G.R.E.E.N. Hospitality

SOLID WASTE AND THE IMPACT OF THE TOURISM INDUSTRY IN THE EAST ASIA PACIFIC REGION

G.R.E.E.N. Hospitality Context Sheet - Solid Waste in East Asia Pacific

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Context Sheet - Solid Waste in East Asia Pacific, March 2020

Report and analysis writen by Camille Fabre
Edited by Lucia Loposova and Tung Ching Li
Design by Jess Lee

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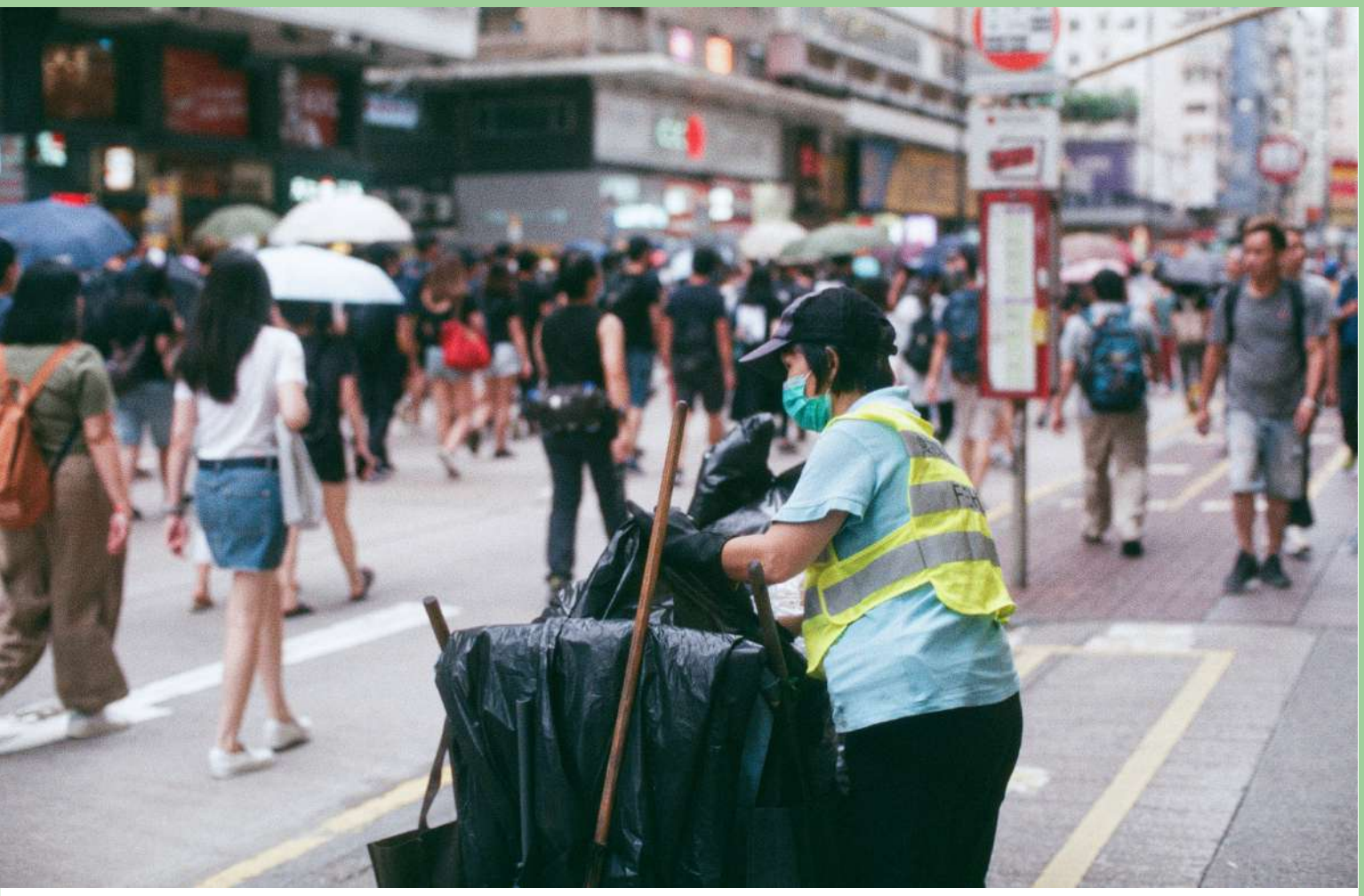
INTRODUCTION

