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Circular Economy in Colombia

Opportunities for reusable packaging systems and women's participation

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List of Abbreviations

B2B	Business to Business
B2C	Business to Consumer
CAN	Andean Community
CCL	Circular City Labs - Testing reusable packaging systems in cities (project implemented by GIZ)
DANE	National Administrative Department of Statistics
DCCGR	Directorate of Climate Change and Risk Management of the Ministry of Environment and Sustainable Development
ENEC	National Circular Economy Strategy
EPR	Extended Producer Responsibility
GHG	Greenhouse gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (German Agency for International Cooperation)
IDB	Inter-American Development Bank
INVIMA	National Institute for Drug and Food Surveillance
UN	United Nations Organization
GDP	Gross Domestic Product
PGIRS	Integral Solid Waste Management Plan
PNACC	National Plan for Adaptation to Climate Change
ProUSAR	Project for the sustainable and efficient use of resources
N.D.	Undated
SPA	Public Cleaning Service

Executive Summary

The reuse of packaging consists of using a packaging multiple times in its original function or an associated one, through refill or reuse practices. It creates environmental benefits due to the decrease in the consumption of single-use materials, as well as economic benefits for companies and for society at large.

The project 'Circular City Labs - Testing Reusable Packaging Systems in Cities' (CCL), implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), seeks to reduce greenhouse gas (GHG) emissions through waste prevention by promoting economically viable reuse systems. In addition, the project aims at strengthening the role of women as entrepreneurs. It will establish circular city labs in up to four cities in Albania, Colombia, Georgia, Kosovo, and South Africa.

This study, focused on Colombia, serves as a basis in the selection of the cities where the laboratories will be implemented. It identifies and characterizes the stakeholders' ecosystem, existing initiatives, gender aspects, enabling conditions, challenges, and suitable sectors for the reuse of packaging in the cities of Bogotá, Medellín, Cali and Santa Marta. The analysis focuses on models of refill and reuse, both at home and on the go, in the food, beverage, cosmetics and cleaning sectors.

A total of 42 stakeholders participated in the study, representing the government, academia, associations, businesses, start-ups, collaboration platforms and civil society. 17 of these stakeholders were reuse initiatives; 11 start-ups, and 6 initiatives from large companies.

The legal framework that enables (or restricts) the reuse of packaging varies according to the product to be contained, the materials of the packaging, and the business model. In terms of products, cosmetic, hygiene and cleaning goods for domestic use (consumption by households) are the most constricted. These are regulated by an international framework from the Andean Community (CAN in Spanish) that neglects the reuse of packaging and restricts filling activities at points of sale. The food and beverage sectors operate under a national legal framework, which does not mention refill, but does enable reuse in glass and plastic packaging; plastic only with authorization from the National Institute for Drug and Food Surveillance (INVIMA in Spanish). There are no regulations for reuse practices in packaging made of metallic or cellulosic materials.

Natural foods (e.g. grain and fruit), foods from animal origin not subjected to transformation processes, and prepared meals (in restaurants) do not have restrictions for the implementation of reuse models as they do not require sanitary registration.

From a market point of view, B2B reuse-practices have fewer restrictions than B2C practices. Additionally, there are more favourable conditions for the development of reuse models than for refill models, both at home and on the go. The implementation of reuse practices in the B2C market is highly restricted, mainly because it has been insufficiently addressed at the nationally and regional levels. Overall, the legal framework does not address the different reuse models and does not provide specifications for different materials according to the existing models and the different types of products to be contained and packaged.

Economic, social, cultural, operational, and governance barriers or challenges were also identified. There is a need to develop larger markets to optimize investments and operational costs of reuse initiatives. For this, among others, it is necessary to encourage access to specific financing for reuse models. At the sociocultural level, it was observed a lack of knowledge about the concepts of reuse (and models) by stakeholders from all groups.

Generally, the term ‘reuse’ is misinterpreted as the recycling of waste.

In addition, the stakeholders expressed that consumers lack appropriation of sustainability criteria in decision-making processes, thus, prioritizing economic aspects that favour single-use packaging due to its low cost. It was also observed that the management of high-value packaging faces an additional barrier associated with their theft for use and/or sale in other sectors or businesses.

At the operational level, it was spotted that there are no standardized information systems that facilitate the collection and analysis of reusable packaging data; thus, limiting the capacity for planning and operation, as well as for the evaluation of the environmental and health impacts of existing initiatives and models. Most initiatives lack technological solutions that allow them to optimize their processes. Besides, packaging supply chains are inefficient, especially for glass and metallic materials. There is a monopoly on the production and recycling of glass which affects equitable and reliable access to this material. In addition, some metallic packaging are not produced nationally, so they must be imported.

At the governance level, there is a need to build trust and to work in coordination with the surveillance and control institutions, as well as to promote cooperation among sectors. Nevertheless, all the stakeholders involved in the study expressed willingness to work and collaborate with CCL.

In terms of gender, no gaps were identified in women's participation in the reuse sector. On the contrary, it was found that the conditions are equitable and even more favourable for the economic participation of women and their performance in leadership roles. This situation opens an opportunity to position the sector as a significant contributor to closing the national gender gaps.

Regarding the cities of study, it was concluded that Bogotá is the reference city, as well as the most favourable one for the implementation of packaging reuse practices. The city has the

largest number of reuse and refill initiatives, prepared meals and cleaning products stand out due to fewer legal barriers. Additionally, the local government, in collaboration with stakeholders from different sectors of society, is consolidating the strategy "Bogotá Circular", which could serve as a platform to mobilize reuse.

Medellín is the second city to suggest due to the presence of a significant stakeholders' ecosystem that can facilitate the development of synergies and the implementation of reuse projects. The institutional capacity of the local government to facilitate networking among stakeholders, as well as the research and innovation project in reusable packaging "Alianza Circular" led by the University of Antioquia stand out. From the existing initiatives, those related to the reuse of packaging in cosmetics and beverages are the ones with fewer barriers.

1. Introduction

The project ‘Circular City Labs – Testing Reusable Packaging Systems in Cities’ (CCL) seeks to reduce greenhouse gas emissions through waste prevention by promoting economically viable reuse systems. In addition, the project aims at strengthening the role of women as entrepreneurs. It will establish circular city labs in up to five cities in Albania, Colombia, Georgia, Kosovo, and South Africa, inviting local businesses, city administrations, academia, and civil society to elaborate functioning reusable packaging systems. The labs will have demonstrable and long-term positive effects on emission savings, the environment, economic development, and social cohesion in the sense of green recovery and just transition. In order to serve as a basis for the CCL project in the final selection of cities where the labs shall be conducted, the study at hand identifies enabling framework conditions, challenges, and sectors suitable for the reuse of packaging in the Colombian cities Bogotá, Medellín, Cali and Santa Marta. The analysis includes models of refill and return; however, the final focus of the recommendations is on the latter. Apart from this version at hand, there is a more detailed version intended for internal use only that includes more details on relevant stakeholders and initiatives, as well as further background information.

This report consists of six sections. The first and current chapter corresponds to the introduction, where the goal of the study and the structure of the report are presented. Accordingly, the following subsections introduce the concept of reuse models in general, as well as the methodology and scope of the work.

The second chapter presents the context of pollution and waste management in Colombia and the cities of the study, as well as the relation with GHG emissions. This section also provides an overview of gender policies and gaps in the country.

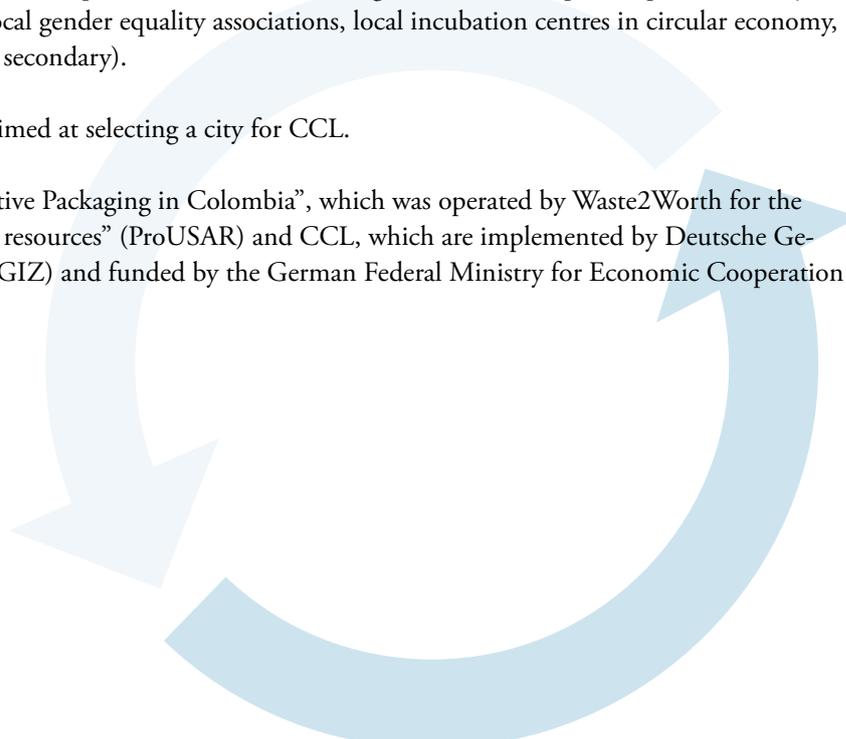
The third chapter introduces the main findings of the study including an examination of the legal framework for reuse, the description of the identified reuse initiatives and the challenges for implementing reuse practices. It concludes with an analysis of the most suitable sectors for the implementation of reuse solutions.

The fourth chapter presents the results of the gender analysis, conducted for the packaging reuse sector, through the review of the legal and institutional framework and the identification of challenges and barriers to women’s participation.

The fifth chapter summarizes the reuse ecosystem’s map of stakeholders, according to their nature (public, private, society), type (e.g., enterprises, industry, government, local gender equality associations, local incubation centres in circular economy, etc.), and relevance to the sector (key, primary, secondary).

The sixth chapter presents recommendations aimed at selecting a city for CCL.

