



**Tourism & Single-Use Bottled Water:  
A Case Study of Singapore**

## EARTHYS Sustainability

EARTHYS Sustainability specialises in formulating solutions that support a circular economy. Because behaviour shapes the success of environmental initiatives, we place importance on understanding the interplay between behaviour & sustainability, and how this can be utilised to solve challenges. Our interdisciplinary team of academics and industry specialists bring a wealth of knowledge and deep expertise in areas such as psychology, technology, social impact assessment and data science, amongst others. We believe, the importance of natural resources, however small, need not be compromised or side-lined in the pursuit of growth.

EARTHYS Sustainability recognises the effort Ridge View Residential College students (G01.2) in contributing to the data collection for this study.

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# INTRODUCTION

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Plastics are heavily entwined in today's society. Plastic products are particularly useful in both the domestic and industrial spheres due to the ease with which they can be manufactured, low cost, as well as their ability to be used in multitudes of forms for various products and services. The use of plastics for consumer goods has made many products accessible and affordable to people of all socio-economic groups which has helped improve the standard of living for many (Davis, 2015).

## **Pollution Caused by Plastics**

However, plastics have major drawbacks. None of the fossil-fuel derived plastics biodegrade, thus, plastic builds up in our landfills and oceans (Geyer, 2017). Between 1950 to 2015, 7900 million tonnes of plastics were manufactured, all of which are not going away anytime soon (Geyer, 2017). While fossil-fuel derived plastics don't biodegrade, they do break up into smaller particles called microplastics. It is estimated that more than five trillion plastic particles are floating in the world's oceans where they threaten marine and human life (EIA, 2015). In addition, as a result of plastic waste financial losses by fisheries and tourism economic costs are also incurred (Alessi et. al., 2018).

## **Single Use Plastic Products**

One of the most heavily used plastics for single use consumer products is PET or polyethylene terephthalate. Today, PET is widely used in consumer packaging due to its ability to hold shape, while still being light and hygienic. One common form of plastic packaging is single use bottled water, which has become ubiquitous throughout the world.

In 2018, the Singapore Environment Council (SEC) reported that just over one-third of Singapore residents use 2 to 4 PET bottles per week (SEC, 2018). Aside from personal use, bottled water is common place in the tourism and hospitality industries.

## **Tourism's role in environmental impacts**

"Everyday more than 3 million tourists cross international borders....." - *United Nations Secretary-General António Guterres, 2017*

Tourism's importance as an economic driver and employment generator has long been recognised by the many countries that leverage it, Singapore being one of them. In 2018, Singapore received 18.5 million international visitors (STB, 2019) - three times the population of Singapore. A total of S\$26.9 billion was spent in tourism receipts which accounted for 10% of our Gross Domestic Product (GDP) (WTTC, 2019). In addition, the tourism sector supports 8.8% of total employment in Singapore (WTTC, 2019).

Regardless, the growth and diversification of tourism globally, brings a substantial environmental footprint that has been recognised as being intensive by the United Nations and other global bodies (UNEP, 2005). Large numbers of people flock to destinations where they consume resources and generate waste within a short-period of time. Much of this waste takes the form of single use disposables as these are convenient for tourists, whose stays are short-lived, and for tour agents, who are dealing with changing tour groups on a frequent basis. An example of this is the 40% spike in plastic entering the Mediterranean sea during peak season, which is caused primarily by tourists (Alessi et. al., 2018).



Closer to home, the plastic waste problem has two implications: circular economy and landfill challenges. Single use plastics are not supportive of circular economy processes which aim to reduce the strain on the natural environment. This, coupled with increasing amounts of solid waste placing an enormous pressure on our only landfill at Semakau, is making plastic waste a major concern.

Domestically, the fight against single-use plastics has commenced. However, given the role tourism plays in our economy it is essential to understand how much of the single use plastic waste generated, is being contributed by international visitors arriving in Singapore. This exploratory study focuses on single-use bottled water and quantifies the amount consumed by international tourists in Singapore.

# PROJECT OBJECTIVE

Tourists spend a lot of time outdoors and need frequent access to water. Being able to consume water on the go with ease would factor very high, and this would influence the number of bottled water they purchase. Given our strong tourism sector, this exploratory study aims to quantify tourism's contribution to plastic waste via single use bottled water. We also sought to uncover what are some of the motivators to consuming bottled water.

# METHODOLOGY

The reference unit is a generic 500 ml PET bottled water commonly available at convenience stores and pop-up carts. Eleven countries, grouped according to High and Middle Income countries (World Bank, 2018), were surveyed. A total of 202 responses were collected over a period of 5 weeks between December 2017 and February 2018. Surveys took place at Sentosa and Marina Bay area.

