materials.
- avoids the overexploitation of natural resources.
- Reduces waste disposal costs.
- Creates new sources of employment Promotes participation

### PROMOTES DECENT WORK

The reinsertion of materials in different productive circuits benefits numerous industries and, particularly, to the urban waste collection cooperatives, which make an invaluable contribution to the reduction of waste destined for burial and the recovery of raw materials. The separation at the source collaborates with the creation and sustainability of decent work and the integration of a population sector that has long been neglected.





### WHAT IS SEPARATION AT THE SOURCE?

Separation at the source is the best way to contribute to recycling. It consists of each resident separating their waste and disposing of it in a differentiated manner. On the one hand, **dry materials** and, on the other hand, **wet materials** are **recyclable and non-recyclable materials.**

### WHO SHOULD SEPARATE AT THE SOURCE?

Everyone should and can separate at the source.

Every day we consume an enormous amount of products in packages, wrappings, bottles, jars, and diverse containers composed of recyclable materials.



**DRY**  
recyclables

**WET**  
non-recyclable

Figure 11: Environmental Promotion Graph of the Environmental Promoters Program. Source: FACCyR.

### 2.5.1.1. Communication pieces

It is essential to lay the groundwork for any communication plan that promotes separation at source and differentiated collection with simple informative messages. Citizens should know what to do and how to incorporate new habits at home. For this, the naming of waste is fundamental. It must be repeated and maintained in all communication pieces, with the icons and colors representing each of these classifications. This will vary depending on how many fractions of MSW are managed. Using those already in use in the district/department is recommended, starting with a double separation (dry recyclable and residual) and progressively integrating other waste streams (compostable wet, E-Waste, etc.).

After the neighbors know what to do at home, the next step is that they know what to do with those bags with waste, highlighting days and times, and finally communicate the entire circuit that the waste goes through, incorporating waste collectors in each of these stages, mainly door-to-door and recovery.

#### COMMUNICATION SUPPORT

The local government should accompany the IISWM Communication Plan with support for communication to promote what is to be done through the environmental promoters program. For example, the notion of the 3Rs proposed by the United Nations minimizes the amount of waste generated daily, maximizing its use, considering the number of jobs created by recycling and the impact of the participation of urban waste pickers.

The materials and communication mechanisms should allow quick reading and be designed to last. Some examples are:

- Web pages and networks that make the program visible so that neighbors and large generators can learn about it and begin to participate.
- Institutional videos that show each of the stages of the IISWM and the LRS from the voice of the urban waste pickers to educate the public on the environmental/social impact and employment creation.

- Green Points or voluntary delivery of recyclable waste: Green Points are simple structures that receive waste such as glass, plastics, paper, cardboard, metals, and tetra brik generated in households. They are intended to help communicate the importance of waste separation and to teach how to identify recyclable waste. It is advisable to set them up at places in the city where there is a large number of people, both in public and private (gas stations, institutions, etc.).

In the case of green points, it is of utmost importance that a team receives the material to ensure that they meet the requirements of dry waste and do not become garbage dumping points. We will see in the next section the deepening of this collection channel with attention by urban waste collectors as a complementary environmental promotion scheme.

- **Clothing and cards for environmental promoters/urban waste collectors:**

The environmental promotion and door-to-door collection tasks that urban waste collectors will carry out will make the waste problem more visible. They will be a channel for dissemination and awareness-raising. The clothing allows agents to identify as local government workers and as providers of an essential service for collecting and recovering dry recyclable waste. The credential ensures quick identification and generates trust between citizens and waste pickers.

- **Guided visits to the Nodes:**

As far as possible and considering Health and Safety precautions, it is recommended to make guided visits to the treatment plants to show not only the work of the waste pickers but also the destination of the recyclable waste, breaking with the idea that “everything ends up in the same place.”

- **Waste collection truck:**

The waste collection truck is a fundamental part of the campaign for waste separation because it has the power to leave in the basket what was deposited and does not correspond to the collection day (educational function). And also because the graphics it can carry are a way of disseminating the campaign. It eliminates the myth that the truck “takes everything together.”

## 2.6. SEPARATION AT THE SOURCE / INITIAL DISPOSAL

Waste generated grows in volume and types of materials according to consumption and production patterns. It accumulates at a rate at which nature cannot degrade it, causing the extraction of new natural resources with the resulting environmental impact. This situation represents a complex problem whose possible solution lies in adequate urban solid waste management to reduce waste generation and recover materials for reuse and recycling. The separation at the source of the urban waste generated daily is essential to contribute to these objectives. Waste classification will depend on local regulations (See Annex 7 - Res. 446.20 Waste Colors MAYDS).

In the first instance, two streams are foreseen according to:

- **Dry Recyclable Waste:** are inorganic or inert and some organic (cellulose), which originates in an industrial process, with high recyclability potential. This fraction includes paper, cardboard, plastics (PET, HDPE, LDPE, PP, and PS), ferrous and non-ferrous metals, glass, multi-laminated containers, and fabrics.
- **Wet waste, garbage, or leftovers:** all organic waste, such as leftover food, fruits and vegetables, infusions, fats and oils, animal waste, and/or waste that could not be recycled due to its contamination level.

It is fundamental to be clear that the integrated management of solid urban waste begins where the waste is generated, whether in homes or businesses where it is consumed, and where it is necessary to carry out the correct separation and classification of waste to have a friendly and committed attitude towards the environment, and contributing to better working conditions and increased employment for urban waste collectors by providing clean and dry recyclable material without contamination. Waste management should be regarded as a public service of sanitary hygiene for a clean city, and in the capacity of urban centers to recycle, with the responsible separation at the source of the waste we generate every day, and associated with a public recycling service in the hands of cooperatives of urban waste collectors.

To carry out this separation in a correct way means to be able to inform about issues such as:

- ✓ Day and time of collection.
- ✓ Collection frequency.
- ✓ How to condition the waste for collection: recyclable waste: clean and dry, separated from organic waste.
- ✓ Types of differentiated collection mechanisms.

Finally, for more information on these topics, see Annex 30 - Separation at Source, Reclaimers History, and Environmental Paradigms.



Figure 12: Double containers: dry recyclables/garbage.  
Source: <https://ideas.mercadolibre.com/ar/trending/clasificacion-de-residuos/>

## 2.7. DIFFERENTIATED COLLECTION

The activities covered by the collection are the loading and transfer of waste from the initial disposal points such as homes, containers, eco-points, bins, and public places, as well as the transport of waste from green areas and from urban cleaning and sweeping. The LRS is based on the development of differentiated collection routes that allow the integration of all pre-existing urban waste collectors to lay the foundations for collecting and treating dry recyclable waste for extrapolating the experience to consolidate an IISWM plan that includes all waste streams.

### 2.7.1. Differentiated collection mechanisms

Differentiated collection for the preliminary stages of LRS implementation includes those actions related to waste disposal by neighbors on public streets before pick up and after separation at the source. For this purpose, it is foreseen to incorporate the urban waste collectors registered in pilot squares to later extend the collection routes, prioritizing them:

**1. Door to Door:** Refers to hand delivery in front of the door of the home or business to an urban waste collector or disposal of recyclable waste after removal of the collector identifying them by green bag, sticker, in bulk, in the corresponding place (container in height, floor, etc.), at a stipulated time. Using a counter-shift to the traditional collection serves as an educational function by forming a new temporary space for this fraction, allowing citizens to incorporate new habits related to waste.



Figure 13: Door-to-door collection. Source: National Dir. of Popular Economy (MDS).

## 2. Green Points or Voluntary Delivery Points:

These are structures that vary in size and shape, it receives recyclable waste that the neighbor brings, and it is also used to communicate the importance of waste separation and to teach how to identify recyclables, as well as temporary storage space before the collection of big bags with recyclables collected by urban waste collectors. It is advisable to install them at points in the city where there is a large number of people, both in public places (mainly squares) and private places (service stations, institutions, etc.). In the case of moving forward with a scheme of green points or voluntary delivery, it is of utmost importance that a team receives the material to ensure that they meet the requirements of dry waste and do not become garbage dumping points.

It is not necessary to spend a lot of money on the design of green points similar to those of Buenos Aires City, for example:



Figure 14: Collection through Green Point. Source: <http://www.moron.gov.ar/puntos-de-recepcion/> y <https://www.infoquilmes.com.ar/ecopuntos-en-quilmes-dondefuncionan-y-que-dias>



Figure 15: Collection through Green Dot. Source: <https://www.buenosaires.gov.ar/ciudadverde/noticias/para-acompanar-la-puesta-en-marcha-de-la-ciudad-los-puntos-verdes-ubicados-en->

We can develop a new model of the green point that allows the same functions but with a lower cost and the possibility of moving it around freely. We refer to a trailer on which a structure is mounted (similar to a food truck) inside which carts and the big bags used by the waste collectors for household collection are stored. It can be parked in a public space such as a square, in the parking lot of a supermarket, etc. Since it can be moved, it can be used for events in particular places, and so on.

A gazebo, with banners and brochures, can fulfill the same function without excessive expenditure of resources. Those responsible for green points should have a basic infrastructure to carry out their functions: a bag scale, which can weigh up to 150 kg, labels/precincts attached to each big bag to identify the WP bags (with route number, WP name, and identification code as appropriate), as well as those prepared at the green point with the material delivered by the neighbors, the routes with the fixed spots to be collected each day by the WP.





Figure 16: Collection by mobile Green Dot. Source: National Directorate of Popular Economy (MDS).

Any unattended collection sites must be integrated into each household collection route. To prevent such sites from becoming small urban micro-garbage dumps. Every 5 household collection routes will require a green point that will fulfill different functions, including environmental promotion and reception of materials by the neighbor. It will also coordinate the work of the urban waste pickers of the route to be defined, register attendance, deliver a backpack with protective elements and the collection route to be followed, deliver a cart and a big bag, identify each bag delivered by the WP, operate replacements in case of absence of the WP, and register the loading of bags in the truck, indicating the weight of each one.

**3. Recycling Day.** It is associated with special days dedicated to the environmental promotion, events, selective reception in a specific place (e.g., main public square, stadium, recital, etc.), using one or several days of differentiated collection for dry recyclable waste, generally during the daytime or contrary to the timetable for the collection of wet waste, residual waste or garbage. This day and time are used as an awareness and specific collection day for neighbors to dispose of recyclable waste.



### Recycling day in ESTEBAN ECHEVERRÍA

*We receive glass, paper, cardboard, plastic, metal, and cans. You can also bring used oil, love bottles, and eco-bricks.*

*We are waiting for you on Saturday, January 09th, from 10 am to 2 pm at AMAT park in Monte Grande. Join us!*

*The first ones to arrive will get a seedling as a gift.*



Figure 17: Collection through Recycling Day. Source: FACCyR

Having established the recyclable potential of the dry fraction and the number of urban waste pickers, it is now possible to design the best approach and social inclusion strategy. To this end, it will be necessary to plan together the collection routes with the urban waste pickers, respecting the pre-existing work zones and the idiosyncrasies of each actor involved, as the case may be. This stage requires articulation with the previous phases, i.e., the environmental promotion program implementation to consolidate good separation at the source and understanding of the IISWM stages.

## 2.7.2. Door-to-Door Differentiated Collection

As mentioned above, it should be noted that Door-to-Door Differentiated Collection is the pillar of The LRS to be implemented in the IISWM plans since it is an integral and inclusive model capable of:

- Strengthen separation at the source through the direct and constant link between the recycler and the generator. In the door-to-door collection, the WP also becomes a daily promotion agent that reinforces the need for separation at the source through the direct and daily human bond, achieving reinforcement in the quantity and quality of the recovered material. The commitment to source separation is detrimental to containers where no one is responsible for the dry recyclable fraction's contamination. There is no promotion and no traceability of the quality of this material, generating even lower recovery rates.
- Create jobs by incorporating urban waste pickers, giving continuity to the current work already.
- Generate higher volumes of dry recyclable waste recovered, based on the continuity of pre-existing and consolidated circuits and route design processes, to increase the already established ratios and not to design new systems that break collection and recovery networks to the detriment of the IISWM and WP revenues. On the other hand, the WP's informal activity is based on the possibility of guaranteeing an income from recovery; modifying these forms of work implies losing the economic incentive that shapes it.
- Increase the temporal and geographic offer of the differentiated collection service since it is a daily service with a stipulated schedule. The massiveness of WP, mainly from large urban centers, does not allow for instantaneous and sustainable inclusion.
- Reduction of the carbon footprint. Differentiated door-to-door collection improves the carbon footprint by reducing unnecessary collection logistics through trucks and/or containers and carrying out logistical posts after the WP crews.
- Social integration by formalizing an essential differentiated collection service.

### 2.7.2.1. Door-to-door household collection devices.

In the case of door-to-door logistics, there are a variety of devices and equipment. Here are the most relevant ones with their benefits and shortcomings.

- **CART:** The cart allows circulation on the sidewalks, avoiding traffic inconveniences. It supports a load of 150kg and can hold a big bag. Its sides are recessed to allow storage in a small place. The cart shown in the following image was built with canvas sides. Once field tested, it was decided that sheet metal was the best material. The curved ends were also changed for linear ones, as this reduced the cost. The front and rear of the cart should have a license plate that would allow the neighbors to report any anomalies or to comment on a positive experience with the collector.



