CHAO PLÁSTICO DESECHABLE

Analyzing the Implications of a Green Tax on Single-Use Waste Plastics

Nolan Bell, Sabrina Napoli, Carly Neeld, and Shannon Ring

Who are we?

Overview

- Overview of Deliverables
- Plastic Pollution Findings
- Case Study Findings
- Consumer Survey Analysis
- Conclusion

Project Goal

Our goal was to analyze the **implications of regulating single-use waste plastics** in Costa Rica and to provide recommendations regarding the implementation of **MarViva's green tax**.

Objective ONE
Environmental and Health Impacts

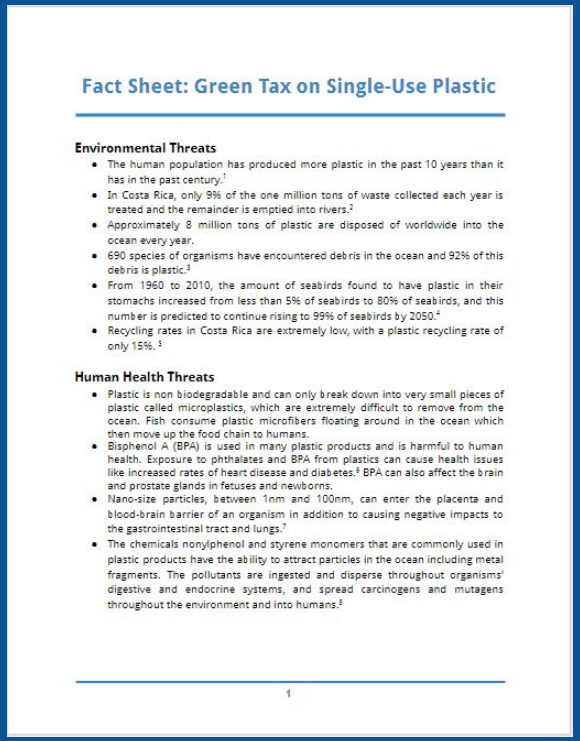
Objective TWO
Case Studies regarding Plastic Policies

Objective THREE
Consumers' Willingness to Pay

Objective FOUR
Recommendations and Supporting Evidence

Overview of Deliverables

Fact Sheets



Fact Sheet: Green Tax on Single-Use Plastic

Environmental Threats

- The human population has produced more plastic in the past 10 years than it has in the past century.[1]
- In Costa Rica, only 9% of the one million tons of waste collected each year is treated and the remainder is emptied into rivers.[2]
- Approximately 8 million tons of plastic are disposed of worldwide into the ocean every year.
- 690 species of organisms have encountered debris in the ocean and 92% of this debris is plastic.[3]
- From 1960 to 2010, the amount of seabirds found to have plastic in their stomachs increased from less than 5% of seabirds to 80% of seabirds, and this number is predicted to continue rising to 99% of seabirds by 2050.[4]
- Recycling rates in Costa Rica are extremely low, with a plastic recycling rate of only 15%. [5]

Human Health Threats

- Plastic is non biodegradable and can only break down into very small pieces of plastic called microplastics, which are extremely difficult to remove from the ocean. Fish consume plastic microfibers floating around in the ocean which then move up the food chain to humans.
- Bisphenol A (BPA) is used in many plastic products and is harmful to human health. Exposure to phthalates and BPA from plastics can cause health issues like increased rates of heart disease and diabetes.[6] BPA can also affect the brain and prostate glands in fetuses and newborns.
- Nano-size particles, between 1nm and 100nm, can enter the placenta and blood-brain barrier of an organism in addition to causing negative impacts to the gastrointestinal tract and lungs.[7]
- The chemicals nonylphenol and styrene monomers that are commonly used in plastic products have the ability to attract particles in the ocean including metal fragments. The pollutants are ingested and disperse throughout organisms' digestive and endocrine systems, and spread carcinogens and mutagens throughout the environment and into humans.[8]

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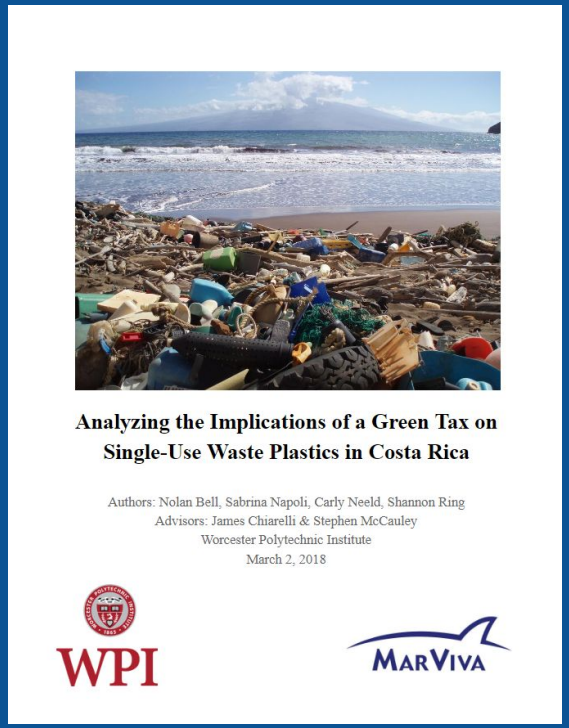
Presentation

La Importancia de un Impuesto Ecológico Sobre los Plásticos de un Único Uso

MarViva

WPI

Elaborated Research



Analyzing the Implications of a Green Tax on Single-Use Waste Plastics in Costa Rica

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Worcester Polytechnic Institute
March 2, 2018

WPI

MarViva

Plastic Pollution

“ The human population has **produced more plastic** in the **past 10 years** than it has **in the past century**”[1] (2014)

8 million **tons**

of plastic are disposed of into the ocean every year[2]

Over 690 **marine species**

are harmed by ocean debris[2]