Data was grouped in two ways to shed light on trends:

1. High Income vs Middle Income Countries
2. Age Groups: less than 18 years, 18 to 30 years, 31 to 45 years, above 45 years.

Table 1. Demographic representation of international visitors surveyed

Country	No. Of Respondents	% High or Middle Income
China	60	54%
Malaysia	27	
Indonesia	14	
Thailand	8	
Norway	5	46%
Korea	12	
Japan	8	
Spain	5	
USA	28	
Canada	20	
UK	15	

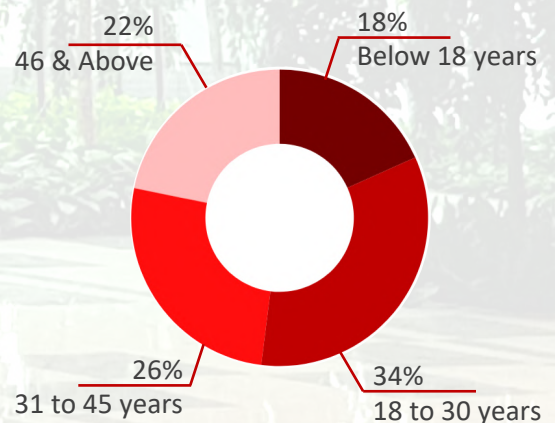


Figure 1. Age group of survey participants.

# FINDINGS

## Do tourists prefer to bring their own water bottle or buy bottled water?

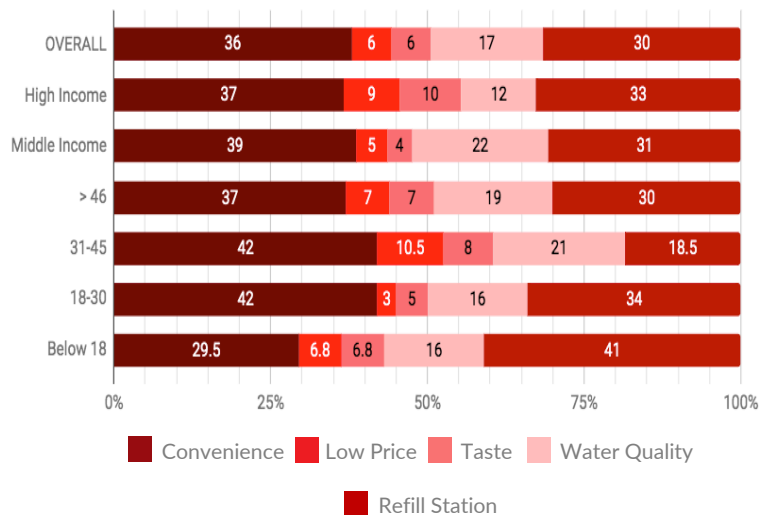
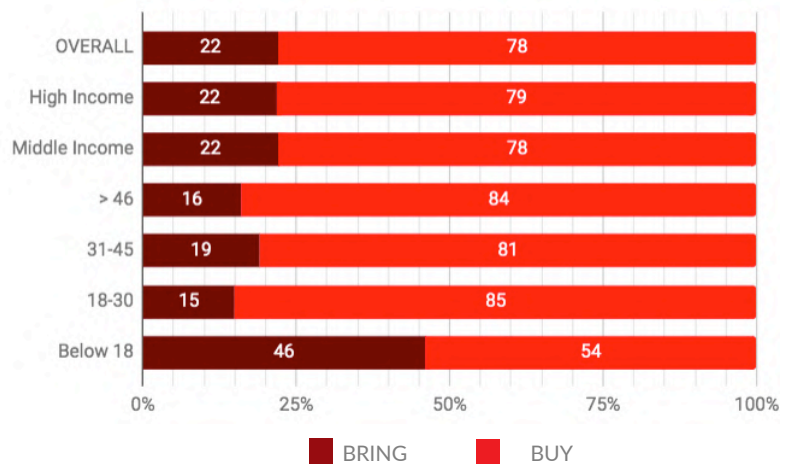
Overall, majority (78%, N=202) of international visitors preferred to buy rather than bring their own bottled water. It is interesting to note there was no variation between High and Middle income countries. International visitors tend to be of higher socio-economic groups who can afford international travel, which may explain the highly consistent pattern.

There was very little variation in preference to buy/bring between age groups. The exception was youths (< 18 years) who had a much higher preference (46%) for bringing their own water bottle – one of the reasons cited was that bringing a water bottle was a habit for them.

