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## IMPLEMENTATION OF PREVENTION AND MANAGEMENT TOOLS

# CIRCULAR ECONOMY IN A MUNICIPALITY

A PRODUCT DEVELOPED WITHIN THE FRAMEWORK OF:



On behalf of:



Federal Ministry  
for the Environment, Nature Conservation,  
Nuclear Safety and Consumer Protection

of the Federal Republic of Germany



**Circular economy in a municipality -  
Santa Marta, Colombia**

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**Project - Prevention of Marine Litter  
in the Caribbean Sea (PROMAR):**

Promoting circular economy solutions  
in the Dominican Republic, Costa Rica  
and Colombia

**Project leader:**

adelphi (Germany)

**Development of the guide:**

SOCYA - Alejandra Gámez

**Technical review:**

Jan Janssen, project leader of  
PROMAR, adelphi Prof. Dr. Florian  
Schindler consultant - adelphi

# PROLOGUE

## ABOUT THE PROMAR PROJECT

The PROMAR project - Prevention of Marine Waste in the Caribbean Sea aims to reduce the flow of plastic waste (mainly plastic packaging and single-use plastics) that reaches the Caribbean Sea, promoting Circular Economy solutions in eight Caribbean countries. The project is funded by the German Federal Ministry for the Environment, Nature Protection, Nuclear Safety and Consumer Protection (BMUV) and led by the German organization adelphi.

Within the framework of the project, the PROMAR BlueBox was created, a collection of various tools, guidelines, tutorials and materials that will help you apply circular economy solutions to reduce marine waste in your municipality. This success story for the circular economy in a municipality is part of the PROMAR BlueBox.

The objective of the tool is to make the pilot project model available to other interested stakeholders so that they can adapt the structure according to the needs of the territory. The learning curve on the implementation of the pilot project will be disseminated; lessons learned, key points, milestones, mistakes, etc.

The content was developed by SOCYA as implementing partner of the PROMAR project in Colombia. The guide is aimed at environmental authorities, government entities, e.g. municipalities and civil society projects, initiatives or organizations interested in reproducing the pilot project.

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# BACKGROUND

Pollution of the seas due to plastics is one of the most discussed topics in different environmental forums worldwide, because today we are seeing its consequences in different ecosystems. Proof of this is the death of birds, turtles, fish and large mammals due to the consumption of plastics that they mistake for food. A further problem is that much of this material does not float and has been found at great depths, in some cases much smaller than the original size, then labelled as 'micro-plastic', which is swallowed by fish and other animals that then become part of our food chain. According to the WWF, man has a diet of approximately 5 grams of plastic per week, which is ingested from different sources. Although we still do not know the effects on human health, it is clear that we do know the damage to ecosystems (100 thousand marine animals die because of plastic and 700 species are critically endangered).

**14 million tons of plastic reaches the seas per year! \***

According to the International Union for Conservation of Nature - IUCN (2021), 14 million tons of plastic reach the seas per year and it is estimated that by 2025 this value will increase by 3 million tons. Of the totality of the plastic waste that reaches the sea, 49% are single-use plastics, 27% are plastic fishing equipment and 6% are other plastics. This has been reflected on beaches around the world and has also created 5 plastic islands located in the South and North Pacific, South and North Atlantic and Indian Ocean. These plastic islands cause the death of more than millions of animals and also make all conservation activities more expensive by thousands of dollars. Due to this growing problem, governments and institutions around the world have focused their efforts on improving waste management, especially plastics, for this different alternatives have been developed among which the Circular Economy plays a fundamental role.

\*International Union for Conservation of Nature (2021)

# BACKGROUND

Of the alternatives to prevent so much plastic from having its final destination in marine waters, many strategies are being worked on, including:

- **Avoid and reduce:** Avoid the use and reduce the consumption of plastics where possible
- **Eco-design:** Product design that takes into account environmental factors, which in this case is reducing the amount of plastic in a product
- **Change of material:** Change plastic containers for other materials
- **Re-use of plastic containers:** E.g. refilling cleaning products
- **Biodegradable packaging:** Replace plastic with material that degrades and can be used for composting
- **New packaging with recycling:** Use of plastic waste to create packaging with a % of recycled material
- **Improvement of materials:** More recyclable packaging
- **Fuel production from plastic:** Post-use plastic for fuel generation through pyrolysis or hydrothermal liquefaction
- **Generation of new products:** Sneakers, glasses, swimsuits and clothing with recycled plastic pellets
- **Crafts:** Recycled plastic for lamps, brooms, keychains, bags and others
- **Recycled plastic slats:** Plastic recycling to generate plastic slats, which are used for the construction of playgrounds, pallets and houses; better known as plastic wood. This last alternative is one of the most explored in the country, it has great uses, a growing market and there are several companies that produce and work with this material.

Of these alternatives, it is observed that some are developed before the production of the plastic and others after its use. For the alternatives that are after their use, the first thing that must be worked on is the management of the collection of this material, since without this the alternatives do not become economically viable, this being a fundamental part of the creation of circular economy pilots. Knowing what and how much raw material we have in addition to the way it is collected makes the alternatives viable or unviable.

Colombia is no stranger to the problem of plastic waste, since it has different important sources of pollution, where coastal cities stand out, which is why the PROMAR project has dedicated its efforts in this area to reduce the flow of plastic waste. that reach the Caribbean Sea.

## 2. INTRODUCTION

**"Marine waste is any persistent, manufactured or processed solid material that is discharged, evacuated or abandoned in the marine and coastal environment."**

United Nations Environment Program

The aim of the PROMAR project's work package is to establish a Circular Economy pilot in the selected territories, with the aim of preventing plastic waste from reaching the Caribbean Sea.

