

Supplemental Material

Kyle Johns, Sophie Togneri, Anthony Bozza, Shane Dancer

Waste Bandits

IQP Puerto Rico B term 2021

Prof. Scott Jiusto & Prof. Gbetonmasse Somasse

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1: Posters



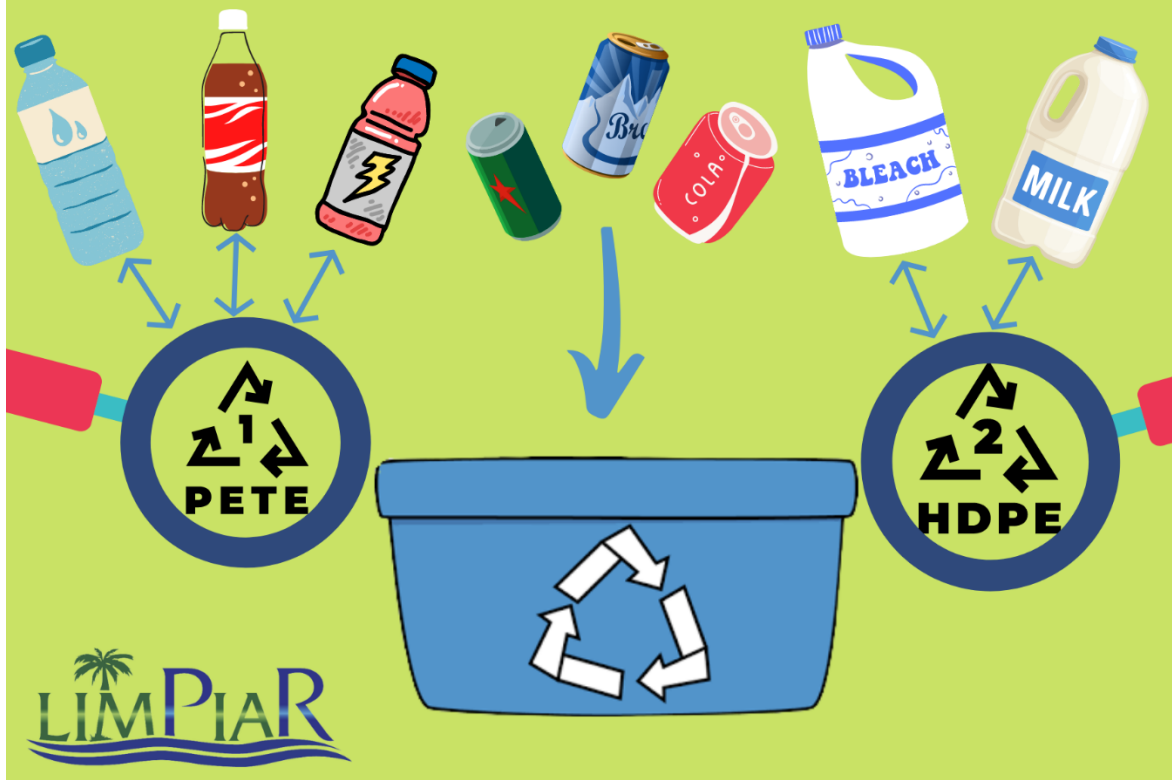
GUÍA DE RECICLAJE

1. Busca el número 1 o 2 en los envases de plástico

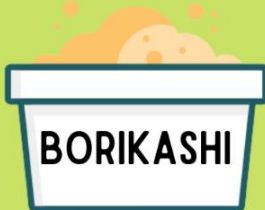
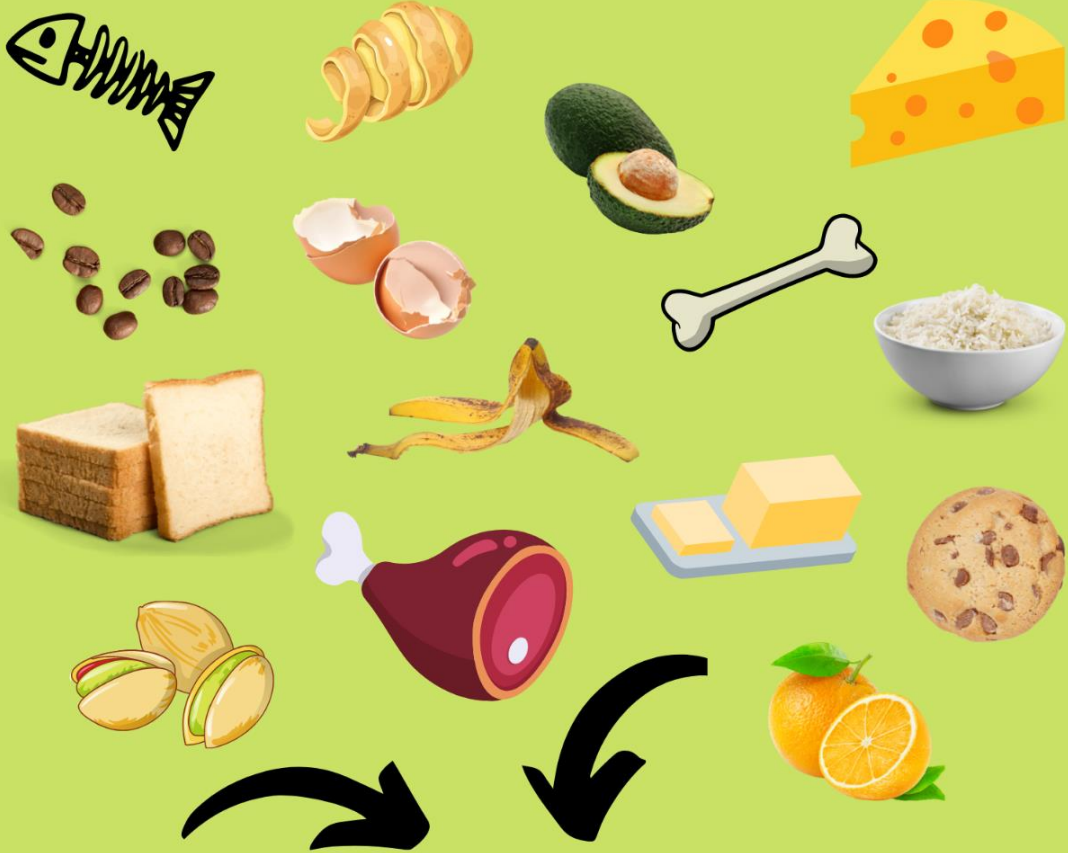
2. Identifica las latas de aluminio de bebidas

3. Enjuaga los envases si están sucios

4. Depositalos en el contenedor de reciclaje



COMPOSTAJE



1.3: Recycle Here Poster



1.4: Guide to Leave a Clean Footprint

GUIA PARA DEJAR UNA HUELLA LIMPIA

Guide to Leaving a Clean
Footprint

**TENGA EN CUENTA LOS
ECOSISTEMAS Y VIDA
SILVESTRE A SU
ALREDEDOR.**

Be mindful of the ecosystems, and
wildlife around you.