## What are the reasons for tourists to buy bottled water?

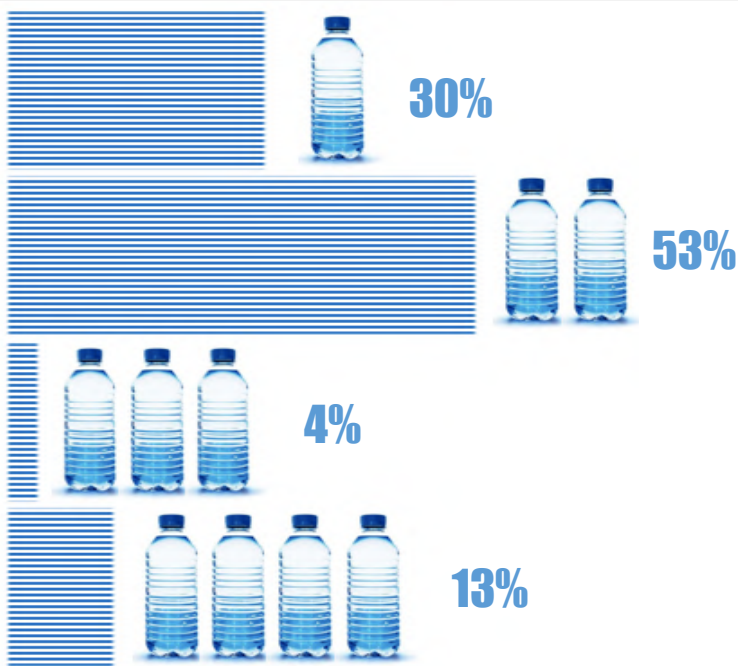
Overall, Convenience (36%, N=192) and No Place to Refill (30%) were the highest rated reasons for buying bottled water. Refill stations are not a common occurrence in Singapore, and tourist locations are no exception. Even when they are available, they are of the “mouth to tap” models which frequently call into question hygiene issues.

There was minimal differences between High and Middle income countries, except in the area of water quality where Middle income countries had more concerns (22%) compared to Higher income (12%). This does not come as a surprise as Middle income nations e.g. Indonesia and China have concerns over potable water quality in their home countries, and those concerns are likely to spillover into any country they visit (WEPA, Webber, 2017). In another study by EARTHYS on MICE & Eco-Hotels, it was found that concerns over water quality prompted 50%



of international business visitors (BTMICE) to opt for bottled water (EARTHYS, 2019). Lack of awareness and/or confidence in Singapore’s water quality is a recurrent theme amongst international visitors. This was also highlighted in a 2015 report by Singapore Tourism Board on Business Events and Sustainability where it was recommended that increasing awareness on Singapore’s water quality was a way to reduce single-use plastic bottled water (STB, 2015).

## How many bottles do you buy every day per person?



Low Pricing of bottled water (6%) and Taste (6%) were not major contributing factors in opting for bottled water. This is promising as personal preference for taste is difficult to change while convenience and accessibility are easier to address.

On average each tourist surveyed consumed two 500ml bottled water per day (weighted average). Only a very meagre 4% make it a point to recycle every time. Over a third practice *incidental recycling* where if they walk past a recycling bin, they will recycle. Incidental recycling highlights the importance of placing sufficient recycling bins around tourist sites.

Given that 59% of tourists are not recycling their bottles, that amounts to **1180 plastic bottles going to incineration and landfill every day for every 1000 tourists**. In 2018, Singapore drew 18.5 million international visitors, if we were to map the 59% onto them, tourists alone sent a whopping 22 million single-use plastic bottles to landfill in 2018.

## Do you recycle the bottles after use?





# RECOMMENDATIONS

Reducing the consumption of bottled water requires addressing three key areas:

1. Increasing Awareness of Singapore's potable water quality
2. Increasing refill stations
3. Encouraging recycling

## 1. Increasing Awareness

"Communicating water quality needs to be undertaken at multiple levels, which include overseas promotions of Singapore as an event destination, at points of entry into Singapore, on event registration platforms and at hotels." - MICE & Eco-Hotels 2019

Tourist sites and tour agents too can contribute significantly. Tourists tend to move from one attraction to another which provides an opportunity for repeated subtle messaging on water quality & recycling to be brought into their awareness either through tour agents or on site.

## 2. Increasing refill stations

Introduce more water refill stations around tourist attractions with clear signs as to where they are located. Such refill stations are commonplace in countries like China where there is a culture of drinking hot water on the go. Even if tourists arrive without their own reusable water bottles, providing refill stations will allow tourists to reuse the bottles they purchase, which can substantially reduce the number of bottled water they buy throughout the day.

