CLEAN CITIES, BLUE OCEAN

3R/SWM and Marine Debris Reduction Strategy Alignment Assessment | Dominican Republic

PHOTO: Oceanworks

Submission Date: June 30, 2021

Resubmission Date: September 3, 2021

This publication was produced for review by the United States Agency for International Development by The Jambeck Research Group under the Clean Cities, Blue Ocean Program.

This report was prepared by:

Eugene, OR
Email: info@goodcompany.com

Tetra Tech Contacts:
Jon Angin, Chief of Party
Email: Jon.Angin@cleancitiesblueocean.org

Gina Green, Project Manager
Email: Gina.Green@tetratech.com

This publication was produced for review by the United States Agency for International Development by Tetra Tech, through USAID Contract No. AID-OAA-I-14-00059/7200AA19F00016, USAID Clean Cities, Blue Ocean Program.

DISCLAIMER

Table of Contents

List of Tables and Figures

Acronyms and Abbreviations

3Rs	Reduce, Reuse, Recycle
CEDAF	Center for the Development of Forestry and Agribusiness
CCBO	Clean Cities, Blue Ocean
CWMA	Comprehensive Waste Management Act
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit – German Development Agency
IWC	independent waste collectors
JICA	Japan International Cooperation Agency
LEEC	Law on Environmental Education and Communication
MNRRD	Movimiento Nacional de Recicladores de República Dominicana
MRF	Material Recovery Facility
PET	Polyethylene Terephthalate
PROPEEP	Ministry of Strategic and Special Projects of the President
REDDORE	Red Dominicana de Recicladores
SBC	Social and Behavior Change
SWM	Solid Waste Management
UN	United Nations
USAID	United States Agency for International Development
U.S. EPA	United States Environmental Protection Agency

1. Introduction

On August 28, 2019, Tetra Tech was awarded the Clean Cities, Blue Ocean (CCBO) Program, a five-year, $48 million contract from the U.S. Agency for International Development Bureau of Economic Growth, Education, and Environment. CCBO is the Agency's flagship program to respond to the global crisis of marine plastic pollution. The objectives of CCBO are to:

Objective 1: Promote reduce, reuse, recycle (3Rs) and strengthen local and regional markets for recycled plastics;
Objective 2: Build social and behavior change (SBC) for 3Rs and sustainable solid waste management (3R/SWM);
Objective 3: Increase capacity and effective governance solid waste management (SWM) and recycling systems; and
Objective 4: Support international fora, public-private partnerships (PPPs), and multi-stakeholder alliances.

As a cross-cutting objective, CCBO also works to support and enhance the livelihoods of those working in the waste and recycling sectors, particularly women, as well as advance gender equality within the sector and opportunities for women's economic empowerment.

Over the next five years, CCBO will collaborate with local USAID missions and key stakeholders to test and scale 3R/SWM solutions with an initial focus in seven focal countries: Indonesia, the Philippines, Sri Lanka, the Maldives, Vietnam, the Dominican Republic (DR), and Peru. To inform CCBO's approach, the program is producing 3R/SWM and Marine Debris Reduction Strategies in each of the focal countries to highlight the ways in which CCBO can support existing marine debris strategies and provide recommendations for increased impact. Good Company was selected to produce Reduction Strategies for the DR and Peru. These Reduction Strategies were generated through literature reviews of existing marine litter plans and strategies, review of proposed CCBO plans, interviews with CCBO staff, and additional desktop research.

2. Scope and Background

CCBO's primary objective is to reduce ocean plastic pollution by addressing it at the source in coastal urban centers. By targeting regions of concern within high leakage countries, CCBO is working to have the greatest impact possible. The DR, on the Caribbean island chain, is experiencing rapid growth and has not yet implemented a national strategic plan for solid waste management, leading to high volumes of plastic and other waste flowing into the ocean. CCBO's geographic focus is the Province of Samaná, a region in the northeast, which has high levels of poverty, while at the same time is becoming a major global tourist destination. Plastic waste pollution flows from the region into the Samaná Bay, which is a globally vital breeding ground for humpback whales, a primary fishing and shrimping ground for Dominicans, and a major tourist draw. Many of the Caribbean island nations have insufficient waste management and have been dubbed "the biggest plastic polluters per capita in the world."[1] These islands generate significantly more trash per capita likely due to their reliance on imported goods and the outsized impact from tourism. It

[1] Forbes. Sept 20, 2019. "Caribbean Islands Are the Biggest Plastic Polluters Per Capita in the World."

has been estimated that 18 billion pounds of plastic flow into the Caribbean Sea every year, with over 90% coming from land-based sources.[2]

In the DR, waste management continues to lag far behind the need. However, a new national law, the Comprehensive Waste Management Act (CWMA), finally passed in September 2020, and the new president, inaugurated in July 2020, has shown significant motivation to properly address the systemic SWM challenges, including plastic leakage. CCBO has already begun working with the national and local government to support this movement, including a partnership with the Ministry of Strategic and Special Projects of the President (PROPEEP). The support and focus of the federal government around waste management will be vital to implement the policies for the new law, as well as to implement a National Marine Litter Plan. By focusing on a high leakage nation in the Caribbean that is demonstrating their focus around solid waste, CCBO initiatives will model best practices for the region while supporting lasting improvements in ocean plastic debris.

