

CONFERENCIA 3:

“Economía Circular y el Análisis del Ciclo de Vida de los Plásticos”



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FORO DE ECONOMÍA CIRCULAR & GESTIÓN DE RESIDUOS EN LA INDUSTRIA DEL PLÁSTICO



The **circular economy** is based on three design-driven principles: eliminating waste and pollution, circulating products and materials at the highest level, and regenerating nature.” – United Nations





Ministerie van Buitenlandse Zaken

Dominican Republic Circular Economy Report 2021

How to achieve a Circular Economy?

We need tools to understand the magnitude of the *impact* and the magnitude of the *problem*

Material Flow Analysis (MFA)
Life Cycle Assessment (LCA)



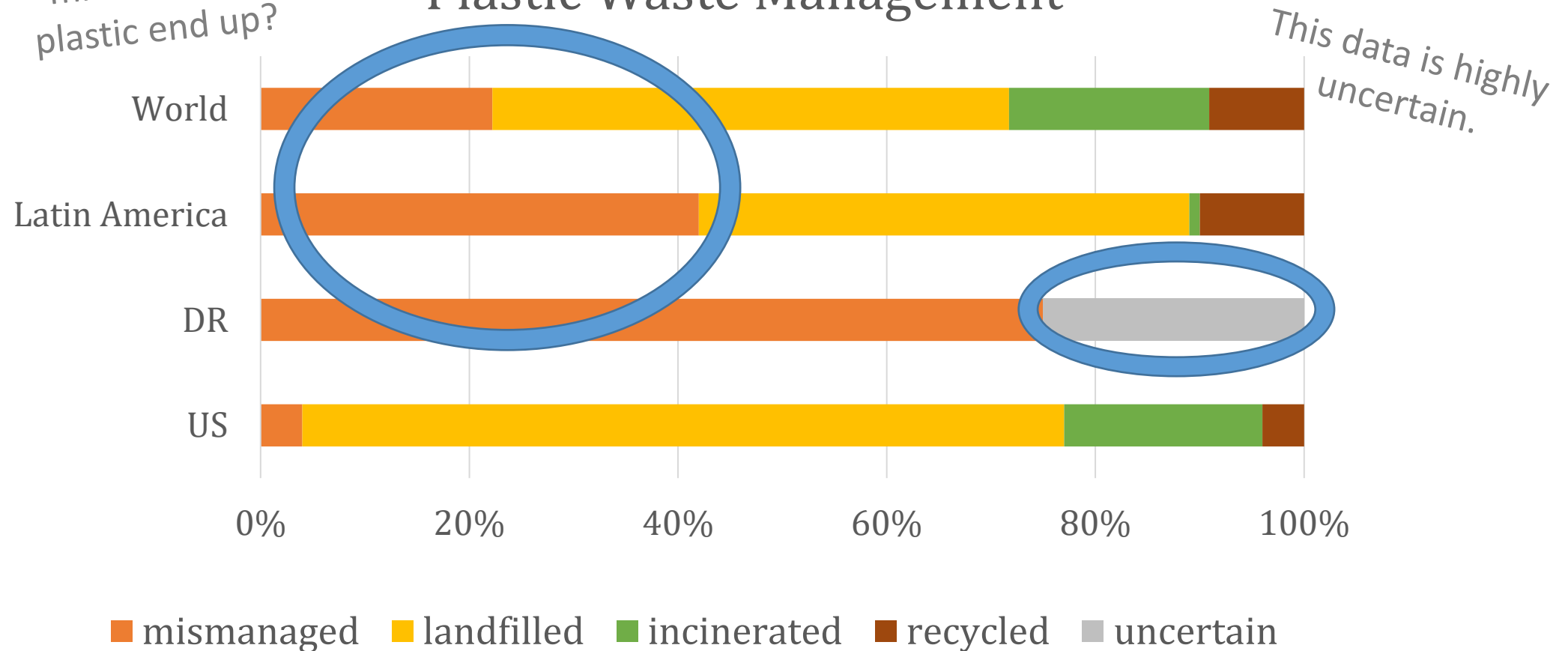
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Magnitude of the problem: Plastic mismanagement

DR generates 88,000 tons of plastic waste annually, of which 75% is mismanaged
-Association of Industries of the Dominican Republic and the Inter-American Development Bank

But where does mismanaged plastic end up?

Plastic Waste Management



Material Flow Analysis (MFA) quantifies stocks and flows of materials or substances in a system (it's perfect for Circular Economy)



MFA would help us see that solutions should not focus on the straws...

STARTING YOUNG

This Kid Single-Handedly Ignited the Plastic Straw Ban Movement

At the tender age of 9, Milo Cress nudged his local cafe into simply offering straws instead of automatically serving them with drinks. Then his idea went national.