Figure 18: Carts for door-to-door collection. Source: National Directorate of Popular Economy (MDS).

- **SEATED TRICYCLE:** The tricycle is used for routes with large generators because once the material has been removed, it is taken to the treatment plant or the treatment plant. The principal maintenance of the tricycle is the wheels. This device improves the ergonomics and workforce of the urban waste collectors since they are seated, and the force is carried out from the legs and with the spine straight. It allows a greater amplitude and territorial approach and has a low investment and maintenance cost.

• **MOTORCYCLE CART:** the motorized cart allows a broader territorial approach than the previous ones thanks to its motor capacity, in addition to greater transport capacity without requiring more effort on the part of the collector. However, different experiences have shown that motorcycles generate a permanent cost and are not always the best solution for household collection. Fuel, maintenance, insurance, and license fees are the main costs to be considered.



Figure 20: Motorcycle cart for door-to-door collection. Source: <https://www.lagaceta.com.ar/nota/560773/sociedad/reemplazan-carros-tirados-caballos-motocarros.html>

• **CLOSED BOX TRUCKS OR CAGE TRUCKS:** trucks are devices that require higher investment and infrastructure and are mainly used to make the route after the door-to-door collection made by the other devices mentioned above (car, tricycle, motorcycle cart, horse-drawn cart). In this way, the trucks are used to collect the big bags, including those temporarily stored at the Green Points (also called voluntary drop-off points or recycling stations), or they can be used for specific routes for large generators that require a different circuit due to their volume. There are a variety of vehicles for this purpose, even if in the case of dry recyclables, closed metal box trucks with side and rear doors are recommended. Since they are more durable and ensure that the material maintains its quality and does not get wet in the event of rain, in addition to allowing versatility in loading. Secondly, open box/cage or roll-off type trucks are an alternative use since they are generally part of the current municipal fleet.

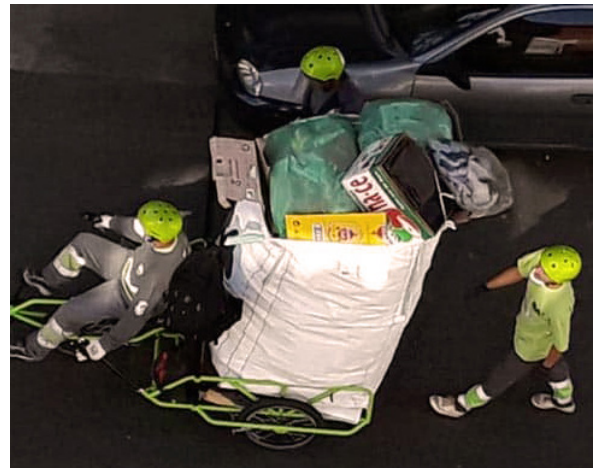


Figure 19: Tricycle for door-to-door collection. Source: <http://www.torkymobility.com/site/>



Figure 21: Differentiated Collection Trucks. Source: National Directorate of Popular Economy (MDS).

• **PARTICULAR CASES REQUIRING THE DEVELOPMENT OF ALTERNATIVES AND PARTICULAR TREATMENT:** there are many districts in which initial instances of WP concerning the use of horse-drawn carts. It requires instrumenting and addressing the specific situation before The LRS is developed.

Horse-drawn carts are often used as a work tool in districts with large surface areas and low population density. This is because the collection of recyclable waste by urban waste pickers requires traveling long distances and that access to the neighborhoods where the waste pickers live, or work, do not have asphalt streets (see the section on disadvantaged settlements), and because of the ancient and cultural use of horses as a pack and drag animals.

However, in many municipalities, it leads to tensions, and it is even forbidden: because in areas where vehicle traffic is higher, it generates delays since the lack of recognition of the waste recovery activity and due to a tendency in the last decades to the substitution of blood traction and the priority of the care of animals. Considering these, we propose implementing a collection system by the Urban Reclaimers that does not use animal blood traction, and that implies an improvement in the work tool of the urban reclaimers. Replacing the work tool does not require expropriating the equine belonging to the urban waste collector's family but rather an improvement that responds to the problems mentioned.

The followings are the steps and issues to be taken into account by the local government that would like to carry out a policy in this sense, always bearing in mind the articulation with the rest of the management system.

1. Use the previously described Census of waste pickers to determine which uses horse-drawn carts.
2. Survey the possibilities of the urban waste pickers to use these other devices (cart, tricycle, motorcycle cart): if they have driving licenses, if they can access the neighborhood with these vehicles, or if they can carry out the maintenance, etc.



Figure 22: TAS in the door-to-door collection.

Source: [http://folweb.com.ar/nota/877/contra\\_los\\_carreros\\_prohiben\\_la\\_traccion\\_a\\_sangre](http://folweb.com.ar/nota/877/contra_los_carreros_prohiben_la_traccion_a_sangre)

3. Identification of the best option for vehicle delivery: motorcycle carts, bicycle carts, and hand-pulled carts. This should be considered according to the work areas where the reclaimer will be incorporated and the distances to be covered. Since the district has a low population density and long distances between houses, using a hand cart may not be appropriate.
4. Training in the necessary maintenance of the devices.
5. The local government may allocate resources to insure the vehicles, provide personal protective equipment, work clothing (motorcycle helmet, bicycle helmet, fireproof vest, raincoat, gloves, etc.), and the necessary bags for collection. In addition, it may establish a storage space for the devices and maintenance.
6. Incorporation into the collection system of recyclable materials through the Nodes.

### 2.7.3.

#### Design of Collection Routes.

Door-to-door collection refers to hand delivery directly at the door of the home or business to an urban waste collector or by disposal of recyclable waste. After collection by the waste collector, they must be identified utilizing a green bag, sticker, or in bulk, in the corresponding place (high container, floor, etc.), according to a weekly schedule for each fraction collected and at a stipulated time. Here the urban waste collectors will take only the dry recyclables fraction.

Then the urban waste picker removes the material corresponding to his collection route. As a first step for implementing this system, the collection routes are designed considering the urban waste collectors' and the estimated volume of material generated. In this sense, and as already mentioned, it should be noted that the use of containers makes the initial differentiated disposal difficult since bags with separated materials (clean and dry) are mixed with badly separated bags that contaminate the rest of the materials, and also does not allow the identification of those neighbors who require educational reinforcement for the assimilation of the program.

The routes are organized into 2 groups according to priority:

**Domiciliary.** For each one, a group of urban waste collectors will be assigned to collect recyclable material. Once completed, each urban waste picker will take the collected material to the intermediate collection point, which will be loaded onto a truck transporting the material to the treatment plant.

**Large generators.** According to the list of large generators provided by the local government, if possible, once the environmental promoters have contacted them, the route will be set up, and the collection frequency will be defined.

This collection route will be promoted by advancing the regulation that obliges large generators to deliver their waste to the urban waste collectors' cooperatives. All routes

must be "sustainable," being those that:

- ✓ Guarantee a minimum amount of materials to each reclaimer, encouraging them to comply with it daily and provide the service to businesses and family homes.
- ✓ Use the maximum load capacity of the collection vehicle. In the door-to-door differentiated collection system, the most important thing is to carry out a campaign that reaches all citizens/institutions, counting on all district entities, whether neighborhood, environmental, or other.

Next, it should be agreed in the vertical building homes that they choose whether they want individual or collective containers. It is essential to recognize the role of those in charge of residential buildings, maintenance, or cleaning in private or public institutions, and the authorities to commit themselves to the collection system agreed upon by the local government. It is recommended that pilot experiences be carried out in more visible central locations and expand the range of territorial approaches as the IISWM system is consolidated.

#### 2.7.3.1.

##### Household collection routes.

Each route must provide the reclaimer with a minimum of 120 kg/day of material. Therefore: The average MSW generation of the route (10 blocks) should be 1500 kg. Of this total, 25% is potentially recyclable: 375 kg. Of that 375 kg. We intend to collect 15% from the floor: 56 kg. There should be medium-sized generators on the route that contribute an average of 50 kg each. Thus, it is sustainable, and the recycler has the necessary incentive to collect the material from residents and small merchants, even though the quantity does not guarantee his livelihood. With this equation, the reclaimer obtains 60% of a minimum living wage in 5 hours of work. The objective is to estimate initial work zones/routes using this initial estimate, institutionalizing work zones assigned to a certain number of waste pickers according to the methodology described above.

Once the collection route has been arranged, it is suggested that the following elements should be available as a basis:

- ✓ A green point with attention, which will function as a post for delivering the material collected by the reclaimer and as a place for voluntary delivery by residents.
- ✓ Collection carts and/or tricycles
- ✓ Collection carts or tricycles, Big bags for collection (2 per day per collector).
- ✓ Backpack with protection elements and tools (mottled and latex gloves, mask, mask, mask, alcohol, girdle, and cutter).

For the operational development of this and all subsequent collection, recovery, and trading processes, it is recommended to see **Annex 8 - Operational Guide for Recycling Processes Argentina Recicla**.

The routes will be set up according to each district neighborhood. The following district is given as an example:

• MAP OF PALMIRA DISTRICT



Figure 23: Zones defined for differentiated collection in Distrito Palmira, Mendoza. Source: National Dir. of Popular Economy..

### 2.7.3.2.

#### Large Generator Routes.

These routes are widely used for the specific commercial collection of large generators since high quality and quantity of material is guaranteed, avoiding overflow problems or the need for large reception capacity of the containers on public roads. The technician responsible for loading the data of an area into the program will have the list of large generators provided by the system itself.

This list will be used to arrange

- Zoned meetings to explain the program and add them to the different routes.
- Training to collaborate in the internal and proper management of recyclables.
- Set up the route and frequency of collection.

In the meetings, special generators will be presented: The LRS with its promoters program, the Basic Node, and the environmental, economic, and social benefits, introducing the work cooperative assigned to that route. Tricycles and one municipal truck will be used for the Large Generators. In addition, Large Generators will be invited to bring their materials to the treatment plant.

The local government will promote the census of large generators on its website. Workers will be trained by the local government, the Large Generator, and another cooperative/agency with experience in this area to deal with large generators by current regulations:

- Insurance policy with a non-repetition clause in favor of the company.
- Uniform and protection elements.
- Preparation of shipments.
- Knowledge of safety and hygiene standards.
- Basic knowledge of preventive maintenance of tricycles.

## 2.8.

### TRANSPORT

The material collected in the door-to-door circuits must be transported to the sorting and treatment plant for processing. It is recommended that the vehicles used are exclusively for differentiated collection to ensure their availability and cleanliness according to the material transported. Compactor trucks should not be used for recyclable materials, as they contaminate them and hinder the final sorting of each dry recyclable stream.

The transportation of the materials collected in the door-to-door circuit will be carried out with the mentioned trucks, which will pick up the bags identified with their corresponding labels/precincts, instruments attached to the big bags with the name of the WP, route number, and identification code, as appropriate. It is recommended that each of the bags be identified using this seal or label to achieve traceability of the material so that once it is unloaded at the treatment plant, its origin can be recognized (LG, urban waste collector identified by route, green point, other), also the performance and quality of each bag, to generate improvements in environmental awareness and separation at the source in those cases where it is not working correctly. It is necessary to define logistic posts, which will be specific areas in charge of temporarily collecting the bags from urban waste pickers. These posts should be able to temporarily receive these bags, being initially possible to use the Green Points for this purpose, or in their absence, squares, parks, or spaces that provide for the collection, where there is a space for the truck to park without hindering vehicular traffic.

Thus, with a closed box, it will transport the big bags to the treatment plant. Upon arrival at the treatment plant, the bags will be weighed, and the data will be entered into the management system, depending on the weighing systems in place (truck scales, floor scales, hanging scales).

## 2.9. TREATMENT AND CONDITIONING FOR SALE

The development of the Basic Node will require, at this preliminary IISWM stage, the design and implementation of a plant for the treatment of recyclable waste from the dry fraction, to receive only a differentiated collection of non-contaminated dry recyclable waste, and with equipment and the necessary personal protection elements that we will see below, to reduce the number of residues disposed of in open dumps or sanitary landfills in each district.

The censused urban waste collectors will need to build or rent a space to carry out the tasks of final separation by material, conditioning, and sale to the industry. In this sense, different plant designs will be proposed according to the initial characteristics of the district.

### 2.9.1. Design of Basic Node

For the local government to correctly implement The LRS, it must design a dry MSW-fraction treatment plant called Basic Node, which will be sized according to the perspective of material to be recovered (product of the systematization of data collected in the previous sections) and managed by the waste pickers' cooperative with technical assistance and with a plant manager assigned by the local government on a shift basis. If an MSW plant already exists, it should be adapted according to the same operational, maintenance, and management considerations. There is also the possibility of renting a work space that must have the characteristics subsequently determined. The plants are divided into two types according to their required floor space: Basic Node, which only has minimal machinery (scales, baler, and forklift), and Node with more complete infrastructure and equipment (sorting belt, truck scale, scales, balers, forklifts, more space for collection, processing, and services). Each type of Node will be able to process more materials. The

minimum recommended dimensions are 400 m<sup>2</sup> for a Basic Node and 800 m<sup>2</sup> for a Node.

The values are estimates and depend on the machinery, the operation, and the related logistics. It is recommended to determine a basic Node with ample dimensions to plan the expansion of infrastructure and work spaces to increase the production in the LRS in line with the Node. **Annex 11 - Node Layout Model** shows optimal plant layouts with the possible extensions required for subsequent expansion.