This report analyzes current laws and policies at the national and local levels to identify alignment with the strategic goals of CCBO, locate gaps in those strategies, and consider opportunities to address those gaps. These findings and recommendations were considered in CCBO's Year One implementation and will inform its Year Two and subsequent work plans.

2.1 Overview of Waste Management Challenges and Sources of Ocean Plastic Pollution

In the DR, large, systemic challenges to a functioning national solid waste system need to be urgently addressed in order to address ocean plastic pollution effectively and permanently. Key challenges include a lack of SWM governance and funding, inadequate and unequal waste collection and infrastructure, and continued reliance on uncontrolled dumps—as elaborated below.

Lack of SWM governance and funding -

- **Local requirements with lacking budget:** Municipal governments were required to manage solid waste as a component of Law 64-00 in 2003. However, accompanying regulations and funding have failed to provide the needed resources to develop these systems.
- **Paying for SWM is not common:** There is a lack of financial structures to pay for SWM and few incentives for the recovery of waste,[3] which has led to missed opportunities to remove valuable materials from the waste stream. It has been estimated that up to 90% of the national average waste profile are recyclable or compostable materials.[4]

Inadequate and unequal waste collection and infrastructure -

- **Challenge of collecting all waste:** Current estimates are that 20-30% of waste is not collected at all, which means nearly 3,000 tons of waste per day is dumped illegally or burned.[5]
- **Better systems and infrastructure in urban centers:** Urban SWM is more sophisticated

[2] Ibid.
[3] ZACK GIZ, 2019.
[4] JICA, 2015.
[5] Wolf, Judith. P. 14

(e.g., Santo Domingo and Santiago) where aggregation and market opportunities exist but is lacking in more rural areas of the country.

Historic reliance on uncontrolled dumps -

- **Considerable number of uncontrolled dumps:** Up to 95% of the 13,000 tons[6] collected daily has gone to approximately 360 ad hoc open dumps scattered around the island that lack environmental controls, and thereby contribute to plastics leakage due to improper siting, lack of both proper management, and absence of landfill cover material. As of 2021, the DR has begun to remediate and close a priority number of sites. The President of the Dominican Republic has delegated resources to this project through PROPEEP and its new ECO5RD project—which CCBO is delivering ongoing technical assistance and guidance to. In 2021, PROPEEP began remediation of two priority legacy dumps in Samaná Province (CCBO's engagement site)—Samaná de Santa Barbara and Las Terranas. The first steps taken were covering the open dump to prevent further environmental leakage, fires, and other impacts from the exposed waste. Additionally, with CCBO's guidance, the government established interim "cells" to be used, until a new, regional landfill is built; established a safe space for waste pickers to work during this transition; designed new "transfer stations" and scalehouses at each site; and provided technical oversight to PROPEEP on the design and construction of stormwater, methane recovery, and leachate management systems. The template and equipment/construction specifications provided by CCBO are now being replicated at the Nagua Landfill in neighboring Maria Trinidad Sanchez Province, in addition to the two remaining open dumps in Sanchez and El Limon.
- **Poor management of dumps:** Mismanagement of dumps has led to major fires, leachate toxicity, and significant health and environmental impacts in the DR,[7] including significant loss of marine biodiversity and wildlife impacts. Especially outside of the major cities, accurate data are lacking to identify amounts and types of waste being generated, as well as point sources of ocean-bound plastic pollution.

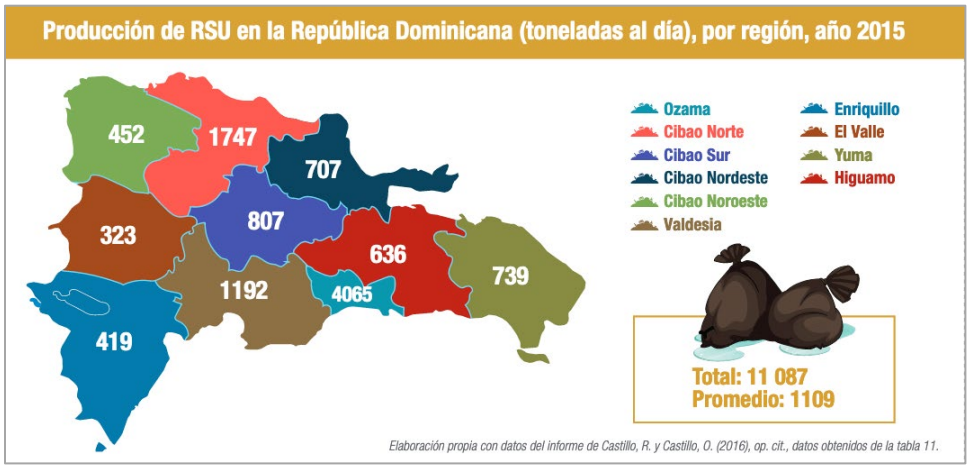
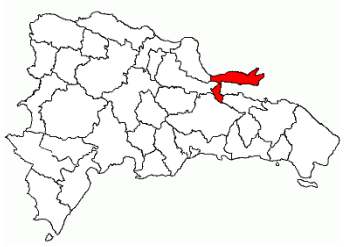


Figure 1. Solid Waste Generation by Region in Dominican Republic, 2015.