Tanya Basu
Senior Editor, Science

Updated 07.24.18 1:09PM ET

Published 07.24.18 5:13AM ET

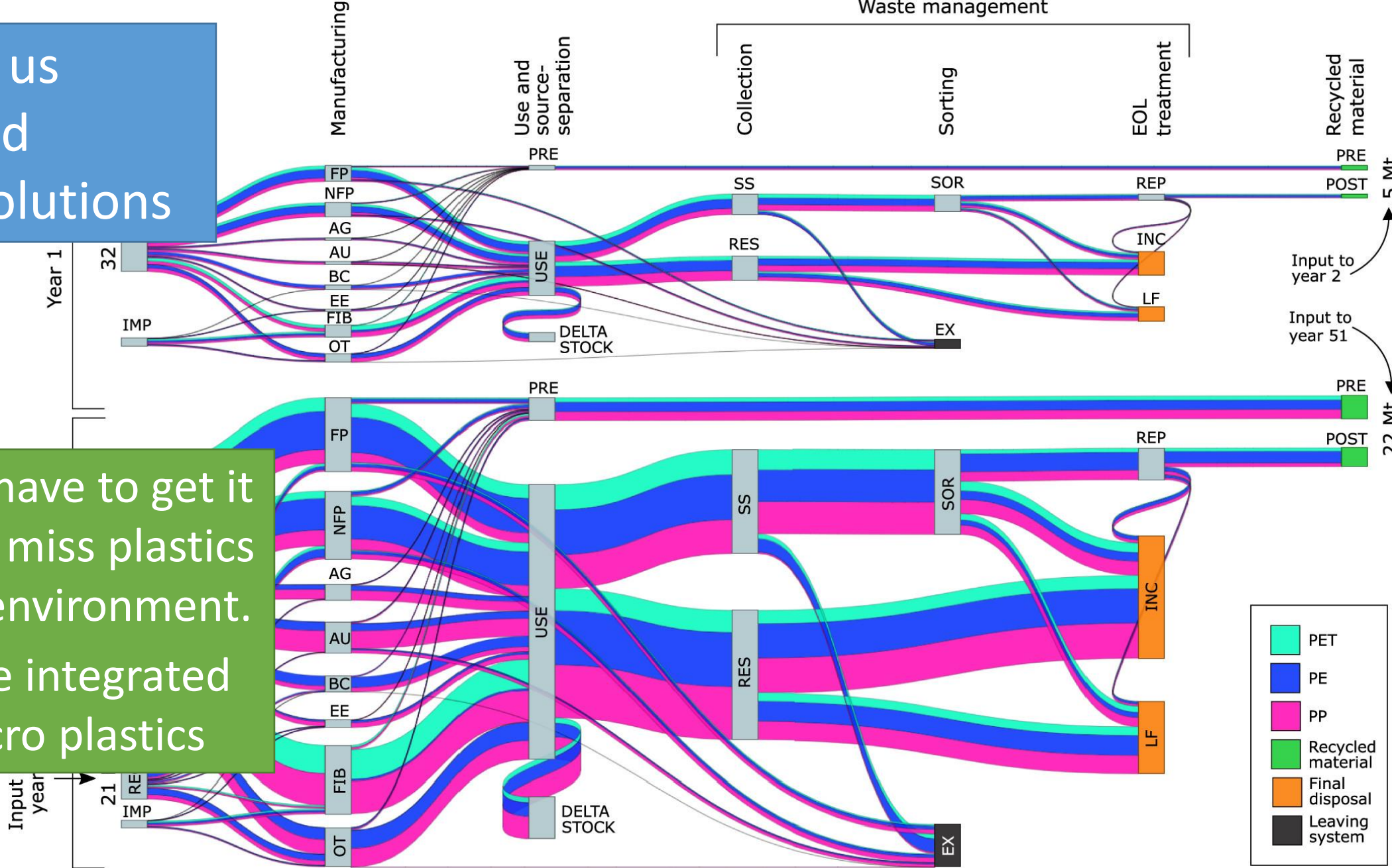


- July 2018 Seattle bans plastic straws
- Est 5-13M tons plastic enter ocean ea yr*
- Straws ~**0.03%***

*Jambeck et al 2015 Science

MFA helps us identify and evaluate solutions

BUT: MFAs have to get it right. Many miss plastics lost to the environment. NONE have integrated nano/micro plastics



Increasing recycling: 4—65% of demand can be met with recycling
Demand must be stabilized, can't rely on technology alone