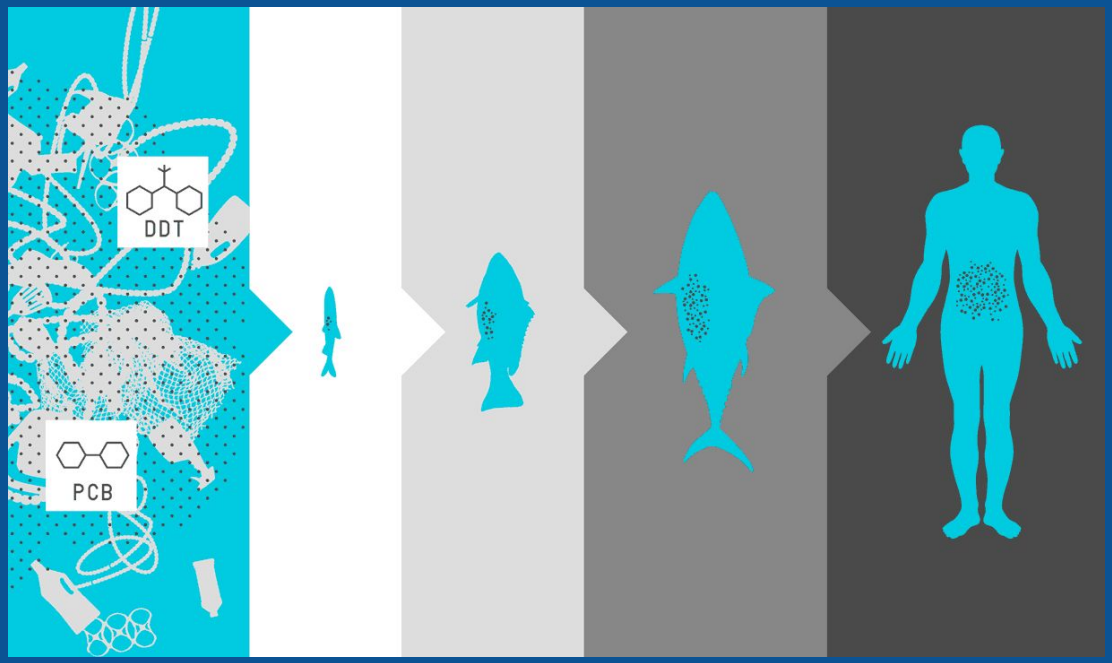
2%

of trash is recycled in Costa Rica[3]

Plastic Pollution: Environmental Threats

Plastic Pollution: Human Health Threats

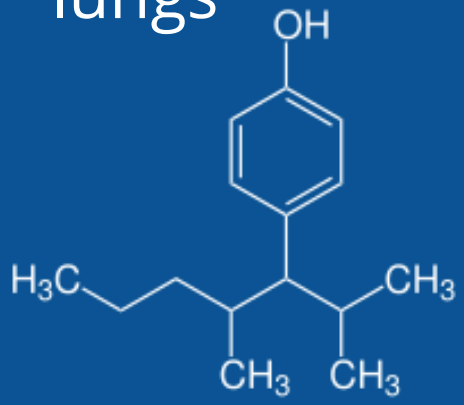
- Microplastics in food chain
  - Study found microplastics in 25% of individual fish sampled, 22% of shellfish, and 67% of all species sampled.[4]
- Bisphenol A (BPA) causes health issues



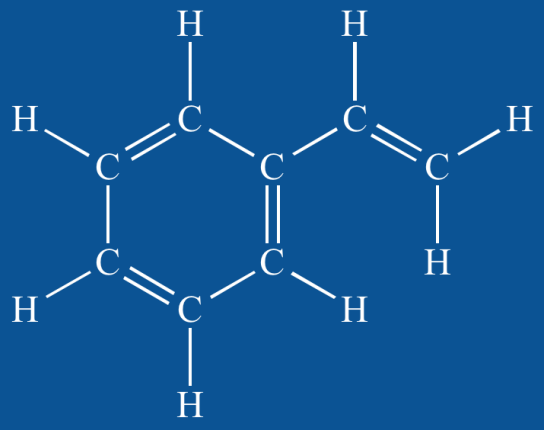
http://cdn.playbuzz.com/cdn/c891a819-5af5-457d-a60d-2da470714c8b/4d71392a-62b0-4529-a986-2da5fb0a6c91.png

Plastic Pollution: Human Health Threats

- Nano-size particles enter the placenta and also cause negative impacts to the gastrointestinal tract and lungs[5]

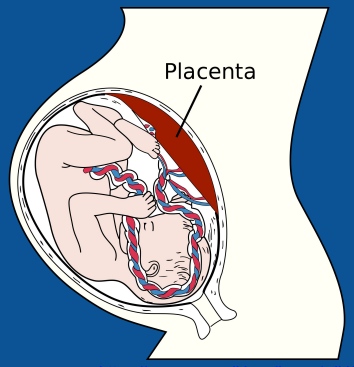


Nonylphenol

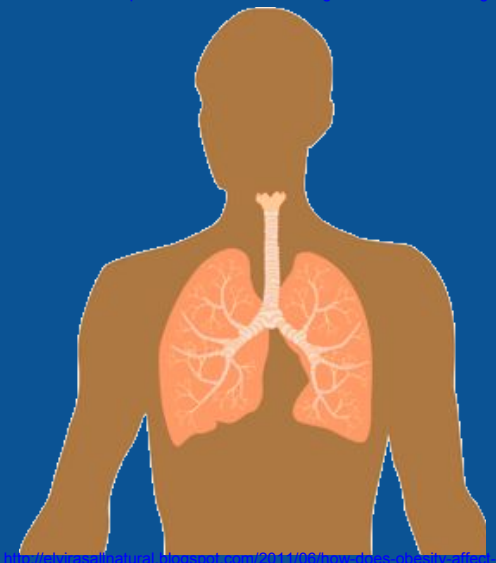


Styrene Monomers


http://defenderauto.info/gi-tract/



https://commons.wikimedia.org/wiki/File:Placenta.svg


http://elvirasallnatural.blogspot.com/2011/06/how-does-obesity-affect-your-lungs.html

Case Studies

On Single-Use Plastic Policies

PLASTIC REGULATIONS AROUND THE WORLD

Case study	Regulation Type	Evaluation of Success
Ireland	Tax	Positive outcome
South Australia	Ban	Positive outcome
Germany	Tax	Positive outcome
Buenos Aires, Argentina	Tax	Positive outcome
Israel	Ban	Positive outcome
Portugal	Tax	Positive outcome
Belgium	Tax	Positive outcome
China	Ban	Positive outcome
South Africa	Tax	Short term success
Delhi, India	Ban	Neutral outcome
France	Ban	Neutral outcome

Ireland

- 2002: Tax of 22 euro cents (₡155)
- 94% decrease in plastic bags within weeks[9]
- Initial costs: 1.9 million euros (₡1.3 billion)
- Funds within the first year: 10 million euros (₡7 billion)[10]