[6] Listin Diario. 6.13.2020. "Vertederos de basura dominicanos: masiva calamadid pública."
[7] ZACK GIZ report

2.2 Waste Management in CCBO Engagement Site: Samaná Province



Samaná is mostly a peninsula, wrapping around Samaná Bay. The province is made up of three municipalities: Samaná, Sánchez, and Las Terrenas, with three municipal districts: El Limón, Arroyo Barril, and Las Galeras. Sanchez is the more populous region, and a portion of Las Galeras (within Samaná municipality) is an unpopulated national park. The region draws significant tourism due to the ecological beauty of the area in its rich flora and fauna – seasonal humpback whales, mangrove forests, and beaches. The province has three national parks: Los Haitíses, Manglares de Bajo Yuna, and Cabo Cabrón. The marine area surrounding Samaná is part of a marine mammal sanctuary/reserve inaugurated in 1986 to protect whales, dolphins, manatees, marine turtles, pelagic fish, and invertebrates. The area is currently on the short list to become an UNESCO World Heritage Site.[8]

The major rivers in Samaná are the Rio Barracote (connected to Haitises national Park), Rio El Limon (a major waterfall), Rio Yuna (empties into Samaná Bay and second largest river in country), Rio Caño Frío, and Río Palmarito. These rivers are all known or likely major conveyances for plastic marine debris.

A lack of effective SWM is the primary cause of ocean plastic debris and other environmental leakage in Samaná, including from:

- **Open dumps in or near waterways and ravines:** As of 2020, there were five official open dumps and many informal dumping locations, which move approximately 100 tons/day in the province.[9] Many are located near waterways or in ravines, which facilitates waste washing downstream.[10] One dump, in Sanchez, is located within the national park. These dumps contain unseparated waste from the area, including hospitals. Significant portions of the mangrove forests are dying within the Samaná Bay. It is believed this is in part due to toxic leachate coming from open dumps.[11]
- **Inadequate service and capital constraints:** In the most recent statistical survey of residents (2015), of the nearly 30,000 estimated households in the province, only 55% had collection service; more than 40% reported burning their trash, and 3.5% reported simply throwing it into a nearby location.[12] Current solid waste collection is primarily done by private collectors coordinated through the local municipality[13]. Collection services are primarily focused on commercial and industrial businesses who generally have the ability to pay the fees and can be enforced upon. It is reported that hauling equipment is insufficient, and many homes are on unpaved or inaccessible roads.[14] The main challenges related to the collection, treatment and final disposal of solid waste and municipal cleaning include a limited amount of necessary equipment, the type of disposal facility, the management in the final disposal of solid waste, the lack of containers in some areas and neighborhoods of the municipality, the lack of community awareness and education, and the

[8] UNESCO listing
[9] Agenda Ambiental de Samaná, 2012. Also, Manual of characterizations and Projection of Municipal Solid Waste. 2017.
[10] CCBO work plan.
[11] CCBO work plan. Jon Angin pers comm.
[12] Provincial Statistical Profile - Samana. 2015.
[13] IDDI grant.
[14] Plan Municipal de desarrollo de Las Terrenas 2013-2016

lack of promotion and/or absence of published garbage collection schedules.[15]

- **Microplastics in wastewater:** Synthetic fibers from clothing are a significant, and less understood, source of ocean microplastics,[16] as are microbeads commonly found in skincare products throughout the world. To date, fifteen countries have taken steps to ban microbeads, and many NGOs are focused specifically on this area.[17] While these tiny filaments persist through water treatment facilities and into the ocean, it is vital to maintain awareness of these sources as the DR designs new facilities. In September 2020, Las Terrenas opened their first wastewater treatment plant The newly established Public Private Trust of the DR will be responsible for environmental infrastructure, including waste and wastewater. CCBO is advising the Trust on capital cost and operating cost estimates and ways in which such plants might be co-located.Samaná's burgeoning tourism sector is both an opportunity and a challenge, if SWM improvements are not made. Inclusion of tourism must be a consideration for integration of SWM in the region, as there are an estimated 180,000 tourists in Samaná annually. The region is a significant and growing tourism destination, with a focus on the picturesque beaches and whale watching.

3. Relevant National Actions

To date, waste management in the DR has suffered from a lack of regulations and enforcement to address solid waste. Two major laws that have potential to create significant change are new as of 2020, the Law on Environmental Education and Communication (LEEC) and the Comprehensive Waste Management Act (CWMA). An overview of previous efforts and recent actions to address ocean plastic pollution are provided below.

3.1 Previous efforts and constraints

No integrated national solid waste law: The Dominican Republic's Constitution, the General Law on the Environment and Natural Resources (2000), the Ministry of Environment and Natural Resources' Law 64-00 (2003), and the National Development Strategy 2030 (2012), each speak generally to the intent of environmental improvement and solid waste programs; however, the country's more than 350 open dumps and its lack of sanitary landfills has enabled plastic waste to flow in increasing volumes from land into the oceans.

National emergency with no funding for implementation: The national government first recognized municipal solid waste as a "national emergency" in 2017, and required that six municipalities, including Samaná, close multiple open dumps, develop sanitary landfills, and implement a rate paying system for SWM. However, the lack of a strong national law, insufficient funding, and a lack of champions at the local level caused progress to be stunted and inconsistent. Samaná remains without a sanitary landfill, with development efforts renewed in late 2020 (given the advances detailed in the following section).