#### 2.9.1.1. Facilities that constitute a Basic Node

- Bag entry control facilities.
- Separation, conditioning, and baling sector.
- Material stockpiling sector to be sorted.
- Administrative office.
- Perimeter enclosure.
- Fire extinguisher.
- Restrooms.

#### 2.9.1.2. Node equipment detail

The plants must be built considering the waste to be treated. Two models of MSW plants are proposed: a small one and a large one, according to two types of capacities of 2 and 5 tn/h. For both cases, the two models are presented as an example:



UBASIC GREEN CORE MODEL		
GENERAL INFORMATION		
Quantity of material to be processed (tons per hour)	2	
Number of jobs to be generated in the plant	48	
EQUIPMENT INVESTMENT		
Detail	quantity	unit (U)
ABC type 5 kg fire extinguisher	10	U
First aid kit	1	U
Electronic floor scale (1,2m x 1,2m)	2	U
Medium vertical press (30 tn-250 kg-0,5m3)	1	U
2000 kg hydraulic pallet truck	1	U
16mm strap coil for baling	10,368	M
Plastic containers 1100 liters 1	10	U
Electric stacker 1000 kg 1	4	U
Tipping metalcontainers 1100 litres	1	U
INVESTMENT IN CLOTHING AND PPE		
Detail	quantity	unit (U)
cotton T-shirts with reflective tape and double printing	96	U
Long work pants with elastic and reflective tape	96	U
Polar fleece vest with reflective tape and print	48	U
Matelase jacket with reflective tape and stamping	48	U
Lumbar belt	48	U
Safety shoes, boot type	48	U
coated gloves	48	U
speckled gloves	432	U
windbreaker coat	48	U
semi-fitted chin mask	1440	U
face protection mask	96	U

1: Detail of equipment and inputs Basic Node. Source: Prepared by the authors. National Waste Directorate (MAyDS).

GREEN CENTRAL NODE MODEL		
GENERAL INFORMATION		
Quantity of material to be processed (tons per hour)	2	
Number of jobs to be generated in the plant	48	
EQUIPMENT INVESTMENT		
Detail	quantity	unit (U)
ABC type 5 kg fire extinguisher	15	U
First aid kit	2	U
Electronic floor scale (1,2m x 1,2m)	4	U
PORTABLE TRUCK SCALES	1	
Big vertical press (30 tn-500kg-1,1m3)	1	U
Sorting belt system	1	U
2500kg triple-stage forklift	2	U
16mm strap coil for bundling	17,280	M
plastic containers 1100 liters	15	U
1000 liters metallic tipping containers	5	U
INVESTMENT IN CLOTHING AND PPE		
Detail	quantity	unit (U)
cotton T-shirts with reflective tape and double printing	164	U
Long work pants with elastic and reflective tape	164	U
Polar fleece vest with reflective tape and print	82	U
Matelase jacket with reflective tape and stamping	82	U
Lumbar belt	82	U
Safety shoes, boot type	82	U
coated gloves	82	U
speckled gloves	738	U
windbreaker coat	82	U
semi-fitted chin mask	2,460	U
face protection mask	164	U

2: Detail of equipment and inputs Node. Source: Prepared by the authors. National Waste Directorate (MAyDS).

It should be considered that in many districts, there are currently MSW separation plants in operation, have part of the equipment, or have never been put into operation. In these cases, it is recommended that specific or complementary investments be made to complete the start-up of the production process.

In any case, every Node recommends the following equipment:

**1. CONTROL OFFICE AND SCALE:** the entrance area to the site is intended to have a truck scale, accompanied by a place for the registration of entry and exit of materials and people. It is to be located at the main entrance to the treatment plant to facilitate and allow fluid circulation, considering that all vehicles entering/exiting must be weighed, in addition to controlling the entry/exit of people.

• **Scale and Scale Civil Works:** The technical characteristics of the scale must meet the following specifications:

- ✓ Special for weighing trucks, installed at floor level, 80,000 kg capacity.
- ✓ Dimensions of the platform: 20,00 m x 3,00 m. If a scale is not available, a public scale will be used.
- ✓ Some mobile truck scales allow the truck to be weighed using mobile cells as an alternative for not carrying out the civil work.

This is the best way to have traceability of the trucks. If not available, item 2 (floor scale) is recommended as a minimum.



Figure 24: Differentiated collection truck. Source: National Dir. of Popular Economy (MDS).

## 2. PROCESSING SECTOR:

### • One (1) Floor scale:

✓ Dimensions: 1.2 m x 1.2 m, built-in painted iron (iron plate 3/16", Iron plate 2 x 1/2", Iron angle profile 2 x 1/4"), with an industrial indicator of 1,000 kg maximum capacity (200 g minimum resolution) with RS-232 type asynchronous serial channel for data transmission to PC or printer.

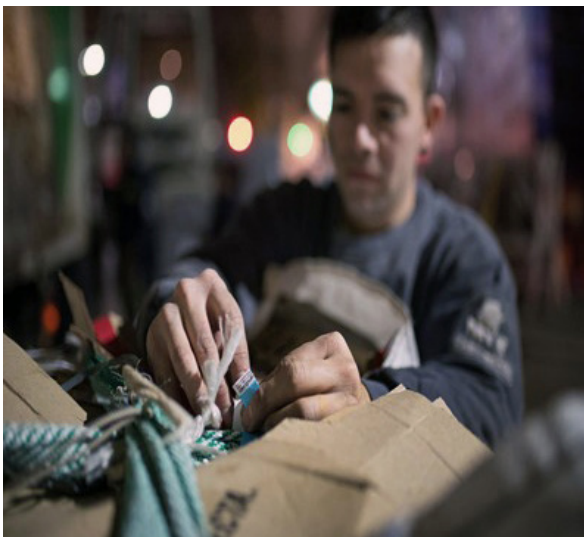


Figure 25: Bag weighing on the floor scale of the Node. Source: National Directorate of Popular Economy (MDS).

### 3. A SORTING BELT:

✓ Approximate length: 10 meters; belt width: 1,200 mm; power required: 1.5 KW; belt speed: 6 to 15 m/min (must be adjustable by electronic variable speed drive).  
 ✓ Reinforced conveyor belt, 100% polyester carcass, PVC impregnation and top cover, the

bottom (sliding) side without cover, resistant to tearing and attack by fatty acids and alkalis that may be present in the waste. The tape results in maximum cases where there is space for installation. In case of having limited space, it is recommended to make the selection on the floor and/or work tables to improve the ergonomics of urban waste collectors.



Figure 26: Floor sorting conveyor at Node. Source: MAyDS

### 4. A SINGLE DRAWER BALER PRESS:

✓ Steel profile structure and cylinder working together with the compacting plate.  
 ✓ Bale dimensions to be obtained: 1,100 mm x 900 mm x 1,000 mm (the latter adjustable).  
 ✓ Compacting basket: inner dimensions: 1,100 mm x 900 mm x 1,700 mm.  
 ✓ It has one (1) door: one (1) front door for the removal of the bale; one (1) 5" diameter double-acting hydraulic cylinder. Solid rod with hard chrome plating.  
 ✓ Hydraulic power pack: mounted on the bridge of the press and made up of; an oil tank / three-phase standardized motor of at least 12.5 HP / submerged hydraulic pump / loading mouth with filter/suction filter on the pump/level indicator / hydraulic oil required.  
 ✓ Thrust capacity: 38 Tn. Adjustable, using a pressure regulator. Controlled by a pressure gauge in glycerin bath.  
 ✓ Control panel: with a contactor, phase protection thermal relay, "start" and "stop" pushbuttons, emergency stop, key, and luminous ignition signal.  
 ✓ Manual directional control: with mechanical stroke regulator. In those cases where the volume of recyclables is higher than 5 tn/hour. It is recommended the installation of continuous balers with underground belts for material loading before entering the hopper.



Figure 27: Baler of recyclable materials of the Node. Source: MAdS

**5. ONE MANUAL HYDRAULIC SCALE:**

✓ Load capacity: 2 Tn. Tandem Steel/ Polyurethane load roller. Wheels Steel/ Polyurethane ✓ Guidelines. Nail width: 688 mm.

✓ Nail length: 1150 mm.  
 ✓ Minimum claw height: 85 mm.  
 ✓ Maximum height of nails: 195 mm.  
 ✓ Indicator: 12V power supply. Integrated industrial polycarbonate front with a flat 5-key bubble-type keypad. Suitable for aggressive industrial work. Display with six high luminosity led type digits and six led indicators of instrument status.

✓ Functions: net weight, gross weight, tare, the sum of weights, quantity and averages; zeroing, manual tare and digital tare functions, automatic zero shift adjustment control.

**6. ONE HYDRAULIC CLAMP:**

✓ Load capacity: 2 Tn. Tandem steel/ polyurethane load roller. Steel/polyurethane guide wheels.

✓ Nail width: 688 mm.  
 ✓ Nail length: 1150 mm.  
 ✓ Minimum height of nails: 85 mm.  
 ✓ Maximum claw height: 195 mm.

The clamps are complementary equipment that facilitates the work of the forklift. Although this equipment should be available for internal logistics, it is recommended not to be the only one because the time of use of a hydraulic clamp for the loading and

movement of bales is tedious and slow.

**7. A FORKLIFT:**

- ✓ Load Capacity: 2,5 Tn.
- ✓ Diesel engine - gasoline - liquefied petroleum gas (LPG).
- ✓ LPG equipment. Triple tower of 3.7 m minimum deployment, with lateral displacement.
- ✓ Adjustable tows: 1.22 m.

In case of reduced spaces, a 1000 kg stacker is recommended. It is recommended for the treatment of industrial plants to design tilting containers to improve internal logistics, safety, and hygiene of plant operators, such as those shown in the image.

The forklift is indispensable for the internal movement of bales and bundles, it is an essential tool, and even in confined spaces, it is recommended to optimize space.



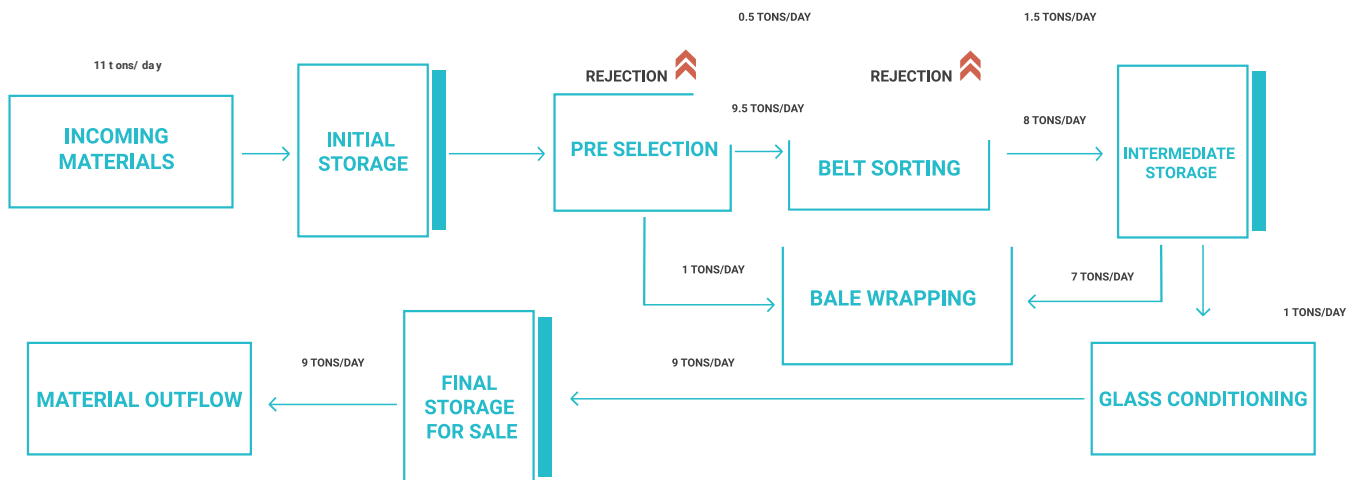
Figure 28: Tipping container for glass with Node forklift. Source: National Directorate of Popular Economy (MDS)

### 2.9.1.3. General description of the facilities and the process

For the management of the operation of a Node, it is recommended to use Annex 8 - Operational Guide for recycling processes Argentina Recicla, which allows determining in detail the steps necessary to record, organize, and manage the daily production of these plants, as well as the previous differentiated collection, environmental promotion and collective sale of recycled material.

Figure 29: Flowchart of the recycling process model of the Node. Source: own elaboration, National Directorate of Popular Economy (MDS).

#### FLOW CHART OF THE MODEL PROCESS



#### • FACILITIES

To obtain the minimum operating and processing base for the recyclable waste from The LRS, every Node should be designed with a perspective for progressively incorporating the following premises, improving workplace safety and hygiene, management, and operations accordingly.

##### • Access Control Office:

This office is located at the facilities' entrance, next to the weighing scale, and it is responsible for controlling incoming/outgoing cargo, registration, and weighing. It will also monitor the entry/exit of people.

##### • Separation Process Reception and Control Sector:

In the unloading area, the materials processed in the Plant will be received and weighed on the floor scale, mainly the bags from the differentiated collection, particularly identified with seals or labels to detect their

origin. In addition, in this area, the control and inspection of the materials will be carried out to discard the load that does not correspond.