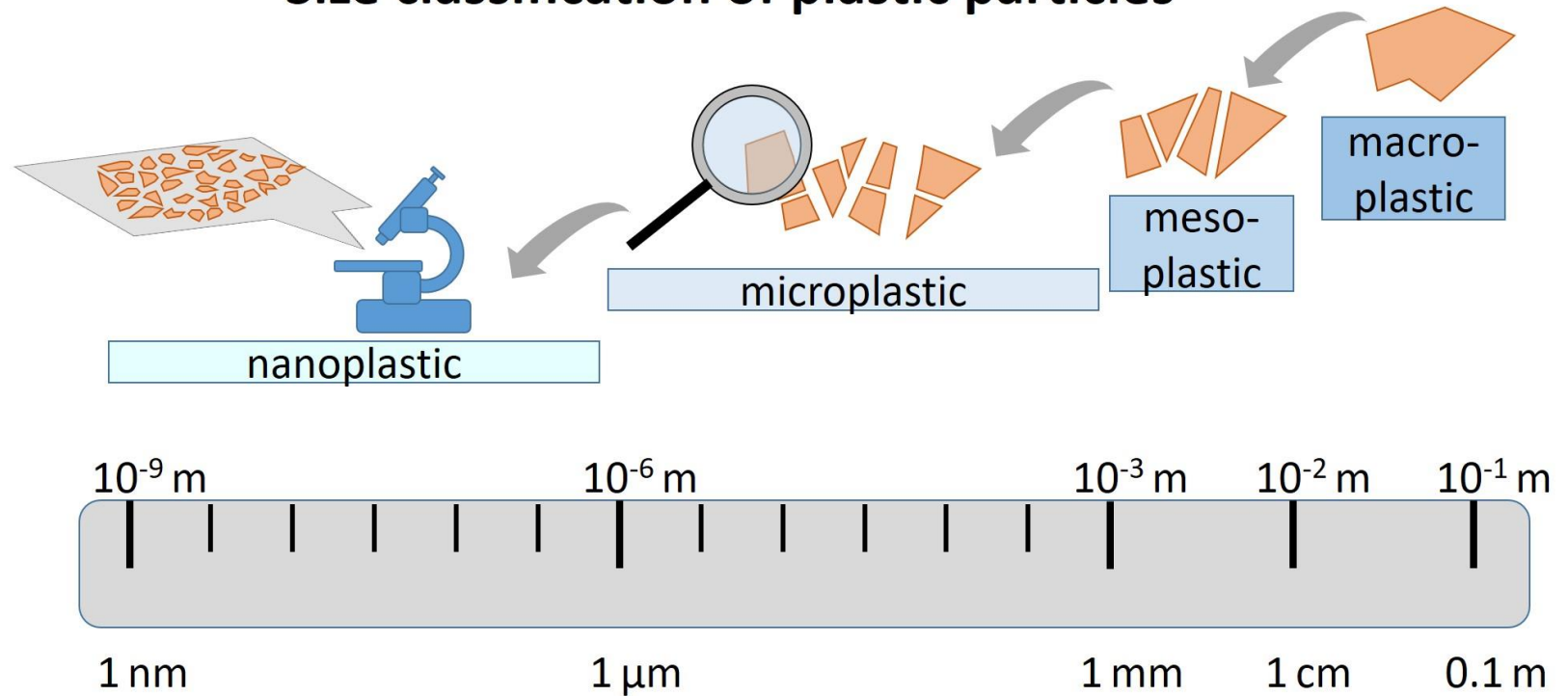
Eriksen ES&T 2020

Micro & Nano plastics



Image from Santa Barbara Independent

Size classification of plastic particles



Size
reference



DNA



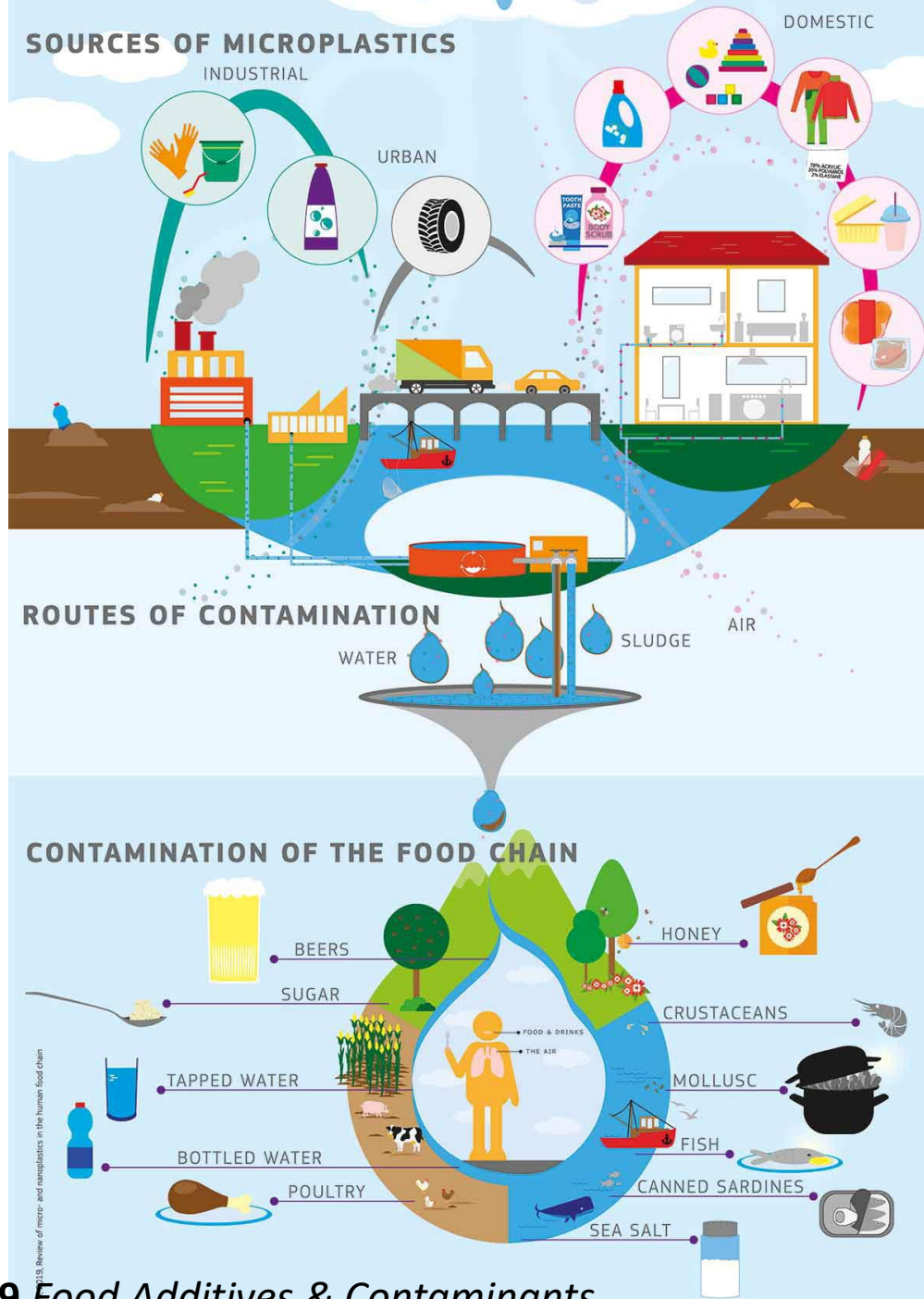
Virus



Human Hair



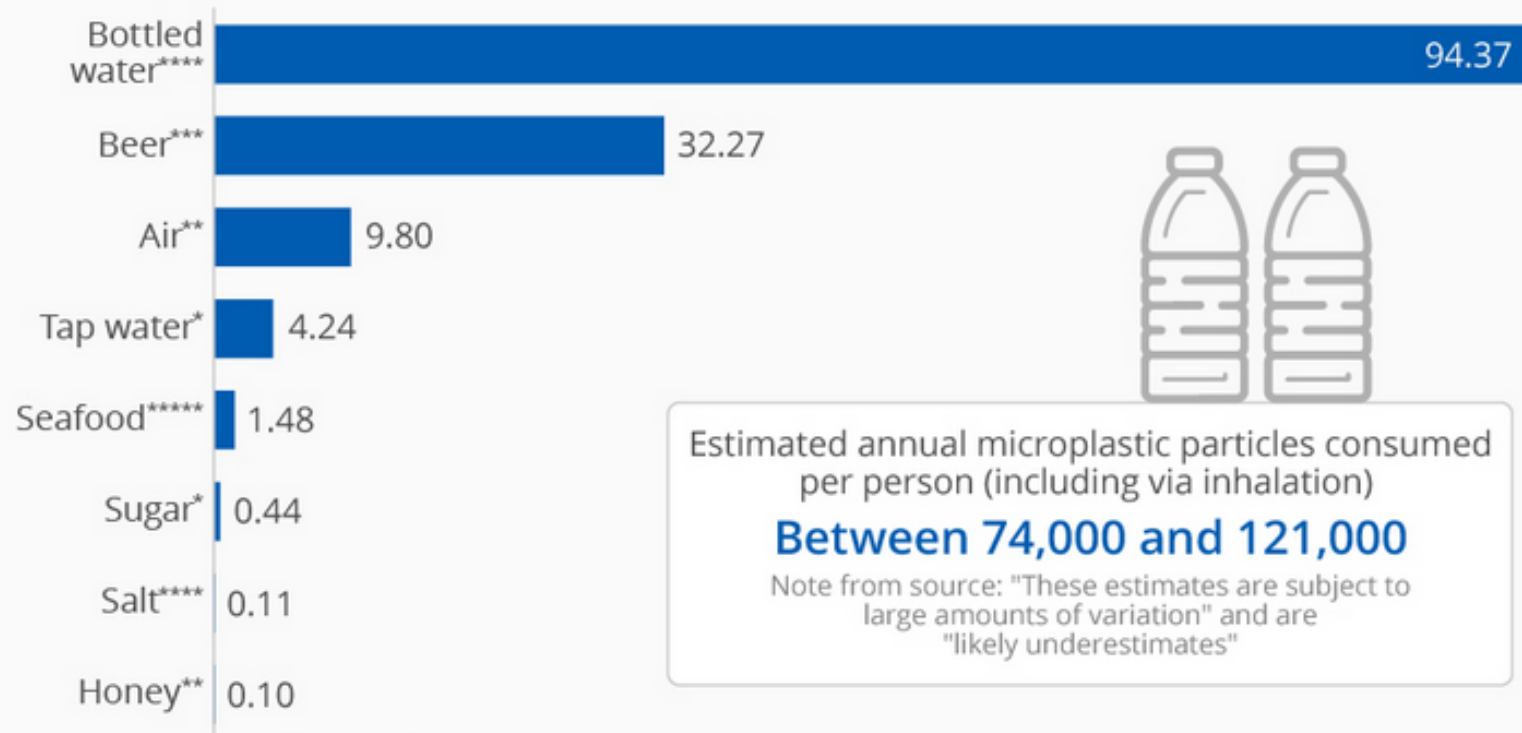
Golf Ball



How does this impact DR?

How We Eat, Drink and Breathe Microplastics

Average number of microplastic particles found per gram/liter/m³ of selected consumables



Estimated annual microplastic particles consumed per person (including via inhalation)

Between 74,000 and 121,000

Note from source: "These estimates are subject to large amounts of variation" and are "likely underestimates"

- * Based on 1 study
- ** Based on 2 studies
- *** Based on 3 studies
- **** Based on 4 studies
- ***** Based on 14 studies

In the US, people drink
~4 cups of water a day
2/3 is tap water
Excludes cooking
(USDA 2011)