Economy has grown faster than waste infrastructure: The DR has seen some of the fastest growth

[15] Plan Municipal de desarrollo de Las Terrenas 2013-2016
[16] The Guardian. October 16, 2020.
[17] Beat The Microbead.org

in Latin America, averaging 5% annual growth in Gross Domestic Product (GDP) over the past twenty years, significantly driven by both tourism and industry. There is higher per capita waste generation in country than other similar nations due to the outsized impact of international tourism. Products linked to tourism (50,000 tons of plastic water bottles annually)[18] remain without functional recycling systems.

3.2 Recent actions and opportunities for transition

New national legislation: The new national waste management bill, the Comprehensive Waste Management and Co-processing Act of the Dominican Republic (CWMA) provides a roadmap with specific objectives, targets, and timelines for regulation and action. This law contains several specific policy instruments that give structure, direction, and funding opportunities to implement the law including a highest and best use hierarchy of interventions.

Committed leadership: National elections in 2020 have resulted in a new political administration, with the promise of environmental stewardship being a high priority. Specifically, the new president visited one of the landfills in Samaná in September 2020, and he has reiterated his focus to close open dumps and invest in SWM. The president has also delegated resources to this project through PROPEEP, upon which the new *ECO5RD* project has been created—which CCBO is delivering ongoing technical assistance and guidance to. In addition to this renewed support for infrastructure and SWM planning, on the passage of the new national law, the Minister of the Environment has emphasized the connection to environmental education "you can have a strong hand, law enforcement, but if there is no environmental education…then we will not see our mission fulfilled."[19]

Growing public awareness: In recent years, there has been an increase in public awareness and more discussion of developing solutions within the DR. International headlines highlighted the waste problem in Santo Domingo following a significant storm in 2018 that causes waves of garbage along the shore[20]. In 2019, the acclaimed documentary "Isla de Plasticó" outlined the true scale and challenges of plastic waste on the island. In 2020, increasing landfill fires drew attention to the state of dump sites and the ongoing environmental and health problems they pose.

Business initiatives: Projects at the private level are moving ahead of the new legislation to begin collecting plastics with the longer-term goal to build a material recovery facility (MRF) and polyethylene terephthalate (PET) processing facility in-country. The national business, NGO ECORED (National Business Environmental Network of over 90 companies), has focused intently on solid waste with major initiatives and funding.

International support: Many international development agencies, including the Japanese International Cooperation Agency (JICA), the German government (GIZ), the United Nations (UN), United States Environmental Protection Agency (EPA), and United States Agency for International Development (USAID) have become involved to find strategies to move the DR towards a functional SWM strategy. The DR has a UN commitment on file to implement the National Action Plan for the Protection for the Marine Environment by 2025. However, previous government officials have failed to submit an annual update on

[18] Dominican Today. 2.2020.
[19] El Dinero. September 15, 2020.
[20] New York Times, July 2018.

this project for the past two years.[21]

4. CCBO Alignment

This section highlights the most prominent opportunities for CCBO to support the DR's SWM system for the reduction of ocean plastic pollution, focusing on engagement in Samaná Province. The following aligns CCBO goals with international best practices for the mitigation of ocean plastic pollution, as well as with relevant articles within national laws, policies, and programs that align with those practices.

Fundamentally, the place to start, and where CCBO can be highly impactful, is in supporting the basic design of adequate solid waste collection, aggregation, disposal, and educational programs. Pilot programs to create recycling markets, and leadership in the direction of a circular economy by the nation's largest businesses, show the pivot towards sustained action around the distinct challenge of SWM on the island nation.

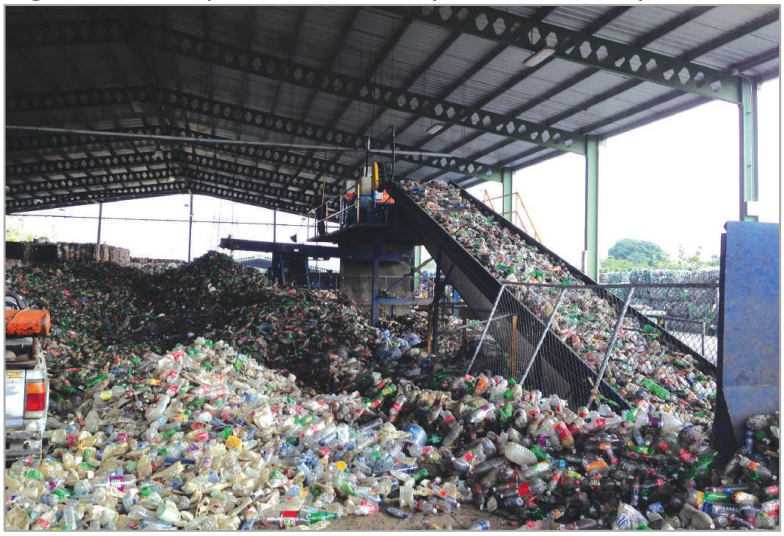
4.1 CCBO Objective 1: Promote reducing, reusing, and recycling practices and strengthen markets for recycled plastics.