##### • Material sorting and classification sector:

The recovered material is transferred to the sorting belt. Depending on the case, it has 12 or more workstations with their respective bags for depositing recycled material classified by a single material.

##### • Recovered materials conditioning sector:

Here, materials are conditioned by applying cutting, milling, beheading, etc. processes. Work is done on hard plastics with a circular saw or grinder; on books, guides, and notebooks to remove their spines with a guillotine; aerosols and siphons are beheaded, and glass is ground. These activities comply with industrial hygiene standards and will depend on the equipment available.

- **Baling sector:**

Materials that can significantly reduce their volume will be compacted (mainly cardboard and PET plastic). This task will be performed in the baler. The result is the formation of compact bales of 1m<sup>3</sup> on average.

- **Order and Cleanliness Sector:**

Tidying and cleaning the work areas, restrooms, and common areas are considered strategic. A place will be assigned to arrange the elements used in the task.

- **Maintenance Sector:**

A specific space will be provided for setting up the tool shed and the work area for maintenance, machinery, and everything used to provide the service. Maintenance is an essential service when generating an IISWM plan with LRS and Node, so it is necessary to develop an Integral Maintenance Plan for the equipment to extend its useful life, reduce costs, avoid plant stoppages and economic losses due to non-processing and sale of the material. Many MSW plants stop operating because they do not have the corresponding maintenance, cutting off the IISWM circuit and, therefore, the public's trust in them.

**See Annex 10. Integral Recycling Maintenance Plan.**

- **Administration Sector:**

This area will be in charge of accounting administration; management of associates' files; management of logistics for large generators and home collection, as well as preparation of reports for the municipality. He will also be in charge of the follow-up of services such as de-sweeping, rat extermination, disinfection, and general cleaning of the premises.

- **Sales and Marketing Sector:**

Materials recovered in the processing and baling sector will be transferred and stowed in the sales sector.

#### 2.9.1.4.

#### Collective training

It is recommended to carry out continuous training in all work teams to improve current processes and integrate all urban waste pickers in The LRS, some of which are mentioned below:

- **Body Care:** basic notions of body care, prevalent diseases: diagnosis and prevention, safety and hygiene standards in plants.

- **Node Operation:** equipment management, production planning, stock and sales system, incoming and outgoing material, traceability.

- **General, preventive, and corrective maintenance.**

- **Administration:** registration of income and expenses, sales, attendance, management of files, large generators, cooperative books, accounting management, and management of reports.

- **Safety and hygiene:** to provide prevention, hygiene, and safety tools as activities integrated into job tasks performed by each recovery worker.

#### 2.10.

#### COLLECTIVE TRADING SYSTEM

It is necessary to regard the sale of materials as the link in The LRS that makes it possible to "complete" the scheme required for developing the Circular Economy.

With the reinsertion process of recovered materials through marketing, traceability is guaranteed, ensuring their final destination as input for industries that use them as raw materials for producing new products.

A collective marketing system seeks to strengthen the relationship between urban waste pickers, who carry out the work of recovering different materials, and the recycling industry through these axes:

- Generate the best commercial conditions for the recyclers by obtaining minimum sales volumes and logistical/administrative means.

- Increase the level of recovery and processing of recyclable materials.

- To guarantee a logistic network of materials to industries.

- Ensure that transactions are bankable (payment for the waste pickers and regulated sales directly to the industry), guaranteeing a stable income for workers.

- Generate monitoring systems with data collection and processing at each municipal, regional, and national stage to ensure traceability.

The objective of this system is access to reliable prices that guarantee the sale of materials directly to the industry, eliminating intermediaries, and establishing a massive and stable flow of raw materials to the recycling industries, according to the volumes required for their production. Connecting the recyclers directly with the final consumers of the recovered waste provides an agile flow of resources that improves the monetary profitability of the entire chain. Thus, providing better income to each participant and generating incentives to process more and better materials.

On the other hand, the need to move towards homogenizing processing capacity at the national level is fundamental for a National Recycling System. In this sense, each local and regional government should contribute by accompanying and supporting the development of local marketing systems that include all urban waste pickers, both organized and informal, ensuring that everyone can access the best possible conditions for selling their materials. In this regard, it is essential to emphasize that the material recovered, conditioned, and processed by waste pickers is their sole and exclusive property.

The ultimate decision to market them is theirs and should not be subjected to

any speculation. As detailed in **Annex 8. Operational Guide for Recycling Processes - Argentina Recicla**, the door-to-door collection of material by WP is generally divided into two origins or modalities:

- **Door to Door:** it is the main link of The LRS. Therefore, it will be essential to carry out the design of the collection routes. This modality is established under a system of identified bags, whereby each collector or collector will have a weighing, translated into a given "mixed value" of heterogeneous material. At this point, local governments may contribute to subsidizing the value of this mixture, generating an incentive for each worker to increase the amount of material recovered and thus his income. This system has proven to be effective in two complementary ways: increasing the amount of material recovered and improving the quality of the material recovered, thanks to the pre-selection of the Urban Recoverers;

- **Large Generators:** as regards the income of waste pickers and the commercialization system, the material recovered through Large Generators may complement the monthly salary of the WP, including those who perform operational tasks, either in the collection (drivers, truck operators) or in the classification of the material in the Green Centers. The data register from Large Generators should be systematized differently from that of Door-to-Door, as detailed in the corresponding Annex.

## 2.11. FINAL DISPOSAL. LANDFILL RECYCLERS

The final waste disposal phase implies burying waste or residues that result from previous treatment. Depending on the infrastructure and the setup of the disposal system adopted will be the quality and the care of the environment. A problem is related to irregular final disposal sites, such as open-air landfills (OD). According to the SAyDS<sup>5</sup>, about 37% of the population of Argentina is still not covered by the service of adequate final disposal of their waste, and there are

about 5,000 irregular disposal sites, among which are the OD. Since these disposal sites are not adequately controlled, all types of waste, including pathogenic and hazardous, can be found in ODs. At present, more than 25% of the waste generated daily in Argentina is dumped in open dumps, almost 30% is disposed of with partial controls in controlled landfills (mostly insufficient), and the remaining 45% is disposed of in sanitary landfills. The activities of this phase are related to the preparation and maintenance of the landfill or dump, gas management, access roads maintenance, soil movement, burying and covering of waste, isolation, and treatment of liquids, as well as site management for visual buffering, among others.

That landfills exist is a symptom of poor waste management. Therefore, tackling the waste problem means first intervening in all the previous stages of the IISWM to improve recycling rates and thus reduce the waste sent to the final disposal. Among the risks generated by landfills to the health of the population are identified as the *“proliferation of vectors; the potential risk of contagion to adults, vulnerable groups and domestic animals; greater susceptibility to dermal and respiratory diseases of the surrounding population and urban waste collectors; the potential presence of pathogenic and/or hazardous waste.”*

According to George Tchobanoglous (1982), the classification according to size/volume of landfills can be determined as follows: a Dump: less than 15m<sup>3</sup> a Micro Landfills: between 15 and 500m<sup>3</sup> a Landfills proper: between 500 and 15,000m<sup>3</sup> a Macro Landfills: more than 15,000m<sup>3</sup>.

In some cases, urban waste collectors are working informally in them. The working conditions in the ODs that many districts of the country have as final disposal sites are critical and have different aspects.



Figure 30: Landfill types according to size: dumping point, micro landfill, landfill, and macro landfill. Source: National Dir. of Popular Economy (MDS).

In the case of Argentina:

- These workers do not have any Personal Protective Equipment (PPE) to protect them, nor drinking water for hydration. Nor do they have toilets to which they can go.
- They do not have safety, being exposed in front of the dump to possible accidents with the collection trucks.
- The waste pickers who work there are exposed to inclement weather, enduring extreme cold and heat in certain areas.
- In the garbage dumps, different complex, and in some instances, unfair work logics are intertwined, where the following can be found:
  - ✓ Family nuclei that arrange work, schedules, and sales collectively.
  - ✓ Waste pickers who go to the dump with their sons and daughters who accompany and/or participate in the work.
  - ✓ Waste pickers who work independently according to their schedules and availability.
  - ✓ Waste picker workers who obtain food from the landfill for their own consumption or for livestock.
  - ✓ Waste picker cooperatives that arrange the work with some coordination with the local government.
  - ✓ Waste pickers determine who enters the landfill and when to pick up what waste.
  - ✓ Material buyers who go to the landfill to buy recyclable materials.
  - ✓ Material buyers who lead and employ a group of workers who go to the landfill in search of recyclable materials.
- In some landfills, recyclers have built permanent or temporary homes where they cook, sleep, and store the recovered materials.
- Access to the best quality materials is disputed by waste picker workers due to the lack of coordination in the unloading of trucks, which generates an extremely dangerous pile-up.

Approaching these problems requires considering some progressive steps that involve municipal coordination, always

keeping in mind that the perspective of the IISWM is essential. These steps should be coordinated with urban waste pickers, and in case they are not previously organized, promote the coordination of work to ensure fair access to materials and improvements in working conditions, generating a new LRS.

#### • STEP ONE:

- ✓ Coordinate the unloading of trucks inside the landfill in a safe place so that accidents do not occur with the reclaimers, and encourage the unloading schedule to be daytime, especially for those trucks with better quality materials.
- ✓ Keep a record of entry to the landfill to identify who is working and at what times, if there are children under 14 years of age, and if they have any assistance from the state.
- ✓ Deliver PPE and provide drinking water for sanitation and hydration of workers.

#### • STEP TWO:

- ✓ Implement separation at the source and differentiated collection through The LRS and coordinate access to recyclable materials within the landfill by the waste pickers.
- ✓ Construction of a workspace for waste pickers: a semi-covered structure should be built with a floor, roof, toilets, and a space to collect materials. The use and access to this space should be coordinated with the waste pickers, and it must be a step before the creation of the Node, generating an articulation with the collection system.

#### • THIRD STEP:

- ✓ Coordination with early childhood care institutions and educational establishments to ensure the attendance of the children of waste picker workers at the landfill. If there are no establishments in the landfill's vicinity, a childcare space should be provided/constructed to operate during the working hours of the landfill.
- ✓ Provision of machinery and equipment for processing recyclable materials. This will improve the quantity of materials processed and the sale prices of the materials. The equipment and machinery should be accompanied by training for waste pickers.



✓ For the development of activities for integrating urban waste pickers in landfills, we recommend Annex 5 - Model Census of Urban Waste Pickers.

## 2.12. TRACEABILITY AND MANAGEMENT MONITORING SYSTEMS

The development of management indicators and traceability of the dry recyclable fraction will be a substantial and preliminary step to subsequently develop LRS associated with IISWM Plans. It will allow us to evaluate the system's progress and plan new implementations and their impacts.

The following indicators and monitoring methodologies are proposed:

- **Number of urban waste pickers censused:** this indicator will provide information that will be the baseline on which to measure the progress of the inclusion of WP. The number of WP will be provided according to the census carried out. See Annex 5 - Model Census of Urban Waste Pickers.

- **Number of formalized WP:** the baseline number of WP formally incorporated into any waste management activities can be counted. They are considered formally incorporated if: they are part of a cooperative with which the local government has an agreement, receive a supplementary social wage, and have PPE to carry out their work. All this should be established in The LRS.

- **Amount of dry recyclable waste collected per month:** this indicator shows the amount of Tn/month of recyclable waste collected by the Cooperative. This will require truck weighing scales and/or a daily record of the quantities arriving at the plant. In this way, it will be possible to increase recyclable materials due to the environmental promotion, the strengthening of the Node, and therefore of The LRS.

- **Quantity of recovered materials marketed/reintroduced to the industry:** this indicator measures the quantities of recyclable materials effectively recovered and sold, so the periodicity will be determined by the frequency of sales and can be calculated on a weekly, monthly, or quarterly basis. If calculated

based on the indicator of recyclable materials collected per month, it will be possible to know how much of these collected materials could have been recovered and how much rejection is taking place. This makes it possible to make adjustments in the collection or identify those materials that cannot be marketed for some reason (e.g., lack of machinery to improve the processing of the material or lack of recycling industry).

Once the LRS has been developed and the Basic Node has been built, implementation will begin, and the indicators described above should be analyzed to evaluate the performance of the LRS and the possibility of accessing new financing for the development of the expanded LRS and the Local Recycling Nodes.

It will be essential to establish a traceability and monitoring system for the recovered waste cycle that will make it possible to measure the flow of materials locally and obtain data on the processing of the public recycling policy. In this sense, the local government could assign personnel to record the inflow and outflow of materials from the Nodes. In this way, weekly, monthly, and annual data on management can be arranged, and dashboards can be generated for follow-up and/or monitoring. The necessary resources should be provided so that the records can be completed by the local government, the waste collectors, and the rest of the actors that make up the IISWM in a transparent, easily accessible computerized management system with control mechanisms agreed upon by the parties. In this sense, several data management systems are under development by the national government and by several cooperatives distributed throughout the country. It is suggested to consult them when formally registering data.

Accessing a reliable and complete data system is the fundamental input to correctly and successfully manage any IISWM plan and to arrange the necessary investments to generate impact to improve each stage. We recommend **Annex 8 - Operational Guide for Recycling Processes Argentina Recicla** to operationalize the traceability of waste through the indicators described above.