Often, when looking at a country or region's waste crisis, figures only focus on volume. However, even if this variable is indubitably an important one, it generally fails to tell the whole story behind the roots of the crisis, and thus how to cope with it. The first important specificity about waste production is that it strongly correlates with development and GDP growth: the higher the GDP level, the more waste is created. On a global scale, tourism is among the strongest and largest sector driving growth today, and the East Asia Pacific region (EAP), is no exception. For many developing countries, and even developed ones like Hong Kong, it is one of the main pillars of economic growth and development, attracting investments and creating jobs. In 2018, the share of the travel and tourism sector accounted for an impressive **8.8% of the region's GDP, that is USD296 billion**[1]. The question is then:

> **WHAT IS THE CONTRIBUTION OF THE TRAVEL AND TOURISM SECTOR (T&T) TO THE REGION'S WASTE SITUATION?**

Through this Context Sheet, we hope to provide better insight into the general waste management situation in the East Asia Pacific region (EAP) with special attention given to the T&T sector impact. We chose to focus on the **Municipal Solid Waste (MSW)** type of waste, (the waste generated by households or public places like schools, public buildings, street sweeping and all the waste that comes from shops, restaurants, offices, hotels, factories and other businesses) because it is the source but also the solution to many negative externalities. Waste management, if properly set up and implemented, **can significantly reduce air pollution, water and environment pollution, food insecurity and even inequalities and poverty.**



In order to understand how a country, a region or a sector for example deals with waste, one should analyse four main variables:

- The **volume of waste it produces**
- The **waste composition**: organic or "dry" waste (plastic, paper, cardboard, metal, and glass), recyclability...
- The **waste management system**: citizens engagement, waste collection system, recycling capacity, type of disposal (open dumping, landfills,
- The **waste governance**: policy instruments, communication programs, regulations, fundings...

However, the ground assumption for such a study is that such data exists. Unfortunately, there is not a unified universal system to measure, report or even define waste[2]. This is a challenge per se, but to minimize the problems it raises for the analysis, this Context Sheet will mainly use the most recent data from the World Bank[3].

In this Context Sheet we chose to study the whole East Asia Pacific region[4], in spite of the high contrast between countries, because of its importance in the global waste crisis. It is also a region which **heavily relies on tourism for its development**, and is then a good example of the impact that the industry can have on waste production. We will then explore the four aspects of waste management as defined above one by one so as to get an accurate overview of the waste issue in the region.

1 VOLUME OF MSW IN THE EAST ASIA PACIFIC REGION

As mentioned above, the volume of waste produced in the East Asia Pacific is often cited as the biggest challenge of the region, and rightfully so: according to the latest World Bank data, in 2016, the region was responsible for **23% of the 2.01 billion tonnes of Municipal Solid Waste created in the world, which amounts to 468 million tonnes, at an average rate of 0.56kg per person per day**. It is the region that produces the most waste in the world. Why is that though? Because so far, the volume of waste has been positively correlated to a set of structural factors, namely:

- **The level of development of the country/ region (measured by the country's GDP)**: As the economy shifts from an agricultural one to a more industry or services-based one, the living standards of the population increase and the buying patterns evolve, with an increase in consumption for commercial goods. As a consequence, the waste volume increases and changes from organic waste to so-called "dry" waste like paper, cardboard, metal or glass.