Estimates based indicate that between 70%[22] and 85%[23] of the daily 0.79 kg per capita waste generated in Samaná[24] is either compostable or recyclable materials. Source separation will reduce contamination and may have the added opportunity to create compost programs for local agriculture while preventing methane emissions from organics in the landfill.

1. Support Implementation of Source Separation and Aggregation Points –

Appropriate and effective waste collection, aggregation points (e.g. small-scale transfer stations), and material separation that creates volumes of clean material for transportation to central recycling facilities must be developed in Samaná. Consistent cleanliness and quality of those materials will help to ensure that haulers receive optimal value for their materials. Therefore, training, education, and infrastructure on the ground are all crucial components.

Figure 2. Example of Source Separation Facility



[21] UN Ocean Conference Commitments
[22] Manual of Characterization and Projection of Municipal Solid Waste, 2017.
[23] Provided INTEC Grant statistic.
[24] Manual of Characterization and Projection of Municipal Solid Waste, 2017.

There is alignment and legal support from the new law as well. The CWMA requires mandatory source separation (Article 82) and states that municipalities are responsible for introducing solid waste collection that complements source separation (Article 96). To effectively manage material separation at scale, aggregation points are also required by the new law.

The DR currently relies upon independent waste pickers to identify and remove valuable materials from open dumpsites and transfer stations;[25] because some materials have a market resale value but the system lacks formal source separation and material aggregation infrastructure. As this infrastructure is developed, there will be an impact on these waste pickers, known as "buzos." New transfer stations/aggregation points may become a focus of contention, as the new law prohibits collection at these stations. It has been estimated this law will impact over 70% of recyclers in the country. "We cannot think, that in two years, there will be work for all of us in the municipal selective collection systems."[26] The CWMA has added language in the final draft of the law that says district boards will "encourage and incentivize formalization of pickers" (article 52), mandates municipalities "promote the progressive program implementation" of source separation (article 172 P3) within one year, but actually have two years (Article 72 P9) to promote formal inclusion with waste pickers in that system. Ensuring waste pickers participate throughout the program design in Samaná will be important to the success and support of SWM in the long term. The law does not mention specifically what "formal inclusion" looks like, the percentage of waste pickers who would be included, or the funding structure to train them.

A strategy for policies within Samaná will be to bring together the unions of recyclers and the municipality to develop the local policies that will provide a path forward. Because independent waste collectors (IWCs) are expressly forbidden from collecting materials within transfer sites, it will be highly important to identify, support, and train people to prevent exacerbating the conflict and poverty. CCBO goals align clearly with momentum to support IWCs, and specifically to empower women who work in SWM. Where possible, new strategies must engage representatives in the drafting of local policies, ensure IWCs understand the implication of the law, and are given the first opportunities to become trained and licensed to work within the new structure, as they have requested.[27] There has been international support for the formal recognition of these groups, including the German development agency,[28] aiding in the formalization of various groups—Movimiento Nacional de Recicladores de República Dominicana (MNRRD) and Red Dominicana de Recicladores (REDDORE).

2. Incentivize recycling –

The CWMA states that there will be payment for recovery of plastics and foam as a component of the new "special recovery program" (article 173), which will incentivize source separation; however, until the infrastructure is in place for product purchasers/consumers to recover a standardized deposit, there may be an unequal cost burden on the poor and a rush on plastics (and glass bottle) collection, potentially within open dumps. The focus in the short term is on financing facilities to process plastics, working with pre-consumer waste and progressing toward urban and mixed products, as it has been acknowledged

[25] Red Latinoamericana de Recicladores- Open Letter 2016.
[26] Ibid.
[27] Ibid.
[28] Participatory Strategy for the Inclusion of Recyclers and Waste Pickers in the ZACK Project. GIZ, 2016.

there will be a ramping up of understanding through different stages.[29] The law does not state what type of plastics may be valued, who sets that value, and where those materials will go in the near term. Potential partners in this work include EcoRed, which supported by Ciudad Saludable and the Clinton Foundation, who has been managing an Inclusive Recycling program in Samaná since 2013. Their program around PET collection to generate a market for plastics (see Objective 4) will also be instructive on creating and sustaining a plastics deposit program. CEBSE (the Center for the Conservation and Eco-Development of the Bay of Samaná and its Surroundings) is another potential partner to bring together eco-tourism development opportunities and community-level behavior change around recycling. In 2020, CCBO engaged with CEBSE to conduct community research to inform behavior change programming, with research set to conclude in the latter half of 2021. The new administration also intends to re-position Dominicana Limpia, a quasi-governmental agency, to focus more on building recycling and reuse markets throughout the country.

3. Energy Generation –

Generating energy through solid waste as an alternatively derived fuel (ADF) or refuse derived fuel (RDF) had already been supported by law through national renewable energy legislation, which was expanded in the CWMA. There is one facility so far on the island (Macoris), which blends biomass and solid waste as a feedstock. The CWMA creates a requirement for the proportion of solid waste be no less than 60% to qualify for investment incentives (article 37). The national government, in partnership with the German Development Agency (GIZ) has supported co-processing of waste for cement production and emphasized the importance of national solid waste legislation to "legitimize and support co-processing to enhance the associated benefits."[30] Cemex, the nation's largest cement producer, has long been involved in sustainability efforts with carbon reduction targets,[31] is also a founding member of EcoRed, and may be a partner in these technology efforts.