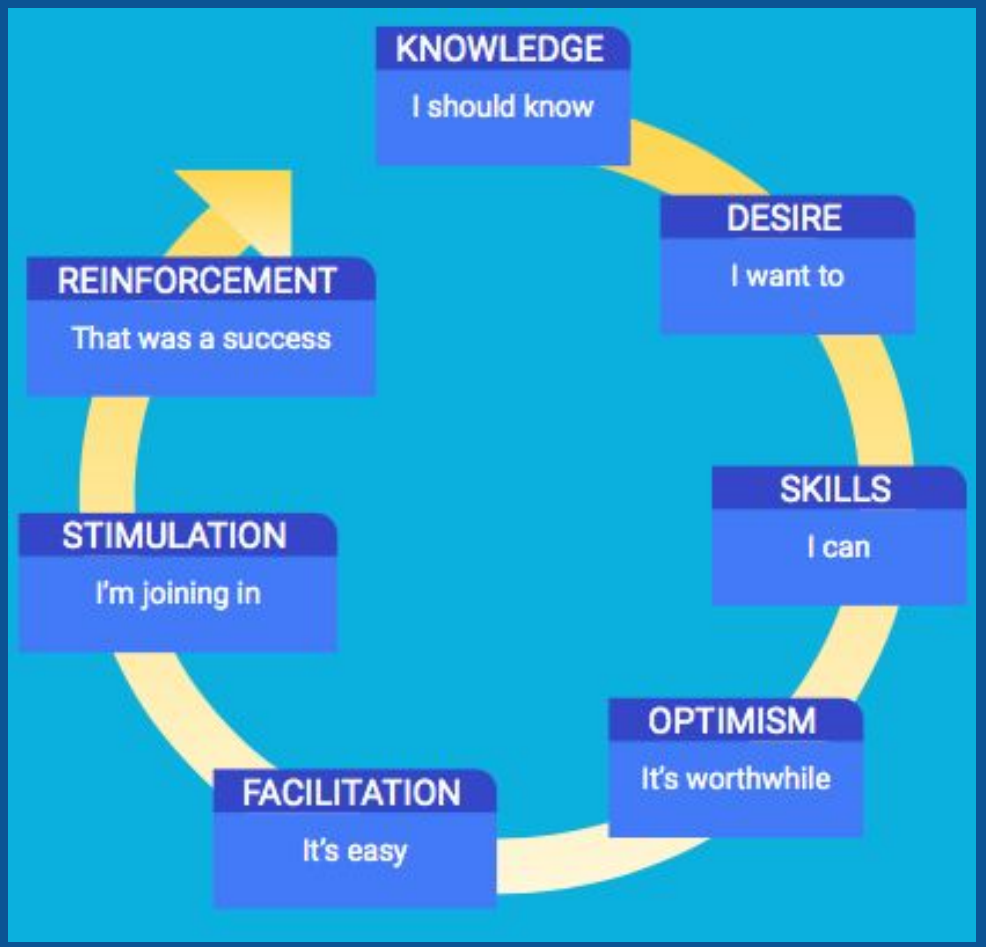
https://en.wikipedia.org/wiki/Geography_of_Australia

http://www.zimbio.com/pictures/ZI3VUnqw8O5/South+Australia+Bans+Plastic+Bags/imucg5IC2uh

South Australia

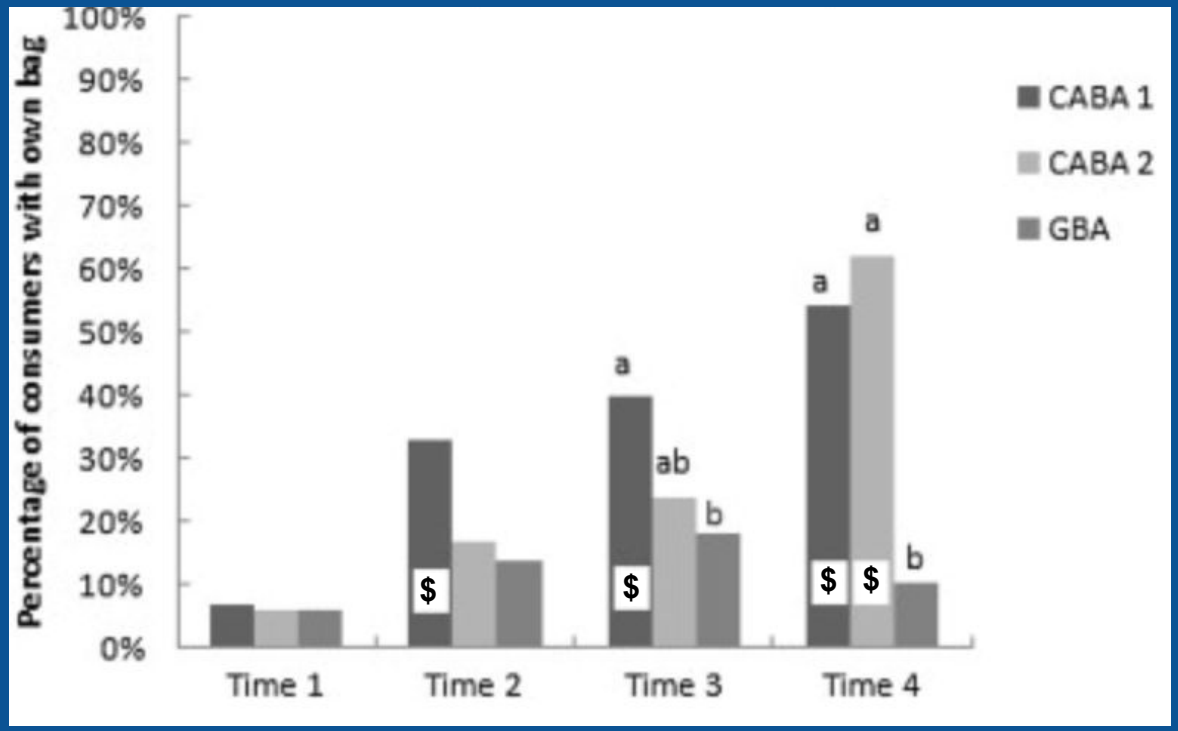
- ➔ 2005: Phase out of single-use plastic bags
- ➔ 45% decrease in the use of plastic bags[13]
- ➔ 8 out of 10 customers were in support of the ban

https://en.wikipedia.org/wiki/Geography_of_Australia



Buenos Aires, Argentina

- 2008 Single-use plastic bag tax evolved into a ban in 2012
- Tax of 0.50 pesos (₡14) for medium sized bags and 7.95 (₡227) pesos for large bags
- About 50% increase in reusable bags[9]