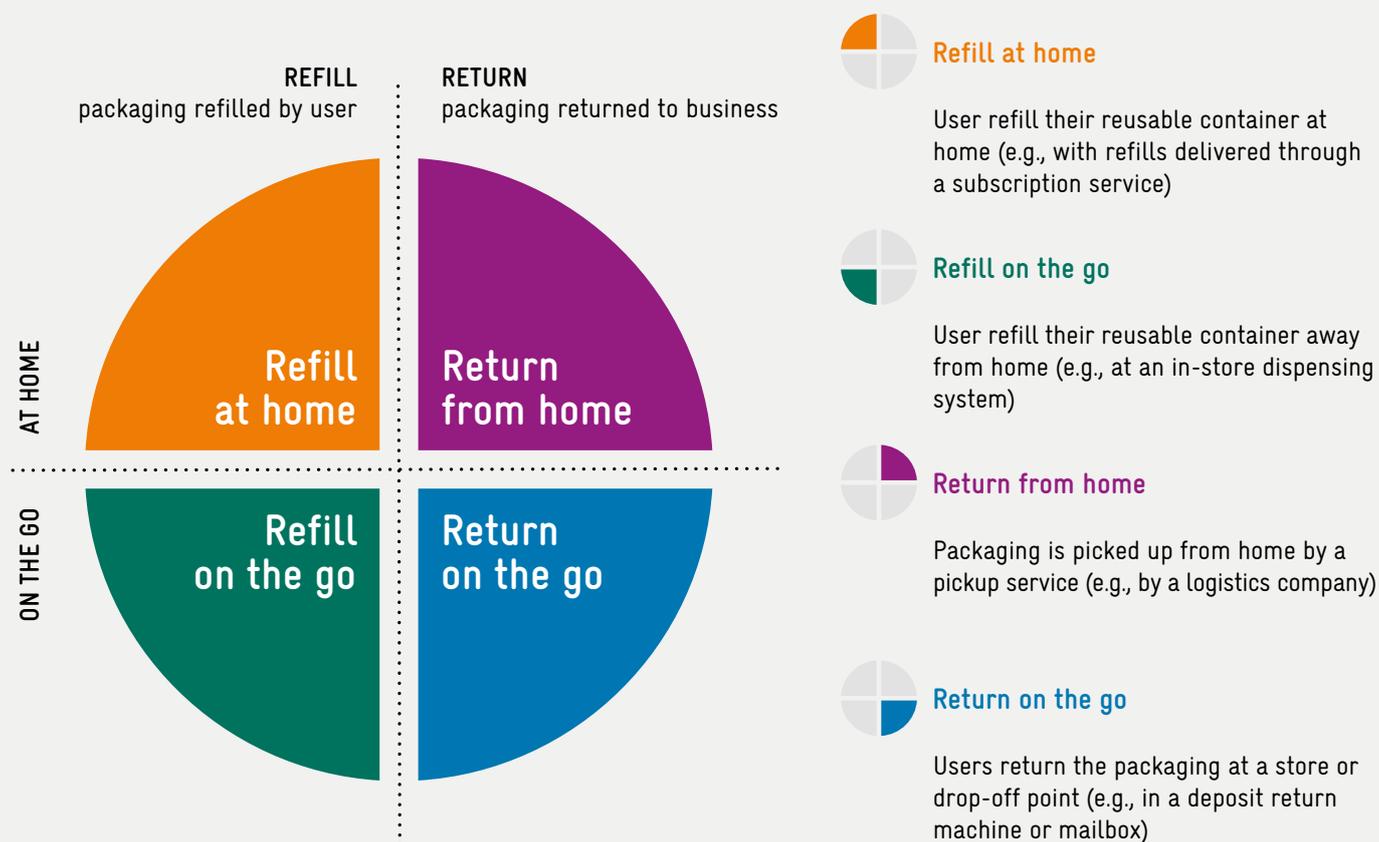
This document is part of the “Study of Innovative Packaging in Colombia”, which was operated by Waste2Worth for the “Project for the sustainable and efficient use of resources” (ProUSAR) and CCL, which are implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).



1.1 Reuse models in Colombia

If we understand reuse as the practice of reusing a packaging in its original function, through refill or reuse practices, with the purpose of reducing waste, protecting the environment and retaining its maximum economic value, 4 reuse models are identified in Colombia: 2 for refill and 2 for reuse. All are present in markets between businesses and the final consumer (B2C), or between businesses (B2B) (Global Plastic Action Partnership (GPAP), 2023).

Image 1. Reuse models. Adapted from EMF (Ellen Macarthur Foundation, 2019)



The two modalities exist, at home and on the go, as follows (Ellen Macarthur Foundation, n.d.):



Refill at Home

This business model involves users keeping a reusable container that they refill at home or institution. Refills can be delivered at home or purchased in stores, usually in another primary packaging of lower quality, in concentrated or solid versions of liquid products. Customers are also offered automatic refills, delivered to their home using subscription services. For this model to be effective, from the perspective of the circular economy, it is important to ensure that refills do not generate more waste than the single-use model, therefore, they must be supplied without packaging or in recyclable, compostable or reusable packaging.



Refill on the Go

This business model involves users refilling their reusable packaging away from home or institution, in a dispensing system in stores or other public places. Users are also responsible for cleaning and maintaining the reusable container.



Return from Home

This business model involves companies collecting packaging from customers' homes or facilities through a delivery and collection service. The ownership and responsibility of the containers lies with the company, which is responsible for cleaning and redistributing them. The packages are designed with better functionality and appearance to improve the user experience and withstand several cycles, maximizing their value and utilization.



Return on the Go

This business model involves users receiving products in reusable packaging and then returning those containers to stores or drop-off points. The containers are cleaned and redistributed. Standardizing packaging design can make reuse more affordable and efficient across the value chain.

The Annex 1 presents a list of definitions of concepts relevant to the understanding of the scope and results of the study. Some concepts are defined by different institutions, mainly the Ministries of Health and Environment, so the annex distinguishes between these and other sources.

1.2 Methodology and scope of the study

The study was conducted over a period of 10 weeks between May and July 2023. Once the work plan was agreed with GIZ, the criteria to select and characterize national reuse initiatives were defined. Table 1 summarizes the technical scope of the study. Information was collected in the cities of Bogotá, Medellín, Cali and Santa Marta.

Table 1. Technical scope of the study

Reuse models	Market	Types of packaging	Sectors/products
1. Refill at home	1. B2C	1. Primary	1. Foods
2. Refill on the go	2. B2B	2. Secondary	2. Beverages
3. Returnability at home		3. Tertiary	3. Cosmetics (beauty and personal care items)
4. Returnability on the go			4. Cleaning and hygiene (domestic use)
			5. Cleaning and hygiene (industrial use)

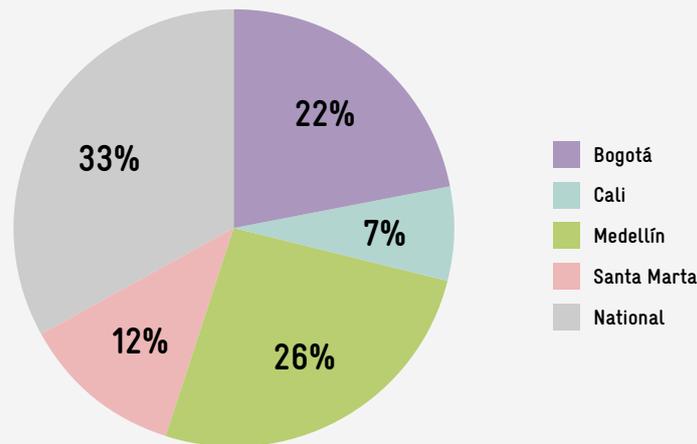
During the process of characterizing initiatives and mapping relevant stakeholders, 118 stakeholders with potential relevance for reuse, circular economy or gender were identified. Of these, it was verified that 83% applied for the study. However, it was only possible to characterize 36% of them. 12% of the stakeholders did not want to participate in the study, 43% did not reply to the invitation for participation, and for the remaining 9% it was not possible to obtain contact information.



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In total, 42 stakeholders were characterized: 14 with national scope, 11 in Medellín, 9 in Bogotá, 5 in Santa Marta, and 3 in Cali (Image 2). These are classified into 11 groups (Image 3). The characterization was carried out through virtual interviews. 18 stakeholders, from an entrepreneurial environment as well as from the industry, were the ones with whom we sought to document the running reuse models, the challenges and opportunities of the sector, scalability opportunities, technical, financial, social, environmental and gender considerations and indicators, as well as their future vision of the project. With the other groups of stakeholders, general issues on the ecosystem and challenges of reuse and gender were addressed.

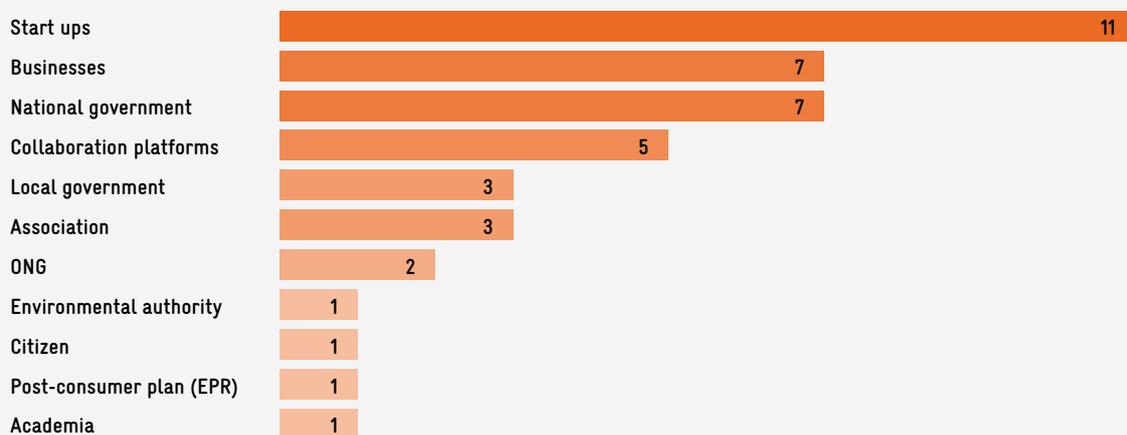
Image 2. Distribution of characterized stakeholders by geography



Once the stakeholders were characterized, the key conditions for reuse in each city were analysed. These were validated in 2 face-to-face workshops, one in Bogotá (06/26/2023) and another in Medellín (07/05/2023). In Bogotá, 4 entrepreneurs and one local public stakeholder participated in the workshop. In Medellín, the workshop consisted of one entrepreneur, one innovation platform and one representative of the academia.

Although various stakeholders, associations and regional leaders were contacted, it was not possible to identify enough stakeholders to develop face-to-face workshops in Cali and Santa Marta.

Image 3. Nature of the characterized stakeholders



2. Status-quo of circular economy and gender equality in Colombia

2.1 Facts and figures about the problem of (packaging) waste in Colombia

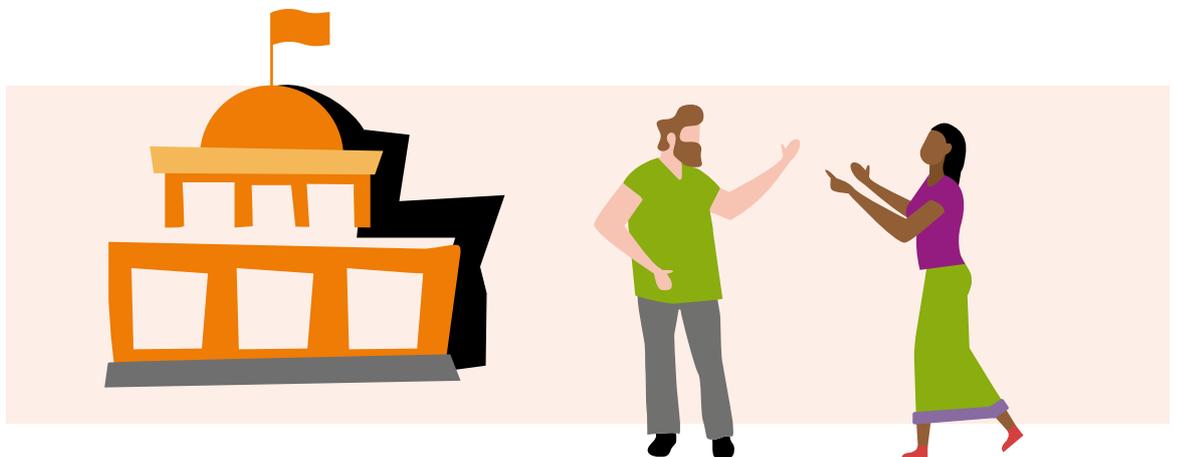
There is a strong relationship between the production and consumption of packaging, climate change, environmental pollution, and the availability of resources. It is estimated that 45% of global GHG emissions can only be mitigated by changes in the ways products and food are manufactured and consumed (WRAP The Waste and Resources Action Programme, n.d.-a). Additionally, about half of the pollution in the oceans corresponds to plastic containers and packaging used for food and beverages to take away, that is, containers and packaging and single-use plastics (Oceana, 2022). Overall, it is estimated that one-third of all plastic containers and packaging placed on the market leak from waste collection systems, resulting in environmental pollution (WRAP The Waste and Resources Action Programme, n.d.-b).