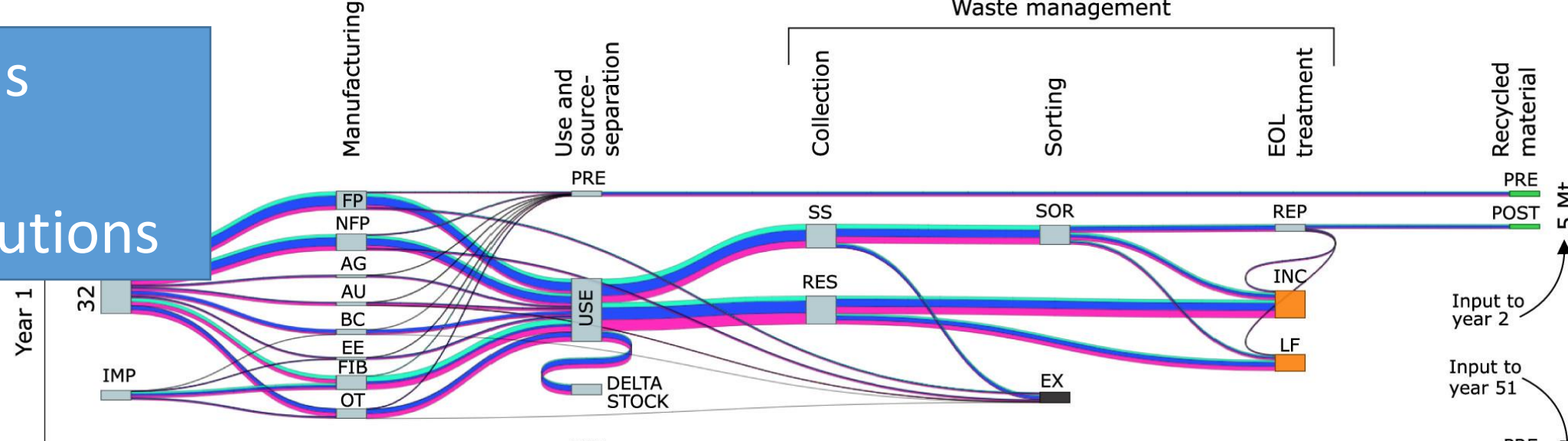


A wide range of ecosystem & human health impacts from nano plastics

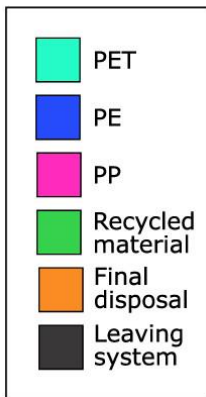
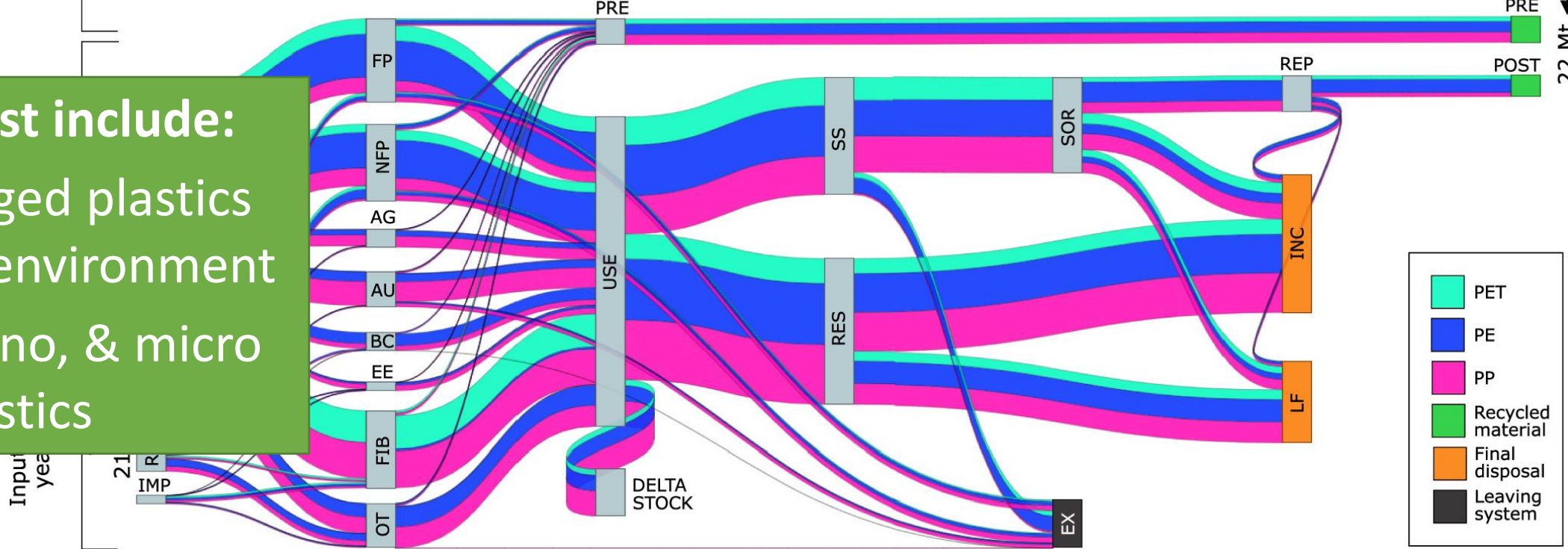
- Endocrine disruptors- impacting reproduction
- Cardiovascular disease
- Diabetes
- Neurodevelopment
- Adverse cellular events (e.g. inflammation)