This waste problem is aggravated due to the population's lack of awareness, which leads to poor waste management near points of interest such as surface sources, which can drag waste into the sea. Seeing this problem, the PROMAR project takes its efforts to areas that have a direct influence on water sources.



The support provided by the PROMAR project focuses on establishing waste collection programs, creating synergies with community leaders, cleaning service companies, waste processing companies and government entities. This is in order to make good use of recyclable waste, especially plastic. With this last waste, recycled plastic strips and other products can be generated that can lead to closing the cycle.

The circular economy pilot in Santa Marta, Colombia, focuses on reducing the flow of waste that can contaminate the water sources that flow into the sea, for this an improvement in the management of solid waste in the territory is structured and seeks alternatives to close the cycle with the collected waste, emphasizing plastic.

The pilot formulated for Colombia takes place near the Caribbean Sea, but that does not prevent it from being replicated in any national or international territory. The success of the pilot depends largely on the local conditions where it is intended to be carried out and the joint work between project stakeholders.

The pilot has been implemented since August 2022 in the Manzanares River area in the municipality of Santa Marta. For its design, a financial model was applied, taking into account the expected material flows, collection and transportation costs and market prices of recyclable materials. The new collection routes for recyclable materials are carried out on tricycles, covering around 16,000 homes, through the local association of recyclers COOEMPROMAC, and in cooperation with the public waste collection company ESSMAR. The population has been made aware of marine litter, waste management and the importance of recycling. PROMAR also launched the RE-PACK collective program in Santa Marta, which collects the collected materials and delivers them to local recycling companies. This link with the Colombian EPR packaging system provides additional income to waste collectors and has allowed the closed-loop collection and recycling of large quantities (so far 578.3 tons as of December 2022). In addition, the recyclers association receives a payment from the municipality, justified by its contribution to waste collection, which improves the financial stability of the organization and the sustainability of its services.



# 3. GENERAL OBJECTIVE

A structural guide to develop the circular economy pilot.

## 3.1. Specific objectives

**IDENTIFY THE STAGES AND PHASES OF THE CIRCULAR ECONOMY PILOT**

**EVALUATE WHICH ARE THE BEST ALTERNATIVES FOR PILOT DEVELOPMENT**

**IDENTIFY IMPORTANT SYNERGIES FOR THE DEVELOPMENT OF THE PILOT**

# 4. METHODOLOGY

The PROMAR project, with its objective of reducing plastic waste reaching the sea, wants to apply the concept of circular economy in a municipality as a pilot that is viable and self-sustainable over time. This circular economy pilot to be implemented is a strengthening of the recyclable waste utilization scheme and has the following stages:

**1. Financial analysis stage.**

**2. Stage of identification of conditions of the area and stakeholders with secondary information.**

**3. Diagnosis stage of local conditions in the field, meetings with project stakeholders and socialization of the pilot in the area.**

**4. Project ideation stage with all stakeholders, and determination of the project's area of influence.**

**5. Approval and synergies stage (work meetings).**

**6. Development stage, this stage was divided into two phases: Recyclable solid waste management phase and solid waste transformation phase.**

**7. Evaluation and dissemination of results stage.**

## 4.1. FINANCIAL ANALYSIS

Every public or private project must have a financial analysis that shows positive margins in economic and social issues, and even more so if the project is expected to achieve financial sustainability and possibly be formalized as a company. This study must show the viability of the project in the future and is a determining factor for decision making; even more so if it is a pilot.

To strengthen the scheme for using recyclable waste in a given area, the first thing that must be done is the tracking of secondary information on: characterization of municipal waste, generation per capital of waste, operational capacity, socioeconomic strata, market prices of purchase and sale of recyclable materials and population density. This is the basic information for generating an initial financial analysis. An example of the information tracked is shown in Table 1.

Characterization stratum 1						
Number	type of waste	quantity in Kg	percentage	goal object	purchase value (Kg)	sales value - transformer (Kg)
1	food waste	20,91	41,80%	N/A	N/A	N/A
2	carton	0,91	1,80%	packaging	\$230	\$420
3	paper	0,91	1,80%	packaging	\$700	840
4	plastics	6,82	13,60%	packaging	\$600	\$1200
5	textiles	0,91	1,80%	N/A	N/A	N/A
6	garden waste	10,91	21,80%	N/A	N/A	N/A
7	wood	0	0,00%	N/A	N/A	N/A
8	metals	1,82	3,60%	packaging	\$700	\$1070
9	glass	1,82	3,60%	packaging	\$30	50
10	hygienic waste	5	10,00%	N/A	N/A	N/A
11	others	0	0,00%	N/A	N/A	N/A
		<b>% packaging</b>	<b>24,40%</b>	<b>verage valu</b>	<b>\$510,74</b>	<b>\$927,05</b>
					<b>Buy and Sale</b>	<b>\$416,31</b>

Table 1. Characterization of waste by stratum and its sales value

From this point, the pilot must begin to be profitable; without financial viability it will not be possible for it to remain over time. Entering the financial analysis, a waste collection goal is determined (annual, monthly and daily) to make the pilot viable, with this the needs are established such as: the area of influence of the project, the users that we must impact, how to transport waste and the type of transport used for collection. Table 2 shows an example of financial analysis of exploitation schemes with the variables to take into account.