### 2.13. COSTS AND FINANCING OF THE SYSTEM

The IISWM should be financed in a coordinated manner by the national, provincial, and municipal governments. The various successful experiences in organizing The LRS highlight the need for local governments to be in charge of the following points:

- ✓ **Logistical costs of collecting materials.** Logistical costs of marketing and shipping to the industry.
- ✓ **Operating costs of the system in the processing plants (preventive and corrective maintenance of machinery, payment of services, fuel, storage, general supplies, etc.).**
- ✓ **Expenses for materials and supplies needed to carry out environmental promotion.**
- ✓ **Allow subsidies to recyclers per kilo of materials recovered.**
- ✓ **Provide and implement a system of registration, monitoring, and traceability of materials.**

In the meantime, the national and provincial governments will invest in durable goods and infrastructure. The government will have to participate in the operating costs, mainly contributing to the basic salary of the recyclers through specific plans or programs such as the program “potenciar trabajo.”

#### • ARTICULATION OF ACTORS

It is essential to be able to establish the economic resources needed to carry out the correct integral and inclusive management of urban solid waste, both the investment required and the operating costs associated with it to complete the information of the costs of the IISWM Plan.

For this purpose, an effective cost matrix allows for calculating, analyzing, and evaluating the sensitivity, sustainability, and system feasibility. This tool is used to list and order each variable to obtain the results to be used for the analysis. **See Annex 28 - IISWM cost matrix.**

### 2.14. WORK METHODOLOGY

The work methodology proposed for designing and implementing the Local Differentiated Recycling Systems and Nodes described in this guide considers the inclusion, incorporation, and participation of the actors involved. They are complemented by the following concrete recommendations on the participative designs of local IISWMs.

#### • Roundtables with urban waste pickers.

The LRS design and implementation. Stakeholder participation should come from the design of The LRS and Nodes. To this end, it is necessary to map social actors, especially identifying urban waste pickers, whether they are grouped in work cooperatives or not. The process should begin with the creation of working groups, for which some recommendations are made: Process should start by creating work groups, for which we recommend:

- **Participants:** the stakeholders surveyed should participate, mainly the collectors. The LRS and Nodes should be designed with the stakeholders involved. For this purpose, it is necessary to map the social actors, identifying, especially the WP, whether they are grouped in work cooperatives or not.
- ✓ **Convening:** this should be carried out by the area or areas of the municipal government that will carry out the design and implementation of the LRS.
- ✓ **The meetings should be convened regularly,** with a frequency that allows the progress of the design and implementation of the policy to be monitored.
- ✓ **A record should be made of the discussions held by the participants** of the Working Groups to obtain a memory of the meetings.

The importance of the working or consultation roundtables is to identify problems and needs, as well as to share the proposal for the design of The LRS and the means of its implementation.

The exchanges on what is being designed will be validated according to what the stakeholders need to project an IISWM that can be effectively implemented in the territory.

Some of the general recommendations for the participatory process of design and implementation are:

- ✓ Consensus on the principal issues to be addressed.
- ✓ When the activities will begin, for which a work schedule can be drawn up.
- ✓ Who will be responsible for each activity.
- ✓ What resources are available to carry them out.
- ✓ Working or Consultation Committees meetings should also continue during implementation to follow up on what has been designed.
- ✓ Plan follow-up mechanisms for the stages to be followed.

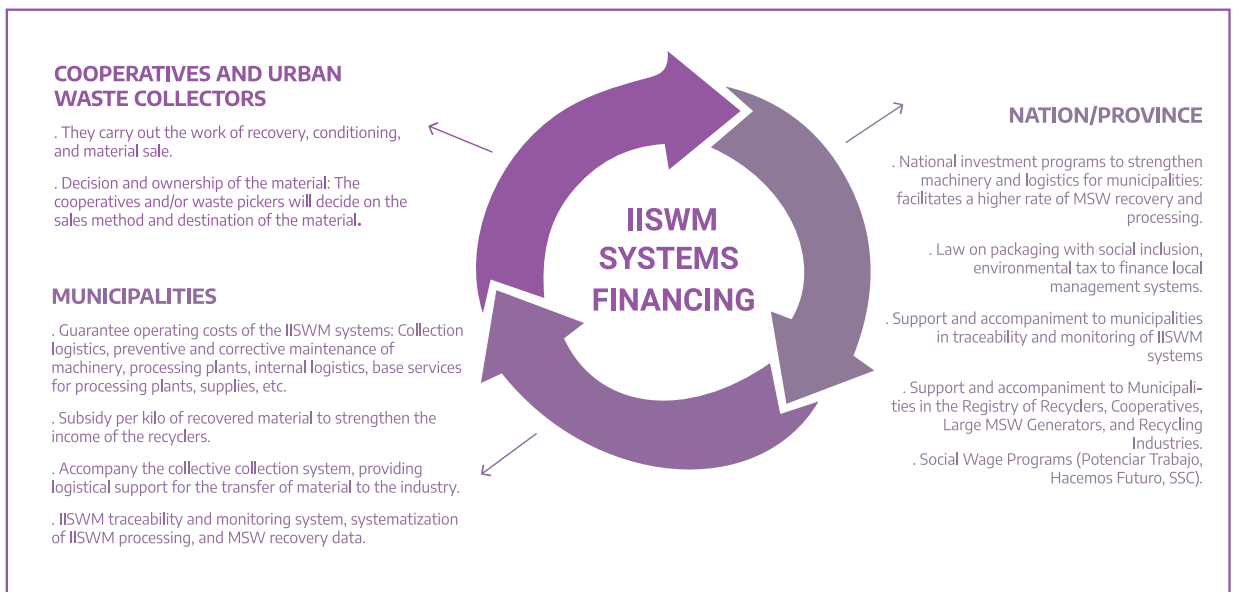


Figure 31: IISWM Systems Financing. Source: FACCyR



**IISWM PLAN. PHASE 2**  
TREATMENT BY WASTE STREAM  
AND ADDED VALUE

3.





### 3. IISWM PLAN. PHASE 2 TREATMENT BY WASTE STREAM AND ADDED VALUE

#### OBJECTIVES

The general objective is the design and in-depth implementation of an **IISWM Plan** based on the development of expanded **LRS and Local Recycling Nodes** to consolidate the co-management system for the recycling of all waste streams with social inclusion at all stages (environmental promotion, collection, treatment, and recovery, marketing), and with **all the necessary social rights**. Developing spaces that promote and improve access to healthy food (canteens), integral health (social health insurance - mutual), education (literacy, programs, training, and education), childhood (daycare for children, culture, sports, and popular justice), safety, and hygiene, determining the guidelines in depth, allowing its planning and monitoring in the medium and long term.

This will require the previous development of The LRS, preliminary IISWM, and the LRS Plans that support the methodology and territorial approach that enables the development of this new stage, where the approach, survey, design, and implementation tools are deepened, including new waste streams, social rights to improve such management and promote the development of the IISWM Plans.

#### 3.1. INITIAL IISWM DIAGNOSIS

Before the final design of the IISWM Plans, it will be necessary to carry out a more in-depth survey of the current situation that will make it possible to prepare a complete diagnosis of the state of the art of waste management with local social inclusion.

This set of ordered data will determine the parameters that will be the starting point for the subsequent approach strategies in the search for the design and implementation of correct, efficient, and inclusive integrated management of municipal solid waste. For this purpose, the IISWM Questionnaire of Chapter 5 (see Annex

**1 - Municipal IISWM Diagnosis**) will be used and complemented with the IISWM decision map.

##### 3.1.1. IISWM Questionnaire

As mentioned above, the questionnaire makes it possible to characterize the state of the current IISWM situation in a general manner with all the information necessary for its analysis. This tool complements the guidelines established in this guide, making it possible to carry out a stage-by-stage study to determine shortcomings and possibilities for improvement, which will be addressed in the following section for their design and implementation. This questionnaire will make it possible to outline the lines of action for developing the Expanded LRS and Local Recycling Node to achieve a definitive IISWM Plan.

##### 3.1.2. IISWM decision map

This tool finally allows complementing the analysis that begins with the specific questionnaire by orienting for concrete conditions of each local government some of the central axes of this guide. There are points where, despite the differences between districts, the action plan, although with nuances, can be used in general, and for these cases, the guide is easy to implement. On the other hand, in other points, the differences generate conditions that merit a specific action plan. For those cases, this decision map is practical and, based on some particular parameters, it establishes a series of scenarios where the current situation of each district can be framed to carry out the implementation of some specific stages of this guide in a more agile way (see Annex 1 - **Municipal IISWM Diagnosis**)<sup>6</sup>.

6. Carried out based on the ISWM Municipalities Survey in <https://recicladores.com.ar/>

### 3.2. DEVELOPMENT AND IMPLEMENTATION OF EXPANDED LRS AND NODES

This section seeks to provide technical tools for implementing expanded **LRS and Local Recycling Nodes**. It improves the processes in generating continuous improvements in the entire production chain from an economic, social, environmental, health, and educational perspective. Therefore, we will seek to expand what was consolidated in the previous stage by complementing new waste streams and the integral human development of urban waste pickers. For each of these new stages, it will be necessary to develop a municipal working group to approach the design and implementation of the IISWM Plan with the participation of urban waste pickers, which is the only way to design sustainable IISWM projects.

### 3.3. REGULATIONS

The regulatory complement initiated in Chapter 2 necessary for the development of the IISWM Plan should continue with the design of new normative that regulate the other waste streams to be treated, for which it is recommended to use the Model Ordinance for waste streams such as Waste Electronic and Electrical Equipment (WEEE), Used Vegetable Oil (AVU), End-of-life Tires (NFU) and Construction and Demolition Waste (RCD). **See Annex 11 - Model WEEE Ordinance, Annex 12 - Model AVU Ordinance, Annex 13 - Model NFU Ordinance, and Annex 14 - Model RCD Ordinance.**

### 3.4. GENERATION

Waste generation is related to consumption habits, local government economic activities, and the socioeconomic level of the population.

One of the keys to generating an efficient and complete IISWM Plan concerning the Preliminary IISWM Plan is to have more reliable information on the quantity and quality of waste generated.

The development of management parameters will make it possible to manage local resources efficiently and plan a public policy in the long term. Among other aspects, these studies allow us to estimate with greater precision:

- **The sup. and capacity required for treatment and final disposal facilities, the size of the necessary infrastructure works.**
- **The amount and type of equipment to be used.**
- **Alternatives for including urban waste collectors in the different stages of the system.**

#### 3.4.1. Strategies for the reduction of MSW generation

Prevention, reduction, and reuse are considered among the most important and promising strategies to reduce the growing volume of solid waste. Local governments can promote source reduction through plans and programs that include information, education, and technical support.

Actions aimed at source reduction can be applied in the process or further down marketing, distribution, or consumption of products. Source reduction includes, as general actions, the volumetric modification of the product, the extension of product life, minimization of packaging and toxicity, selective purchase of products, and reduction of consumption. Another form of source reduction is the reuse or reuse of by-products from solid waste. Thus, the action in this regard is the Promotion of reuse. These actions can be applied to production, sale, distribution, and consumption. The following are examples of the application of these actions:

- **Producers can:** improve the durability and quality of some specific products, reduce or eliminate elements that become waste, reduce the material used for packaging and distribution, and promote reuse and repair against early disposal.



- **Businesses and institutions can:** adopt indicators aimed at volume reduction, durability, and reuse of traded products, organize cooperative purchasing or material exchange programs, implement source reduction requirements in international trade operations, and increase or create jobs in companies that apply source reduction options.
- **Individuals and communities can:** promote source reduction through lifestyle changes that include selective purchasing of products, reuse, and reduced consumption.
- **These activities can be promoted:** by residents, environmental groups, or public programs. For source reduction to gain importance at the social level, the local government must promote plans and programs related to solid waste minimization and reuse. If promoted at the federal and state levels, the results in reduction can be relevant.
- **Thus, the Plan recommends that local governments can promote reduction at source through plans and programs that include:**
  - ✓ **Information, education, and technical support:** Information distributed in the district targeted to source reduction actions that individuals can take at home, in the office, or in the factory. Messages can easily be incorporated into recycling promotion and in-process education activities. Technical support can also be provided to small businesses, institutions, and community groups. Educational and technical support programs for recycling promotion can also be extended to include source reduction. These programs could consist of: hearings about waste at businesses, support for on-site composting, source reduction demonstration programs, and technical support for large generators to encourage them to have programs that include MSW minimization and separation at the source. For some citizens, participation in these programs will consist of helping to conserve the environment. However, in some cases, legal or economic tools will be required.
  - ✓ **Economic/financial incentives and disincentives:** Tax exemptions for source reduction or product taxes for excessive packaging can provide solutions at the municipal level. Such strategies include variable taxes by type and quantity of

packaging or disposal charges to discourage residents or business establishments from generating expendable volumes of waste. The variable tax structure can be based on the number of containers disposed of, frequency of collection, or other similar criteria. Examples of possible incentives include modifications to local waste disposal fees; increased fees, surcharges, or taxes on cleaning/recycling services; increased taxes for advertising disposable or litter-generating products; provision of loans, grants, and guarantees on loans or purchase of source reduction equipment (dishwasher or duplex copier); financial incentives for the sale of waste or source reduction activities on the business or commercial premises; deposits, rebates and discounts for reduction of toxicity and other challenging wastes, such as tires and batteries.