- Much much more
- Research is nascent- much more work needs to be done

*Do Dominicans have more exposure?
Have higher risk?*

MFA helps us identify and evaluate solutions



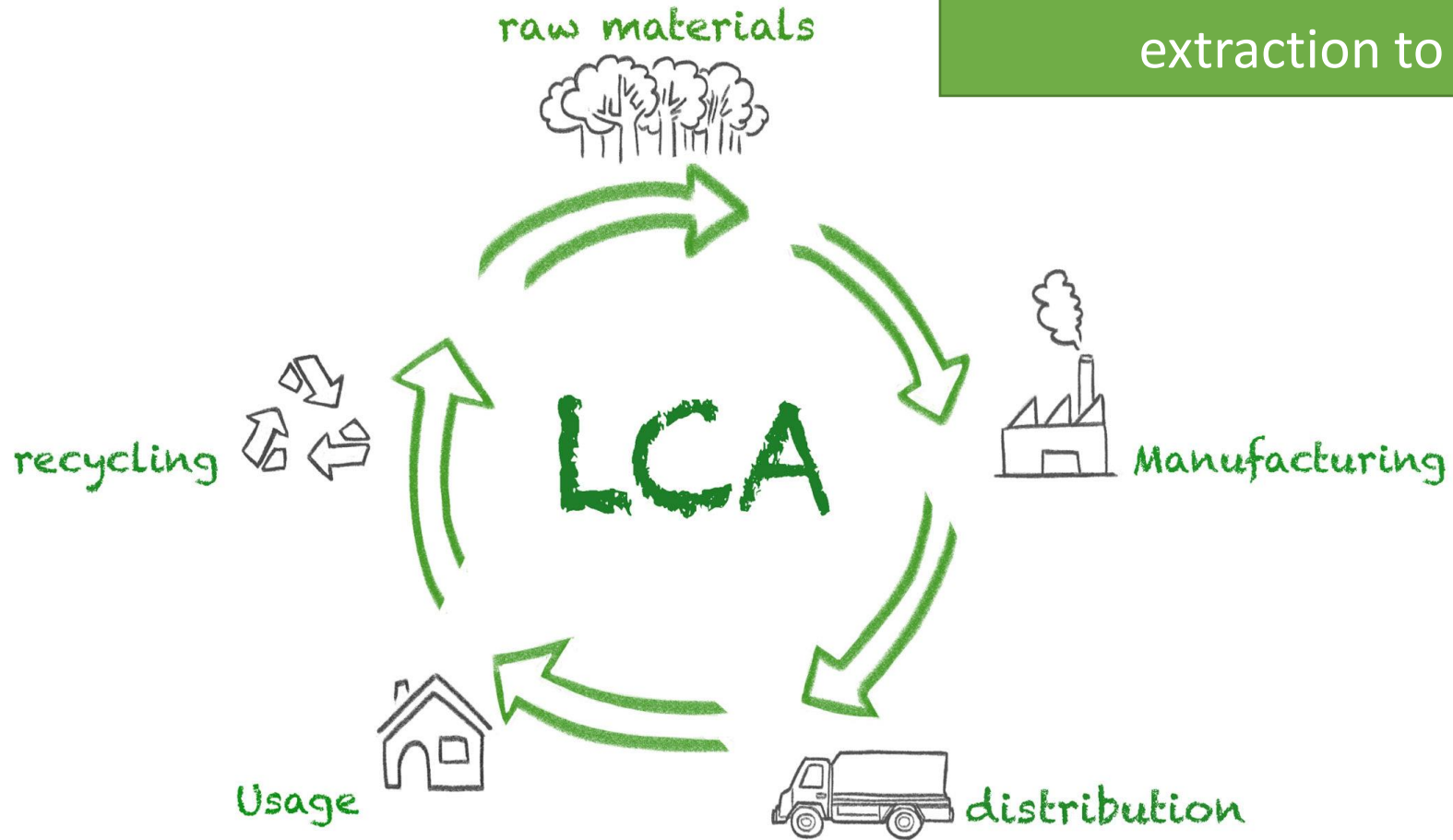
MFAs must include:
 -mismanged plastics lost to the environment
 -macro, nano, & micro plastics