**EVITE USAR PLÁSTICOS DE
UN SOLO USO. TRAIGA
UTENSILIOS Y VASOS
REUSABLES.**

Avoid using single-use
plastics. Bring reusable
utensils and cups.

**TRAIGA UNA BOLSA
DE BASURA Y
LLÉVESELA TODA DE
VUELTA A CASA.**

Bring a garbage bag and take
it all back home.

**DISFRUTE DE LA
PLAYA Y DÉJELA MÁS
LIMPIA DE LO QUE LA
ENCONTRÓ.**

Enjoy the beach and leave it
cleaner than you found it.

**LIMPIAR**



1.5 To Save the Oceans Take Your Trash Home!

¡PARA SALVAR LOS OCEÁNOS! LLEVA TU BASURA A CASA



1.6 Be Environmentally Responsible Like These Restaurants

¡SE AMBIENTALMENTE RESPONSABLE, COMO ESTOS RESTAURANTES!

BE ENVIRONMENTALLY RESPONSIBLE, LIKE THESE RESTAURANTS!

LA CASA DEL INDIO

F248 + GJX, Cangrejo Arriba, Carolina, Puerto Rico, Loíza 00983

NUEVO ACUARIO

Carretera 187, Punta Cangrejo (Piñones), 00772

SUN CITY

Calle Finca Piñones, Carolina, Loíza 00772

NANA'S PLACE

Carretera PR-187 frente Negocio El Farol, Piñones, 00983

THE WATERFRONT

Carretera 187, O C. Playa km.5, Loíza, 00772

MI CASITA SEAFOOD

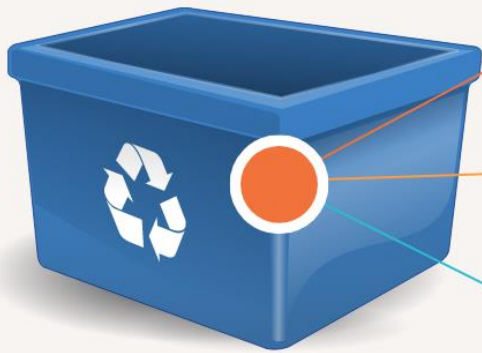
Km 5, PR-187, Carolina, 00983



1.7 Process of Recycling



Reciclar en Piñones



Plástico 1



Plástico 2



Latas de Aluminio



ENCUESTA COSTERA

¡ESCANÉAME!

Olas

tais

LIMPIAR

Scuba Dogs Society
TU HUELLA EN ARMONÍA

C.C.S.A.M.

1.10 Steps for Composting



PASOS PARA EL COMPOSTAJE



¿Por qué compostar? ¡Puede reducir la producción de desechos, ahorrar dinero y mejorar su jardín!

Estamos trabajando con TAIS para llevar el compostaje a Piñones. ¡Solo sigue los pasos a continuación!

1.



RECOGER RESTOS DE COMIDA

A lo largo del día, recoja todos los restos de comida y los alimentos no consumidos y colóquelos en su cubo de compostaje TAIS.

2.

AGREGUE UNA CUCHARADA DE BORIKASHI

El Borikashi iniciará el proceso de fermentación. ¡Este paso es muy importante!



3.



COMPACTAR EL CONTENEDOR

Con el prensador, compacte los restos de comida y Borikashi hacia abajo para eliminar el oxígeno y activar los microbios.

4.

REPITE TODOS LOS DIAS

Repita este proceso todos los días hasta que su balde esté lleno. Luego, llévelo al sitio de compostaje, vacíelo y comience de nuevo.



Aprender más en www.taispr.com



1.11 Leave a Clean Footprint Recycling Turtle Poster



1.12 Before There Were Only Mountains



Salva Nuestro Planeta

AQUÍ ANTES
HABÍA NADA MÁS
QUE MONTES

Respetar el Medio Ambiente

POR FAVOR, LLEVAE TODA TU BASURA A CASA CONTIGO





1.14 Leave a Clean Footprint Beach Side-by-Side



1.16 Help Take Care of the Piñones Ecosystem

Ayúdanos a Cuidar los Ecosistemas de Piñones
Help us Take Care of the Piñones Ecosystems

LIMPIAR **COPI**

The infographic features a central map of the Piñones region with ten callout lines pointing to circular images of various ecosystems and species. The species are arranged in two rows above the map. The top row includes: Mangle Rojo (Red Mangrove), Pelicano Pardo (Brown Pelican), Lagartijo Crestado (Puerto Rican Crested Anole), Garza Azul (Little Blue Heron), and Tinglar (Leatherback Sea Turtle). The bottom row includes: Manatí Antillano (Manatee), Juey Azul (Blue Crab), Arrecifes de Coral (Coral Reefs), Dunas de Arena (Sand Dunes), and Robalo (Common Snook).

Ecosystem	Species
Mangle Rojo	Red Mangrove
Pelicano Pardo	Brown Pelican
Lagartijo Crestado	Puerto Rican Crested Anole
Garza Azul	Little Blue Heron
Tinglar	Leatherback Sea Turtle
Manatí Antillano	Manatee
Juey Azul	Blue Crab
Arrecifes de Coral	Coral Reefs
Dunas de Arena	Sand Dunes
Robalo	Common Snook

1.17 Protect Our Animals

Proteja a Nuestros Animales
Todos estos animales son especies en peligro de extinción

The image features a map of Puerto Rico with eight circular callouts, each containing a photograph of an endangered species. The callouts are connected to specific regions on the map by thin black lines. The species shown are: Manati Antillano (a large marine mammal), Cotorra Puertorriqueña (a green parrot), Coquí Llanero (a small brown frog), Carey (a sea turtle), Guajon (a large tree frog), Tinglar (a large tortoise), Boa Puertorriqueña (a brown snake), and Pelicano Pardo (a brown pelican). The map is color-coded: the western tip is grey, the north coast is green, the central region is light green, the southern coast is orange, the eastern coast is pink, and the interior is grey.