## FINANCIAL ANALYSIS

Parameter	Value	Unit
PPC stratum 1	0.63	Kg
Urban Density	500	HA
Characterisation of plastics stratum 1	0.136	%
Characterisation of usable stratum 1	0	%
Inhabitants per household stratum 1	4.2	Houses
Target	1000	Tonnes
Time to meet the target	365	Days
Target on usable potential	0.3	%
Waste in ECA with potential for REP (packaging and containers)	1	%
Potential for offsets according to EPR targets (packaging and containers)	0.5	%
Recyclables collection performance (recycler)	300	Kg
Minimum wage 2022 Colombia	1000000	\$
Transport allowance 2022	117.172	\$
Performance factor	0.56	%
Staff administration	0	%
Provision for research, development and research and innovation	0.15	%
Administrative expenses (administrative staff, equipment, computers, software, consultants, utilities and others).	0	%
Transfer of resources from tariffs and recyclers	0.55	%
Recycling trade price per tonne	927.049	\$
rental of warehouses and storage places	757295	\$
material transport	15.000	\$/m2
Number of housing units according to the census map 2018 (working area)	50000	\$/Tonnes
Number of people according to the census map 2018 (working area)	14.415	Houses
Potential usable working area	41964	Habitants
Potential for material uptake on route	6	Tonnes
Percentage of material collection on route	0.3	%
Collection of waste materials in the work area	2	Tonnes
Weekly collection frequency in the catchment area	2	Days
Required vehicles (600 kg micro route)	11	Units

Table 2. Parameters to take into account in the financial analysis

In the financial analysis stage, several scenarios must be developed. The idea of this analysis is to find the best alternative so that the pilot is financially viable. Variables that can change in this analysis are: area of influence, amount of waste collected, types (fractions) of recyclable waste to be collected, number of personnel necessary for the work, types of vehicles, among others that depend mainly on the local conditions where the waste is collected. will develop the pilot.

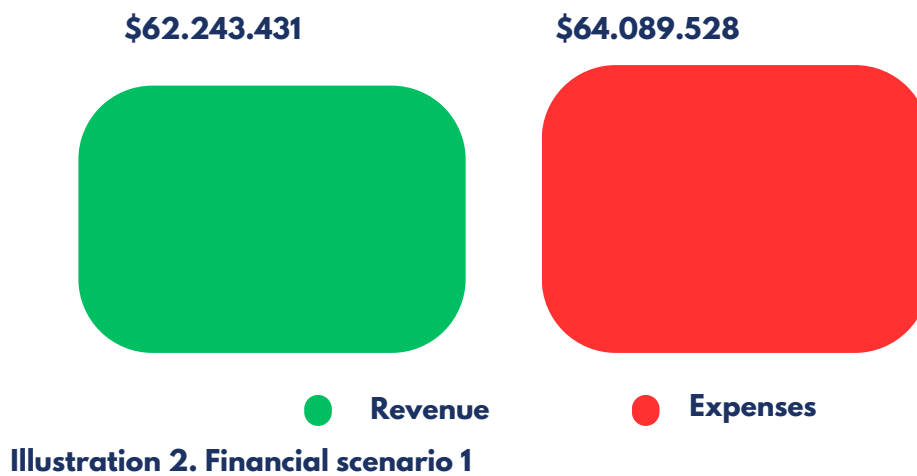


*Illustration 1. REP collective plan in Colombia Repack*

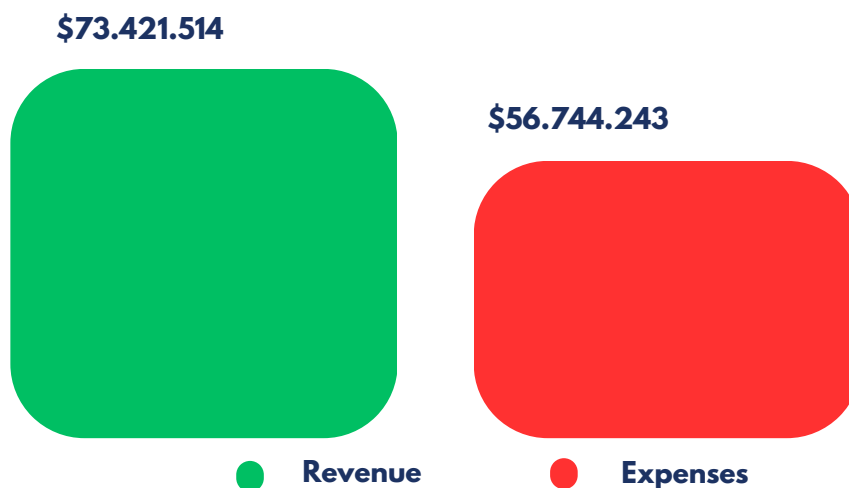
It is important to link to the financial analysis alternatives that seek to improve the conditions of the collection of recyclable waste, supported and legislated by government entities. In the case of Colombia, this pilot is based on Resolution 1407 of 2018[1] called Extended Producer Responsibility (REP) and is where the environmental management of paper, cardboard, plastic, glass and packaging waste is regulated. metal; which involves producers, marketers, manufacturers, importers, managers, processors and final consumers.

It is important to mention that the circular economy pilot must strengthen an entity that provides the recycling service legally constituted as a recycling provider. In the case of the pilot and with the previous resolution, the REP's support for managers and processors of recycled material is financially analyzed. Below is an example of 3 financial scenarios making changes to different variables.