IT IS THE REGION THAT PRODUCES THE MOST WASTE IN THE WORLD

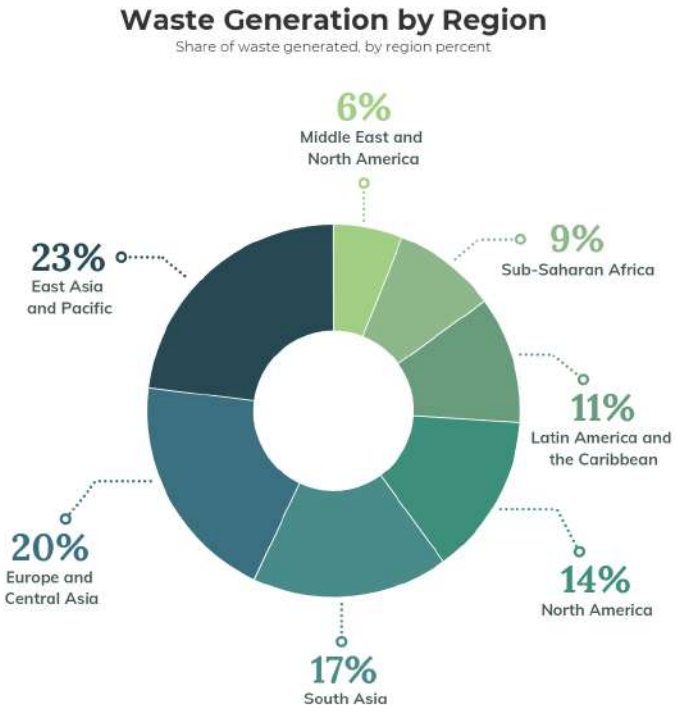
- **Its urbanization**: Urbanization is tightly linked to development and also modifies consumption habits and thus waste production.
- **Its population**: the more people, the more they consume.

Now, if we look at the East Asia and Pacific region through the lens of these 3 factors, we can understand the **size and the durability of the waste volume problem in the region**[5]:

- **Development**: After the 2008 financial crisis, the GDP growth of the region has kept a stable 2nd place behind the South Asia region with figures oscillating between 4.057% growth per year and 4.756%. In volume, the region has, by far, the highest GDP with US$25.942 trillion.
- **Urbanization**: The East Asia and Pacific region has the strongest urbanization growth, with 2.493% per year and, by far, the biggest urban population in the world, with 1.375 billion people living in cities.
- **Population**: The region also has the world's biggest population, with 2.328 billion people, and the 3rd biggest population growth (1.202% per year)

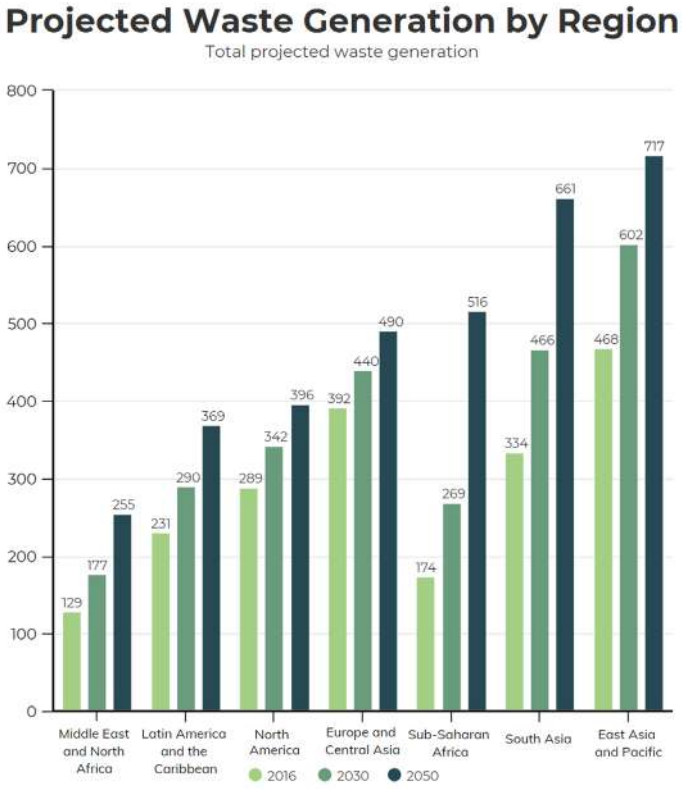
behind Sub-Saharan Africa (2.681%) and the Middle East and North Africa (1.735%).These two regions with the highest population growth rate are also expected to have the fastest waste growth. By 2050, the total waste generated there is expected to approximately triple, and double, respectively.