Reusable Bag Use in Supermarkets in Buenos Aires

(Jakovcevic, et al., 2014)

https://commons.wikimedia.org/wiki/File:Argentina_Blue_Marble.png

Delhi, India

https://en.wikipedia.org/wiki/Geography_of_India

- 2009: Ban on the use of all plastic bags
- Ineffective as 94% of people still used plastic bags due to lack of awareness[12]
- A 42.9% decrease of plastic bag usage

Delhi slaps blanket ban on plastic bags

New Rules To Be Implemented Within A Year

WHY THIS BAN HAS MORE BITE

https://www.indiamart.com/popularindustries/news.html

Contributing Factors for a Successful Plastic Policy

- A Green Tax
- Informing Consumers
- A Strong Campaign Strategy
- Slowly Introducing the Green Tax
- Providing Alternatives

https://www.usatoday.com/story/news/nation/2014/01/06/reusable-grocery-bag-germs/4341739/

Consumer Survey Analysis

CONSUMER ANALYSIS BASED ON LOCATION

198 respondents

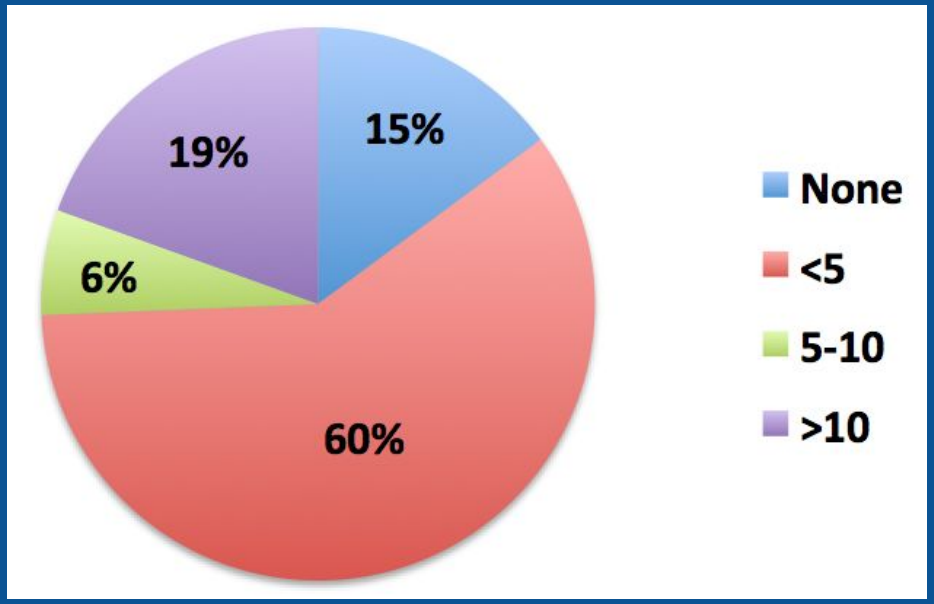
auto MERCADO

Survey Methods

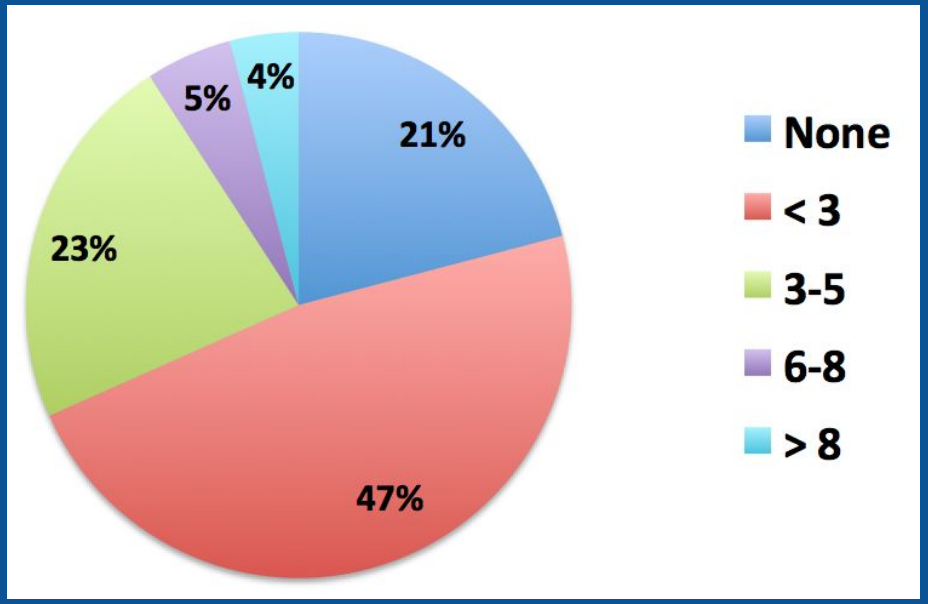
- Contingent Valuation (CV) Method
- Research Questions:
  - Consumer Habits
  - Willingness to Pay
  - Environmental Awareness
  - Demographics
- Eliminating Bias