✓ **Municipal regulation:** The authorities must have legal means that directly allow them to influence the economic agents to be affected by source reduction and reuse programs; in this way, the prevailing legal framework at both the municipal and federal levels should be considered. Pilot programs for municipal regulation can include the promotion of ordinances that encourage purchasing durable, recycled, and recyclable items that favor source reduction. Requirements for source reduction plans by local businesses; restrictions on the packaging of local products. The key is to consider incentives as one of several strategies. Imposition and prohibition will not change habits, but if we motivate, incentivize and persuade, we will achieve something additional. It is necessary to carefully analyze the conditions for formulating environmental taxes since they should not affect municipal jobs.

### 3.5. ENVIRONMENTAL ADVOCACY

#### 3.5.1. IISWM Communication Plan

The objective of an IISWM communication plan should promote actions to minimize the waste generated, encourage separation at the source in households and institutions, and improve habits related to urban hygiene.

Environmental promotion is part of the recovery cycle of potentially recyclable materials since its purpose is to educate and make the population aware of the importance of separation at the source and how it should be done. In this sense, it is recommended to complement the actions of the Environmental Promotion Program (EPP) and the communication pieces with complementary programs that raise awareness among other actors, such as schools and public administration, addressed with the specific programs developed later on.

### 3.5.2. Green Schools Program<sup>7</sup>

The school fulfills an educational function, at the same time that it is in itself a significant generator of waste. And since students are multiplier agents of the message in their families, it is essential to work together with the district's schools to raise awareness about environmental care through proper waste management and a change in the habits of citizens. The objective of a Green Schools program is to form a population that is aware of and concerned about the environment and its problems, one that possesses the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively to solve current problems and prevent new ones from arising. At the same time, it allows a space for sensitization and the transitory collection as a Great Generator of recyclable waste.

The following actions should be undertaken to develop the Green Schools Program:

- Use the registration census of educational and public administration establishments.
- Develop the communication plan according to the previous itemized with environmental promoters, contents, and communication mechanisms.
- Integrate the Green Schools into the differentiated collection service by the urban waste collection cooperatives.

The plan is implemented in state and private schools and involves the entire

educational community: supervisors, management, teachers, non-teaching staff, and students. This program will promote sustainable development through education and environmental management in schools. It is aimed at students, directors, teachers, and non-teaching staff. It reaches preschool, primary, middle, high, superior, and specialized schools of the state and private municipal management. The plan aims to promote responsible consumption and reduction, reuse, and recycling in schools, establishing separation systems at the source and differentiated collection, thus including urban waste collectors in the awareness and collection. **See Annex 17 - Green Schools Program CABA.**

### 3.6. SEPARATION AT THE SOURCE / INITIAL DISPOSAL

The strategy of an IISWM Plan implies treatment by differentiated waste streams to analyze, size, and generate actions and/or programs for them. To this end, it is suggested to start the process of consolidation of the dry recyclable fraction and progressively develop strategies for new streams, such as compostable organic waste generated at home, and then WEEE, AVU, and NFU, promoting the following household separation to optimize actions aimed at minimizing waste destined for final disposal:

- **Dry Recyclable Waste:** papers, cartons, maples, plastics, glass (bottles and canning jars), ferrous and non-ferrous metals (cans, deodorants), and multi-laminated containers. These should always be clean and dry.



7. <https://www.buenosaires.gob.ar/educacion/escuelas-verdes>

- **Compostable wet waste:** deposit them in a biowaste garbage can (5-liter container or smaller) where all fruit, vegetable, and garden waste can be deposited and then taken to a composting bin. See Annex Composting.



- **Wet waste, garbage or leftovers:** leftover food, dirty paper, and cardboard, leftover meat, pet waste, cigarette butts, mirrors, containers with chemical waste (pesticides, paints, enamels, dyes), plasticized paper.



Figure 33: Separation at the source according to the type of waste. Source: OPDS

### 3.7. SEPARATE COLLECTION

#### 3.7.1. Differentiated collection mechanisms

In addition to the devices mentioned in Chapter 2, containers for specific waste streams are added to complement. The LRS, broadening its spectrum of approach by capturing new streams such as E-Waste, organic, WVO, and ELT, generating citizen commitment that is already consolidated previously with the WP, adding environmental compromise by new streams and devices. In cases where it is required due to low population density, sparsely populated urban centers, or low population, green points or containers are recommended.

- **CONTAINERIZATION:** it is associated with containers of generally 1100 plastic and/or metallic or 5m<sup>3</sup> or 10m<sup>3</sup> roll-off containers for bulky waste, with variable shapes and characteristics, which allow depositing recyclable waste at any time. These are located on public roads, inside public and private buildings of large generators. This device is costly in terms of investment and maintenance and does not generally allow control over who and how the waste is disposed of, as its quality is lower than that of the devices previously used, which is why they are not recommended. However, they are convenient for specific waste streams such as E-Waste, the reception of WVO, or cages for ELT.



DEPOSIT HERE  
your electrical and electronic equipment



Waste electrical and electronic equipment collection point

Used vegetable oil only  
deposit only WVO  
waste vegetable oil

Collection point  
E-Waste  
in tightly closed plastic containers



Figure 34: Containerization for other waste streams. Source: Prepared by the authors. National Directorate of Popular Economy (MDS)

Having established the streams to be separated, their characterization by the stream, the estimated volumes to be recovered, and the specific characteristics of the territory, such as population density, establishments, and large generators, it will be possible to decide on the best strategy, which a priori should be developed from the central areas to the peripheries in its service approach. It is necessary to emphasize the design and the specific places of collection of the new waste streams without forgetting the previous stages of environmental promotion to strengthen the effective separation at the source by waste streams.

In this sense, the design of the household collection routes can be deepened by incorporating the product of the land use census, which will have an approximate amount of material available in each censused area, for which the tools described in Chapter 2 can be used, using geolocation systems such as QGIS for:

- Geolocation of micro and macro landfills.
- Geolocation of Green Centers and Green Points.
- Geolocation of Logistics Posts
- Logistic Route Dimensioning based on per capita waste generation, characterization, and land use, using census radii to develop heat maps and optimal logistics routes.

• MUNICIPALITY  
KG/DAY OF MSW PER CENSUS RADIUS

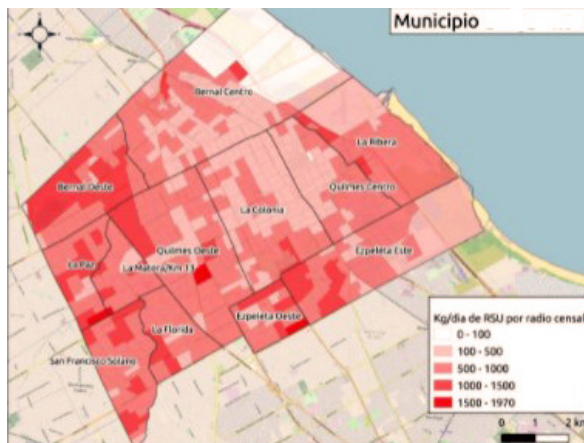
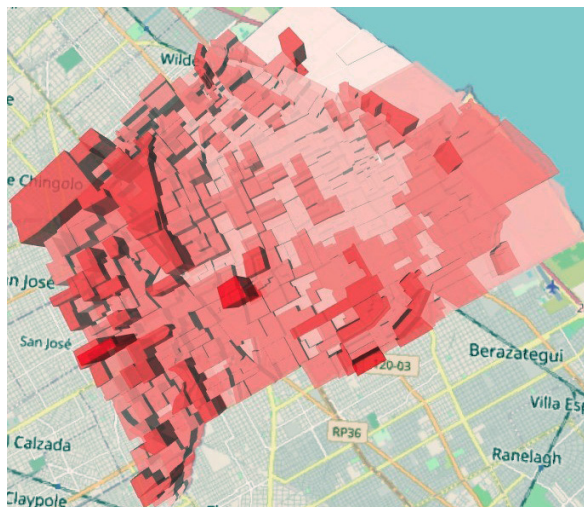


Figure 35: Map of per capita waste generation with QGIS. Source: Prepared by the authors. National Directorate of Popular Economy (MDS).

### 3.8. TREATMENT AND CONDITIONING FOR SALE

According to the waste hierarchy, prevention and reduction are strategies that form part of the first phase of waste generation. Reuse is the second resource in the management hierarchy, including recovery operations consisting of testing, cleaning, or repair, whereby products or components of products that have become waste are prepared for reuse without further processing. Recycling, on the other hand, is any recovery operation by which waste materials are transformed back into products, materials, or substances, whether for the original purpose or for any other purpose. Transforming organic material but not energy recovery to be used as fuel or backfilling operations. Other processes as composting, which will be addressed in the final complementary items, allow organic waste to be biologically transformed under controlled conditions of humidity, oxygen, and temperature. Such compost is a stable and sanitized material that can be used as an organic amendment to improve soil health. As an undesirable treatment alternative, energy recovery stands out in developed countries, referring to the thermal treatment of waste with any process transforming waste through heat energy (incineration, pyrolysis, drying, etc.). More specifically, this technology refers to (To be discussed in depth in **Annex 19 - GIZ 2017 Energy Recovery Recommendations Guide**).

- **Analysis of the volume to be treated and studies on emissions:** at least 1,000 tn/day are required for the process to be efficient, and it requires an investment of 50% in monitoring systems, resulting insufficient in many cases the application of environmental standards, resulting in public health problems due to emissions and polluting fly ash (dioxins and furans).
- **Waste composition:** the lower calorific value of MSW from countries such as Argentina compared to industrialized countries, due to the high moisture content (high organic content), makes its operation technically unfeasible or results in higher costs due to the need for additives.
- **Post-recycling strategy:** waste hierarchy. This technology should be a last option when the IISWM systems are already consolidated and

if the other aspects allow it. In places with no consolidated IISWM, it competes with it to the detriment of the Circular Economy.

- **Efficiency, investment, and costs:** the efficiency of this technology is 15-30% for its transformation into electricity and 60-85% for heat, used for this purpose in countries where temperatures require it. The initial investment for building a WTE plant is around 220 MM dollars. With 5% of its investment, it is possible to create 50 MSW plants or 1,000 MSW plants throughout the country. Finally, the high maintenance and operation costs require high tariffs or public subsidies.
- **Employment:** IISWM creates 10 times more jobs per ton than landfills and incinerators. In addition, Waste to Energy (WTE) requires highly qualified human resources that generally end up in high-cost external consultancies.
- **Legal framework:** Current Argentine regulations prohibit incineration and similar energy recovery technologies.
- **Citizen license:** There is widespread citizen resistance, NIMBY (not in my backyard), to landfill regionalization projects. Much worse is energy recovery. Therefore, the treatment of each waste stream will depend on the best technology for each case.

For the dry recyclable waste stream, the recommendation is the implementation, as we already talked about, of Nodes that receive only a differentiated collection of non-contaminated dry recyclable waste and that can progressively incorporate infrastructure and equipment for the recollection and/or treatment of new recyclable waste streams such as E-waste, WVO, ELT and organic.

#### 3.8.1. Design of a Local Recycling Node

For the local government to properly implement the Expanded LRS, it must design a Node that is capable of fulfilling the function of being a territorial meeting place for urban waste pickers, government agencies, the recycling industry, educational and scientific institutions, NGOs, citizens, and other stakeholders, from where central issues

are addressed and resolved to strengthen socio-productive recycling networks and approached from the logic of the IISWM. Therefore, it should also be an educational center for recycling that makes the importance of the recovery of each stream visible and reinforces the door-to-door differentiated collection's role. The Nodes should include urban waste pickers, strengthen the first link in the recycling value chain, and promote integral human development by complementing their facilities to facilitate access to social rights such as health, education, childhood, food, sports, culture, and justice. The Nodes are, therefore, spaces capable of weaving networks of socio-community, economic, and territorial exchange that promote the productive fabric of recycling and the IISWM.

### 3.8.1.1.

#### Facilities that make up a Node

- Truck entry control and weighing facilities.
- Separation, conditioning, and baling sector.
- Material stocking sector to be classified
- Stock sector: material ready for sale.
- Community dining room.
- Dressing rooms for operators.
- Administrative office.
- Perimeter enclosure.
- Fire prevention facilities with evacuation plans.
- Space for training and education.
- Nursery.
- Multipurpose Room (SUM).
- Health Promotion Team.
- Sector for collection and revaluation of other waste streams such as E-waste, WVO, organic, and ELT.

### 3.8.1.2.

#### Detail of Node equipment

The equipment of the Nodes complies with that detailed in Chapter 2, progressively allowing the development of new methodologies for the treatment and valorization of other waste streams to be determined. As a comment regarding other waste treatment and valorization technologies, it is recommended to carry out a previous technical analysis and consult with experts on the subject for their correct selection and sizing since historically inefficient technologies have



Figure 36: Abandoned equipment, without the correct design and obsolete waste treatment technologies ("candies"). Source: National Directorate of Popular Economy (MDS) and <https://www.lavoz.com.ar/ciudadanos/ambiente/apuntan-al-final-delos-basurales-en-el-sur-cordobes/>

been implemented in the country or that were not focused on differentiated collection and treatment per waste stream, such as, for example:

- **Waste packaging plants:** which provide only the volume reduction for final disposal using waste "candy."
- **Inertization of final waste:** once inertized, if disposed of in the open air, it is activated again.
- **Ecological bricks:** where the procedures to validate the construction model or the brick require years of investment and certification by competent bodies such as INTI.
- **White Elephants:** plants designed without planning their maintenance and use, ending in stopped and deteriorated plants.
- **Oversized equipment:** with high maintenance costs or erroneous layout designs.