If these statistics explain the current waste crisis, they can also help predict the future. The current model[6] used by the World Bank to predict the evolution of waste generation links the future waste production per capita with the variation in GDP per capita. In this scenario, the problem will only keep getting worse in the future as, by 2050, **the region's yearly waste generation is expected to increase by 50%**. By then, **the region will still be the highest producer of waste in the world**.



Source: World Bank, What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, 2018

In terms of projection, given that the model of the World Bank is directly linked to GDP growth, it also means that the countries with the lowest GDP growth will also have a low waste generation growth. It is the case for the high-income countries, whose total waste generation per year in 2050 is expected to increase by "only" 30%, when the yearly waste generation for lower-middle income countries is expected to have the strongest increase, with a 100% growth.

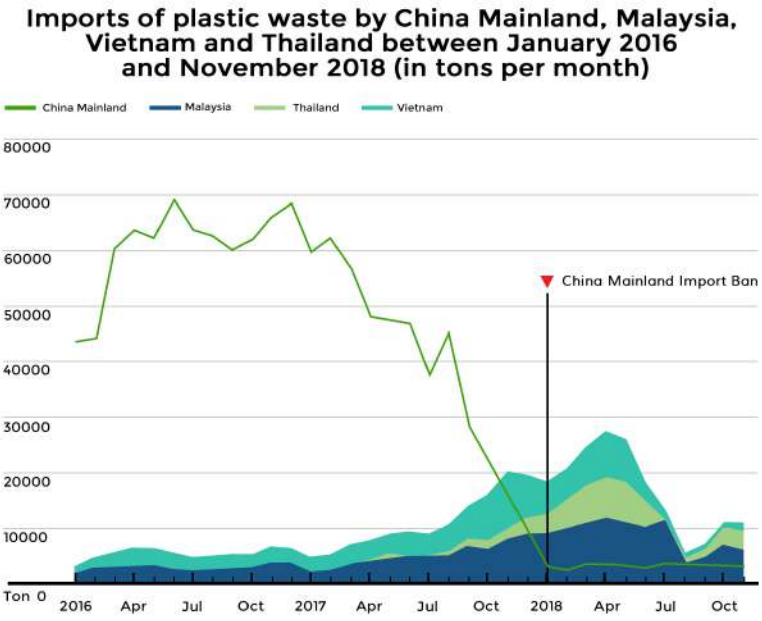


This is consistent with the idea that, once a certain development level is reached, the total waste production and the waste production per capita per year will also stabilize. In the EAP region, out of 20 countries, **9 are lower-middle income**. It is then important to think about a way to weaken the relationship between GDP growth and waste generation.

One way of doing that would be through **sustainable tourism**. Indeed, tourism is an important source of revenue, investments and jobs, but also waste: in 2011, the UNEP estimated a worldwide solid waste generation of **4.8million tonnes** just from international tourism, representing about **14% of the total municipal solid wastes generated during this year**[7]. Broken down in terms of volume per guest per night, the most commonly found figure is 1kg, but this doesn't take into account the discrepancies between the different destinations. Even though there isn't a specific figure for the EAP region, two recent studies explore the waste generation in two popular tourist destinations of the region: the city of Hoi An in Vietnam[8], and the Thai Golden Triangle[9]. In both studies, **the average solid waste generation per night and per person was more than 1.7kg** (2.28kg and 1.74 kg respectively), which is **about 3 times the average regional waste production** (0.56kg/person/day). The second article also compared the waste of hotels depending on their standards and found that **luxury hotels were way ahead when it came to waste production** (**3.77kg/night/guest** compared with 0.62kg/night/guest for normal hotels).