Reusable packaging is a solution that contributes to reducing waste pollution and GHG emissions, as well as a strategy to close the material circularity gap, primarily for fast-moving consumer products (Goldberg, 2022).

In Colombia, the National Circular Economy Strategy (ENEC in Spanish), which objective is to serve as a vehicle to meet the Green Growth goals of increasing the rate of recycling and the new use of solid waste, and of reducing GHGs, prioritized the flows of packaging materials as one of the lines of action (Ministry of Environment and Sustainable Development & Ministry of Commerce, Industry and Tourism, 2019).

It is estimated that the packaging used in Colombia is intended 22% to food, 17% to beverages, 29% to hygiene and cleaning products, cosmetics, chemicals and fertilizers, 23% to commerce, restaurants and hotels and 9% to other sectors (Acoplásticos, 2022). By 2011, 34% of the packaging used in the country was considered to be plastics (Ministerio de Ambiente y Desarrollo Sostenible & Ministerio de Comercio Industria y Turismo, 2019). In 2021, it was reported that 56% of the plastic raw materials consumed in the country were directed to the production of packaging (Acoplásticos, 2022). The apparent consumption of plastic resins that year was 1.48 million tons.

Approximately 50% of plastic packaging waste is still not recycled in the country. Colombia lacks official data and figures that allow to understand and measure the problem of pollution caused by packaging waste. In that sense, the following section presents an overview of the waste management situation at the national and territorial levels (Colombia Productiva, 2020).



2.2 Status quo of the local waste management system

The solid waste in the country is managed through two schemes: the Public Cleaning Service (SPA in Spanish) that deals with ordinary waste, and the private management of special waste (hazardous waste, special, etc.). The planning of this management is carried out through the municipal Integral Management Plans of Solid Waste (PGIRS).

In Colombia, 24.8 million tons of waste are produced every year; 47% from households. The largest proportion of waste generated by households is organic, followed by recyclable materials (cardboard and paper, metals, plastic, glass, wood, textiles). A study by the Inter-American Development Bank (IDB) (Departamento Nacional de Planeación et al., 2022) in 2015 reported an average of 24.04% of recyclable material in the waste generated in the country's main cities; 10.78% plastic (Departamento Nacional de Planeación, 2016).

The Ministry of Environment and Sustainable Development estimated that, by 2019, approximately 50% of the recyclable waste would correspond to packaging; about 2.2 million tons (Ministerio de Ambiente y Desarrollo Sostenible & Ministerio de Comercio Industria y Turismo, 2019).

In 2021, approximately 11.9 million tons of solid waste were disposed of under the SPA. Regarding the useful life of landfills, 27% of these have a useful life of less than 3 years (Superintendencia de Servicios Públicos Domiciliarios, 2023).

The main indicators on waste generation and management for the cities of this study are displayed in [Table 2](#). The four cities have recently updated their PGIRS and aimed at seeking a waste management model with a circular economy approach, as follows:

- Bogotá, in 2020, set as an objective to “redefine the solid waste management model of the Capital District, moving from a linear model to a circular economy model, which tends to maintain the products and materials invested in them as long as possible in the production cycle, through their repeated use, recycling and treatment, so they can continue creating value, and thereby minimizing the use of new resources, the generation of waste and its landfill” (Alcaldía Mayor de Bogotá D.C, 2020a).
- Medellín, in 2021, defined a strategic line associated with the development of the circular economy and recycling of waste in the city, through the “orientation of the formulation of projects that point to new models of production and consumption, seeking that the value of products and materials are maintained for as long as possible in the production cycle” (Alcaldía de Medellín, 2021b).
- Cali, in 2021, established the objective of strengthening the guidelines, programs and planning goals for the integral management of solid waste through the approaches of sustainable development, circular economy, resilience and smart cities, taking into account changes in habits and practices of sustainable consumption (Alcaldía de Santiago de Cali, 2021a).
- Santa Marta, in 2022, set the objective of “advancing in the reconversion of a linear economy model to one of circular economy, implementing organic waste treatment alternatives, continuing to strengthen the activity of recycling and the inclusion of segregated waste collection routes” (Alcaldía Distrital de Santa Marta, 2022).

Additionally, these cities have technical and legal instruments to develop circular economy strategies or initiatives, which have an important emphasis on waste management and the consolidation of ecosystems of stakeholders for sustainable governance in their territories, as follows:

- Bogotá is building the “Bogotá Circular” strategy that seeks to promote the development of circularity business initiatives, reduce the consumption of natural resources, and reduce waste generation. It is intended to consolidate a “multi-stakeholder platform to articulate, direct and accelerate the transition towards a sustainable, competitive, regenerative and restorative circular model of Bogotá - Metropolitan Region that, at the same time, generates prosperity and economic resilience for its inhabitants and the territory” (Secretaría de Ambiente de Bogotá, 2023).
- Medellín advances in the formulation of the Public Policy of Circular Economy under guidelines defined by the Municipal Council in 2021 (Concejo de Medellín, 2021).
- Cali, through the Public Policy of Economic Development develops the strategic line of Sustainable Economy that seeks to “implementing actions aimed at changing production and consumption practices in the city, through knowledge management, pedagogy on the relationship across the concepts of circular economy and sustainability, the promotion of responsible production and consumption practices and the strengthening of companies and enterprises”. Within this line, the development of the “Cali Circular” initiative stands out, through which alliances are promoted between the key stakeholders of the Regional System of Innovation in Circular Economy (State, Company, Academia, Communities and interest groups) (Alcaldía de Santiago de Cali, 2022).
- Santa Marta adopted the “District Guide of circular economy” in 2022, which intends to “provide guidelines for establishing alternatives in terms of the use of the different materials that are produced inside and outside the city, and thus initiate new strategies that generate a significant change both economically and socially” (Ministerio de Ambiente y Desarrollo Sostenible, 2022).

It must be clarified that the figures in Table 2 correspond to the cities in scope for this study, but it is understood that the dynamics of these cities respond to metropolitan conglomerates that are not reported in the study due to its city focus.

Table 2. Indicators on waste and plastics in the studied cities

	 Bogotá	 Medellín	 Cali	 Santa Marta
Population (million inhabitants)	7.74	2.53	2.25	0,54
Per-capita waste production (kg/day)	1.13	0.58	0.44	0,72
Recycling rate	29.85%	4.71%	6.11%	3,00%
% Plastics in waste generated	16.88%*	11.90% residential sector** 17.39% other sectors**	n/a	n/a
% Plastics in waste disposed of in the landfill	12.87%*	n/a	10.24%	13,90%
Waste disposed of in landfill (million tons)	2.47	0.77	0.61	0,20
Landfill useful life (years)	3.2	5.7	17.4	6,5
Year of information	2020	2020	2021	2022

Sources: (Alcaldía de Medellín, 2019a, 2019b, 2020b, 2020a; Alcaldía de Santiago de Cali, 2021b; Alcaldía Distrital de Santa Marta, 2022; Alcaldía Mayor de Bogotá D.C, 2020a; Superintendencia de Servicios Públicos Domiciliarios, 2023)

* Year 2017; ** Year 2019

2.3 Greenhouse gas emissions and relevance of waste prevention

For the year 2014, national emissions were estimated at 236.97 million tons of CO₂-eq (Ministerio de Ambiente y Desarrollo Sostenible, 2020a). The sanitation sector, comprised of solid waste and domestic wastewater disposal, contributed to 4% of the emissions; half of these emissions originated from solid waste disposal in regional landfills.

Bogotá, Medellín and Cali, which have GHG inventories (Table 3) and climate management and/or action plans, show contribution from waste (in total emissions) above the national average. In Bogotá and Cali, waste disposal contributes to 13% and 11% of the city's emissions, compared to a national average of 2%.

Regarding waste management and climate change, the action plans of the cities include the following measures:

- Bogotá established two lines of work that are articulated to the PGIRS: 1) To formulate and implement a new model for the recycling of organic waste and recyclable materials, oriented towards the circular economy and 2) to improve the current situation of final disposal and treatment of waste, through the implementation of alternatives of thermal treatment or similar with energy generation (Alcaldía Mayor de Bogotá D.C., 2020b).
- Medellín set to promote the city to the transition towards a regional model of circular economy, the development of integral strategies for the treatment and use of solid waste, the optimization of the collection and final disposal system and the implementation of an inclusive scheme of recycling. It is considered that the actions will contribute to reducing 10% of the total GHG emissions projected to 2030 and 11% of the total emissions estimated in 2050 (Alcaldía de Medellín, 2021a).
- Cali seeks to reduce GHG emissions associated with the disposal of solid waste in landfills, which is why it proposed measures aimed at strengthening the PGIRS to reduce waste generation, properly dispose of solid waste and increase its recycling (Alcaldía de Santiago de Cali, 2020).

Table 3. Indicators of emissions of the waste sector in the cities of the study

	 Bogotá	 Medellín	 Cali	 Santa Marta
Emissions from the sanitation sector (waste disposal and wastewater) (Million-ton CO ₂ eq)	2,1	0,65	1,15	0,54
% Emissions from waste disposal in the sanitation sector		88,0%	74,0%	41,0%**
% Sanitation sector emissions in total city emissions	18,3%	18,0%	27,5%	
% Waste disposal emissions in total city emissions	13%		10,57%*	n/a
Year	2017	2019	2015	2012

(Alcaldía de Santiago de Cali, 2020; Fondo Mundial para la Naturaleza WWF et al., 2021; Ministerio de Ambiente y Desarrollo Sostenible, 2015; Secretaría Distrital de Ambiente de Bogotá D.C., 2020; WWF, 2022) The inventories of Bogotá, Cali and Medellín follow the methodology of the IPCC - Basic Report of the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (CPG)

* Year 2022; ** Based on departmental scale measurements.

2.4 Facts and figures about gender equality and women's economic contributions

Since 2013, Colombia has a National Public Policy on Gender Equity, which aims to guaranteeing the integral and interdependent human rights of women and gender equality (Consejo Nacional de Política Económica y Social, 2013). This is led by the Presidential Advisory Office for Women's Equality (Ministerio de Salud y Protección Social, 2023). In 2023, the Ministry of Equality and Equity was created, within its functions are to create public policies and to manage actions that guarantee the closing of gender gaps and violence against women (Senado de la República de Colombia, 2023).

Additionally, since 2019, the Ministry of Environment and Sustainable Development, through its Directorate of Climate Change and Risk Management (DCCGR in Spanish), initiated the mainstreaming of the gender approach in the management of climate change in the country, through the formulation of a Gender and Climate Change Toolbox for the integration of a gender approach in projects, programmes and policies; particularly, in the Nationally Determined Contribution (NDC) and the Long-Term Strategy for Carbon Neutrality and Climate Resilience (E2050).