To this end, this guide offers Annex 20 - List of Machinery, Tools and PPE IISWM - Argentina Recycles, which details the equipment and supplies that local governments and Reclaimers can progressively implement in their IISWM plans to strengthen and complement the proper management of each waste stream according to:

- Dry Recyclables.
- Other recyclable streams.
- Pathogenic.
- Garbage.

In this sense, it is recommended to use it as a frequent consultation since it will be updated with the technology that best suits the current situation and should be considered as a first consultation to be complemented with the corresponding technical assistance. It is important to remember that there are no magic solutions for waste treatment; the best solution is to implement an IISWM Plan through the LRS and the Nodes.

### 3.9. SOCIAL RIGHTS - TOWARDS INTEGRAL HUMAN DEVELOPMENT OF URBAN WASTE PICKERS

In line with the Social Inclusion component of The LRS concept, all municipal, provincial, and national public policies aimed at these systems must identify and provide complementary tools that guarantee the Social Rights of waste pickers.

As stated in the introduction to this guide, the recycling sector is defined by a high level of labor informality and precarious working conditions. It brings together, for the most part, family groups that are socially vulnerable in access to housing, comprehensive health, education, and justice, among other human rights. In this sense, for the System to be inclusive, in addition to contemplating the necessary improvements linked to the work-recycling factor of the Circular Economy, it is essential to consider the social element for a comprehensive approach in coherence with the general purposes.

That is why the development of Nodes that include the social aspect in their scope is foreseen, contemplating the following complements:

- Canteen
- Children's Recreation and Learning Center
- Team for the Promotion of Integral Health
- Culture and Sports
- Education
- Justice. To value an IISWM that benefits society, it is necessary to value the Integral Human Development of all those who make it possible to function daily.

A Circular Economy that cares for the Environment also cares for people.

#### 3.9.1. Canteen

The Node incorporates a Canteen to provide food support to workers during the working day, guaranteeing a minimum of daily meals to help alleviate nutritional deficits. It also contributes indirectly to the family economy. For its implementation, a circular methodology is suggested, which contemplates a Central Dining Room from which the meals are distributed to the different points where the workers start and end their working day. The routes and logistics necessary for MSW transportation can be used. In this case, the minimum essential equipment will refer to white modules (refrigerator, freezer, industrial stove, solar water heater), modules of kitchen elements (pots, utensils, etc.), furniture, cutlery, cleaning supplies, and food.

On the other hand, a minimum amount of equipment is foreseen for the routes/stages, green points, and operational bases, whose quantities will be adjusted according to the dimensions and number of waste collectors: microwaves, tables, chairs, kettle, and refrigerator. In both cases, it will be required the survey and implementation of the minimum primary services that the physical spaces, arranged for the workers' dining room and satellite spaces, must have during the working day according to natural or bottled gas, mains water, and electricity.

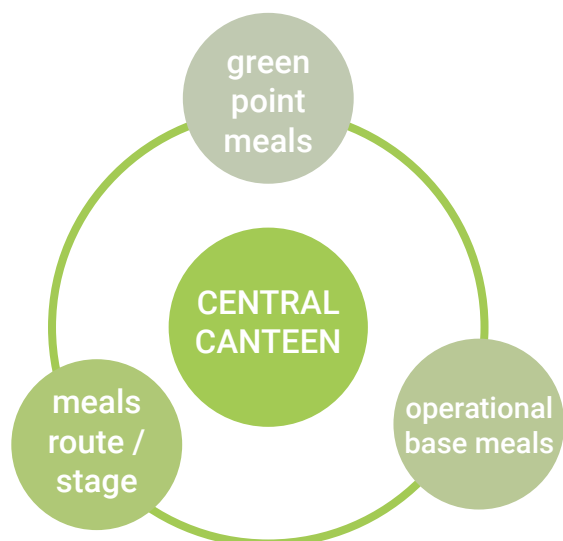


Figure 37: Dining system at Nodo. Source: Prepared by the authors. National Directorate of Popular Economy (MDS).

### 3.9.2. Children's Recreation and Learning Center

The provision of Children's Centers within the framework of the Nodes policy is based on the need for spaces for the children of waste pickers following the reality of their homes, the characteristics of the work, and the work shifts. To take care of schooling, prevent, and extinguish child labor, is the aim for school-age children. The centers work in counter shifts and offer care, stimulation, food, and educational, cultural, and sports proposals by their developmental ages. The beneficiaries are children and adolescents from 45 days to 17 years of age. To this end, the infrastructure must include the following:

- ✓ 6 rooms (45 days to 1 year, 1 to 2 years, 2 to 3 years, 4 to 7 years, 8 to 12 years, 13 to 17 years).
- ✓ Spaces for management/office, dining room, kitchen, 4 bathrooms (2 with children's furniture and 2 for adults), and a rest area for workers.
- ✓ Pedagogical support, training, and strengthening of community educators must be guaranteed.

The Center must have an interdisciplinary team composed of a person in charge of coordinating the space, a social worker, a psychologist, an educational psychologist, an administrative assistant, a kindergarten teacher, a primary school teacher, 10 community educators, 2 people in charge

of cleaning, a person in charge of general services and maintenance, a cook, and a kitchen assistant. The possible modalities for the execution:

- ✓ Self-management
- ✓ Associated management (co-management): municipal community gardens and social organizations.
- ✓ Mixed financing: state through agreements with social organizations and with the possibility of submitting projects for financing in open calls.

### 3.9.3. Team for the Promotion of Integral Health

The Integral Health Promotion Team's objective within the Node is to promote the waste pickers' integral health and to mediate access to the public system when necessary. Recycling entails risks due to working conditions (outdoors, in dumps, use of physical force without adequate protection), the type of materials handled daily (such as glass), and/or heavy machinery, among others. Therefore, incidents or accidents usually occur that require first aid but also planned prevention activities to reduce or, in the best of cases, eradicate them. At the same time, the vulnerability of many families in the sector,



the lack of access to social security, decent housing, and spaces for recreation, leisure, sports, and culture, to mention a few, make it essential to have a device that accompanies the development of the Integral Health of the waste pickers and their family groups.

### 3.9.4. Culture and Sports

The objectives of incorporating Culture and Sports as axes of Rights contemplated in the Nodes policy are linked to Integral Health, Human Development of the waste pickers and should focus on

- ✓ Encourage and promote the expressions of community-based and popular culture for the integral development of territories with identity and belonging that deploy their creative and transformative potential.
- ✓ Create mechanisms that guarantee that sports are within reach for all the inhabitants of popular settlements.

### 3.9.5. Education

Education is another social right that should be contemplated in a Node that seeks an integral approach, including the social factor. In this point, Educational Completion and Literacy are central objectives, together with cooperative education and job training. In this sense, it will be relevant to:

- ✓ Develop and articulate tools to address the high levels of school dropout of young people and adults in this sector of the popular economy through national, provincial, and municipal programs of formal education.
- ✓ Manage education and training in cooperativism and administration for waste pickers and recyclers' organizations.
- ✓ Manage education and training to improve the development of waste pickers' work activities.

### 3.9.6. Justice

The Node should consider Access to Justice, providing for the economic, social, cultural, and territorial particularities of WPs. They can:

- ✓ Articulate with the Centers for Access to Justice itinerant operations in the Nodes where lawyers and facilitators advise and bring the tools of both agencies to urban recuperators. Consultations can be made on evictions, access to public services, access to health, social security, labor conflicts, and domestic and gender violence.
- ✓ Articulating local resources for free legal representation.
- ✓ Developing devices for the registration, control, petition, and accompaniment of situations of waste pickers in conflict with the law. Generate concrete employment opportunities for people who have passed through the scope of the Federal Prison Service, promoting access to jobs to ensure the labor insertion of this population.
- ✓ Develop incentives for popular economy entities (cooperatives) of persons under guardianship or released from prison.

## 3.10. TRACEABILITY AND MANAGEMENT MONITORING SYSTEMS

At this stage, it is fundamental to be able to develop greater scope in traceability and management indicators:

- ✓ Reduction in waste generation. Tn/month.
- ✓ Recovery of dry recyclable waste: Collection. Tn/month.
- ✓ Valorization of recyclable dry waste: Sorting and conditioning. Tn/month.
- ✓ Recovery of dry recyclable waste: Commercialization. Tn/month.
- ✓ Recovery of recyclable dry waste: Discarding sent to final disposal. Tn/month.
- ✓ Other waste stream valorization (wet compostable, ELT, CDW, WVO, E-waste, etc.). Tn/month.
- ✓ Recovery of dry recyclable waste from Large Generators (LG). Tn/month.
- ✓ Adequate final disposal of non-recoverable MSW (rejection). Tn/month
- ✓ Awareness raising and habit change. Implementation strategies.
- ✓ Other waste stream valorization (wet compostable, ELT, CDW, WVO, E-waste, etc.). Tn/month a Valorization of dry recyclable waste from Large Generators (LG). Tn/month.

- ✓ Adequate final disposal of non-recyclable MSW (rejection). Tn/month
- ✓ Awareness raising and change of habits of the population. N° of trained population.

All these indicators or system data must be able to be entered, generated, and monitored by each of the actors involved in the management. They should be uploaded to a digital platform monthly and complement the systems already in the district.

### 3.11. OTHER WASTE STREAMS

Ultimately, and so that local governments can develop definitive IISWM plans in their Nodes, it is advisable to analyze and address other waste streams, such as the organic fraction (OFMSW) from households and green waste (pruning, leaves, grass, and other vegetable waste from the maintenance of green spaces), construction and demolition waste (CDW), and Special Waste of Universal Generation (SWUG). Those “whose generation derives from mass consumption and which, due to their environmental consequences or hazardous characteristics, require environmentally appropriate management that is differentiated from other waste.” This includes waste electrical and electronic equipment (E-waste), end-of-life tires (ELT), batteries, portable batteries, empty phytosanitary containers, and used vegetable oil (WVO). It should be noted that CDW, together with ELT and pruning waste, deserve a specific approach because their inadequate disposal leads to dumping points and the subsequent creation of micro and macro landfills.

The anticipation of waste and/or its early identification favors minimization and utilization. Working by waste streams makes it possible to focus on waste generation and avoid contact between different types of waste, thus enhancing recovery processes. In this sense, basic procedures and tools for approaching these streams will be highlighted.

#### 3.11.1. Organic fraction of municipal solid waste (OFMSW). Composting and Pruning Management

The OFMSW is the household organic fraction and the waste produced in pruning and gardening activities (called “green waste”). They are composed of raw and cooked remains of fruits and vegetables, dairy products, bones, fats, and other remains of red meat, poultry, and fish. It also includes grass clippings, dry leaves, branches, trunks, potted plants, and garden waste. All of these are characterized by their biodegradable nature and high moisture content, which allows them to be biologically treated by composting. Composting consists of the decomposition of organic matter by aerobic microorganisms; this reduces the mass of waste and produces compost, a soil amendment that helps reduce erosion and favors water and nutrients absorption by plants. During the process, some variants incorporate earthworms of the genus *Eisenia* (“vermiculture”), although these are not indispensable.

Since OFMSW represents the majority fraction of MSW, its local treatment by composting would result in multiple benefits. To name a few, it would enhance the valorization of dry and recyclable waste by preventing it from getting dirty when it comes into contact with them; it would reduce the generation of greenhouse gasses and polluting leachates in the collection and final disposal stages; it would generate savings associated with its centralized management, and an organic amendment could be obtained for use in vegetable gardens, flower beds, landscaping, nurseries, and green spaces.

The practice should consider various complementary scales: from home and community composting to the design and implementation of composting plants for pruning and gardening waste, or even fruit and vegetable waste from concentrated markets.

In this sense, it is essential to provide advice and training to municipal personnel and develop professional profiles of “Composting Promoters” and “Composting Plant Operators,” a qualitative leap for this valorization technology

to be installed in integral management. In the first case, the composting promoter would be an ally to promote the practice at the household and community level, implementing door-to-door awareness campaigns, training workshops in institutions and social organizations open to the community, promoting the delivery or self-building of compost bins, holding stands at local and regional fairs, following up on composting sites installed in community spaces or in neighborhood Green Points. It is suggested to read and support **Annex 21 - Home composting manual and Annex 22 - OPDS composting design and construction catalog**.

In the case of the composting plant operator profile, it would be the opportunity to have trained personnel to implement the action of municipal green waste composting (from pruning of urban trees and maintenance of public green spaces). If treated locally, local governments could save the cost of acquiring black soil for their landscaping tasks, generate compost for delivery in “eco-exchanges,” and even for commercialization. This initiative should be complemented with plans for social firewood delivery for use in cooking and heating. **Annex 23 - Guide for integrated management of municipal green waste INTI**.