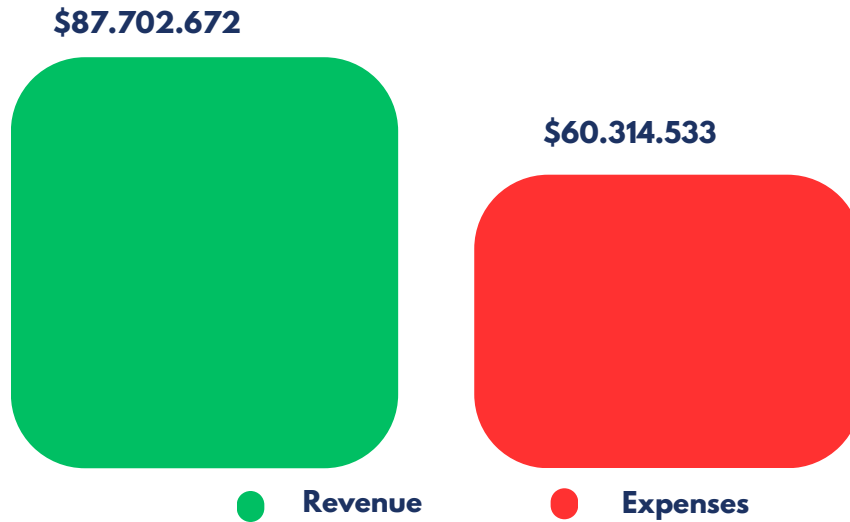
**Scenario NO recycling provider buys material from recyclers (2.7 tons per day).**



**Scenario of collection service provider with hired personnel (2.7 tons per day)  
EPR + collection service.**



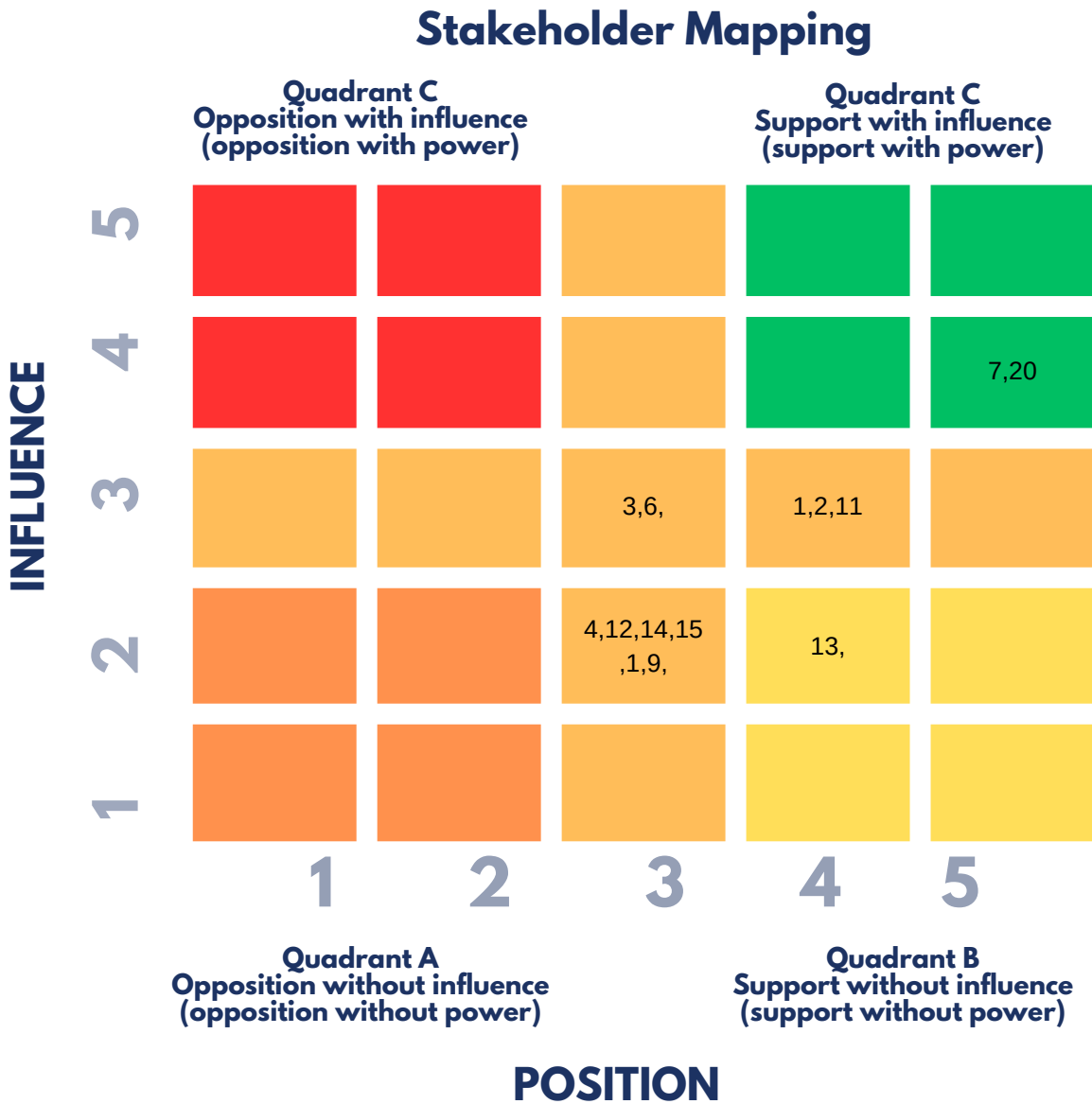
*Illustration 3. Financial scenario 2*

**Scenario of collection service provider and processing with hired personnel (2.7 tons per day)  
EPR + collection service.****Illustration 3. Financial scenario 3**

This last scenario shows a company providing the cleaning service legally constituted for the collection of materials, with hired personnel (guaranteeing the minimum vital for recyclers), linked to a collective REP plan and transformed part of the collected material. For this example, financial analysis 3 shows that for a daily collection of 2.7 tons of recyclable waste, income is expected to be 31% higher than expenses (net income). With a financial study showing positive figures in income, we can continue with the other stages of the pilot.