Support Opportunity	CCBO Activity Alignment (CCBO Work Plan)
Support Implementation of Source Separation and Aggregation Points	• Provide technical assistance and guidance to support initial engineering siting and design (Activity 3.2) • Support workforce development and training to empower women working in SWM (Activity 4.1) • Support women-owned recycling and reuse businesses (Activity 4.3)
Incentivize Recycling	• Promote education and Social and Behavior Change (Activity 2.1) • Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4) • Support women-owned recycling and reuse businesses (Activity 4.3) • Issue grants to conduct local formative research
Energy Generation	• Provide technical assistance and training on solid waste governance and enforcement methods (Activity 2.2)

[29] Webinar "Waste Law 225-2 and the development of the Dominican Industry." October, 15, 2020.
[30] 2018. GIZ, Governments of Germany and the Dominican Republic. "Adapting the Legal Framework for the Co-processing of Waste in the Cement Industry".
[31] Cemex - Sustainability

	• Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4)

4.2 CCBO Objective 2: Increase capacity and effective governance; improve local implementation and enforcement of laws, policies, and regulations

Lacking SWM capacity is the single biggest contributor to ocean plastic pollution in the DR, and this area is also where there is considerable expertise and support available through CCBO. This is an area where significant improvement in SWM is expected through implementation of the CWMA; better data gathering at the front end to understand exactly the amount, types, and sources of the solid waste must be a primary objective for effective strategies moving forward. These data are required through the new municipal plans for integrated waste management (articles 30-33) with new support from the Ministry of the Environment. The CWMA creates the framework for several new agencies and systems aimed at increasing effective governance around solid waste.

1. Support Infrastructure and Operational Capacity Building –

Figure 3. Sanitary landfill with adequate security and cover

In Samaná, there are five open dumps and countless illegal tipping locations. *As of 2021, two of the five locations have started the environmental remediation and closure process, led by the Ministry of Strategic and Special Programs and supported by CCBO technical guidance.* As previously mentioned, the dumps are themselves have been direct sources of ocean-bound pollution. Closing and remediating these sites (CCBO activity 3.3) as well as siting a sanitary landfill and aggregation/transfer sites (CCBO activity 3.2) will begin to address the most significant leakage points in the system. Creating aggregation and manual sorting locations, or pick lines, by training people who previously gathered recyclables from open dumpsites, will support the program goals for equity and safety, as well as increase public awareness and social responsibility around SWM.

Collection from homes in Samaná will likely require other infrastructure improvements; while 90% of residents live in free-standing homes, adding distance as a challenge to collection, fully 35% of those homes are classified as rural, and 50% of residents live in poverty.[32] This increases the likelihood that homes are inaccessible by typical solid waste equipment and vehicles, and also the likelihood that a requirement to pay for trash service will push people to continue to illegally dump or burn their waste.

2. Establish Stable and Equitable Funding Sources –

It is imperative to fund these programs in a sustainable, and publicly accepted, manner. The final draft of

[32] Samana statistical profile. 2015.

the law added a new "Special Contribution" provision, an income tax, earmarked to "mitigate the negative effects of current waste disposal and develop a comprehensive management system" (Article 36). This is direct and specific to address significant financial costs; it provides the foundations for solid funding structures, but only if a transparent mechanism for the distribution of funding is put in place and strictly enforced. The law requires developing a service charge system to users for waste collection and transportation using a national formula, but with specific rates to be defined by the city council. Base rates for services at the systems level have been added to the final language of the law.

There is a remaining gap in funding allocation from the national to the local levels for landfills. The formula that will be used to determine the specific allocation for the new income tax to each municipality has not yet been developed. It may be that geographically, some sanitary landfills may bring waste across municipal lines, where tipping fees and local allocation of infrastructure funding would need to be considered. Taxation on tourism is another viable alternative the government or local leadership may take. Permit fees for tourist's entrance to specific sites could be earmarked for SWM and remediation. Tourism is covered more under Objective 4 (Section 4.4).

3. Introduce New Policy Measures, such as Regulations on Single Use Plastics –

A contentious component of the CWMA draft originally banned foamed polymers (like expanded polystyrene) and certain single use plastics; the final law has removed that, but contains language that commercial establishments who provide single use plastics must "carry out an awareness campaign; plastic bags for transport of goods must be recyclable or eco-efficient." The law provides for five years to phase out 'free' disposable plastic bags. It is unlikely that these efforts will be effective or impactful on their own, but education, producer efforts, and adequate SWM will likely mitigate some of the missed opportunity.

Support Opportunity	CCBO Activity Alignment (CCBO Work Plan)
Support Infrastructure and Operational Capacity Building	• Provide technical assistance and training on solid waste governance and enforcement methods (Activity 2.2) • Develop siting, design and engineering plan for new solid waste and recycling infrastructure (Activity 3.2) • Develop strategy for interim and long-term closure and environmental mitigation of existing dump sites (Activity 3.3) • Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4)
Establish Stable and Equitable Funding Sources	• Develop cost of service models and rate design to support new solid waste services, including collection, aggregation, sorting and disposal (Activity 3.1)
Introduce New Policy Measures, such as Regulations on Single Use Plastics	• Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4) • Support implementation of the national law, including development of supporting regulation and policy

4.3 CCBO Objective 3: Build social behavior change for 3Rs and sustainable solid waste management

1. Promote Social Responsibility and Youth Education –

CCBO's Year One Work Plan contains clear language to Promote Education and Social and Behavior Change (Activity 2.1). This goal has clear alignment with the Law on Environmental Education and Communication (LEEC) and so ensuring that curriculum includes ongoing education about recycling, waste, and ocean impacts can act as a launch pad to rapidly expand understanding about these issues within the younger populations and their parents. It further creates a citizen's oversight board to implement these education strategies. Of concern is the lack of specific mention about the sources of content creation within environmental education. The law contains no formal structure for metrics for student engagement or learning assessment. Nor does the law expressly mention expectations for content itself, like plastics, trash, recycling, or the ocean.