### 3.11.2. Waste Electrical and Electronic Equipment (E-waste).

Waste electrical and electronic equipment, or E-waste, is the fastest-growing waste fraction worldwide in developed and developing countries. This growth is directly related to the increased consumption and speed of replacement of electrical and electronic equipment (EEE) by companies, businesses, public institutions, governments, and individuals. The consumption of EEE is likely to increase even more in the immediate future with the rise of teleworking and digital solutions in response to Covid-19. Both in the manufacture of the device (EEE) and in its disposal as waste (E-waste), there are several impacts on nature and people’s health. EEE is manufactured from non-renewable natural resources and, in some cases, contains hazardous substances.

Proper E-waste management will reduce the risks of releasing hazardous substances and allow the recovery of materials that can be reinserted into the industry, thus reducing environmental pressure from the extraction of virgin raw materials.

*What are the challenges for the world of work?*

In a transition towards more sustainable societies, the E-waste reuse and recycling sector can only be destined to grow. As a labor-intensive sector, it is to be expected that this growth will translate into the creation of numerous jobs. One of the challenges will be to ensure that these new jobs are indeed “green jobs,” decent from the labor point of view and sustainable from the ecological point of view.

*How is the work in E-waste currently carried out by local governments? How are the popular economy and informal sectors integrated into this chain? What are the needs in terms of job training? What are the health and safety conditions at work?*

For more information on the E-waste problem and its correct management, we recommend analyzing **Annex 24 - MADyS E-waste Integral Management Manual**.

### 3.11.3. End-of-life tires (ELTs)

As developed in Vignart’s thesis (2010), the seriousness of the pollution caused by fossil fuels makes less visible the environmental damage caused by motor vehicles: unserviceable tires, whose natural degradation can take centuries. The constant manufacture of tires and the difficulty of disposing of them after use is one of the most severe environmental problems in the world in recent years. Clean disposal of unserviceable tires is not easy. Direct burning, for example, results in the emission of harmful gasses and particles into the atmosphere, and since combustion in high-quality furnaces that guarantee minimum emissions is costly, year after year, tons of tires end up abandoned in fields and ditches or stored in landfills.

In addition to the wastefulness of not taking advantage of the material in whose manufacture, significant amounts of energy have been invested: it takes half a barrel of oil to make one truck tire.

The so-called “tire war” in Brazil reflects concern about the fate of this waste in many tropical developing countries. Tires are ideal breeding grounds for dengue mosquitos because they hold rainwater for a long time. In Spain, the aim is to end tire dumping by applying the 3Rs of recycling: reduce, reuse, and recycle. The accumulation of end-of-life tires in Argentina - calculated based on production volumes destined for the domestic market and imports - exceeds 150,000 tons per year, of which 58,000 tons correspond to the Capital and Greater Buenos Aires.

As there are methods to achieve recycling, it would be necessary to have policies that favor its collection and industries dedicated to the recovery or clean disposal of hazardous components of vehicle and machinery tires. For more information on how to deal with the problem of ELTs and their correct management, it is recommended to analyze: <https://www.sltcaucho.org/revista-seccion-6-reciclaje-de-neumaticos> and **Annex 25 - Res. No. 523 on tire management. MAYDS.**

#### 3.11.4. Used vegetable oil (UVO)

The BIO Plan prepared by the OPDS indicates that several municipal programs promote the collection and recovery of Used Vegetable Oil (WVO) to collaborate so that the WVO used in homes or businesses does not pollute and can be transformed into clean and renewable energy. This generates benefits such as:

- Recycling this waste to transform it into a biofuel.
- Reduce pollution of our rivers, thus reducing the death of fish and aquatic flora that this waste generates.
- To reduce the costs of drinking water purification.
- Reduce flooding in our homes and streets since Waste Vegetable Oil (WVO) is one of the main elements that clog pipes and sewers.
- Reduce greenhouse gas emissions that generate climate change. For more information

on the problem of WVO and its proper management, we recommend analyzing **Annex 26 - OPDS BIO Plan.**

#### 3.11.5. Construction and Demolition Waste (CDW)

In Argentina, there are no estimates on the daily production of construction and demolition waste, of which a high percentage is potentially recyclable. Poor management of these wastes usually generates clandestine open-air dumps, which cause obstructions in rivers, land, and public roads, direct and indirect risks to human health, and high maintenance and environmental restoration costs. The poor management of this flow promotes ODs since where bulky waste is dumped, there is a tendency to dump other wastes on a smaller scale.

The Guide for the Development of the Integrated Management Plan for Construction and Demolition Waste (CDW) in Colombia “provides a tool that will allow the construction sector and local governments to minimize environmental impacts in the development of the different stages of the construction process, and will also guide the generator to the proper control of waste, leading them to the final disposal and recovery by the established environmental regulations” (2014:8).

In this sense, the guide proposes strategies that are easy to handle and understand, to be applied at the time of executing activities aimed at the integrated management of Construction and Demolition Waste (CDW). It shows the high potential of Construction and Demolition Waste to be recycled, and it leads to evidence of the economic benefits of implementing these practices that not only favor the builder but also help to promote a culture of reuse and reuse of the raw material derived from these processes.

For more information on how to address the problem of CDW and its proper management, it is recommended to analyze **Annex 27 - Guide for the Integrated Management Plan for Construction and Demolition Waste (CDW) on site. Colombia.**

### 3.12. IISWM IN POPULAR NEIGHBORHOODS

The so-called popular neighborhoods are found in many municipalities in Argentina. They are neighborhood extensions generated by families who, without territorial planning, establish their homes in areas lacking primary services. These structural deficiencies of poor neighborhoods, such as lack of access to water, electricity, sewage, asphalt, etc., are intertwined with inefficient waste management, such as the lack of municipal waste collection. In these neighborhoods, the residents usually resolve waste management, and the lack of coordination with the municipality favors the proliferation of micro dumps, putting health at risk.

Given this problem, it is recommended to carry out coordinated actions with the community of the neighborhoods and municipal waste management.

#### • STEP 1: Survey the neighborhood's characteristics

- Neighborhood characteristics: physical boundaries, main access streets, access to public transportation, kiosks, and stores.
- Identification and mapping of schools, educational centers, health care centers, canteens, sports clubs, etc.
- Description of current waste management: streets with recollection (frequency and collection points), frequent dumping points (micro dumps), containers, household baskets, and burning sites.
- Identification of urban waste collectors in the neighborhood, individual or organized: if they exist, their incorporation into the new waste management should be prioritized, both in collection and cleaning routes and in environmental promotion.
- Identification of social organizations with which it would be possible to articulate: they are essential to promote the new waste management in the neighborhood.
- Structural problems of the neighborhood: lack of electricity, water, sewage services, etc

#### •STEP 2:

#### Plan a neighborhood waste management based on the survey carried out in Step 1.

It is recommended to plan waste management in the neighborhood considering the following issues:

- Develop a collection route with some existing cooperatives in the area that can integrate the WP of the neighborhood for waste management. Should the settlement be large, different working groups can be formed, and each group can be assigned a temporary collection point. The workgroup will be in charge of cleaning the micro dumps, internal collection of the neighborhood's waste, transportation to transitory collection points, separation of recyclable waste, environmental promotion, coordination with the cooperative of urban waste collectors (in the case of recyclables) and with the municipal area in charge of waste collection (rejects and other waste streams).
- The salaries of the workers of this cooperative or collection route should be in charge of the local government, being able to articulate with National Programs such as the Complementary Social Wage. They should be provided with the tools and carts corresponding to the needs of the new waste management system in the neighborhood.
- Placement of community baskets at strategic points for initial disposal.
- Coordinate the removal of these frequently, to transitory collection points in the neighborhood limits, with the cooperative/quadrille.
- Create temporary collection points: these should have different containers to separate recyclable from non-recyclable waste. These temporary collection points should be closed spaces managed by the cooperative/crew in charge of the internal collection in the neighborhood. It will also be an environmental promotion point. The recollection of waste from the transitory collection point (both recyclable and non-recyclable fractions) should be coordinated with the municipal collection and urban waste collection cooperatives, if any.

- Generate neighborhood socio-urban promotion teams to hold conversations with neighborhood residents about separation at the source and the new waste management system in the neighborhood. The team of promoters should be part of the team in charge of waste management and other neighborhood promotion issues.

- **STEP 3:**

- **Implementation of the new waste management in the neighborhood.**

The new waste management in the neighborhood should be carried out in a progressive but coordinated manner. For this reason, an order in the implementation of the actions to be followed is recommended below:

- Meetings with the neighbors to inform them of the new waste management. In case of being formed, introduce the members of the cooperative and the environmental promoters, but also survey interested parties for the conformation of the working group.

- The work cooperative will install community baskets for the disposal of waste. Firstly, they will be without separation at the source until the environmental promotion can move forward.

- Clean the dumping points or micro dumps, prioritizing the beginning with those closest to the population's homes to the farthest ones. This cleaning should be frequent. However, as the new waste management system of the neighborhood progresses, the dumping points will decrease.

- House-to-house environmental promotion and in neighborhood institutions: the environmental promoters should communicate to the neighborhood population the importance of the correct initial disposal in the new community bins, separation at the source, and the harmfulness of waste incineration. Neighborhood institutions can be a relevant promotion point and spaces where the community bins could be located.

- Construction of a temporary collection point in the neighborhood limits, where separation and recovery of recyclable materials can be generated and can be a point of environmental promotion.

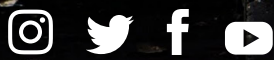
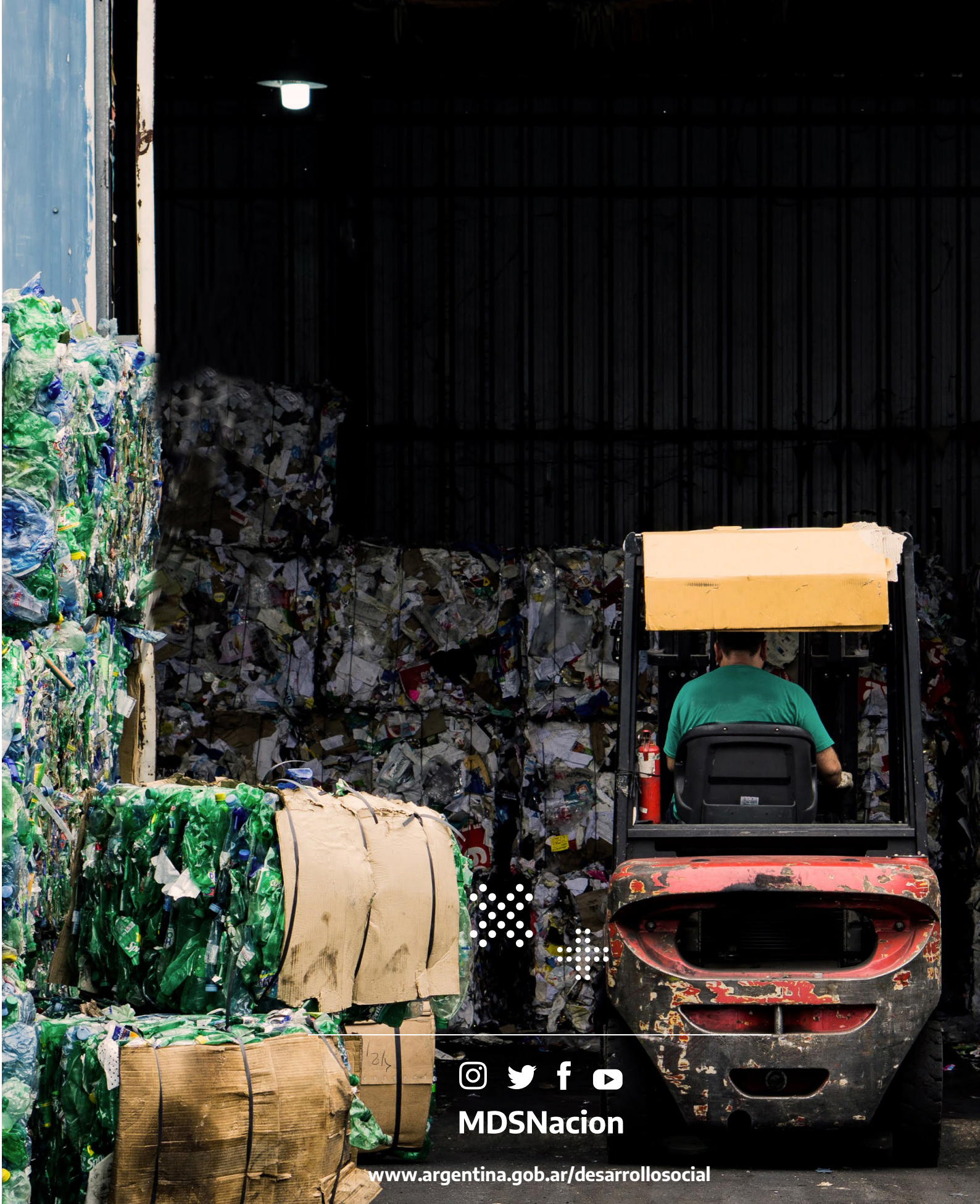
- Promote community composting in neighborhood canteens, picnic areas, soup kitchens, and other community centers: complementary actions such as community composting can be implemented parallel to neighborhood waste management. These spaces usually generate a lot of organic waste from the kitchen and the same premises (grass cutting, autumn leaves). It can be a suitable space for a biological treatment initiative. In this way, neighbors can be encouraged to progressively take their organic waste there or implement their own home composting (**see the section on composting**).

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