## 4.2. ACTOR EVALUATION

In the **second stage**, an evaluation of actors is carried out that allows you to identify which entities are related to the project, which ones are interested, and identify the degree of influence they have within the pilot. (See our analysis tool in the BlueBox "**Stakeholder Map**"). It is important to have a tool where you can evaluate the different actors (stakeholders) and determine whether or not they are relevant to the pilot. For this, our tool that graphically shows the results is recommended.



**Illustration 5. Actor evaluation graph.**

Among the interested parties, one or more allies are sought, that is, organizations that have interest and capacity in executing the main activities of the pilot. The purpose of the pilot partners is for them to be included within the areas selected for the pilot and to provide the service of collecting recyclable waste for its transformation and commercialization, to carry out training and educational campaigns, to provide facilities for waste management and to open communication spaces with the population and interested parties.



This compilation of actors is initially carried out with secondary information. After having a preliminary list, we proceed to have contact with each of them virtually or by telephone, this with the purpose of locating the appropriate person or area that can collaborate with the pilot, in addition to scheduling virtual or in-person appointments to disseminate the pilot and see the form of collaboration.

Among the most important actors that can be identified in the pilot we find:

- **Local and national environmental authorities:** Facilitator in the creation of institutional synergies, technical and administrative advisor.
- **Public cleaning services companies:** You can support by holding door-to-door environmental awareness and education sessions.
- **Public Service Companies for recyclable waste collection:** Waste management company or companies that can develop the circular economy pilot. Initially all are identified, after a more detailed evaluation we work with those that have influence in the pilot area and are legally constituted (if it is not a legal entity, but has an advanced process, it can be supported until it is constituted).
- **Foundations that work for the environment in the territory:** Organizations potentially related to Community Action Boards in the area of influence of the pilot and can carry out educational activities.
- **Mayor's Office:** Coordinates the execution in the territory of the plans, programs and projects of the district entities and organizations that intervene in the territory, complementing the Development Plan.
- **Waste transformers:** Companies that transform recyclable material, which can be associated with the waste manager and can be linked to the REP strategy. Initially all are identified, after a more detailed evaluation we work with those that are legally constituted (if it is not a legal entity, but has an advanced process, it can be supported until it is constituted).
- **RED collective plans:** Group of organizations or companies that jointly work in the territory according to the REP
- **Others:** Research entities, community action boards, educational institutions, companies that carry out their activity within the area of influence of the pilot, community organizations, among others.

## 4.3 DIAGNOSIS OF LOCAL CONDITIONS IN THE FIELD

In the third stage, the activity is to develop an on-site diagnosis, where the conditions of the areas of influence of the pilot are observed; In addition, meetings are held with each of the entities identified in the mapping of project actors:

The meetings will be held with the purpose of disseminating the circular economy pilot proposal in the areas of influence, listening to their opinions and establishing possible synergies in the project.

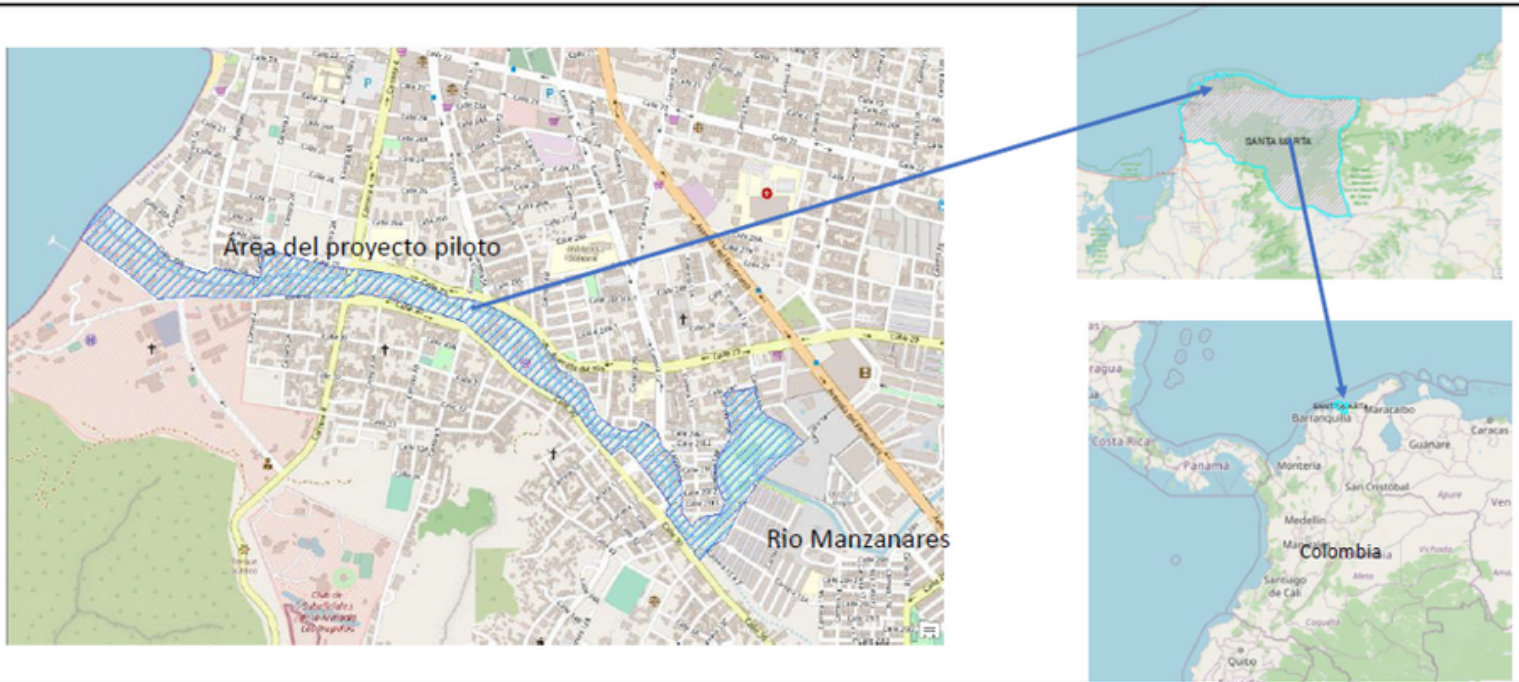
The companies that provide recyclable waste collection services and waste transformers, which we will call strategic allies, must have a visit to their workplace, in order to evaluate the working conditions, management capacity, safety areas. collection and interest in the project; This is with the objective of selecting the most suitable providers and processors for the pilot (it is highlighted that it is much more profitable for the waste manager to be the waste processor himself). Each company must have a file where the information of the ESP or transformer is related, in addition an evaluation must be carried out where the conditions of each of the ESP and the transformers are verified.