Consumer Habits

Single-Use Plastic Bags Used per Week

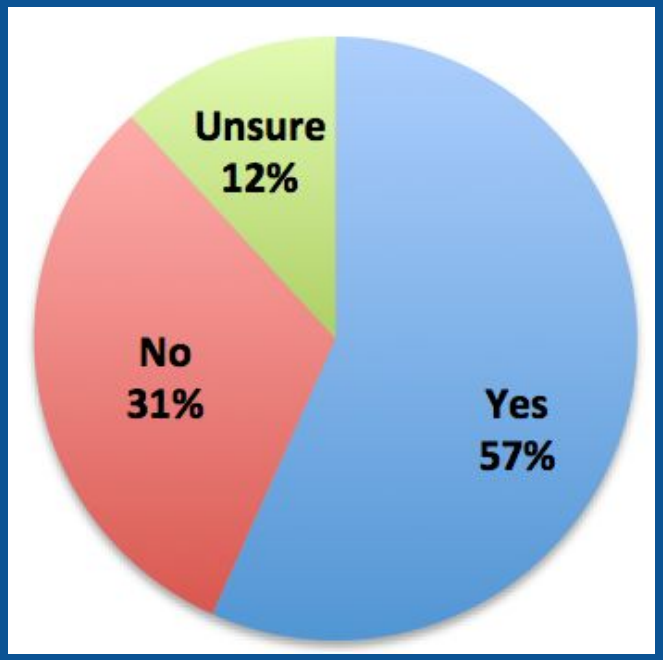


Single-Use Plastic Bottles Used per Week

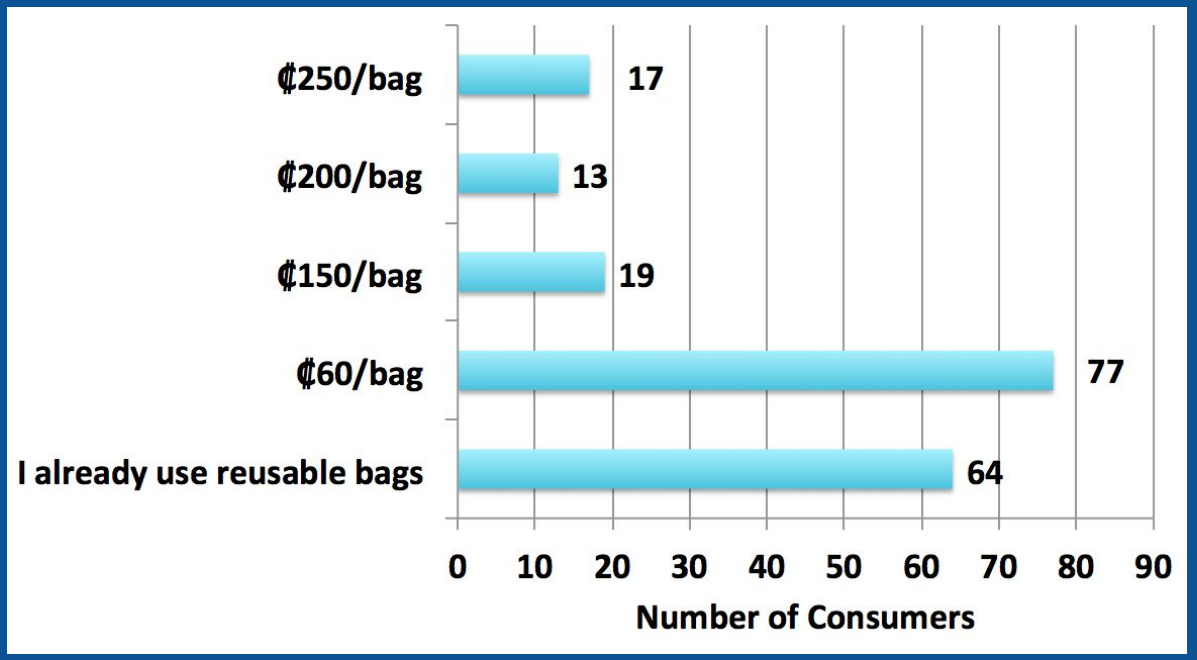


Willingness to Pay: Single-Use Plastic Bags

Willingness to Pay

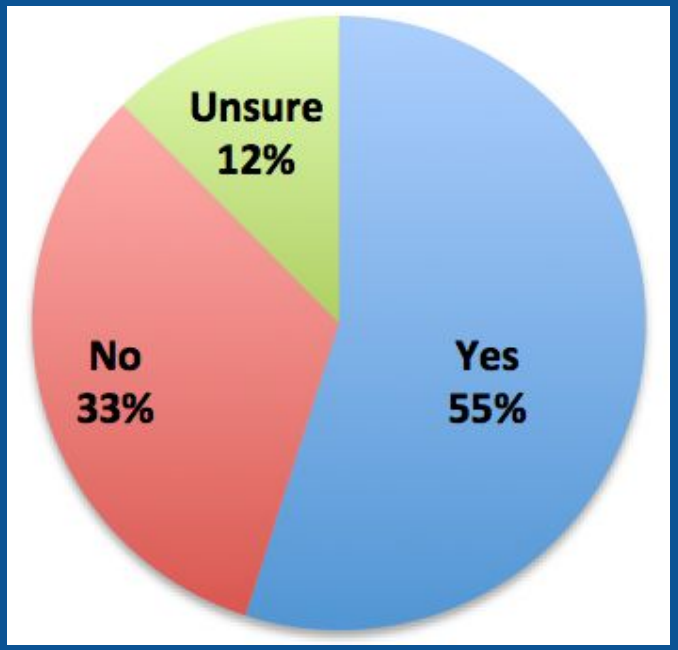


Price Point

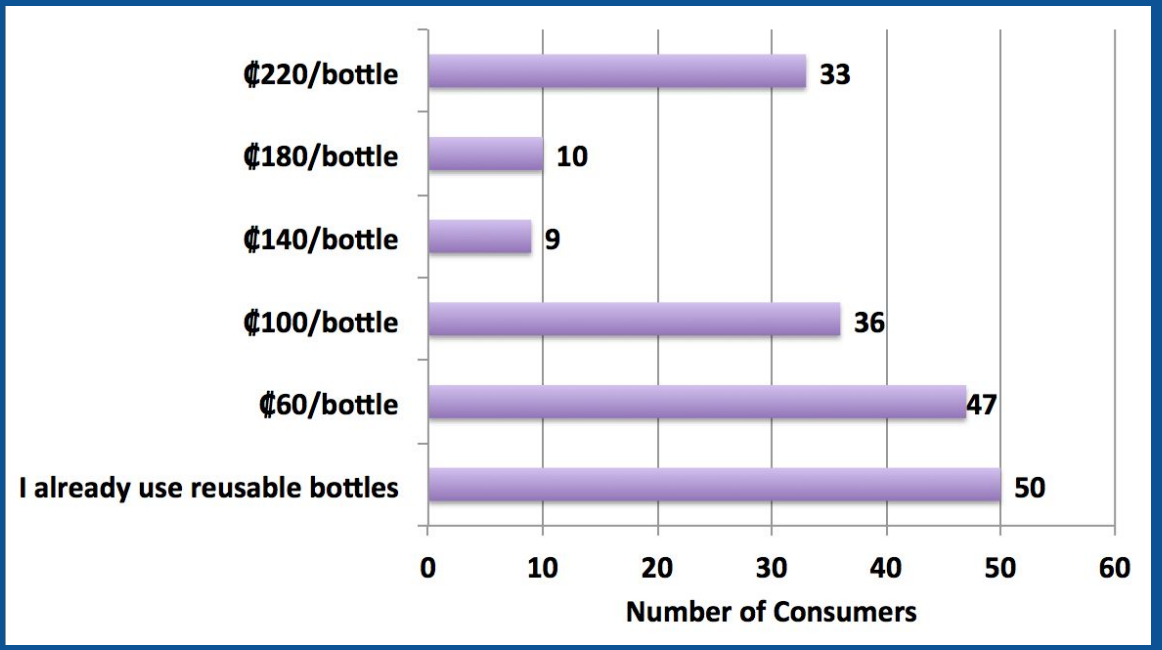