Manati Antillano

Cotorra Puertorriqueña

Coquí Llanero

Carey

Guajon

Tinglar

Boa Puertorriqueña

Pelicano Pardo

LIMPIAR

2: Stickers



2.1 Reduce Reuse Recycle, Leave a Clean Footprint Realistic Turtle



2.2 Leave a Clean Footprint Cartoon Turtle



2.3 Reduce Reuse Recycle, Leave a Clean Footprint Manatee



2.4 Reduce Reuse Recycle, Leave a Clean Footprint Pelican



2.5 Reduce Reuse Recycle, Leave a Clean Footprint Blue Crab



2.6 Care For the Ocean Protect the Animals



2.7 Reduce Reuse Recycle, Leave a Clean Footprint



2.8 Leave a Clean Footprint Earth



3: Recycling Bin Lids



3.1 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 and Aluminum - Crab



3.2 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 and Aluminum - Animals



3.3 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 and Aluminum - Lizard



3.4 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 + Aluminum – Stylistic Turtle



3.5 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 + Aluminum – Turtle Head



3.6 Leave a Clean Footprint, Recycle Only Plastics 1 and 2 and Aluminum - Sea Life



4: WorkCharts



4.1 General Work Chart for LimPiaR

2022

AÑO DEL CALENDARIO

ENERO

MES CALENDARIO

LUNES

PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
27	28	29	30	31	01	02
03	04 RECOGIDO DE DESPERDICIOS DE RESTAURANTE VOLUMEN: _____	05	06 RECOGIDO DE DSPERDICIOS COMUNITARIA VOLUMEN: _____	07	08	09
10	11 RECOGIDO DE DESPERDICIOS DE RESTAURANTE VOLUMEN: _____	12	13 RECOGIDO DE DSPERDICIOS COMUNITARIA VOLUMEN: _____	14	15	16
17	18 RECOGIDO DE DESPERDICIOS DE RESTAURANTE VOLUMEN: _____	19	20 RECOGIDO DE DSPERDICIOS COMUNITARIA VOLUMEN: _____	21	22	23
24	25 RECOGIDO DE DESPERDICIOS DE RESTAURANTE VOLUMEN: _____	26	27 RECOGIDO DE DSPERDICIOS COMUNITARIA VOLUMEN: _____	28 6	29	30
31	01	02	03	04	05	06

4.2 Work Chart for Casa Del Indio

2021

AÑO DEL CALENDARIO

DECIEMBRE

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 LA CASA DEL INDI RECOGIDO DE DESPERDICIOS	08	09	10	11	12
	VOLUMEN: _____					
13	14 LA CASA DEL INDI RECOGIDO DE DESPERDICIOS	15	16	17	18	19
	VOLUMEN: _____					
20	21 LA CASA DEL INDI RECOGIDO DE DESPERDICIOS	22	23	24	25	26
	VOLUMEN: _____					
27	28 LA CASA DEL INDI RECOGIDO DE DESPERDICIOS	29	30	31	01	02
	VOLUMEN: _____					
03	04	05	06	07	08	09

4.3 Work Chart for Mi Casita

2021

DECIEMBRE

AÑO DEL CALENDARIO

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 MI CASITA SEAFOOD RECOGIDO DE DESPERDICIOS VOLUMEN: _____	08	09	10	11	12
13	14 MI CASITA SEAFOOD RECOGIDO DE DESPERDICIOS VOLUMEN: _____	15	16	17	18	19
20	21 MI CASITA SEAFOOD RECOGIDO DE DESPERDICIOS VOLUMEN: _____	22	23	24	25	26
27	28 MI CASITA SEAFOOD RECOGIDO DE DESPERDICIOS VOLUMEN: _____	29	30	31	01	02
03	04	05	06	07	08	09

4.4 Work Chart for Nana's Place

2021

AÑO DEL CALENDARIO

DECIEMBRE

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 NANA'S PLACE RECOGIDO DE DESPERDICIOS VOLUMEN: _____	08	09	10	11	12
13	14 NANA'S PLACE RECOGIDO DE DESPERDICIOS VOLUMEN: _____	15	16	17	18	19
20	21 NANA'S PLACE RECOGIDO DE DESPERDICIOS VOLUMEN: _____	22	23	24	25	26
27	28 NANA'S PLACE RECOGIDO DE DESPERDICIOS VOLUMEN: _____	29	30	31	01	02
03	04	05	06	07	08	09

4.5 Work Chart for Nuevo Acuario

2021

AÑO DEL CALENDARIO

DECIEMBRE

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 NUEVO ACUARIO RECOGIDO DE DESPERDICIOS VOLUMEN: _____	08	09	10	11	12
13	14 NUEVO ACUARIO RECOGIDO DE DESPERDICIOS VOLUMEN: _____	15	16	17	18	19
20	21 NUEVO ACUARIO RECOGIDO DE DESPERDICIOS VOLUMEN: _____	22	23	24	25	26
27	28 NUEVO ACUARIO RECOGIDO DE DESPERDICIOS VOLUMEN: _____	29	30	31	01	02
03	04	05	06	07	08	09

4.6 Work Chart for Sun City

2021

AÑO DEL CALENDARIO

DECIEMBRE

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07	08	09	10	11	12
	SUN CITY RECOGIDO DE DESPERDICIOS					
	VOLUMEN: _____					
13	14	15	16	17	18	19
	SUN CITY RECOGIDO DE DESPERDICIOS					
	VOLUMEN: _____					
20	21	22	23	24	25	26
	SUN CITY RECOGIDO DE DESPERDICIOS					
	VOLUMEN: _____					
27	28	29	30	31	01	02
	SUN CITY RECOGIDO DE DESPERDICIOS					
	VOLUMEN: _____					
03	04	05	06	07	08	09

4.7 Work Chart for Waterfront

2021

DECIEMBRE

AÑO DEL CALENDARIO

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 THE WATERFRONT RECOGIDO DE DESPERDICIOS VOLUMEN: _____	08	09	10	11	12
13	14 THE WATERFRONT RECOGIDO DE DESPERDICIOS VOLUMEN: _____	15	16	17	18	19
20	21 THE WATERFRONT RECOGIDO DE DESPERDICIOS VOLUMEN: _____	22	23	24	25	26
27	28 THE WATERFRONT RECOGIDO DE DESPERDICIOS VOLUMEN: _____	29	30	31	01	02
03	04	05	06	07	08	09