In 2022, the National Government, together with GIZ, began the formulation and implementation of a Gender and Climate Change Action Plan (PAGCC-CO in Spanish), so that the implementation of the country's mitigation and adaptation goals and measures integrate a transformative gender approach. Thus, guaranteeing the full, effective and substantive participation of organizations from rural, Afro-Colombians and indigenous women in all their diversity, both in the formulation processes and in their implementation and follow-up (Casas Monsegny & Pinilla Orozco, 2022).

Below are some national figures on gender gaps and women's economic participation published 2020 and 2022 by the National Administrative Department of Statistics - DANE and the United Nations Organizations - UN Women (Departamento Administrativo Nacional de Estadística et al., 2020, 2022).

Approximately 26.4 million women constituted 51.2% of the country's population in 2022; 77.7% of women live in municipal capitals. In 2020, 2.5 million women self-identified in some ethnic group and more than 1.5 million women were considered long-term internal migrants, that is, they have suffered processes of displacement within the country.

In 2020, Colombia ranked 22nd out of 153 countries in the Global Gender Gap Index. In 2019, 53.1% of women participated in the labour market, compared to 73.9% of the male population. However, the gap has closed in the last 10 years where women presented an increase in participation of 6.7% compared to a growth of 2.8% in men. In the same year, the unemployment rate for women (22.9 per cent) was higher than for men (13.8 per cent). In the country, 59.7% of the population is employed in informality: 60% in women and 59.3% in men.

In general, women are paid 12.1 per cent less than men and about 30 per cent of women over the age of 15 have no income of their own, compared with 10 per cent for men.

In the country, 77% of domestic work and unpaid work is contributed by women; equivalent to 15% of the Gross Domestic Product - GDP. In general, women spend more than twice as much time as men on these activities. In this regard, stereotypes and discriminatory roles are still in force: about 38.5% of the population agrees or strongly agrees that "a man's duty is to earn money, and a woman's is to take care of the home and family". (Departamento Administrativo Nacional de Estadística et al., 2020). Women are the main income earner in 35 per cent of households.

Finally, DANE and UN Women conclude that "the incorporation of women into labour markets still occurs in disadvantaged conditions that are expressed in greater unemployment and greater informality" and that "despite the importance of women for labour markets, and their proven contribution to the prosperity and efficiency of economies, progress has been slow".

2.5 Awareness for (plastic) waste pollution and climate change

In Colombia and its cities, awareness on waste pollution and climate change origins from three sources:

1. Initiatives led by the National Government through its ministries or dependencies.
2. Territorial strategies addressed by the municipalities, within the framework of the Municipal or District Development Plans and the PGIRS.
3. Initiatives financed with private resources.

The main awareness initiatives identified for each of these sources are presented below, highlighting that it was not possible to obtain information on the specific results achieved in the implementation of these.

From the National Government, there are 4 instruments that seek to promote awareness about climate change, waste, circular economy and plastics:

- The national strategy for education, training and public awareness on climate change: formulated in 2010 with the objective of “establishing guidelines that contribute to the creation of capacities at local, regional and national levels on climate change issues through the implementation, monitoring, support and evaluation of measures that promote access to information, foster public awareness, training, education, research and participation” (IDEAM, 2010).
- The national plan for the sustainable management of single-use plastics, proposes transversal actions for the establishment of a communication and citizen culture program, which seeks the articulation of stakeholders to promote circular economy actions and the management of single-use plastics (Ministerio de Ambiente y Desarrollo Sostenible, 2021b)
- The national plan for communication and citizen culture, which aims to design, implement and update strategies and concrete actions that allow the promotion of sustainable lifestyles, sustainable consumption, integral management of solid waste and direction of productivity and efficiency in production processes within companies, within the framework of the circular economy (Ministerio de Ambiente y Desarrollo Sostenible, 2021a).
- The national guide for the correct sorting of solid waste, which aims to “provide a tool that allows to contribute to the sorting at the source of solid waste at homes, workplaces and others that refer to everyday life, so that they are properly managed through recycling, treatment or final disposal” (Departamento Nacional de Planeación et al., 2022).



At the municipal level, the following strategies were identified:



Bogotá

- Program of “Citizen Culture” in the PGIRS, which seeks to increase knowledge and citizen culture in waste management (Unidad Administrativa Especial de Servicios Públicos - UAESP, 2022).
- Training for entrepreneurs related to the registration process of companies transforming recycled material from packaging, in compliance with Resolutions 1407 of 2018 and 1342 of 2020 on extended producer responsibility (EPR).
- Training for citizens related to sustainable lifestyles that include the responsible consumption of single-use plastic.



Medellín

- Campaign “Tacita de Plata”, which seeks to minimize the inadequate sorting and presentation of solid waste (Alcaldía de Medellín, 2022).



Cali

- Educational campaign “Cali I want you clean”, which aims to raise awareness among citizens about the integral management of waste, aimed at citizens between 15 and 44 years old.



Santa Marta

- It has projects formulated in the PGIRS, for the next 12 years, associated with the awareness and education of users of the public cleaning service for the correct management of solid waste, as well as awareness campaigns on waste management on coastal and riverside beaches (Alcaldía Distrital de Santa Marta, 2022).

The private sector develops awareness activities within the framework of packaging’s collective EPR plans, as well as from companies with their customers and citizens, mainly aimed at promoting the correct sorting of waste and promoting sustainable consumption.

3. Circular economy and reuse in Colombia

3.1 Legal framework and enabling conditions

The legal framework enabling (or limiting) the reuse of packaging varies depending on the product to be contained, the materials of the packaging and the form of commercialization. At the same time, the legal framework originates from two currents of public policy - environmental and health - in which institutions of the international, national and municipal order converge with functions of regulation, execution, surveillance and control.

Reuse, from the environmental current within the framework of the ENEC, is firstly perceived as a strategy to retain the value of materials; and secondly, as an alternative to prevent the generation of waste and reduce the consumption of single-use plastics. At first glance, the incentive for reuse is indirect, since returnable packaging are not subjected to meeting targets in EPR schemes (Ministerio de Ambiente y Desarrollo Sostenible, 2020b). In the second perspective, the National Government promotes packaging return systems and beverage dispenser strategies for reusable bottles, as well as bulk sales in systems where the consumer carries their own packaging (Congreso de la República Colombia, 2022).

From the health point of view, the requirement for having (or not) a notification, permit or sanitary registration, conditions the possibilities of carrying out some practices of reuse of packaging, so before analysing the enabling conditions this concept will be defined:

The sanitary registration is an administrative act issued by the National Institute for Drug and Food Surveillance (INVIMA in Spanish), through which a natural or legal person is authorized to manufacture, process, package, import and/or market a food of high risk for public health intended for human consumption.

Cosmetics, hygiene and cleaning products for domestic use require sanitary registration and, in addition they are governed in their manufacturing practices by technical regulations from the Andean Community (CAN in Spanish) (INVIMA & Ministerio de Salud y Protección Social, 2022). For cosmetics, it is required to ensure the correct cleanliness of (re)filling equipment, as well as to avoid materials corresponding to the previous filling and packaging (Comisión de la Comunidad Andina, 2002, 2018, 2020).

For washing, hygiene and cleaning products for domestic use, INVIMA considered that the model of dispensing bulk products at marketing points (that is, refill models) is not allowed, since it would have to comply with the requirements for the operation of establishments that manufacture household hygiene products and absorbent personal hygiene products since packaging and conditioning are considered stages of the production chain to obtain the finished product. To comply with the above, a visit to certify production capacity must be requested from INVIMA for the facilities where it carries out container filling and conditioning activities (INVIMA & Ministerio de Salud y Protección Social, 2022).

The reuse models for cosmetics and toiletries, hygiene and cleaning products for domestic use are not regulated, so in practice they are carried out as long as the technical manufacturing requirements are met, guaranteeing the correct cleaning and sanitization of the reused packaging.

Food and beverages are only regulated at national level. Those that are directly sold to consumers must have a notification, permit or sanitary registration, except for:

- Natural foods that are not subjected to any transformation process, such as grains, fresh fruits and vegetables, honey and other beekeeping products, “panela” and rice.
- Food from animal origin, raw, chilled or frozen, which has not undergone any processing process.
- Food and raw materials for exclusive use by industry and the gastronomic sector, for example, sauces, jams, biscuits, among others, used exclusively in restaurants and that are part of the menus (Ministerio de Salud y Protección Social, 2013).
- Food produced or imported to the Free Port of San Andrés and Providencia for marketing and consumption within the department (INVIMA, 2023).

No packaging regulations or requirements were identified for meals prepared by restaurants or dining establishments.

Considering the above, natural foods and foods from animal origin not subjected to transformation processes, as well as prepared meals have no restrictions for the implementation of refill or reuse models in B2C markets.

On the other hand, for food and beverages that require sanitary registration, within our knowledge, there are no concepts or regulations that restrict the implementation of reuse practices, except in the case of plastics, for which reuse is prohibited unless authorized by INVIMA (Ministerio de Salud y Protección Social, 2012a, 2012c).

Following the logic of the concepts issued by INVIMA for cosmetics and hygiene products, it is presumable that for food and beverages that require sanitary registration, compliance with the technical requirements for a linear chain of manufacturing must be guaranteed, ensuring adequate cleaning and sanitization in packaging and conditioning both in refill and reuse models.

Food, beverages and toiletries, hygiene and cleaning items for industrial use, with the exception of detergents and fabric softeners for industrial laundry marketed in the B2B segment (Comisión de la Comunidad Andina, 2008), do not require sanitary registration, so the practices associated with the reuse of packaging are not restricted in any way.

A hygiene and cleaning product for industrial use must meet the following four requirements (Ministerio de Salud, 1998):

- The market is not aimed at household cleaning products.
- The distribution and marketing system are aimed at the industrial sector.
- The composition of the product in amount of active ingredient is different in terms of concentration.
- It is used through specialized machines and equipment.

Regarding the materials used in packaging, since 2012, the Ministry of Health and Social Protection allowed the reuse of glass or plastic only if there are technologies for returning containers (reuse models), which include the logistics for their recovery, the detection of contaminants, their cleaning and sanitation, as well as the evaluation of their sanitary suitability and safety (Ministerio de Salud y Protección Social, 2012a).

There are no explicit restrictions on the reuse of metallic packaging, however, food and beverages must be validated with stability testing, to ensure that the safety and sensory properties of the product are maintained during the shelf life of the product. Tests that support the shelf life of the finished product must be performed and are the responsibility of the packaging manufacturer and the food and beverage producers (Ministerio de Salud y Protección Social, 2012b). No requirements associated with cosmetic or grooming, hygiene and cleaning products were identified for this type of packaging.

INVIMA establishes the migration tests and verifies compliance with the total and specific migration limits of materials, containers, objects and equipment used for food and beverages.

The study did not identify any regulations that restrict the reuse of secondary packaging.

3.2 Inventory of reuse solutions

There are initiatives in all different categories of reuse models. Regarding the operation, it is observed that several modalities are applied at the time of purchase, both for refill and reuse. When purchasing a product in a reusable packaging, examples are a deposit system based on a digital application (e.g. Xiclo) or discount on the next purchase (e.g. Ocre Natural Cosmetics). For the return of the reusable packaging, there are return points in large retailers (e.g. Grupo Éxito - Coca Cola) or a collection service at the customer's home is offered (e.g. Alfe Aseo).