Willingness to Pay: Single-Use Plastic Bottles

Willingness to Pay



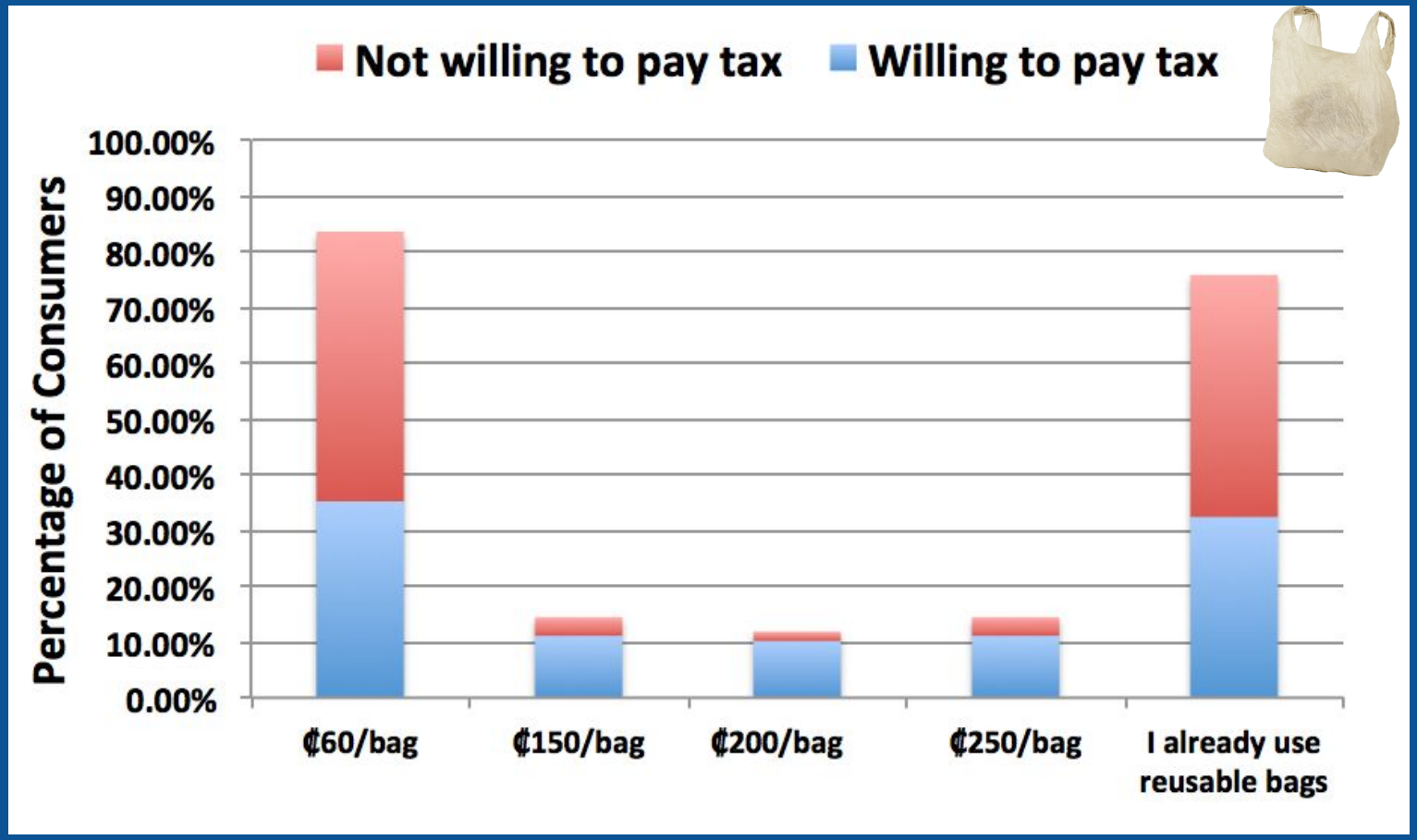
Price Point



Key Findings

- Consumers choose extremes
- Different interpretations of questions
- 26 consumers not willing to pay, but use reusable bags
- 19 consumers not willing to pay, but use reusable bottles
- Already using the reusable option