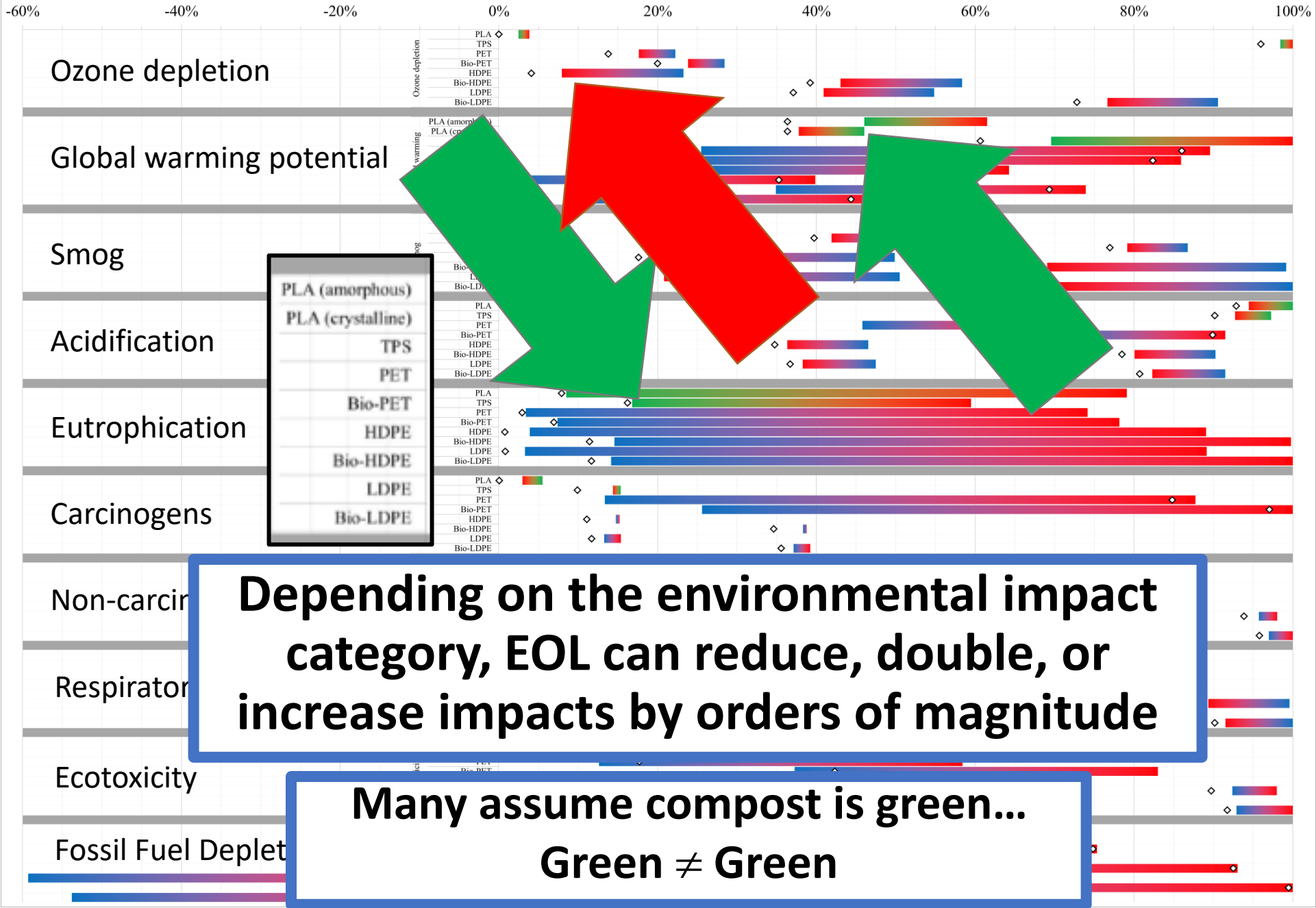
Increasing recycling: 4—65% of demand can be met with recycling
 Demand must be stabilized, can't rely on technology alone

Impact of plastics

Life Cycle Assessment (LCA)
quantifies the environmental impact
including *materials*, *energy* and
emissions from raw materials
extraction to end of life.