4.8 Work Chart for Copi

2021 DECEMBER

AÑO DEL CALENDARIO MES CALENDARIO

LUNES
PRIMER DÍA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02	03	04	05
06	07 COPI RECOGIDO DE DESPERDICIOS VOLUMEN: _____	08	09	10	11	12
13	14 COPI RECOGIDO DE DESPERDICIOS VOLUMEN: _____	15	16	17	18	19
20	21 COPI RECOGIDO DE DESPERDICIOS VOLUMEN: _____	22	23	24	25	26
27	28 COPI RECOGIDO DE DESPERDICIOS VOLUMEN: _____	29	30	31	01	02
03	04	05	06	07	08	09

4.9 Work Chart for the Community

2021

DECIEMBRE

AÑO DEL CALENDARIO

MES CALENDARIO

LUNES
PRIMER DIA DE LA SEMANA



LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
29	30	01	02 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	03	04	05
06	07	08	09 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	10	11	12
13	14	15	16 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	17	18	19
20	21	22	23 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	24	25	26
27	28	29	30 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	31	01	02
03	04	05	06	07	08	09

4.10 Work Chart for the Community English

2021 **DECEMBER**

AÑO DEL CALENDARIO

MES CALENDARIO

MONDAY
PRIMER DIA DE LA SEMANA



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	01	02 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	03	04	05
06	07	08	09 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	10	11	12
13	14	15	16 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	17	18	19
20	21	22	23 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	24	25	26
27	28	29	30 RECOGIDO DE DSEPERDICIOS COMUNITARIA VOLUMEN: _____	31	01	02
03	04	05	06	07	08	09

5: WorkChart FAQ



WORK CHART FAQS:

- 1** How do I change the month and year?
- 2** How do I add a new sheet?
- 3** How do I make the words Spanish?



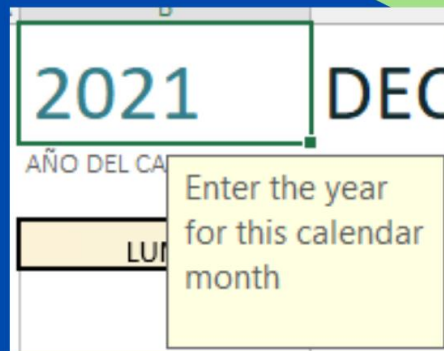
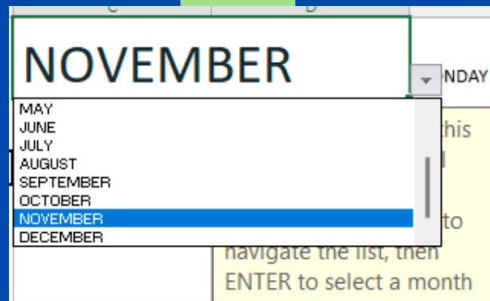
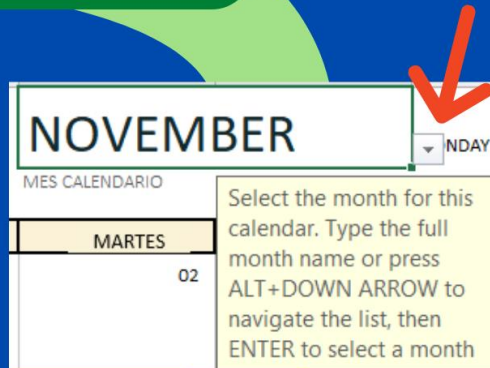
1

How do I change the month and year?

Select the drop down arrow highlighted in the picture to the right to open all of the available months

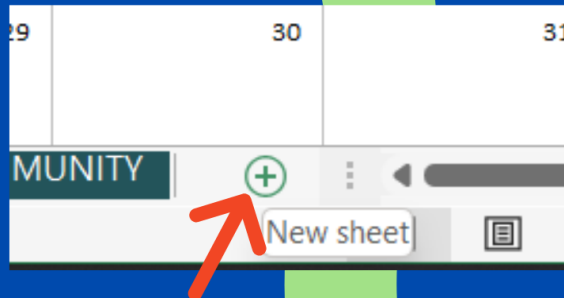
Click the desired month and the calendar will automatically update with the correct days

To change the year simply type the desired year and press enter, the entire sheet will update accordingly



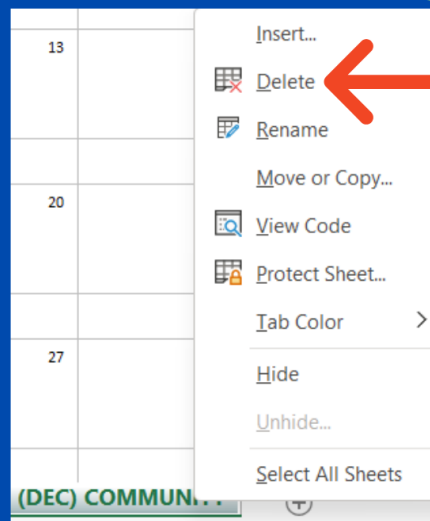
2 How do I add a new sheet?

If you want to add a blank new sheet then press the small plus button located on the bottom bar in excel.



If you are looking to duplicate a pre-existing sheet, press the control key then click and drag on that sheet's tab, located on the bottom of the page, to replicate it.

To delete a specific sheet on the excel file right click on that sheet's tab. This will open up an array of options, from here press the delete option to permanently delete the file



3 How do I make the words Spanish?

The formula in excel is in English and will not recognize Spanish text



While the formulas must remain in english, all of the words can appear to be in Spanish by adding a white text box containing the Spanish translation.



After the text boxes with the Spanish words are created, move them over the English words. This will give the appearance that the calendar is in Spanish while keeping the formulas in English

Contact Us



Tony Bozza - arbozza@wpi.edu

Shane Dancer - sdancer@wpi.edu

Kyle Johns - ktjohns@wpi.edu

Sophia Togneri - smtogneri@wpi.edu

Waste Bandits - gr-CTPR-pinoneswaste@wpi.edu

Website -<https://wp.wpi.edu/puertorico/projects/2021-fall/pinones-waste-management/>



6: Workshop Facilitator Guide



RECYCLING ORIENTATION FACILITATOR GUIDE



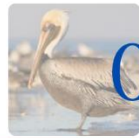
EMPLOYEE TRAINING MANUAL
& WORKSHOP GUIDE

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WORKSHOP DAY 2



04

COMMUNITY



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CONTACT US

INTRODUCTION

Message from Authors

The following document details the necessary steps to efficiently and effectively train participants in LimPiaR's recycling program.

The following pages contain the important steps for hosting workshops with both restaurants and community members. The pages highlight all of the steps that our team found to be effective when designing and running our own workshops. It is important to follow the steps, as each step has a specific purpose that will help the restaurant owners understand the program. This guide was created for LimPiaR representatives or community leaders who are going to be running recycling workshops. Tailor each restaurant workshop towards the personality and culture of the restaurant. Be mindful of the staff and have fun.