Distribution of Price Point Responses Based on Willingness to Pay for Green Tax

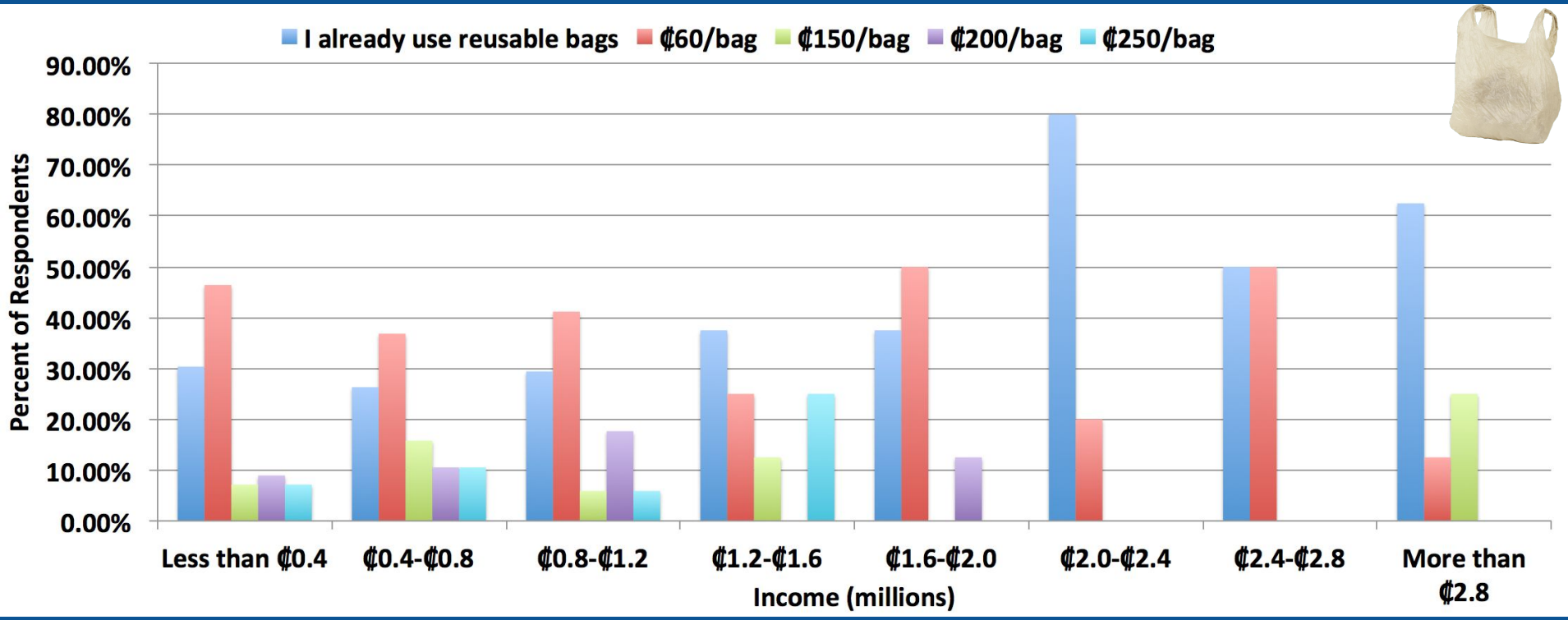


Single-Use Plastic Bags

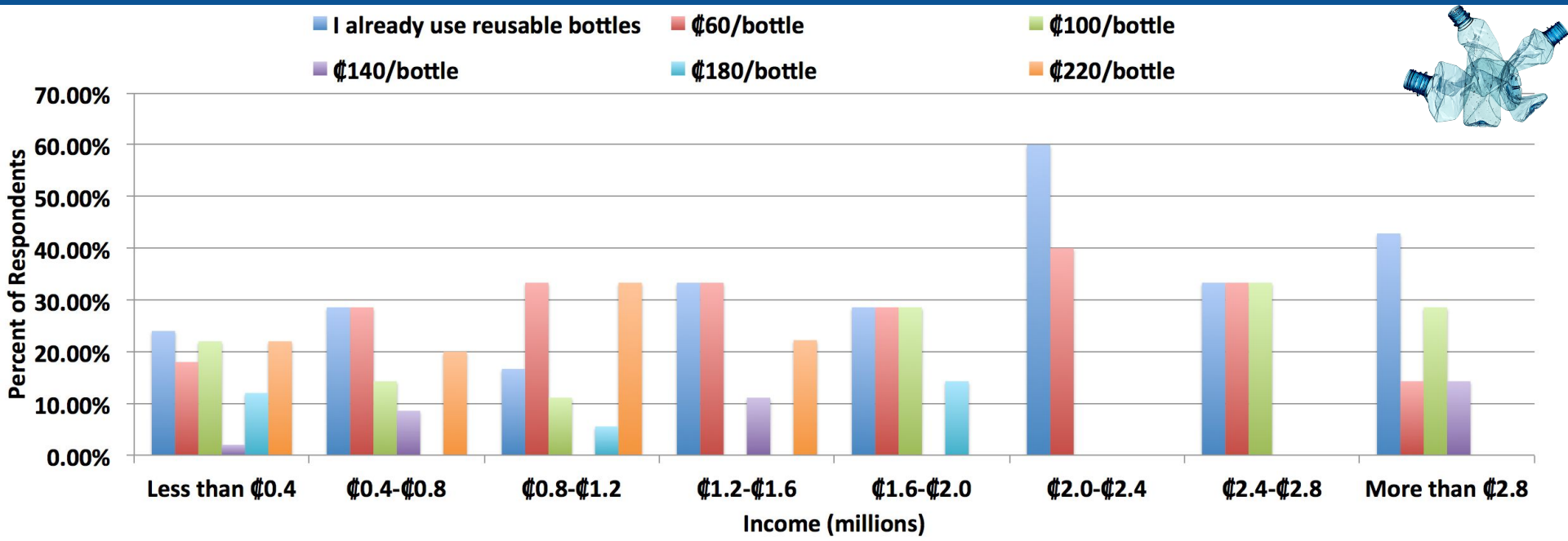
Distribution of Price Point Responses Based on Willingness to Pay for Green Tax

Single-Use Plastic Bottles

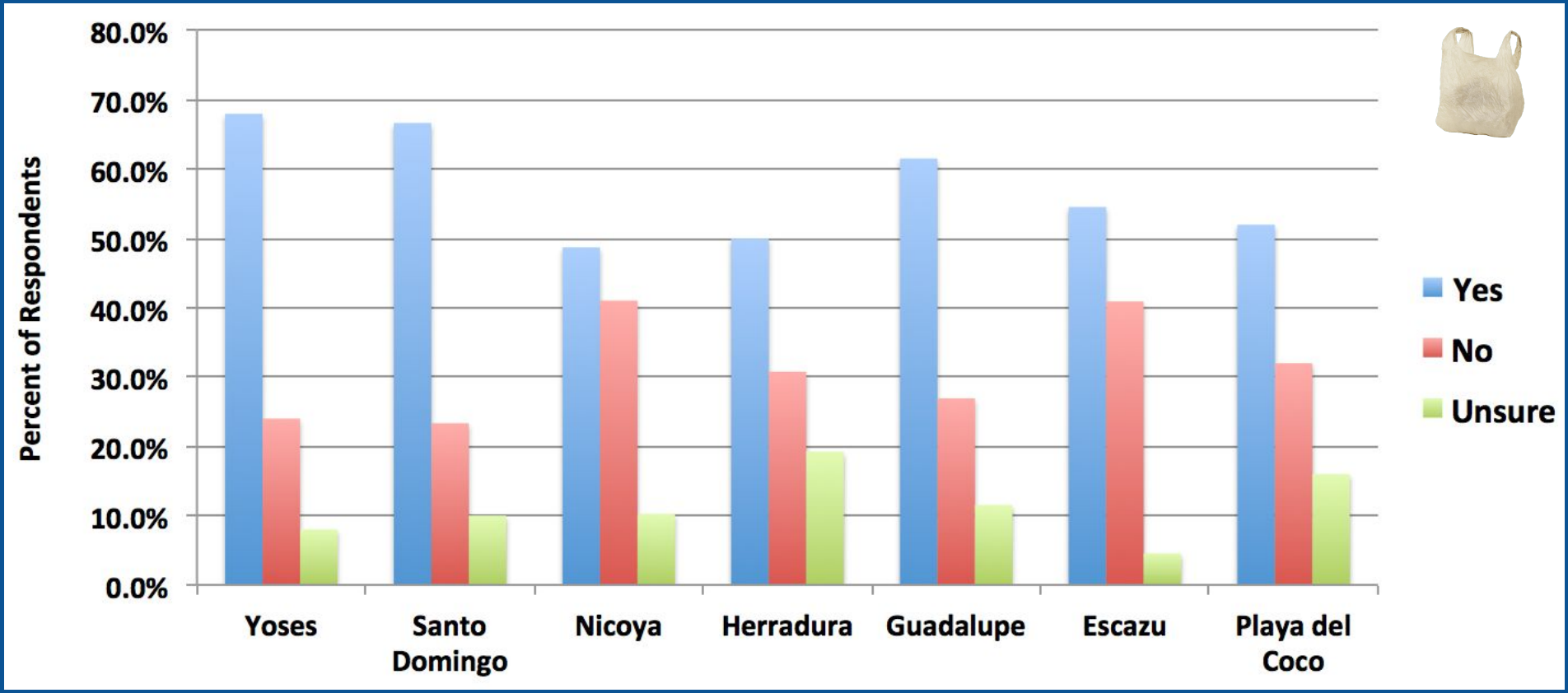
Price Point Preference on Single-Use Plastic Bags Based on Income