From this point and with the help of the evaluation and a map of actors, we begin to identify which of the stakeholders can be linked to the pilot. It is worth clarifying that some are chosen by the coordinating entity of the pilot, but each entity has the power to Decide if you want to work on the pilot or not. It is highlighted that local authorities are very important when executing the pilot, since they can facilitate the work in the areas of influence, and they also know the details of the territory. It is proposed that these strategic allies know and work under the REP, since it would allow them to access benefits for the management of packaging waste.

As a link to the circular economy, plastic waste collected in the areas of influence of the project must be processed locally (it is not a straitjacket, but it makes the financial study more viable) in order to continue with the circular economy cycle. In this stage of the pilot, a milestone is carried out where the financial viability is reconsidered, since with more knowledge of the territory and with the actors already identified some variables may change, the idea is to continue with a viable financial study at all times.

## 4.4 PROJECT IDEATION

In the fourth stage, it is expected to complement the circular economy pilot, the area of influence of the pilot is determined, it is reflected in plans for a better analysis and understanding of the work area and the roles of each stakeholder are determined, these roles are determined according to the activities of the pilot and the support of each actor.



*Illustration 6. Influence area signage.*

Once the strategic allies have been identified, a pilot ideation workshop must be held together, in which the results of the diagnosis of the area of influence will be shown and the circular economy pilot will be illustrated with the changes that occur after stage 3. In This workshop is expected to find the needs that exist so that the circular economy pilot can be carried out in the territory.

This stage is built with all allies and is where the best strategies are identified to make the pilot a success, addressing issues such as:

- How to carry out efficient and effective collection?
- Collection routes
- Route designs
- Type of collection vehicles (electric, fuel-powered or human-powered)
- Collection points (primary and secondary)
- Communication
- Links with the communities to impact (perifoneo, sono-types, bells)
- Educational activities (door-to-door training, neighborhood meetings, meetings in educational institutions)
- Staffing of workers
- Colors representing the pilot or allies' strategies
- Staff training (leadership, communication, personal growth)

In addition, actors or projects that are carrying out similar activities in the territory can also be identified and support synergies can be established that benefit the linked entities.

It is highlighted that ideation spaces can be presented in other later stages of the pilot, since the pilot is changing and there are unforeseen events to be overcome and opportunities to take advantage of; Therefore, it is very important to maintain assertive and cordial communication with each of the actors.

## 4.5 APPROVAL AND SYNERGIES

For the fifth stage, meetings are planned with each stakeholder where synergies and approval of the project are generated.

For this project to be successful, the collaboration of local authorities is important, entities such as the Public Service Company, since it is the entity that provides us with information about the conditions of the territory with respect to the provision of the cleaning service and is also guarantor so that recyclable solid waste collection companies comply with good service provision.

With local environmental authorities, synergies are sought in which we can collaborate; projects that have similar objectives or activities, or products that may be useful for the development of the projects. One of the important allies in these projects are the initiatives of the extended producer responsibility plans, these provide support to the managers and transformers who are the strategic allies of the pilot.