National Initiatives

Name	Xiclo
Hotel Area	Bogotá
Model	Reuse at home and on the go
Description	Packaging for prepared meals. The dispatch is carried out directly by the restaurant and Xiclo performs the reverse collection through optimized and automated routes.
Material	Stainless steel, PP and plastic resin
Indicators	<ul style="list-style-type: none"> • 800 pieces in use. • 100% return rate. • 5,000 people registered in APP. • 11,500 packages avoided since 2022. • Distribution of work 50% men and 50% women.
More information:	https://xiclo.app/

Name	Alfe Aseo
Location	Bogotá and Barrancabermeja
Model	Reuse at home and on the go
Description	Reuse of containers used for marketing soaps, detergents and other hygiene products used in industry.
Material	Plastic
Indicators	<ul style="list-style-type: none"> • 4 to 10 cycles per container. • 6 jobs created. • 115 thousand plastic containers avoided in the last 3 years. • Distribution of work 50% men and 50% women.
More information:	https://alfeaseo.com

National Initiatives

Name	Agua Siembra
Hotel Area	Bogotá
Model	Reuse at home and on the go
Description	Bottled mineral water, which is sold in glass containers and plastic jugs.
Material	Plastic and glass
Indicators	<ul style="list-style-type: none"> • 155 thousand containers sold per month. • 30 to 35 cycles of use per bottle. • 24 jobs created. • Distribution of work 58% women and 42% men.
More information:	https://www.aguasiembra.com

Name	Vytal
Location	Bogotá and Santa Marta
Model	Reuse at home and on the go
Description	System of containers and reusable packaging for prepared meals, replacing single-use plastics in restaurants.
Material	Polypropylene & Metal
Indicators	Pilot initiative.
More information:	https://en.vytal.org

Name	Lava
Hotel Area	Bogotá
Model	Reuse and refill at home and on the go
Description	Sales of cleaning products in reusable plastic containers for industrial use.
Material	Plastic
Indicators	<ul style="list-style-type: none"> • 6,000 containers in use per year. • Return rate of 24%. • 10 to 15 cycles of use per container. • 6 jobs created. • owned by a woman.
More information:	https://www.instagram.com/lavaagranel/

Name	Coco Natu
Hotel Area	Medellín
Model	Reuse at home and on the go
Description	Sales of artisanal coconut milk in returnable bottles of 400 ml and 1 litre.
Material	Glass
Indicators	<ul style="list-style-type: none"> • Return rate of 70%, with two-year old containers still in use. • 30 weekly customers. • 7 jobs created. • 50% owned by a woman.
More information:	https://www.instagram.com/lechedecoconatu/

Name	Pepsico
Location	National
Model	Reuse on the go
Description	Return of boxes used to distribute food products from stores.
Material	Cardboard
Indicators	<ul style="list-style-type: none"> • Up to 5 cycles of use per box. • Return rate of 95%; 70% of the returned boxed is reused and the rest goes to recycling. • In 2022 at the Latin American level: 98.5 million cardboard boxes returned; 1 million trees saved, and more than 3000 million litres of water saved in the production process of the boxes
More information:	https://www.pepsico.com.co/que-creemos/sustainability-reporting

Name	Grupo Éxito/Coca-Cola
Location	National
Model	Reuse on the go
Description	Pilot project to promote the reuse of plastic Coca-Cola bottles.
Material	Plastic
Indicators	Pilot being conducted.
More information:	https://www.grupoexito.com.co/es/noticias-grupo-exito/el-sistema-coca-cola-y-grupo-exito-sellan-su-primera-alianza-de-impacto-sostenible

National Initiatives

Name	Nutrium (Postobón)
Location	National
Model	Reuse at home
Description	Distribution of fruit pulp in returnable metal drums for the B2B market
Material	Metal
Indicators	<ul style="list-style-type: none"> • Use of 20 to 25 thousand drums per year. • Up to 5 cycles of use per drum. • Of the returned drums, 80% go directly to reuse, the remaining goes to reconditioning or recycling.
More information:	https://nutrium.com https://www.postobon.com

Name	Alpina
Location	National
Model	Reuse at home
Description	Reuse of baskets or crates in logistics processes, in which they transport and distribute their products to supermarkets, chains or stores.
Material	Plastic
Indicators	<ul style="list-style-type: none"> • 20 cycles per basket, with a lifetime of 2.5 years (each cycle lasts approximately 40 days).
More information:	https://alpina.com

Name	Decameron Hotels
Location	National
Model	Reuse on the go
Description	Use of reusable cups in bars and restaurants, replacing single-use plastics.
Material	Polycarbonate
More information:	https://www.decameron.com/es/co-inicio

Name	Natural Cosmetic Ocre
Hotel Area	Medellín
Model	Reuse and refill at home and on the go
Description	Sales of cosmetics in (i) (secondary) wooden packaging with refills in primary bioplastic packaging and (ii) in returnable glass containers.
Material	Wood
Indicators	<ul style="list-style-type: none"> • 30% return rate in glass. • More than 1,000 refills for wooden packaging sold per year. • Return is incentivised with a 5% discount on returns at points of sale and 10% on shipments. • Owned by a woman.
More information:	https://ocrecosmetica.com

Name	Etnia Colors
Hotel Area	Bogotá
Model	Refill at home and on the go
Description	Sales of cosmetics in wooden packaging with an aluminium tray that has the main contact with the product. Once consumed, the trays are recycled and the wooden packaging is refilled with a new aluminium tray.
Material	Wood
Indicators	<ul style="list-style-type: none"> • 18 years of implementation. • Refills are performed every 4 months on average. • Sale of 100 units per month. • Owned by a woman.
More information:	https://www.instagram.com/etnia.colors.cosmetics

Name	Atávico
Hotel Area	Cali
Model	Refill and reuse at home
Description	Online sales of bulk food products (legumes, nuts, condiments, flours, among others).
Material	Glass
Indicators	<ul style="list-style-type: none"> • 417 bags and 27 plastic bottles avoided in 6 months. • Initiative developed by 2 women.
More information:	https://www.tiktok.com/@atavicogranel/

National Initiatives

Name	Jerónimo Martins
Location	National
Model	Refill on the go and reuse at home
Description	System that supplies water for 5-litre bottles. And reuse of plastic boxes at stores.
Material	Plastic
Indicators	Up to 20 cycles of use per PET container.

Name	Mottanai
Hotel Area	Medellín
Model	Refill on the go
Description	Refill of cleaning and hygiene products.
Material	Plastic
Indicators	<ul style="list-style-type: none"> • More than 1000 plastic containers avoided in one year. • 3 jobs created. • 1 woman owns 50%.

More information: <https://www.mottainairello.com>

Name	Vida Simple Granel
Hotel Area	Medellín
Model	Refill on the go
Description	Sales of bulk products (flours, dehydrated fruits, oils, granolas, among others). The customers refill in their own packaging or those sold by the store.
Material	Glass & Paper
Indicators	<ul style="list-style-type: none"> • 7 jobs created. • Distribution of work 86% women and 14% men.

More information: <https://vidasimplegranel.com>



© Freepik | This image serves as a representative image of the described product.

3.3 Awareness for circular economy and reuse of private and public sector and general public

No activities were identified from the public sector for the specific promotion of reuse. As discussed in the [chapter 2.5](#), the strategies of local governments are fundamentally oriented to the correct management of waste.

From the private sector, awareness strategies come from the enterprises and industry initiatives that are currently implementing some model of reuse. This awareness is about their product or service, and it consists mainly of publications on social networks or at customer service points where the environmental and economic benefits and the way of operation are explained.

3.4. Challenges for implementation

The studied cities (Bogotá, Medellín, Cali, and Santa Marta) face a series of common challenges regarding solid waste management. These are mainly related to low recycling rates, inadequate sorting, and presentation of waste by citizens, limited useful life of final disposal sites (except Cali), and low indicators citizens' awareness and culture. This situation directly influences the sector's GHG emissions, which have increased in absolute terms and in their share of total municipal emissions over time.

One of the main causes of the aforementioned problems is the indiscriminate use of single-use packaging. This is reflected in its share of around 50% in the waste generated, which ends up mostly in landfills thanks to the persistence of low rates of recycling; thus, representing a leakage of materials from the economic system. Undeniably, it is essential to design and develop strategies to manage packaging in more sustainable and circular ways such as reuse.

Despite this clear need, currently, there are barriers to the development of reuse models from the regulatory (environmental and health/sanitary), economic, logistical, technological and social points of view ([Table 4](#)).

At the health level, cosmetic, hygiene and cleaning products for domestic use have the greatest restrictions. These are regulated by an international framework from the Andean Community (CAN in Spanish) from 2002 that neglects the reuse of packaging and restricts (re)filling activities at points of sale. Consequently, the existing refill practices for these products make use of or sell the product in a second primary packaging, which may be of lower quality and/or more difficult to recycle. The refill product can be (i) of higher concentration for dilution at home by the user in another reusable primary packaging, or (ii) of equal concentration to be refilled at home in a secondary packaging. The second situation was observed in the cosmetic products' initiatives "Ocre Cosmética Natural" and "Etnia Colors". Returnability practices operate primarily on the go, with the consumer being responsible for returning the packaging at the initiative's points of sale.

The food and beverage sectors operate under a national legal framework. The sanitary regulations do not mention refilling of food and beverages, but it does explicitly enable reuse for these goods in glass and plastic; plastic only with authorization from INVIMA. This restriction for plastics, added to the growing negative perception about this material has led initiatives such as "Coco Natu" to choose glass, which is more expensive, more difficult to collect and with the potential to cause a greater impact to climate change in transport processes (Ferrara et al., 2021).

The reuse of metallic packaging or cellulosic materials is not regulated. Natural foods (e.g., grains and fruit) and foods from animal origin not subjected to transformation processes as well as prepared meals (in restaurants) have no restrictions for the implementation of reuse models as these are products that do not require sanitary registration.

In practice, refill initiatives were observed at home – Atavico – and on the go – Vida Simple – in natural foods at points of sale. For prepared meals, there exist reuse initiatives at home and on the go – Xiclo. However, it should be noted that for natural foods in bulk, the National Government is still pending for regulating the technical criteria of the containers that producers must fulfil to perform the refilling.

In summary, from the sanitary perspective, the possibility of developing packaging reuse practices for the B2C market is highly restricted, mainly because it has been poorly addressed both nationally and in the region. In general, different reuse models are not considered and there are no specific regulations for packaging of different materials according to these models and different types of products to be contained. This situation has led to:

- The cessation of refill initiatives for cosmetic products; situation expressed by Grupo Éxito
- The change of business models (from refill to reuse); situation evidenced in the field for the Kip Clin initiative.

These aspects limit companies and investors to scale initiatives, since on multiple occasions there is a generalized lack of knowledge about the regulations. Even for enterprises it is difficult to recognize if their practices strictly comply with the regulations, operate in an unregulated market or are informal.

At the sanitary level, B2B markets present no barriers to the development of packaging reuse models. During the study, the following reuse practices were documented in the food industry: tertiary packaging by Alpina (plastic baskets) and Pepsico (cardboard boxes) and primary metal packaging by Postobón-Nutrium. Returnability at home is common in the cleaning products sector (e.g., Alfe Aseo y Lava).

At the environmental and economic level, national regulations have evolved in the reverse direction of the waste management prioritization pyramid, that is, from the base to the top, starting with the final disposal of waste and more recently including recycling. However, the country lacks concrete actions that favour reuse practices. While it is internationally understood that reuse can have economic advantages (Peeters et al., 2007), today, companies in Colombia have no incentive to prioritize the selection of reusable packaging and overcome the following barriers:

- The high cost of reusable packaging, when compared to single-use packaging,
- The high initial cost of implementing infrastructure and additional logistics processes (e.g., storage, return, washing/sanitizing and backfilling),
- The development of packaging traceability and information management systems, which are additional requirements with respect to the use of single-use packaging.