The CWMA states that "educational institutions…should promote education on the recycling and recovery of waste from schools." However, by only committing to school level recycling programs as an income generator (article 50), it does not specifically address the negative social, health, and environmental importance of solid waste management. It is therefore important to connect specific education about solid waste and ocean debris into local and national environmental education platforms being set up through the LEEC. In Samaná, a collaboration between Ciudad Saludable, the Clinton Foundation, and EcoRed has developed and continues to implement the "Inclusive Recycling" program and is piloting twenty-two education centers. Nationally, the Center for the Development of Forestry and Agribusiness (CEDAF), in partnership with JICA runs programs with educational centers around solid waste and sustainability: 3Rs "*I recycle with Clean Points*" programs and the "*I am Ecoefficient*" programs. Locally in Samaná, CEBSE has a strong presence and connection between the local community and tourism focused on marine life. CCBO's grant to CEBSE in 2020-2021 has established a solid foundation for ongoing and future coordination.

2. Cleanup of Degraded Waterways –

The visibility of plastic waste, and the global movement to address it, has led many international organizations to focus on local beach cleanups as a way to educate young people especially. While less impactful in terms of volume of waste removed, cleanup events can be very effective at building public awareness by creating dramatic images of improvement with a brief effort by volunteers. Some destination locations, like Costa Rica, advertise the opportunity for volunteer beach cleanups as a draw for eco-tourism to those who look for a chance to give back while on vacation.[33] Currently, and very visibly, one of the new Ocean Cleanup Project ships is moving through the Rio Ozama in Santo Domingo,[34] drawing continuing international attention to the removal of marine-bound plastic waste in the DR. Other organizations offering cleanup events include Parley for the Oceans at 52 cleanups, 49,684 volunteers, and 26,000 tons of waste removed[35] and Vida Azul, a local NGO that sponsors periodic beach cleanups and

[33] RCDP Volunteer Programs
[34] Ocean Cleanup Event
[35] www.parley.tv

environmental education programs.[36]

While CCBO's approach does not commonly focus on investing in cleanup events, instead focusing on stemming the tide of pollution before it reaches waterways, CCBO expects that its activities will align with efforts to cleanup degraded waterways. For example, supporting environmental mitigation and closure of open dumps will have tremendous effect on waterways' conditions.

Support Opportunity	CCBO Activity Alignment (CCBO Work Plan)
Promote Social Responsibility and Youth Education	• Promote education and social and behavior change (Activity 2.1)
Cleanup Degraded Waterways	• Develop cost of service models and rate design to support new solid waste services, including collection, aggregation, sorting and disposal (Activity 3.1) • Develop siting, design and engineering plan for new solid waste and recycling infrastructure (Activity 3.2) • Develop strategy for interim and long-term closure and environmental mitigation of existing dump sites (Activity 3.3) • Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4)

4.4 CCBO Objective 4: Forge new private sector partnerships for improved impact, sustainability, and forward-looking commitments

1. Engage and Leverage the Tourism Industry –

The largest sector in terms of revenue in Samaná, as well as the largest source of solid waste, is the tourism industry. The relatively low cost of the DR for international visitors may indicate elasticity, where a few dollars make a minimal difference to the tourist, but aggregates to significant income for the municipality to maintain necessary infrastructure. There are nearly 2,400 hotel rooms in Samaná (as of 2014), which receive over 180,000 tourists a year. A tourism tax in Samaná, paid by the visitors themselves in the form of permits, access fees, or a small local tax on rooms, would support solid waste infrastructure costs and ensure adequate maintenance of the most desirable destinations.

Figure 4. Recycling bins made from recycled Dominican plastics

One of the most common single items associated with tourism is bottled water. Travelers' concern about

[36] Vida Azul

water quality creates 50,000 tons of bottled water waste annually in the DR.[37] One opportunity this provides is a concentration of single stream materials for recycled plastics programs, if collection programs focus on tourist locations. Another opportunity may be to work with hotel chains to break the cycle of bottled water by selling reusable bottles and promoting high-quality filtered water stations as a marketing opportunity for conscious travelers.

CCBO has engaged and will continue to collaborate with potential tourism partners, including the Samaná Tourism Group, and the Dominican Institute of Integrated Development (IDDI), which has the goal to "invest in the development of the province of Samaná, improving the environmental conditions of the area and the development of its inhabitants through projects that seek to make the province a tourist destination of greater interest, sustainable, and harmonious integration."