Waste Bandits
Kyle, Sophia, Tony & Shane

INTRODUCTION

Materials

- **Posters**
 - Guía de Reciclaje
 - Aquí se Recicla
 - Guía para Dejar una Huella Limpia
 - Cuidar los Ecosistemas de Piñones



- **Recyclable Material Examples**
 - Water Bottle, Soda Bottle, Juice Containers, Soap Containers, Aluminum Beverage Cans, Plastic Bowls
- **Prepared Recycling Container**
 - Including sticker for the lid
- **Work Chart**

2022 ENERO

AYUDANOS A CUIDAR LOS ECOSISTEMAS DE PIÑONES

LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Workshop Day 1

Set-Up (~5 minutes)

Step 1: Introductions

Use this time to introduce yourself to employees and share LimPiaR's mission and vision: *"Achieve a cleaner and greener Puerto Rico for everyone who lives and visits the island while also providing educational information geared toward raising environmental awareness."*

Step 2: Explain the Importance & Benefits of Recycling

Explain by saying *"by participating in recycling, the restaurant will not only decrease their waste disposal costs but also promote sustainability."*

Then, display the ecosystems poster and say *"Recycling decreases the amount of litter found on the beach and protects the surrounding environment and ecosystems. This will protect biodiversity and the health of the wildlife."*



Step 3: Display and Explain Posters

Display the 18 x 24 posters and explain their main messages which are listed below:

- Guía de Reciclaje: *Explains the necessary steps to take when preparing to recycle an item*
- Aquí se Recicla: *Shows a visual representation of commonly recycled items*
- Guía para Dejar una Huella Limpia: *Provides suggestions on how beachgoers can limit their ecological footprint*
- Cuidar los Ecosistemas de Piñones: *Displays common animals found in Piñones to increase environmental awareness*

Workshop Day 1

Recycling Process (~5 min)

Step 4: Find the Recycling Symbol

Displaying a plastic water bottle and juice container, show where the plastic symbol is found. Say *"most commonly the recycling symbol will be found on the bottom of a container. It looks like a triangle of arrows with a number on the inside. We are only collecting items with a 1 or 2, all other numbers should be disposed of in the trash, not the recycling bin."*



Step 5: Describe Common Recyclable Items

Display the "Aquí se Recicla" poster and describe some of the most common recyclable items, using the following script: *"Most commonly, you will encounter Plastic Type 1. These items include most plastic beverage bottles including water and soda bottles. Plastic Type 2 items will most commonly consist of milk and juice containers and cleaning supplies. Aluminum cans are limited to just beverage cans including soda and beer cans, not cans that are used in the kitchen."*

Step 6: Describe Recycling Process

Display the "Guía de Reciclaje" poster and describe the steps that need to be taken to prepare an item to be recycled which are listed below:

1. Busca el número 1 o 2 en los envases de plástico
2. Identifica las latas de aluminio de bebidas
3. Enjuaga los envases si están sucios
4. Depositalos en el contenedor de reciclaje

Emphasize the importance of preventing contamination by stating *"If the recycling gets contaminated, all of it will be thrown away so it is essential that all recycled items are clean."*



Workshop Day 1

Recycling Process (~15 min)

Step 7: Interactive Prop Activities

This part of the training gives the employees hands-on experience. There are 2 potential opportunities for activities depending on the time availability and number of participants.

Activity 1: This is an activity for large groups. Hand out examples of recyclable materials to the employees. Explain the activity using the following description: *"Looking at your piece of plastic, locate the recycling symbol, find which number plastic it is, then identify whether it is recyclable or not."* Have the group share out and correct any incorrect identifications.

Activity 2: This is a short game. Have one employee or manager participate. Combine recyclable materials and non-recyclable materials in a pile and explain the rules using the following description: *"This is a combination of both recyclable and non-recyclable items. Your goal is to identify and separate these plastic items by number and pick those that are able to be recycled."* If there is time, you can make this a competition by having multiple employees participating and timing them.

Step 8: Hanging Up Posters

Use this time to walk around the restaurants with the restaurant owner and hang up the posters. Recommend hanging the "Guía de Reciclaje" and "Aquí se Recicla" posters near the recycling bins to *"remind the employees of the items that can be recycled and the required steps."* Also, recommend hanging the "Guía para Dejar una Huella Limpia" in areas of high foot traffic to *"increase exposure and raise awareness to be a responsible beachgoer."*

Step 7: Questions

Use this time to ask if there are any questions from any of the employees and address any concerns that are raised about recycling.

Workshop Day 1

Schedule & Logistics (~10 min)

Step 8: Pass out and Review Work Chart

Pass out the work chart schedule and say *"Except for extenuating circumstances, pick-ups will occur on Tuesday. To prepare for pick-ups the recycled items need to be put in the provided reusable contractor bags and put outside the restaurant."*

LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Step 9: Suggest Daily Schedules

Suggest to managers that it may be easier to create a daily schedule to run the program. Some possible recommendations are listed below.

- *"Having employees sort through recycling at clean-up every day to prevent having to do it at the end of the week"*
- *"Have a separate collection area for containers that had food debris to ensure thorough rinsing and prevent contamination"*
- *"Create specific jobs depending on the day to prevent procrastination"*

Step 10: Schedule Follow-Up Meeting

Schedule a meeting for the following week to review the first week of recycling and sort through the week's recycling.

Step 11: Questions

Use this time to ask if there are any questions from any of the employees and address any concerns that are raised about the schedule.

Workshop Day 2

Recycling Review (~20 min)

Step 1: Check-In on Previous Week

This meeting will take place only with the owner. To review the operations of the previous week, ask the following questions:

- *"Were there any concerns that you would like to discuss?"*
- *"How do you feel the program functioned this week?"*
- *"What do you think were the biggest challenges?"*

Step 2: Examine Recycled Items

Quickly sift through the previous week's recycling and examine for any obvious issues or contamination. If there is, address that with the manager and explain why it is important to follow the needed criteria. The two biggest issues will be putting non-recycling materials into the bin or food contamination.

Logistics (~5 min)

Step 3: Weigh Picked-Up Recycling

This is a very important step for LimPiaR as this information can be used for grants. Bring a scale and weigh at the restaurant.

Step 4: Review Schedule

Ask *"If there were any issues or confusion with the work chart or schedule"* and address these issues if they arise. Reiterate that *"Except for extenuating circumstances, pick-ups will occur on Tuesday. To prepare for pick-ups the recycled items need to be put in the provided reusable contractor bags and put outside the restaurant."*

Step 5: Questions

Use this time to ask if there are any questions from any of the employees and address any concerns that are raised.