The idea of increasing water refill stations is not new and was also put forward in an article by Channel News Asia on Singapore's S\$134m bottled water addiction, where Professors Ong and Ramaswami suggested installing more water fountains to reduce consumption of bottled water (Lim, 2016). This would certainly help both international visitors and locals alike. However attention to hygiene has to be considered as studies have established the health risks water fountains or water coolers present because of the mouth to tap design (Cram & Walters, 2002; Reiling, 2016; Costa et. al., 2016). Given that international visitors are diverse with varying levels of hygiene, we recommend installing refill stations that are only for refill (Figure 2).



Figure 2. Refill only stations reduce health risks.

### 3. Recycling

Behaviour modification is always a challenge. Expecting that of a transient crowd is an even bigger challenge. However, a few things can be done to support recycling behaviour. Ensure there are sufficient recycling bins at tourist sites and they are placed in strategic locations instead of being tucked out of sight. Some nations are recognised for their good recycling efforts e.g. Taiwan, Germany, Norway. For visitors arriving from such countries, we can leverage their pro-recycling behaviour by simply making them aware that recycling is practiced here and providing access to recycling bins.

The youngsters in this study favoured bringing their own bottles. Since many would be travelling with their families, influencing their families through them should be explored.

In 2017 Palau started a campaign requiring international visitors to sign an eco-pledge in their passport, promising the children of Palau, to be good (Figure 3). By making a personal connection with individual tourists, Palau hopes to effect a larger positive impact (Havas Australia). Approaches such as this have the potential to “set the stage” for how visitors interact with the country, and can be adopted to varying degrees by Singapore.



Figure 3. The Palau Pledge which requires tourists, on entry into the country, to pledge their support to treat the environment responsibly. Image © Havas Australia

## BOX 1 Measuring Sustainable Tourism (MST) Framework

The Sustainable Development Goals (SDG) were launched in 2016 and with it came the push for more sustainability to be adopted throughout the tourism industry. The following year, United Nations declared 2017 the Year of Sustainable Tourism.

“ Sustainable Tourism is defined as tourism that takes full account of its current and future economic impacts, addressing the needs of visitors, the industry, the environment and host communities. - *Making Tourism More Sustainable* - A Guide for Policy Makers, UNEP and UNWTO, 2005

In order to achieve this, the UNWTO recognised that evidenced-based decision making was critical to implementing and monitoring policies. This meant that decision makers needed a robust set of data, derived from rigorous statistical approach, to measure sustainable tourism. Such an approach would allow baseline data to be compared across countries and key focus areas with reduced biases. The World Tourism Organization (UNWTO), with the support of the United Nations Statistics Division (UNSD), developed the Statistical Framework for Measuring Sustainable Tourism (MST Framework). The MST aims to go beyond the economic focus, to incorporate environmental, and social dimensions and at relevant spatial levels: global, national and sub-national. Some policy areas that the MST will address are:

- environmental impacts of tourism: emissions, solid waste, wastewater, disruption of ecosystems and biodiversity;
- dependency of tourism on the environment: water and energy requirements, healthy and good quality ecosystems (beaches, reefs, forests);
- environmental protection expenditure and environmental taxes;
- some socio-economic impacts and dependencies of tourism such as employment.

*Source: Measuring Sustainable Tourism - UNWTO 2005*

# TRUE IMPACT OF TOURISM

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Tourism has grown substantially in Singapore in the past twenty years, and is projected to grow more (CLC, 2015). While, we benefit economically we need to consider the impacts on the environment and balance economic benefits with sound policies that support sustainable tourism. It can be argued that the environmental impacts resulting from tourism in many islands and beaches in Southeast Asia are the result of poor planning and waste management – not to be compared with Singapore. However, waste and resource use comes in many forms and urban cities like Singapore have to contend with good waste management, but an excess of waste itself.

This study highlights one variety of waste generated by tourists - single use bottled water. However, there are other forms of waste and resource use that are impacted by the tourism

sector: intensive water use (hotels & tourist sites), energy use (hotels & tourist sites), packaging waste, tourist paraphernalia, food waste – but what is the true impact of the tourism sector which receives three times as many visitors as residents?

Without baseline data it is not possible to benchmark the environmental impact of the tourism sector. Identifying areas which need addressing is difficult, and designing effective solutions is even more challenging.

This study size was relatively small compared to the number of international visitors Singapore receives annually. A more detailed study covering a representative spread of nationalities to assess their perception of bottled water and water quality will help shed light on much needed strategies to reduce plastic waste generated by tourists.

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