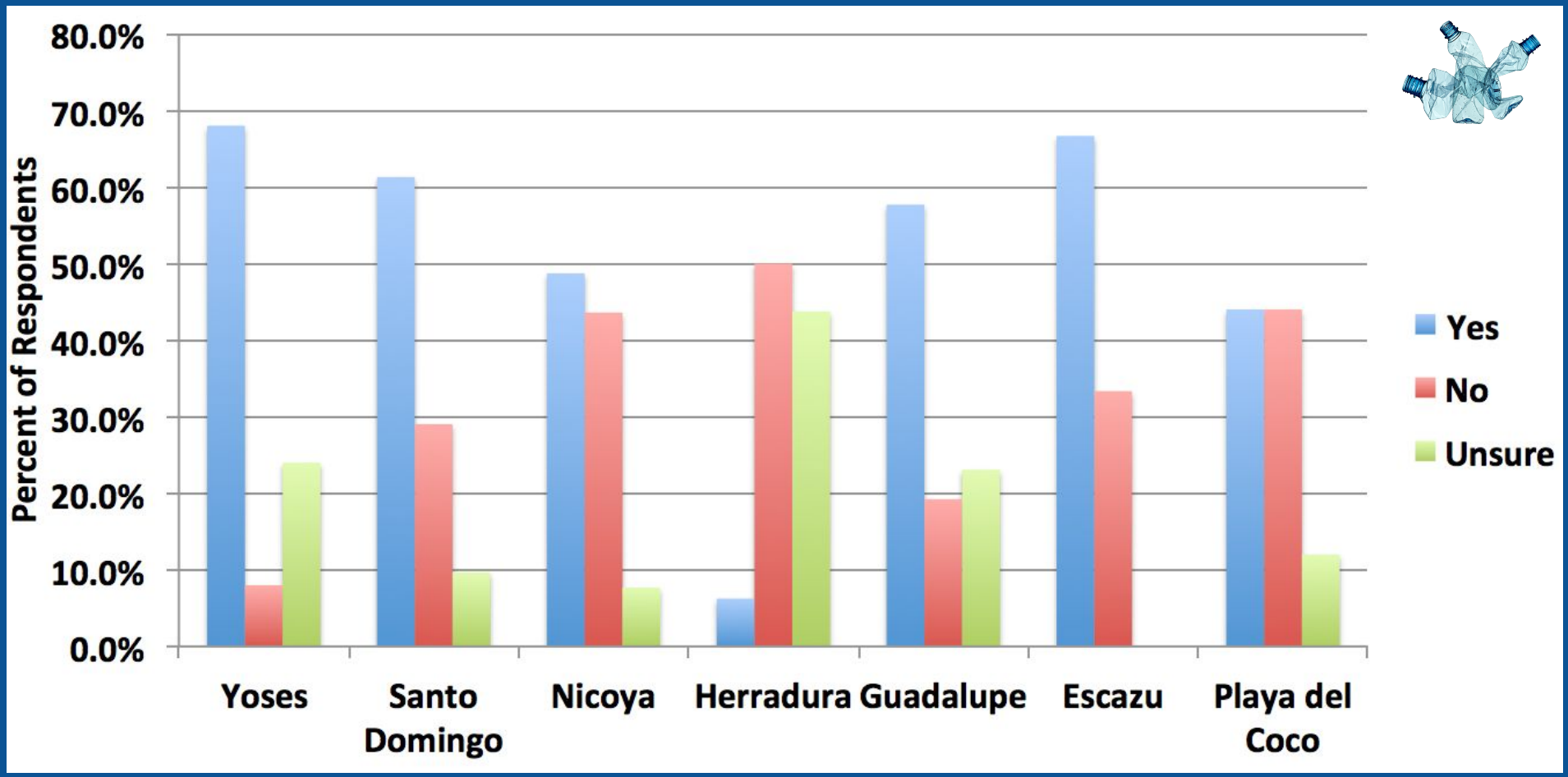
Price Point Preference on Single-Use Plastic Bottles Based on Income



Willingness to Pay for Single-Use Plastic Bags Based on Location



Willingness to Pay for Single-Use Plastic Bottles Based on Location



88.5% of consumers
believe disposable plastics are harmful to the environment

57% of consumers
are willing to pay a green tax on single-use plastic **bags**

55% of consumers
are willing to pay a green tax on single-use plastic **bottles**

70% of consumers
believe that a green tax on single-use plastics would reduce plastic pollution

₵100

as price of tax for single-use bags and bottles

- **26% chose a price point higher than ₵60 for bags**
- **34% already use reusable bags**
- **46% chose a price point higher than ₵60 for bottles**
- **27% already use reusable bottles**

Possible revenue with 50% decrease in single-use plastic use:

₵57,885,622,600 from bags*

₵33,573,633,600 from bottles*

*Very rough estimate based on our collected data

Recommendations

- Public/retailer education on new tax
- Provide options for alternatives for retailers to use
- Focus on rural area education on new tax
- Price Tax at 100 Colones for single-use bags and bottles
- Follow up study of success of tax
- More accurate estimation of economic benefits of reduction

Conclusiones

- High possibility of success in Costa Rica
- Increased funding for marine ecosystems
- Positive impacts of tax
- Convincing evidence for legislators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MarViva, *Alberto Quesada and Haydée Rodriguez*

WPI, *Jim Chiarelli and Steve McCauley*

Marcela and Jimmy Music

Melissa Belz

Auto Mercado and Survey Respondents

¡Gracias!

¿Preguntas?

References

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