Community Workshop

Recycling Process & Logistics

Step 1: Set-Up

This workshop is going to be very similar to Workshop Day 2 with the restaurants. The drop-off date needs to be coordinated with a local community leader and will be held on Thursdays at 6:00 pm. This day will need to be advertised and shared with the participating community members.

Step 2: Examine Recycled Items

When community members bring their recycled items to the recycling bin, located behind the bleachers of the basketball court, pair them with a LimPiaR representative. Ask some of the following questions:

- "How did the collection process go this week?"
- "Did you face any challenges that we can help you with?"
- "Did any questions arise throughout the week that you would like to ask us?"

Then, examine each item they brought and ensure that it is plastic type 1 or 2 or aluminum and look for any contamination. Have copies of both the "Guía de Reciclaje" and "Aquí se Recicla" posters available for reference. If problems arise, address them appropriately with the community member.

Step 3: Questions

After examining their items, ask if the community member has any questions and address any concerns that are raised.



Contact Us



Tony Bozza - arbozza@wpi.edu

Shane Dancer - sdancer@wpi.edu

Kyle Johns - ktjohns@wpi.edu

Sophia Togneri - smtogneri@wpi.edu

Waste Bandits - gr-CTPR-pinoneswaste@wpi.edu

Website - <https://wp.wpi.edu/puertorico/projects/2021-fall/pinones-waste-management/>



7: Future Implementation





Worcester Polytechnic Institute in
collaboration with LimPiaR

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OUR STORY

Proclaimed by Jami Claypoole as the "Waste Bandits," we arrived in Piñones, with the idea that we were going to develop an ecological certification program for restaurants in the community. However, upon walking around the community and learning of the reality of the litter situation it was suggested that we take "baby steps" and tackle the waste management situation one small step at a time.

For us, these small steps meant focusing on implementing a recycling program within the restaurants and creating a poster campaign for the beaches with a focus on decreasing litter.

In our 7 weeks of working in Piñones, we were able to create a series of posters that illustrated strategies to "Deja una Huella Limpia" at the beach and developed a set of educational materials to teach restaurants and community members about recycling and composting.

We hope that these materials help facilitate developing a community-based mentality focused on sustainability and environmental awareness.

Now, as we depart, we wanted to leave behind some of the reflections we had after our interviews, research, and observations, as well as our input and suggestions for future plans and projects.

We hope that these materials provide LimPiaR with some helpful information and ideas to promote their projects and increase sustainability in Piñones

Waste Bandits



EXPANSION OF THE RECYCLING PROGRAM

Current Recycling Program

During our work in Piñones, we developed the plans for implementing a recycling program for 6 restaurants and COPI. These businesses can currently recycle plastic types 1 & 2 and aluminum beverage cans.

Expansion of Materials

According to IFCO, there is also the opportunity to recycle plastic 4. Plastic 4 is LDPE (low density polyethylene) which includes bread wrapping, squeezable bottles, and shopping bags.

However, these items are not consistently labeled, which can cause confusion among participants.

Prior to rolling out this process, it is essential to speak with IFCO about exactly what materials they will accept.

After consulting IFCO, LimPiaR will need to meet with the restaurant managers and the expansion process and what new items can be recycled.

Residential Expansion

Resident involvement is another important step in implementing a community-wide recycling program.

We recommend starting with 10 families. The smaller the starting population, the easier it is to manage and plan at the onset.

We recommend rolling out the program in waves, 10 new households a week. This will create a manageable workshop size for LimPiaR. After 2 months, a majority of the community members who want to participate will be trained and workshops will only be held on a case by case basis.

Restaurant Expansion

We recommend that LimPiaR continue to reach out the restaurants around Piñones to join the program and provide materials and workshops for those who choose to participate.

Logistic Considerations

When expanding the program it is essential for LimPiaR to update their schedule and other logistics to account for the extra bandwidth that will be needed. We recommend keeping a detailed schedule of occurring pick-ups and the corresponding important information in the work chart as well as implementing another pick-up day if necessary.

The work chart will serve as important documentation for grants and subsidies, so upkeep and careful notes are essential for the success of this program

ROADMAP TO COMPOSTING

Composting Overview

Composting is a very complicated procedure. In order to be successful, the program requires careful planning, training, and education, which is why we recommend LimPiaR takes calculated and methodical steps when implementing this pilot program. We recommend that LimPiaR continues to consult with TAIS and utilize them as a reference when designing the program.

Composting Pilot Participants

We recommend that the composting program be limited to a group of 8-10 committed residents.

This small pilot group will allow LimPiaR to easily manage and control the early stages of the program. It is always easier to expand.

This small pilot group will also allow LimPiaR the necessary time to understand the logistics of the operation and develop their own course of action for the maintenance of the site

Logistics

We recommend that LimPiaR start by only using one composting site. A small group of residents will not generate enough organic waste to require two and it will be much easier to manage while figuring out the necessary logistics of the operation.

Another important logistic is to determine where the feedstock is coming from. We recommend having residents collect their leaves and sticks from home and bring them to the site as well as invest in a wood chipper.

Ideally, we recommend collecting food scraps once a month (every 4 weeks), with 2 piles it can be collected every 2 weeks if necessary but alternate which piles gets added to.

Educational Plans

One of the most important aspects to consider when implementing the pilot program is participant education. Our team has designed and provided an educational poster and infographic that can be provided to the residents detailing the steps and necessary information needed to start composting.

We also recommend hosting community-wide information sessions and workshops detailing the necessary steps and requirements to composting, similar to the provided workshops for the recycling program. Following the correct steps is essential to the success of this program, so training the participants is a vital step.

Required Infrastructure

A top priority of maintaining a composting site is to minimize the environmental impact. Due to its location adjacent to the drainage channel, it is vital to develop the necessary infrastructure to prevent harmful runoff from the site. We recommend running an environmental impact assessment to ensure the site will be ethical and safe.

Restaurant Expansion

For restaurant expansion, we recommend deferring to TAIS on how many restaurants they recommend participate. However, we do not recommend that the program be expanded to restaurants until LimPiaR feels as though they are thoroughly prepared and have regular maintenance of the sites.

As stated in the original interview with TAIS, prior to accepting a restaurant into the program, we recommend having them separate their food waste for a week to estimate the volume of food waste generated. This will help LimPiaR understand the bandwidth needed to add restaurants to the program.