All these costs imply an increase in the final value of the product in reusable packaging with respect to linear alternatives, limiting the access of the population with lower purchasing power, the largest population segment in the country. This is concerning, even more so, when considering that the implementation of reuse practices is taking place mainly by micro, small and medium enterprises with limited scaling capacity. The exception is the reuse models implemented in the country by large soft drink and beer companies for several decades already.

Currently, there are no standardized information systems that facilitate the collection and analysis of reusable packaging data, limiting the capacity for planning and operation, as well as for evaluating the environmental and health impact of existing models. In short, the capacity for informed decision-making by the government sector and the initiatives themselves is limited. Currently, the initiatives lack technological solutions that allow process optimization such as: information systems to guarantee the traceability of packaging, optimization of reverse collection routes in reuse models, efficiency in packaging washing and reconditioning systems and management of greater storage infrastructure required for reuse models. In addition, it was observed that most of the initiatives do not address hidden aspects or costs such as: avoided packaging, substituted materials, materials saved, distances, consumption in washes, reuse rate, job creation, cycles, useful life, carbon emissions, among others.

Among the barriers identified, those associated with operational and logistical aspects stand out. Supply chains are lacking or inefficient, especially in glass and metallic packaging. The production and recycling of glass is monopolized at the national level, so access to this material is neither equitable nor reliable. Some metal packaging are not domestically produced, so initiatives must import their packaging inventory.

Sociocultural barriers were also identified, which are transversal to the whole value chain of reuse. These are mainly associated with the lack of knowledge by stakeholders of all groups about the concepts of reuse (and models), reuse and refill. Reuse tends to be interpreted as the recycling of waste. Regarding reuse, it was observed that some initiatives of EPR programs of packaging use the term reuse to refer to the collection of packaging for recycling purposes, which conflicts with the application of the concept of reuse in a reuse scheme.

On the other hand, reuse initiatives repeatedly expressed a lack of knowledge, awareness and commitment from the users and stakeholders involved – commerce, government, associations, academia – for the implementation of reuse models and the promotion and development of adequate maintenance practices necessary to extend the useful lifetime of packaging. The stakeholders also stated that consumers lack appropriation of sustainability criteria in decision-making processes, prioritizing economic aspects, where single-use packaging are clearly favoured due to its low cost. All this restricts the acceptance and adoption of new consumption patterns and products with a circularity approach.

In this sense, it was evidenced that the management of those packaging of high value in the market face an additional barrier associated with their theft for use and/or commercialization in other sectors or industries; thus, creating a need for new inventories. This happens mainly with tertiary packaging in the B2B market when the handling of the baskets is in the hands of third parties (e.g., transport operators, retailers, etc.). This case was documented by Alpina with its plastic baskets.

Finally, there is evidence of a low brand positioning of existing reuse initiatives and a low level of research, innovation, or technological development in the sector. Only one project focused on research and development of reusable packaging was found; “Alianza Circular”, led by the University of Antioquia.

It is highlighted that for the B2B market there is no specific regulation around packaging.

The challenges described are summarized in [Table 4](#). These need to be addressed comprehensively by all parties in the country to enable and promote reuse effectively. Regulatory challenges must be managed by the public sector, led by the Ministry of Environment and Sustainable Development and the Ministry of Health and Social Protection. Operational and logistical challenges will need to be addressed and led by industry and enterprises facing similar barriers. Finally, the challenges at the governance, socio-cultural and economic and financial levels should be addressed with differentiated efforts by all stakeholders involved in the value chain of reuse, that is, contributions from the government sector at national and local level, industry and entrepreneurship, academia, associations, and citizens in general.

Table 4. Challenges for the implementation of reuse in Colombia

Type of Challenge	Description
Normative	<p>Design a regulatory scheme that promotes and regulates in sanitary and environmental terms the implementation of the different models of reuse in Colombia, including the following aspects:</p> <ul style="list-style-type: none"> • Enable packaging reuse practices for food and beverages in materials other than glass and plastic. • Enable practices of reuse and refill of packaging, at home and on the go, for cosmetic, hygiene and cleaning products for domestic use, which are not considered in Decisions 516, 706, 721, 833 and 857 issued by the Commission of the Andean Community for this type of articles. • Standardize information management for the tracking and traceability of packaging. • Establish responsibilities of users in the management of packaging. • Incorporate incentives (technical, operational, financial, tax, among others) that encourage the adoption and operation of the models. • Formulate regulations with differentiated approaches according to the health risk posed by the product and the packaging material that contains it (sanitary and microbiological conditions may change depending on the components). • Establish regularization plans for those initiatives that currently operate under partial or total regulatory breaches.
	<p>Regulate Law 2232 of 2022 “By which measures are established aimed at the gradual reduction of the production and consumption of certain single-use plastic products and other provisions are dictated”, especially in aspects related to the development and implementation of sustainable alternatives and bulk sales, through which the market for the reuse of packaging can be promoted while discouraging the consumption of products of single use.</p>
	<p>Promote from and for the different stakeholders (citizenship, commerce, industry, academia, national, regional and local public sector) the development of packaging reuse models at a higher level than recycling, according to the hierarchy in the “waste management pyramid”. For this, it is necessary that the concept gets incorporated, among others, in the PGIRS.</p>
Economic/Financial	<p>Develop markets at scale to optimize CAPEX, the financial rate of return and the financial sustainability of initiatives, since the investment in packaging inventory, washing stations, enabling stations for reuse schemes and refill systems is high.</p>
	<p>Reduce CAPEX and OPEX costs with the aim of reaching lower income markets where most of the population is positioned.</p>
	<p>Enable conditions and promote access to funding for initiatives that work under reuse models.</p>
Governance	<p>Generate trust and articulate work with surveillance and control entities.</p>
	<p>Give continuity and strengthen the circular economy strategies and initiatives that have been carried out by the territorial entities addressed in the study.</p>
	<p>Promote the articulation and linkage of different productive sectors as allies for the rapid establishment of reuse practices (mass events, restaurants, among others).</p>
Cultural	<p>Enable market conditions that facilitate the adoption of practices around reuse, addressing aspects such as:</p> <ul style="list-style-type: none"> • Changes in consumption habits, especially in the development of good handling practices inherent to reuse, which may include washing, displacement for return / refill and care of packaging by users, logistics operators and other stakeholders involved in the value chain to ensure its durability and efficiency in its life cycle. • Appropriating sustainability criteria in economic decision-making processes. • Improve the perception and receptivity of users to new materials. • Facilitate the incorporation of the different sectors, overcoming the barrier of high informality of the national market.
	<p>Develop education processes that allow appropriation of the concepts of reuse, reuse and refill, clearly differentiating them from the concept of recycling.</p>

Type of Challenge	Description
Cultural	Address cultural processes that facilitate knowledge about the origin and destination of packaging, the products it contains and the “demonization” of plastic.
	Overcome the barriers associated with packaging theft of high commercial value and demand in other industries in the country.
Operational/logistic	Establish supply chains that ensure a constant and efficient flow of inputs, products and packaging required for reuse models, with special emphasis on processes associated with glass (monopoly) and packaging that do not have national production.
	Structure information systems that guarantee the traceability of the packaging, which, through monitoring and control actions, allows verifying the conditions of reuse, cycles of use or refill, indicators, and labelling, among others.
	Generate capacities for the articulation of stakeholders and the improvement of technical, financial and operational conditions around the optimization of routes for reverse collection, washing systems, packaging reconditioning and the management of other types of infrastructure required at the operational level.
	Optimize and manage packaging storage spaces, since they generally occupy a volume greater than that required for single-use containers.
	Develop marketing strategies for the brand positioning of those initiatives that carry out packaging reuse practices.
	Promote research, innovation and industrial technological development to ensure efficiency and safety in the packaging filling and washing processes, as well as greater durability.

3.5. Sector analysis for the implementation of reuse solutions

Analysing the enabling conditions, it is possible to conclude that reuse practices in B2B markets have fewer restrictions or are less controlled than B2C practices. Additionally, reuse models both at home and on the go have more favourable conditions for their development than refill models. [Table 5](#) summarizes for both markets, the packaging reuse models, products and materials with fewer regulatory constraints.

The B2B market presents the main opportunities for the development of packaging reuse through both reuse and refill models. The legal framework enables the implementation of actions in food, beverages, cosmetics, hygiene and cleaning products for industrial use. Additionally, this market allows for faster progress in fundamental aspects such as:

- The education and awareness to the user that intervenes directly with the packaging, because at the industrial level, the implementation of handling and care protocols can occur at a higher speed than in the B2C market; and
- The development of operational and logistical alliances, for the benefit and optimization of routes for reverse collection, washing systems, packaging reconditioning and management of storage spaces, thanks to the management capacity in intersectoral relations and at the association level.

Table 5. Sectors with lower regulatory barriers to the development of reusable packaging systems

Market	Reuse models	Types of packaging	Sectors/products	Packaging Materials
B2C/B2B	Returnability at home	Primary	Foods	Glass
	Returnability on the go		Beverages	Metals
			Cleaning and hygiene (domestic use B2C and industrial use B2B)	
B2C			Prepared meals (B2C only) Cosmetics (B2C only)	Plastic (with restrictions for B2C for food and beverages)
B2B	Refill at home (B2B only)	Secondary (B2B only)		
	Refill on the go (B2B only)	Tertiary (B2B only)		

On the other hand, the B2C market presents disadvantages for the implementation of reuse and refill practices in primary packaging, both at home and on the go, as it operates under a highly demanding and unclear regulatory framework that results in high costs, and in certain cases, in an environment of legal uncertainty. In this market segment, refill practices encounter greater barriers than reuse practices, mainly in cosmetics and household hygiene and cleaning products. Additionally, there are restrictions on the use of reusable plastic packaging in food and beverages.

Some unprocessed foods do not require sanitary registration, so their bulk sale is enabled in refill models, making this modality a common practice. Similarly, ready meals do not have restrictions for the development of packaging reuse models.

Furthermore, the success of B2C models depends fundamentally on the large market volumes that can impact. In this sense, two difficulties are foreseen:

- The first one is associated with the cultural immaturity of the market, which has developed patterns and consumption habits contrary to those required for decision-making and the execution of good manipulation practices in reuse models, aspects that require long-term management for their change.
- The second one is of economic nature. The high informality in the country and, to some extent, the low culture in sustainability issues leads to the most economical alternatives being prioritized.

Both situations have a direct impact on the high investments and long development times required to consolidate markets and significant and economically sustainable operational and logistical conditions for reuse practices.

Demand for packaging is dominated by four sectors: toiletries (29%), retail, restaurants and hotels (23%), food (22%) and beverages (17%). In this sense, a greater impact can be achieved in B2C markets by prioritizing reuse models for the cleaning and prepared meals sector, which also have fewer restrictions regarding the type of material used in packaging.

Moving forward, both in the B2B and B2C markets, requires addressing the challenges described in the previous section in a way that allows building with foundation and with a long-term vision the conditions required for the definitive and massive implementation of packaging reuse models. In all circumstances it is important to consider that the challenges apply to all reuse models.