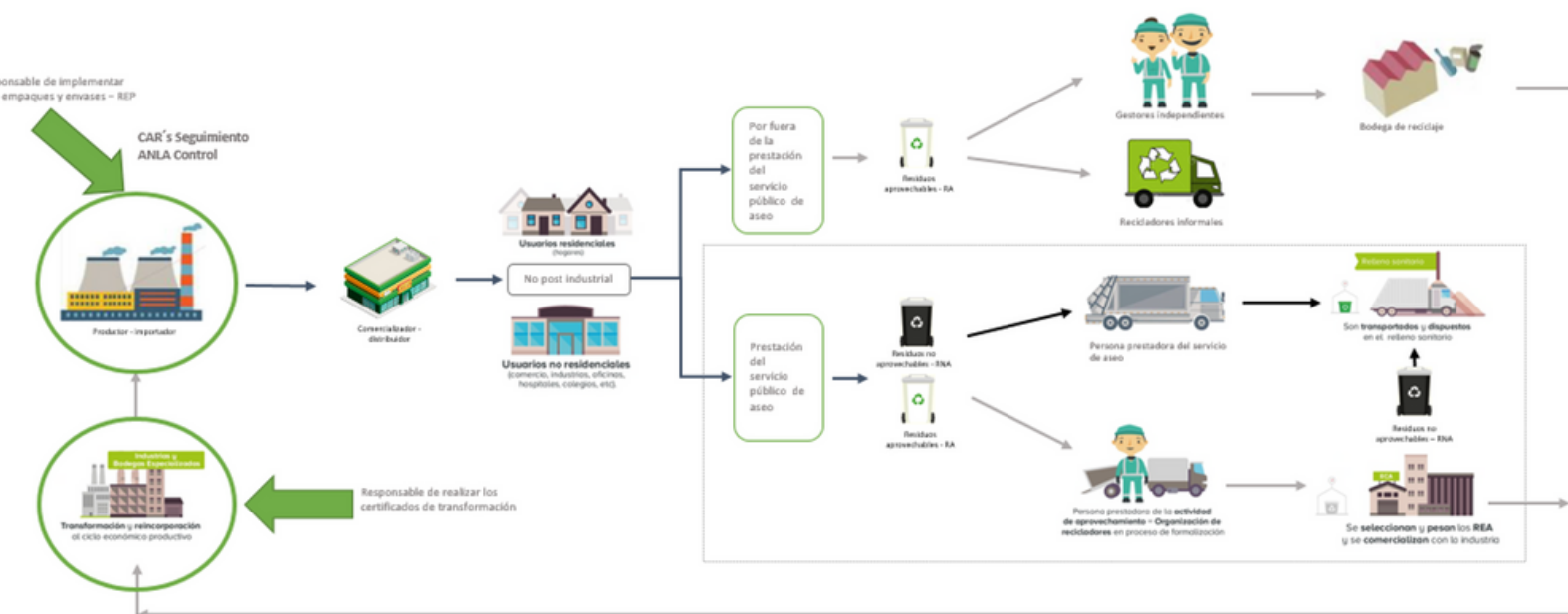


Illustration 7. Structure of actors in the pilot.

Strategic allies are those who carry out the pilot, therefore, they are the basis of it. Although the other actors are important, without them the pilot could not be made. Once the actors have been identified and committed, it is recommended to prepare a document that costs the support that these institutions will work in the pilot. This document must have the commitments of the parties and must be signed by everyone.

Once again there is a new milestone where the financial model is reviewed, the pertinent changes are made and the viability is verified again, in addition the role they play in the pilot is structured with each of the actors.

## 4.6 PILOT DEVELOPMENT

In the sixth stage, phase one, the development of the pilot begins, the collection of recyclable solid waste begins, where the strategic allies begin the collection of waste in the areas designated for the pilot. For this, you must already have a route map where you can see the route that recyclers must take (see Illustration 8) in the areas where the different activities that were identified in the ideation workshop are carried out, and that improve the quantity and the management of waste to be collected. For this, the recyclable waste collection entities must be complemented with elements that help the collection efficiency. This stage will be complemented with an “Information System” that helps generate traceability of the materials collected by the providers and managers of the exploitation activity, which allows the management of information that supports decision-making in the pilot. This system must contain:

- An information module on the traceability of the collection and transformation of materials within the framework of the pilot project. These can be through a GPS or through platforms that work with Smartphone cell phones (it all depends on the financial analysis), this must be traceable in real time and must leave records of the routes taken (see Illustration 9).
- An information space for the actors of the pilot value chain and
- A management mechanism for certificates of recovered, recycled and reintegrated plastics.

The second phase focuses on the waste transformer, seeking synergy between the waste manager and the transformer and developing products that close cycles (the ideal is to identify a recyclable waste manager that also has material transformation processes collected).

This transformer must work with the waste collected in the pilot and must have a financially profitable product with a potential market. Furthermore, part of the success of the pilot is looking for new alternatives or products to the material to be transformed. That is why it is very important to link to the pilot, research institutions that show new forms or alternatives of processing or new products that increase the value of the collected material.

COLLECTION ROUTES



Illustration 8. Collection routes.

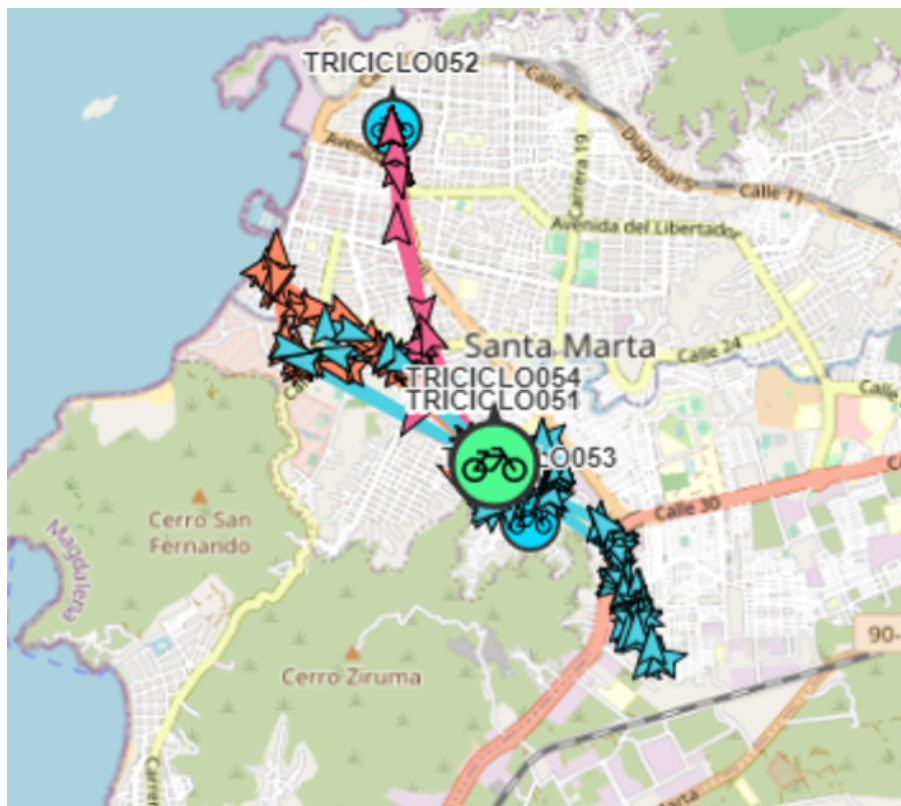


Illustration 9. Route tracking

## 4.7. EVALUATION AND DISCLOSURE

In the evaluation and dissemination, it is expected to monitor the pilot month by month, its progress, opportunities for improvement, needs and the completion of evidence, in order to continuously optimize operations, financial performance, participation of actors, amounts collected. and the impact of the pilot. In addition, it is expected to collect enough information to show the results of the pilot, in order to promote its replication.