ELIMINATING SINGLE-USE PLASTICS

Issues with Single-Use

One of the biggest environmental impacts that restaurants have is their use of single-use plastics. These include plastic utensils, cups, and plates, take-out containers, and Styrofoam. We observed during the beach clean-up that these single-use plastic items made up much of the litter that was found. There are a number of strategies that LimPiaR can suggest to restaurant owners to decrease their environmental impact.

Styrofoam Alternatives

One common observation we made at restaurants is the use of Styrofoam take out containers. The best alternatives that restaurants can use are biodegradable containers.

Many of these options are made from wheat straw, which is completely compostable. These materials will completely biodegrade within 3-6 months, and can be added to a composting pile.

Another option are containers made of bagasse. Bagasse is the pulp of sugarcane and is made of sugar cane pulp. These are naturally biodegradable within 90 days of disposal.

Although restaurants cannot guarantee that these containers will not end up as litter, these two products will biodegrade and break down quicker than Styrofoam or other single-use plastic would.

While there are other bioplastics out there like PLA, a corn-based plastic, that are marketed as eco-friendly, they are often not naturally biodegradable, so our team recommends that LimPiaR promote paper and wheat straw based products to restaurants.

Limiting Plastic Use

One of the simplest ways that restaurants can reduce their plastic use is by conducting a plastic use audit and determining where they can use reusable options instead of single-use plastics.

Some common places we recommend considering are:

- Using reusable utensils instead of plastic
- Only provide plastic utensils for take out when specifically requested
- Replacing using plastic bags or plastic wrap with reusable containers
- Using paper straws as an alternative to plastic
- Only providing straws upon request
- Replacing plastic take out bags with paper, or forgo them all together

Subsidizing Opportunities

Plastic Free Restaurants (PFR) is a non-profit organization that provides subsidies to account for the difference in cost between purchasing plastic and its reusable alternatives. They will pay 100% of the cost difference between a single-use plastic item and its reusable alternative and 50% of the cost difference for reusable plastic items.

The restaurant simply needs to contact the organization and send them the corresponding invoices. Specific manufacturers and companies that partner with PFR also offer special discounts to restaurants that are purchasing green food ware and utensils.

The only criteria restaurants need to meet is that they must eliminate at least 25% of the single-use petroleum-based plastic that touches its customers prior to receiving the subsidy.

CREATING AN ECOLOGICAL CERTIFICATION PROGRAM

Examples of Programs

There are many large scale certification programs that are provided through various environmental organizations. We recommend looking at the criteria that these certifications require and using them as inspiration for LimPiaR's own certification. Some of the certifications to reference are:

- Green Restaurant Association
- Ocean Friendly Restaurants
- Zero Waste International Alliance
- TRUE

Local Certifications

It was brought to our attention that there is already an ecological certification program in place in Loíza. This program consists of restaurants getting a symbolic "plate" and for each sustainable practice they adopt, they receive a badge for it.

We recommend that LimPiaR consult with the organization running this program and create a partnering program for restaurants in Piñones. LimPiaR should consult the results of the Visual Art Survey prior to developing the artwork necessary to implement this campaign to make it culturally relevant to the area and resonate with community members.

Recommended Implementation Plan

Based on our observations and experiences through implementing the recycling program, we recommend that LimPiaR implement each aspect of the ecological certification plan individually. It will be easier to manage and introduce programs for each sustainable practice if the project is approached with baby steps. We recommend starting each restaurant with recycling, then composting if feasible, and introducing other programs as they are developed.

Artwork

We highly recommend that LimPiaR continue to work with a graphic artist to develop a logo for the ecological certification program.

Prior to working with the graphic artist, we recommend that LimPiaR receive more responses from their Visual Art Survey as to ensure that the community's voice is heard in the development of this art.

We also recommend that LimPiaR provide the graphic artist with the designs that are currently being used for context and consistency.

Promotion

Once in place, it will be important for the program to be promoted accordingly. Our team recommends that this take place onsite at the participating restaurants, on the surrounding beaches, and online through social media.

In restaurants, the certification logo, created by the graphic designer, should be prominently displayed on posters and table fliers.

Social media is another important promotion technique for the program. This will include posts promoting the restaurants' sustainable practices on both LimPiaR's and the restaurants social media outlets.

INVESTING IN A GLASS PULVERIZER

Why Can't Glass be Recycled?

Currently, there are no opportunities in Puerto Rico to recycle glass. Because there are no recycling facilities on the island all materials need to be exported to foreign countries to be recycled. The weight and cost of shipping glass make it untenable for companies to export. Therefore, all glass bottles and other glass materials imported to and used on the island end up in landfills.

Glass Crushers vs. Glass Pulverizers

There are two options when it comes to handling glass: glass crushers and glass pulverizers. The primary difference between is the size of the cullet.

A glass crusher creates pieces that are 0.75 inches with sharp edges. A glass pulverizer converts glass to sand with no sharp edges between -0.125 and -0.375 inches in size.

We recommend that LimPiaR invest in a glass pulverizer as the smaller, smooth-edged cullet and sand will be easier to manage with more uses.

Uses for Pulverized Glass

Crushed glass (known as cullet) is a versatile material that can be used to provide ample upcycling opportunities for the community.

Some options for crushed glass include:

- a base or surface coat for roadways
- pressed glass tableware
- glass mosaic tiles
- Aggregate fill for water filtering
- Glasscrete (cement-base composite)

Some options for pulverized glass include:

- a base for unpaved roads
- underlay for walking trails
- parking lots
- beach nourishment
- and many similar uses to the cullet list above

We recommend creating a community educational campaign describing these uses because it serves as a prime example for how what is considered "waste" can actually provide value for the community.

Glass Pulverizer & Crusher Options

In order to determine which pulverizer option is best for LimPiaR, they first must determine the amount of glass that they are going to handle. Three options are listed below:

- MODEL GP1000 from Compactors Inc. - <https://compactorsinc.com/glass-pulverizers-model-gp-1000/>
 - \$10,990 + shipping
 - 80" long x 76" high x 29" wide
 - Capacity up to 1000 lbs per hour
- MODEL GP1500C from Compactors Inc. - <https://compactorsinc.com/glass-pulverizers-model-gp-1500c/>
 - \$16,990 + shipping
 - 166" long x 78.5" high x 29" wide
 - Capacity up to 1500 lbs per hour
- MODEL 95-2 from Compactors Inc. - <https://compactorsinc.com/glass-crushers-model-95-2-4-6/>
 - \$3,000 + shipping
 - Fits over 30 & 55 gallon drums
 - Capacity over 600 bottles per hour

FUNDRAISING OPPORTUNITIES

Sticker Shop

During our 7 weeks in Piñones, we developed a series of stickers on Canva that focus on the messaging of "Reduce, Reuse, Recycle" and "Leave a Clean Footprint". These stickers had images relating to the local wildlife, the Earth, or the recycling symbol. All designs can be found on the Canva page.