To overcome the barriers identified in the study and to move towards the consolidation of reuse practices in an efficient and sustainable manner, it is recommended to establish a relationship of trust and cooperation with the surveillance and control agencies (INVIMA and health secretariats), strengthen circular economy strategies at the city level and promote alliances with different productive sectors. Initiatives such as “Bogotá Circular” and “Cali Circular” or institutions such as Ruta N in Medellín can help to coordinate stakeholders.

4. Gender equality and women's participation in the Colombian economy

4.1 Legal framework and enabling conditions

The four cities of the study have public policy and territorial management instruments on women and gender, as follows:



Since 2010, **Bogotá** has a Public Policy on Women and Gender Equity led by the Women's Secretariat (Alcaldía Mayor de Bogotá DC, 2010, 2021).



Medellín formulated the Public Policy for Women's Gender Equality in 2018 (Concejo de Medellín, 2018). This is led by the Women's Secretariat.



Cali, in 2022, adopted the Public Policy for Women 2022 – 2031, implemented by the Undersecretariat of Gender Equity (Concejo Distrital de Santiago de Cali, 2022).



Santa Marta, in 2014, formulated the Public Policy on Women and Gender Equity, led by the Secretariat of Women and Gender Equity (Alcaldía de Santa Marta, 2021).

Challenges that women's public policies seek to address include discrimination, subordination and exclusion based on gender, ethnicity, religion, sexual identity or political status, equal opportunities and gender equality. The strategies are diverse – education, access to opportunities, political participation, associativity, strengthening on productivity and financial autonomy – but with particular emphasis on violence against women (femicide and mistreatment).

Faced with the circular economy and the reuse of packaging, it is observed that these are not aspects considered in the management and public policy instruments on gender and women. Nor were gender studies identified for the sector to understand women's economic participation and/or gender gaps.

Women's participation in the economy at the national level was described in the [Chapter 2.4](#), which concludes that women's labour participation and remuneration is lower than that of men, yet the unemployment rate is higher. In 2022, the share of women employed in branches of the economy relevant to reuse was approximately 74% in accommodation and food services, 51% in manufacturing and 33% in electricity, gas, water and waste management.

From the private sector, it was observed that the reuse initiatives do not have specific policies for women or gender equality. Only in large industries (e.g., Grupo Éxito) there exist some related policies, for example, in terms of inclusion.

4.2. Women's participation in reuse: challenges and barriers

The absence of gender-specific policies in the reuse and circular economy sector was not observed as a shortcoming. All interviewees agreed that the reuse sector does not show gender gaps associated with women's opportunities and participation. The prevalence of stereotypes regarding women's roles in the sector was also not observed.

These observations are corroborated by the findings of the study which show that women have on average a participation of 69% in jobs, 74% in managerial positions and 70% in the ownership of reuse initiatives that were characterized and that have available information at this level.

In this sense, the conditions of the sector are equitable and even more favourable for the economic participation of women and their performance in leadership roles. A situation that opens an opportunity to position the sector as a significant contributor to closing gender gaps in the country, noting the importance of reuse not only in environmental and economic aspects but also in social aspects. For CCL, it represents favourable conditions to contribute to the growth of a sector with good opportunities for women.

5. Stakeholders for reuse systems in Colombia

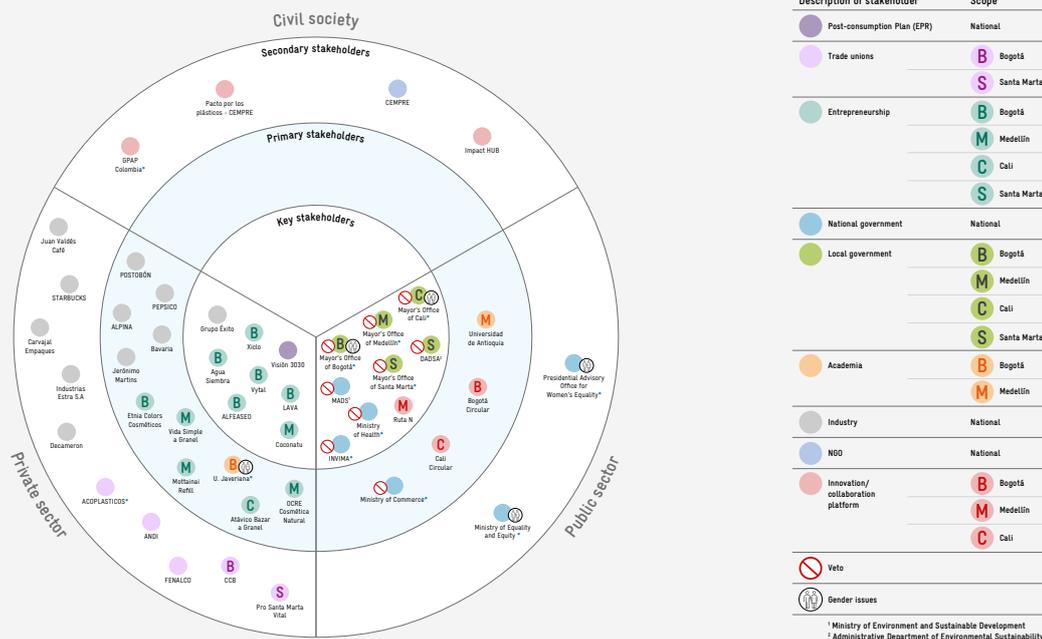
All relevant stakeholders (contacted and identified) for reuse and the CCL project are presented in the stakeholder map (Image 4). The diagram is divided firstly into three sections (public, private and civil society) depending on the nature of the stakeholder, and secondly into three levels (key, primary and secondary stakeholders) that represent the importance of the stakeholder towards reuse, as follows:

- Key stakeholders: those who can use their skills, knowledge, or position of power to significantly influence a project. They are usually involved in decision-making within a project.
- Primary stakeholder: those who are directly affected by the project, either as designated beneficiaries or because they may gain or lose power and privileges as a result of the project. This category includes those who are adversely affected by the project.
- Secondary stakeholder: whose participation in the project is only indirect or temporary, as is the case, for example, with service providers.

Likewise, it is evident if the stakeholder has the capacity to veto the development of reuse activities, with the symbol . If the stakeholder is relevant to gender issues, it has the symbol . The geographical location of the stakeholders is represented by a symbol for each city as illustrated by the legend located on the right of the image. The nature of the stakeholder is described through the use of colours. On the other hand, a  at the end of the stakeholder's name indicates that it was not characterized but referenced due to its importance in the subject.

The stakeholder map can also be viewed on a larger scale in [Annex 2](#).

Image 4. Map of stakeholders



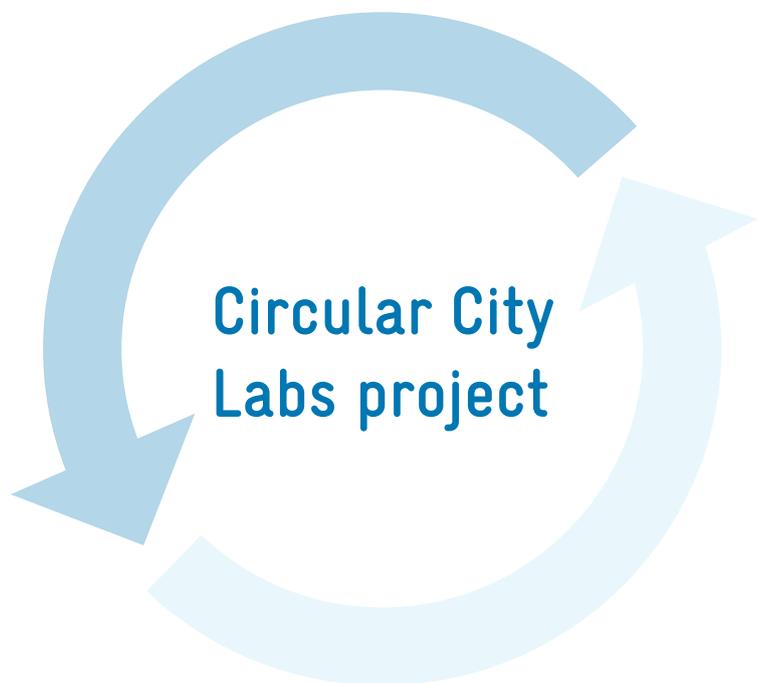
In terms of gender, all municipal mayor's offices have a unit – secretariat or undersecretariat – responsible for women's and/or gender affairs.

In terms of innovation, the study only identified one initiative in Medellín led by the University of Antioquia consisting of a research project for innovation in the reuse of packaging.

In terms of circular economy networks and processes, the existence of a platform of local stakeholders led by local governments in Bogotá and Cali was documented.

At the public level, local governments are fundamental stakeholders to articulate processes around reuse and participation of women.

All the stakeholders characterized expressed their interest in collaborating with the CCL project.



6. Conclusion

As a conclusion, an analysis of the opportunities in the studied cities for the promotion and development of reusable packaging systems is presented in this chapter. This analysis considers findings on enabling conditions, implementation challenges and stakeholder ecosystem, as well as the selection criteria, private sector engagement, public sector support, awareness and environmental concerns, gender equality, and collaboration. It is understood that the cities start from different socioeconomic realities. In this sense, the rating does not aim to qualify one city as better or worse than another.

Bogotá is the reference city, as well as the most propitious at the national level for the implementation of packaging reuse practices. There, the largest number of B2C initiatives and representativeness of sectors was identified, mainly in the reuse model, as follows: reuse in prepared meals (Xiclo), reuse in beverages (Agua Siembra and Grupo Éxito / Coca-Cola), reuse in cleaning products (Alfe Aseo and Lava) and refill in cosmetics - Etnia Colors. Of these applications, the reuse in prepared meals and hygiene products stand out due to fewer barriers to their development as highlighted in [table 6](#).

Additionally, from the institutional point of view, the local government is working on the consolidation of the “Bogotá Circular” strategy, along and coordinated with stakeholders from different sectors of society. This could serve as a platform to mobilize reuse in the city. Furthermore, the presence of the National Government in the country’s capital is also favourable, considering that many of the barriers to be overcome involve regulatory development. All this, added to the intention of all local stakeholders to collaborate with CCL, shows the existence of an adequate ecosystem for working on reuse.

Medellín is the second city to suggest for having an ecosystem of stakeholders that can facilitate the development of synergies and the implementation of projects associated

with reuse. In this city, different reuse initiatives are implemented as follows: reuse and refill of cosmetics (Ocre Natural Cosmetics), reuse in beverages (Coco Natu) and refill in hygiene products (Mottanai). Ocre Cosmética Natural is the only cosmetics’ initiative that operates a reuse model (for glass). Of the models in Medellín, reuse in cosmetics, followed by reuse in beverages are the applications that present fewer barriers to their development (see [Table 6](#)). It is noteworthy that there was no evidence of reuse models for prepared meals, a sector with low restrictions for the development of reuse models.

The actions carried out by the municipal institution Ruta N stand out, especially in its institutional capacity to facilitate relations and identification of stakeholders from different sectors. Likewise, the University of Antioquia stands out for being a pioneer in the country in the leadership and development of the research and innovation project in reusable packaging “Alianza Circular”, which runs from 2022 to 2026, and has funding from the General System of Royalties. Finally, the Government of Antioquia and the Mayor’s Office of Medellín have been carrying out actions around the formulation or implementation of Public Policies in Circular Economy that can serve as support and administrative public foundation.