For assessment, also check out our KAP (Knowledge + Attitude + Practice) tool in the BlueBox!

## 5. PILOT COMPLEMENT

For this project to be successful in the territory, the project coordination must seek research alternatives for the development of product improvement, support the strengthening of the actors' process, provide advice, workshops and training to all interested parties and allies, generate progress reports and promote the product resulting from the pilot. For this, 3 strategies have been thought of that will serve as support and complement to the pilot, two of them are carried out transversally from the ideation stage, the strategies are:

### 5.1. COMMUNICATION AND EDUCATION STRATEGY

Although this strategy is formulated in the ideation stage, it is a strategy that lasts throughout the development of the pilot and continues after it; Its focus is on the population located where the pilot will be developed. Among these mechanisms we have:

- **Pilot launch:** Event where the development stage of the project begins; For this, local environmental authorities, community action boards from the area of influence, educational centers, community leaders and foundations that are in the areas where the project is developed, as well as the population of the area, must be invited. The launch creates an expectation and the pilot actors and their strategic allies begin to be recognized.



- **Cleaning days:** Events that take place at strategic points such as beaches, river banks or points where problems are observed due to the accumulation of waste. It is recommended to always invite the population to participate in the sessions; in addition, the pilot actors must be present and make their contribution. These days are suitable for providing workshops and other recreational activities so that the population has more interest in learning about these topics.

**Also check out our “Beach Cleaning Guide” tool in the BlueBox!**

- **Education days:** The community is invited to workshops where they talk about the problem of waste and how work is being done to mitigate its impact. Community headquarters, schools, among others, can be used for these workshops. The pilot actors must be present, especially the strategic allies.

**Also consult our tool “Educational workshop on the oceans and their pollution due to plastic” in the BlueBox!**

- **Street Advertisement:** Delivery of information through loudspeakers where the population is encouraged to carry out better waste management in their homes and to get to know the personnel who are carrying out the waste collection work in the area of influence; In addition, it is recommended to create a Sonotype that seeks to generate identity for the recyclable waste collection manager and that is easy to recognize.



*Photograph 1. Education days*

- **Media:** Other means for disseminating information are social networks, where graphic pieces of the activities to be carried out, articles that talk about the pilot, photographs and videos must be posted. In addition, information about events, workshops and pilot training must be communicated by this means.
- **The press and radio** are effective means for disseminating information; written press and radio stations should be searched in the territory for the publication of activities and events that will take place.
- **Posters:** Posters are a means of disseminating very local information. These can be designed and placed in places with a high influx of people such as: churches, schools, markets, among others.
- **Results event:** This event aims to disseminate results to local authorities and people interested in the project.

In the communication and education strategy, the pilot can be supported by the following actors: Local environmental authorities, public sanitation service companies, foundations and universities.

## 5.2. TRAINING STRATEGY

Training is one of the fundamental pillars for the proper development of the project; for this, the people who will carry out the recycling work in the pilot areas and the waste managers and transformers (strategic allies) must be identified. In training you can use the following strategies:

- **Technical training for professional recyclers:** The training of professional recyclers leads to better service provision, the identification of materials, the use of new tools, better assertive communication and providing a better image to the target audience.
- **Technical training for waste managers and processors:** This is expected to seek new alternatives for their business, improve the service provided, be more efficient and effective, improve the relationship with the community and local authorities, develop collection logistics, provide better guarantees and contractual security to its collaborators.
- **Door-to-door training of users linked to the collection route:** Door-to-door training of users linked to the collection route: users are expected to improve separation at source, identify collection days and gain greater knowledge on the waste problem in the district. To carry out these training programs, it is essential that professional recyclers play this role, after receiving the necessary training on the topics to be taught.

The following actors can be counted on in the training strategy: Local environmental authorities, public sanitation service companies and foundations.



*Photograph 2. Door-to-door training strategy*

## 5.2. RESEARCH STRATEGY

It would be an important complement so that the pilot has permanence over time. This strategy seeks to design a circular alternative for recyclable materials based on the principles of Cradle to Cradle. For this you must:

- **Diagnose the flows of materials, energy, water and social aspects of the current process**
- **Prototype circular alternatives for recyclable materials**
- **Propose alternatives to improve processes from collection to transformation**

With this, it is planned to look for new alternatives that give added value to the product; it is important to select a material for the study. Today one of the most problematic wastes is plastic, which is why much of the research focuses on finding a solution to this material.

In the research strategy you can find support from universities, research institutes or independent researchers. They can work with local processing companies to improve their products, increase their efficiency and explore new local markets.



Illustration 10. Research process

# BLUE BOX

A PRODUCT DEVELOPED WITHIN THE FRAMEWORK OF:



On behalf of:



Federal Ministry  
for the Environment, Nature Conservation,  
Nuclear Safety and Consumer Protection

of the Federal Republic of Germany