We recommend that LimPiaR use these designs and sell them as regular stickers, bumper stickers, and magnets. These can be sold in either an online marketplace, at LimPiaR run events, or in local shops.

LimPiaR Merchandise

In addition to the sticker designs and related items, we recommend that LimPiaR start a merchandise campaign that can include some of the following items:

- Reusable Cups and Mugs
- T-shirts
- Key Chains
- Reusable Water Bottles
- Silicone Bracelets
- Canvas/Reusable Bags
- Pins
- Reusable Straws & Utensils

These items should have the LimPiaR logo and can feature designs including some of the wildlife symbolic of Piñones.

This merchandise can also be sold at events that LimPiaR runs like beach clean-ups and future brigades.

LimPiaR Online Store

There are 2 strategies for creating a LimPiaR merchandise store: a page on the LimPiaR website or through an e-commerce website like Etsy or Shopify.

We recommend LimPiaR creating their first online store through Shopify. Shopify is an e-commerce website where you can upload products and track orders. It is extremely easy to set-up as it guides you step-by-step through creating your store and requires no prior website design knowledge.

Once the shop is up and running LimPiaR can add their merchandise and promote it on social media and during other events.

Additional Events

There are a number of common fundraising events that we recommend LimPiaR could host.

One is a walk-a-thon on the Piñones bike path. LimPiaR could provide a pamphlet that describes all the local wildlife and encourage awareness.

Another option is a planting event, which can be at the community garden where participants help plant trees or other plants which are then sold.

LimPiaR merchandise can also be sold at all future fundraising events

Donations

Donations can continue to be advertised on social media, but we also recommend reaching out through an email campaign. If a membership or participant list is created, reach out directly to them and ask for donations.

BEACH CLEAN UP ADVICE

Our Experience

While in Piñones, we were provided with the opportunity to help run and participate in a beach clean-up at La Pocita de Piñones. We hosted 26 WPI students, 2 community members, and 1 additional outside organization member. Through this experience and our observations our team was able to make a number of recommendations for LimPiaR for future clean-ups.

Increasing Advertising

We first recommend that LimPiaR increase their advertising prior to the clean-up.

We recommend that for at least 2 weeks, preferably a month, prior to the clean-up, it be regularly posted on Instagram and other social media platforms to raise awareness. It is necessary to start this process early as it will give potential participants time to prepare for the event.

We also recommend getting permission from local restaurants and businesses in the area to hang fliers and posters to raise awareness about the event.

Participant Outreach

In addition to their social media presence, we recommend that LimPiaR also increase their individual and organizational wingspan.

We recommend collecting the emails of beach clean-up participants and create an email alias including all of them. By doing so LimPiaR can essentially create a database of supporters that they can continue to reach out to. LimPiaR can then use this alias to send out pictures from clean-ups as well as reminders about promotional events.

Collaborative Events

Collaboration between organizations and businesses can only boost efficiency, effectiveness, and participation. This is why we recommend that LimPiaR partner with their participating restaurants, and other environmental organizations.

Collaboration with other environmental organizations can include:

- Jointly hosted clean-ups & other events
- Reposting on social media
- Sharing educational materials

Collaboration with restaurants can include:

- Sharing promotional materials
- Providing gift cards for raffles
- Displaying posters & fliers

Recycling

Now that Piñones has the infrastructure in place to recycle, we recommend that LimPiaR establishes a recycling station at the beach clean-ups.

No matter if the clean-up is using plastic or canvas bags, delegate a specific bag as the recycling bag. Only recyclable materials should go into that bag. Once the bag is full, it should be returned to the tent and at the end of the clean-up they will be emptied into the provided IFCO container.

Consistency

Consistency is key when for regular participation in events. COVID-19 made it difficult to host safe and consistent beach clean-ups, but bar further restrictions we recommend holding monthly clean-ups. The time, date, and location of the clean-up then needs to be appropriately conveyed on social media and to the local community.

ADVERTISING & INCREASING PUBLICITY

Customer Loyalty

One of the benefits of becoming a sustainable restaurant is that it attracts a loyal customer base. Nowadays, customers are more aware than ever of where they spend their money, so it is essential that restaurants publicize their sustainable practices to attract these ecologically-minded customers.

Sustainability Visions

One of the ways that we recommend restaurants promote their environmental practices through a sustainability mission and vision statement.

Their mission statement should include the restaurant's current sustainability practices and it's approach to accomplish those and their vision statement should include their desired future position.

We recommend that these statements be publicly shared throughout their restaurants and on their social media accounts to promote themselves as ecologically friendly.

Social Media Promotion

Due to the prevalence of social media in today's business practices, we highly recommend that restaurants utilize their social media outlets to promote their green practices and market themselves.

Restaurants can create their own hashtag that promotes their restaurant and branding like #GreenPiñones or #PiñonesRecycling

We also recommend that restaurants highlight their sustainability strategies and techniques regularly through social media posts.

Increasing Online Presence

In this day and age, the most common important outreach and publicity strategies is through social media. We observed that while many of the restaurants that are currently participating in the program have Facebook pages, we recommend that restaurants expand their online presence to include an Instagram page.

Having an Instagram account will allow restaurants to be tagged in posts by their customers, be shared by other accounts, and promote themselves through ads and posts of their own. For many younger customers, Instagram is more accessible and will attract more internet traffic than a Facebook page.

Utilizing Apps

One of the best ways for a restaurant to market their sustainable practices is through apps. There are a number of branding apps available, but two that we recommend are Jybe and NatureHub.

Jybe is an app that ranks restaurants based on their plastic use. App users can submit a review and photo of the plastic items used during the meal. The Jybe team then analyzes the review and will give the restaurant a score that reflects their plastic use.

NatureHub is a community app that connects users with environmentally-friendly local businesses and restaurants. It allows users to filter restaurants based on food options and sustainable practices, so users can then easily identify those restaurants.

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WASTE BANDITS

CONTACT US

Tony Bozza - arbozza@wpi.edu

Shane Dancer - sdancer@wpi.edu

Kyle Johns - ktjohns@wpi.edu

Sophia Togneri - smtogneri@wpi.edu

Waste Bandits - gr-CTPR-pinoneswaste@wpi.edu

Website - <https://wp.wpi.edu/puertorico/projects/2021-fall/pinones-waste-management/>



8: Composting and Recycling Locations



8.1 Map of potential Composting and Recycling Sites in Community Center