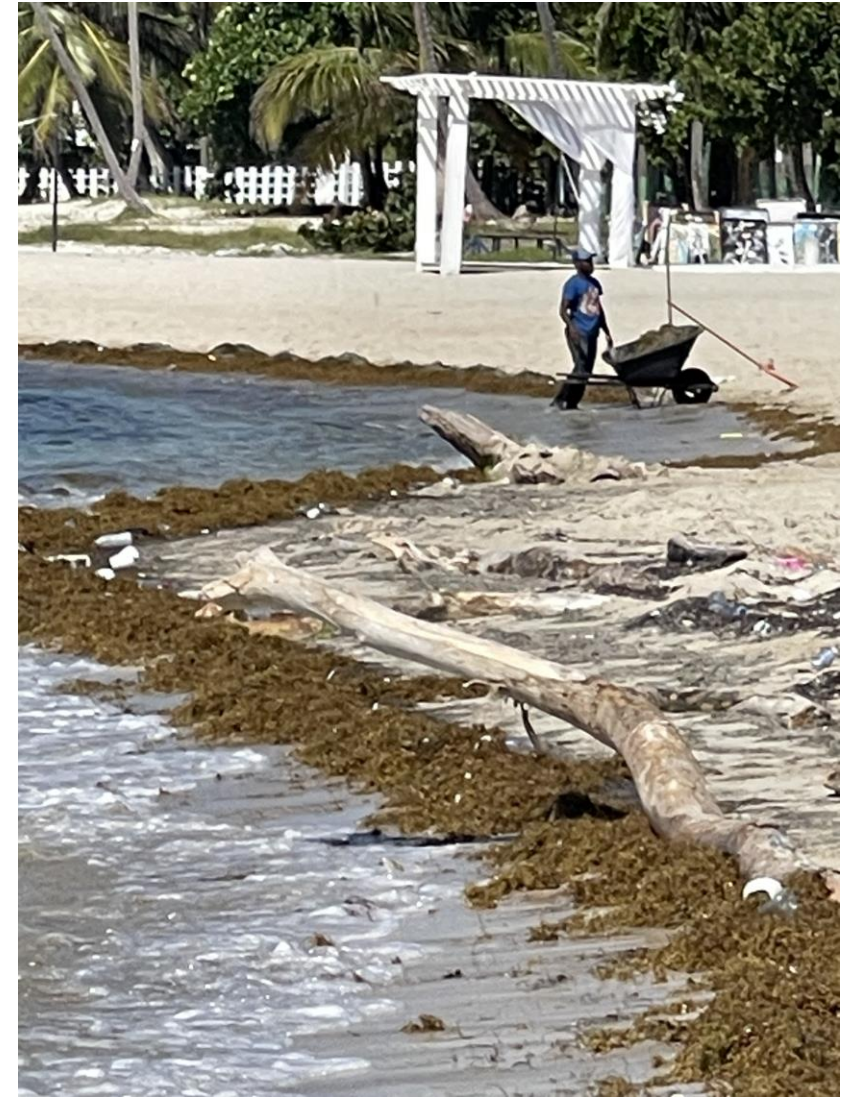
Normalized Life Cycle Impacts Including EOL Scenarios and Production



Depending on the environmental impact category, EOL can reduce, double, or increase impacts by orders of magnitude

**Many assume compost is green...
Green ≠ Green**

Plastic Clean-Up: need valuable products and waste management infrastructure



^Dominican Today photo. My photo>

Plastic Clean-Up: need valuable products

Waste diversion &
Collection in the
Ozama River, Santo
Domingo



In Summary:

- **MFA** to understand **magnitude** of the problem
 - identify areas to target solutions
 - Experiment with hypothetical scenarios
- **LCA** to understand **impact** of the problem and solutions
 - Be sure to design value-add products and waste management from recycled materials that are better for health and the environment
- Improve understanding of micro/nano impacts and flows, esp in DR

Collaborators & Acknowledgments

- INTEC, Santo Domingo
 - Jessica Feliz, Dr. Carlos Sanlley, Dr. Ulises Jauregui
 - Center for Plastics Research & Education
- Landis (plastics) Research Group
 - Madie Addis, Lydia Allison, Anne Marie Mozrall
- **Funding**
 - NSF AccelNet 2301682
 - Fulbright