It is noteworthy that, for both Bogotá and Medellín, the dynamics beyond their geographical limits should be considered and analysed, since both are part of conurbations with many municipalities that have a high influence on the flows of matter and energy of these urban centres. In that sense, it is recommended to analyse the Metropolitan Region Bogotá – Cundinamarca and the Metropolitan Region of the Aburrá Valley. Also, because the relations in the B2B market tend to have regional and national scope.

With respect to the cities of Cali and Santa Marta, it is considered that favourable scenarios that facilitate the rapid implementation of circular strategies focused on the

reuse of packaging are still immature due to the low presence of reuse and refill initiatives, as well as the lack of a mature ecosystem of stakeholders. Although Cali has implemented circularity actions from the municipal administration – Cali Circular –, these scenarios have not yet discussed or included reuse issues in their roadmap.

It is important to mention that in October 2023 new mayors have been elected in all cities. The term of the new government will begin in January 2024 and will end in December 2027. This implies that in the months of November and December 2023 there will be a hand-over processes between the outgoing and incoming administrations. Likewise, the new governments will formulate their Municipal Development Plan during the first half of 2024. These periods present an opportunity to consolidate the continuity of circularity strategies and processes that are being carried out in some cities, as well as to position reuse in the government plans of the next 4 years.

All cities have a similar platform from the public sector for the promotion of women's rights and gender equality.

In Bogotá, Medellín and Cali, women leaders of reuse solutions were identified who can act as role models, as follows:

Table 6. Women-led reuse initiatives – role model

City	Reuse model	Sector	Initiative
Bogotá	Returnability at home and on the go	Prepared meals	Xiclo
	Refill and reuse at home and on the go	Industrial cleaning	Lava
	Refill at home and on the go	Cosmetics	Ethnic Colors
Medellín	Filling on the go	Cleaning	Mottanai
	Refill and reuse at home and on the go	Cosmetics	Ocre Coméstioca Natural
Cali	Refill and reuse at home	Bulk food	Atávico

It is important to bear in mind that once the sector is chosen, it is recommended to carry out a market study to verify the potential for scalability.

On the other hand, CCL must consider that the regulatory framework is complex and both consumers and producers are not familiar with these regulations. Effective collaboration with the institutions that create the standards and the possibility of having the support of initiatives related to the subject must be generated.

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Annex

Annex 1 – Definitions

Below, we present a list of definitions of the concepts relevant to understanding the scope and results of the study. Some concepts are defined by different institutions, mainly the Ministries of Health and Environment, so Table A1 distinguishes between these and other sources.

Table A 1. Definitions about packaging, reuse, and products

Concept	Ministry of Health and Social Protection	Ministry of Environment and Sustainable Development	Other sources
Packaging	<p>Elements that allow for the protection of primary packaging from external influences and ensure proper maintenance and storage. This includes secondary and tertiary packaging.</p> <p>(Ministerio de Salud y Protección Social, 2013).</p>		
Packaging			<p>Material that protects the packaging and serves commercial purposes, with its primary objective being to protect the product, the packaging, or both, and can also serve as a promoter of the item within the distribution channel. It may be composed of various types of materials.</p> <p>(Cámara de Comercio de Bogotá, 2019).</p>
Containers			<p>Any container in which products and/or goods are preserved, transported, and sold. Based on their function, they can be classified as follows: primary packaging, secondary packaging or packaging, tertiary packaging or packing, and unit of load.</p> <p>(PROCOLOMBIA, 2016).</p>
Primary packaging	<p>An item that is in direct contact with food, intended to contain it from its manufacture until delivery to the consumer, with the purpose of protecting it from external agents of alteration and contamination. The components of the primary packaging, namely, the main body and closures, may come into direct or indirect contact with the food.</p> <p>(Ministerio de Salud y Protección Social, 2013).</p>	<p>It is the first-level or innermost one, meaning it is in direct contact with the product. It is the minimum packaging unit that is maintained from manufacturing to the final link in the supply chain, which is the consumer.</p> <p>(Ministerio de Ambiente y Desarrollo Sostenible, 2018).</p>	<p>Container or rigid or semi-rigid structure designed to contain or store liquid or solid products, finely divided such as granules, powders, flakes, fats, or liquids like water, pharmaceuticals or veterinary products, homeopathic remedies, cosmetics, spirits, beverages, food, oils, in materials such as glass, metal, plastic, intended to contain a specific substance or item.</p> <p>(Cámara de Comercio de Bogotá, 2019).</p>
Middle-level packaging – secondary packaging	<p>Article designed to provide additional protection to the food contained in a primary package or to group a specific number of primary packages.</p> <p>(Ministerio de Salud y Protección Social, 2013).</p>	<p>It is designed to contain a specific number of primary packages and packaging in order to provide additional protection to the sales units, enable better handling, or for commercial purposes.</p> <p>(Ministerio de Ambiente y Desarrollo Sostenible, 2018).</p>	

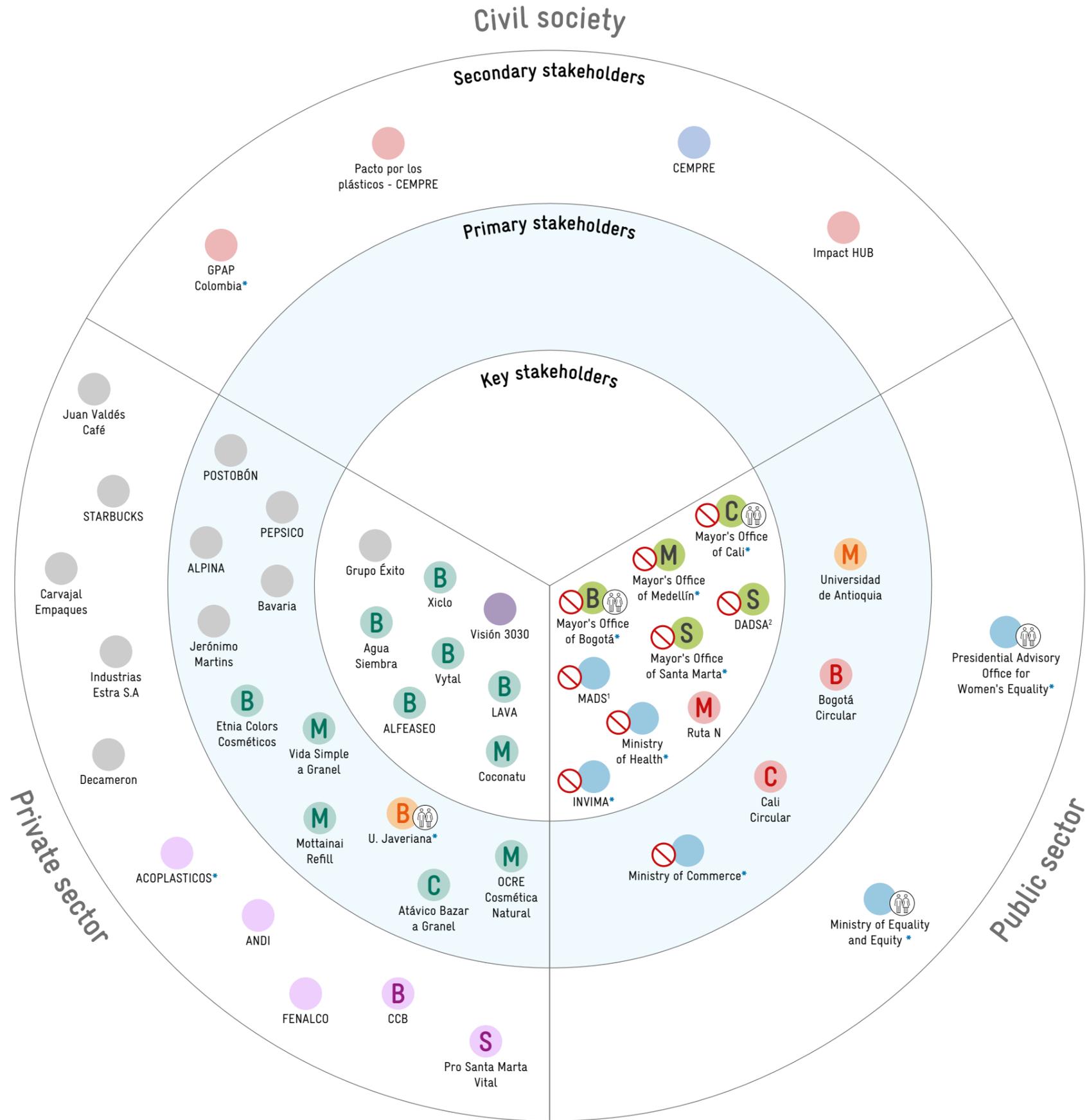
Concept	Ministry of Health and Social Protection	Ministry of Environment and Sustainable Development	Other sources
Tertiary packaging	Article designed to facilitate the handling and transportation of multiple units of primary or secondary packaging to protect them during physical handling and prevent transport-related damage. (Ministerio de Salud y Protección Social, 2013).		It unifies, protects, and distributes the product throughout the logistics chain. It must withstand the storage, transportation, and distribution operations and prevent damage during handling from the manufacturing center to the end consumer. (PROCOLOMBIA, 2016).
Reusable (returnable) packaging	Packaging that has the strength and hygiene characteristics that allow it to be filled and used multiple times, exclusively for containing food or alcoholic beverages, and undergoes an industrial sanitization process before each use. (Ministerio de Salud y Protección Social, 2012).	It is one that has been conceived, designed, and marketed to perform multiple cycles or rotations throughout its life cycle in order to extend its useful life and return materials to their potential for use in their original function through conditioning processes. Its management is financed, directly or indirectly, by the company that puts them on the market. (Ministerio de Ambiente y Desarrollo Sostenible, 2020).	
Household Hygiene Product (and Industrial Hygiene Product)	It is a formulation whose main function is to remove dirt, disinfect, freshen the environment, and promote the care of utensils, objects, clothing, or areas that will later come into contact with humans, regardless of their commercial presentation. This definition does not include products whose main function is to remove dirt, disinfect, and promote the care of industrial and commercial machinery and facilities, educational institutions, healthcare settings, public health, and others used in industrial processes. (Ministerio de Salud, 1998)		A household hygiene product cannot be intended for use in hospitals, clinics, schools, shopping centers, or educational institutions, nor for the cleaning of machinery or in the industry in general. (INVIMA, 2023).
Reuse		The extension and adaptation of the useful life of recovered solid waste that, through processes, operations, or techniques, restore the materials to their potential for use in their original function or a related one, without requiring additional transformation processes. (Ministerio de Ambiente Vivienda y Desarrollo Territorial, 2004)	Practice that allows the use of a product (active ingredient, packaging, or container) multiple times for the same purpose for which it was conceived, designed, or introduced to the market, without altering or modifying its physical or chemical properties and may be subject to conditioning processes in rotation or circulation cycles. (Global Plastic Action Partnership (GPAP), 2023)

Image A 1. Primary, secondary and tertiary packaging



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Description of stakeholder	Scope
Post-consumption Plan (EPR)	National
Trade unions	Bogotá Santa Marta
Entrepreneurship	Bogotá Medellín Cali Santa Marta
National government	National
Local government	Bogotá Medellín Cali Santa Marta
Academia	Bogotá Medellín
Industry	National
NGO	National
Innovation/collaboration platform	Bogotá Medellín Cali
Veto	
Gender issues	

¹ Ministry of Environment and Sustainable Development
² Administrative Department of Environmental Sustainability

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