2. Public-Private Partnerships and Extended Producer Responsibility –

Figure 5. NUVI plastic bottle collection

Under the CWMA, the plastics industry is being required to implement significant changes within specific timelines to begin the process of circularity. These include a requirement to incorporate a percentage of resin from domestic recycled material into manufacturing processes within two years (Article 172), to increase that percentage annually (Article 122), and to develop and implement recovery and recycling plans and programs that encourage the optimal use of the resources contained in the plastic waste, either as raw material or by recovering its energy. The implementation of the principle of shared responsibility is left to a *National Extended Liability Plan* (Article 58), which requires a plan for each type of waste to be developed by the Ministry of the Environment.

Nationally, the Circular Economy Project is a coalition of twenty-two corporations under the umbrella of EcoRed, which aims to scale up the collection of plastic bottles to create a market justifying building a MRF in country. These corporations represent significant industry leverage in-country. The Circular Economy Project has committed an investment of $25 million over seven years, with the first phase aiming to increase recycling collection of plastic bottles to provide feedstock of 300 tons/month. Material will be baled and sold to countries that have poly-condensing units to convert plastics into resin. The second phase is set to purchase a poly-condenser unit for the Dominican Republic.[38] The project is currently marketing its collection of plastic water bottles under the name "NUVI," with current locations concentrated around Santo Domingo.

Support Opportunity	CCBO Activity Alignment (CCBO Work Plan)
Engage and Leverage the Tourism Industry	• Engage the private sector regarding investment in solid waste/recycling services and infrastructure (Activity 3.4)
Public-Private	• Engage the private sector regarding investment in solid waste/recycling

[37] Dominican Today. 2.2020.
[38] Dominican Today. 2.27.2020 "The DR Generates 50000 Tons of Plastic Bottle Waste Per Year."

Partnerships and Extended Producer Responsibility	services and infrastructure (Activity 3.4) • Support implementation of the national law, including development of supporting regulation and policy

5. Summary Recommendations

Clean Cities, Blue Ocean has a unique opportunity to leverage the momentum for improved SWM in the DR to make significant progress against ocean plastic pollution. By focusing on a region with high levels of leakage, as well as high visibility in marine biodiversity, CCBO can make progress on advancing the goals that the DR has for its own health and development. It is imperative to choose partners who can be champions on the local level, connected to the community, cultural, and political context, and who are able to build coalitions to progress programs from design to implementation. High-priority opportunities for near-term efforts include:

- Leverage new law to further momentum to close open dumpsites and clean up waterways
- Co-locate sanitary landfills with aggregation sites and potential energy generation
- Engage waste pickers and educators as partners in education and equity

Additional opportunities to explore, may include:

Continue to engage with national government on Marine Litter Plan – First proposed in the 2019 year in review document by the Ministry of the Environment,[39] this concept has not been development, but would be timely to follow the CWMA and be incorporated into the associated regulations.

Capture low-grade plastics for secondary process opportunities – A major gap in the CWMA is a lack of strategy to address lower value plastics, which are both complex to recycle and extremely common. Sachets, films and mixed plastics are useful because they are light, inexpensive, and durable materials. However, their composition makes them difficult to recycle. The effort to collect, sort, and process these materials is often not justified by the effort needed to extract the relatively low embedded value in these packaging formats. One opportunity may be to create a useful product using low technology solutions from these waste materials, perhaps by creating construction grade bricks, pavers or other building materials through high heat compression or extrusion. Models of this technology are being pioneered from Colombia[40] to the Philippines[41] with marked success. Homes for rural and low-income residents are often of low quality from found materials. Distributed eco-brick facilities co-sited with aggregation and transfer locations would provide a local, sustainable source of durable building materials. Similarly, the CCBO work plan "support(s) women owned upcycling and reuse businesses." However, there are no laws or specific associations that we were able to find to leverage this goal. The eco-brick concept can be focused on inclusion of women, as well as opportunities to collect and recycle polyester

[39] https://ambiente.gob.do/wp-content/uploads/2020/01/Memoria-Institucional-2019.pdf

[40] Conceptos Plásticos

[41] Green Antz Builders

clothing for new textiles. The fashion industry in the DR is very strong and continues to grow[42]. Private partnerships to encourage material circularity in the clothing industries may be an opportunity.

Engage with cross-sectoral partners to reduce plastic and waste leakage – Low-cost construction methods tend to maximize perceived strength against the risks of hurricanes and earthquakes by using durable, low-cost, and readily available materials. This has led to a heavy reliance on inexpensive, strong materials, like concrete, low grade hollow bricks, and rigid polystyrene. Polystyrene for construction is not addressed in law in the DR but is an unaddressed source of pollution. Thick, non-encased sheets are cut to size, where breakage and shredding blows small pieces into waterways. Considering the above recognition of plastic waste as a construction material, there may be an opportunity to replace polystyrene with a functionally comparable recycled plastic product.

Improve related infrastructure while advancing the waste system – While outside of the scope of this project, CCBO initiatives to focus attention on the scourge of ocean plastics may also review investments in improved wastewater treatment. While much of the DR remains without adequate water treatment, there is potential for these investments to consider microplastics in their design and in consideration of final disposal of sewage sludge, known to contain high volumes of microplastics.[43]

[42] Globe News Wire. November, 2018.

[43] Iyare et al. "Microplastics removal in wastewater treatment plants: a critical review". Environmental Science: Water Research and Technology. Issue 10, 2020.