> THE WASTE GENERATION IN POPULAR TOURIST DESTINATION IS ABOUT 3 TIMES THE AVERAGE REGIONAL WASTE PRODUCTION

Adding to that burden, **some countries in the region are also dealing with waste** exports from other parts of the world to treat their waste, including from high-income countries from the region like South Korea and Japan[10]. Indeed, waste and especially recyclable waste like plastic, can be a source of income and, for decades, China has been the world's biggest receptacle of scrap plastic[11]. However, aware of the environmental cost of these imports, China imposed a country-wide import ban in January 2018, including for its Special Administrative Regions like Hong Kong. Following that decision, the burden has then been sent to other countries in the region. According to a Greenpeace report[12] on the topic, "*Southeast Asia, in particular Malaysia, Vietnam, and Thailand became primary importing countries/regions of plastic waste from mid-2017 to mid-2018.*" The report shows a gradual increase in waste imports in these three countries: the increase in volume basically matches the diminution of Chinese imports, with a sharp increase after the ban, followed by a sharp drop when they all introduced similar policies in July.

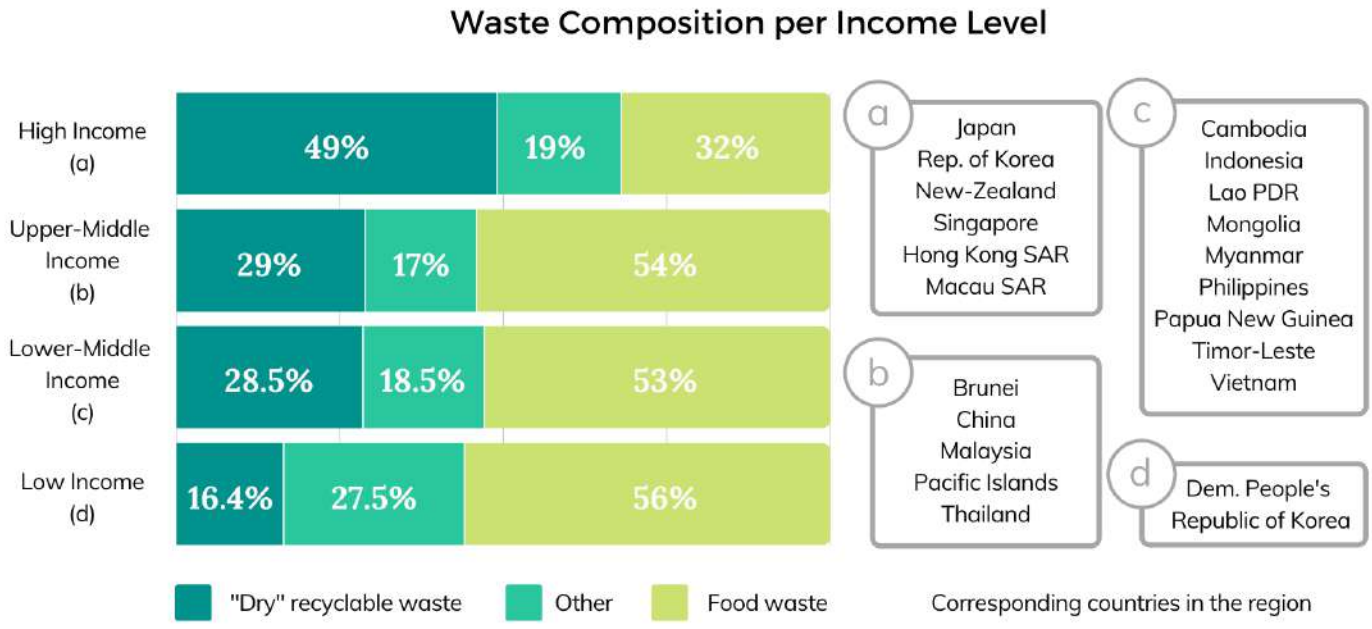


Source: Greenpeace report, Data from the global plastics waste trade 2016-2018 and the offshore impact of China's foreign waste import ban, 23 April 2019

According to an interview given to TIME[13], Lea Guerrero, Country Director for Greenpeace Philippines, points to the fact that "*richer countries are taking advantage of the looser regulations in poorer countries. They export the trash here because it's more expensive for them to process the mixed, contaminated waste themselves back home due to the tighter laws.*" Following the Chinese waste import ban early 2018, drastic measures have then been taken by Malaysia, Thailand, Vietnam and the Philippines, which all introduced legislation to prevent contaminated foreign waste coming into their ports[14]. Waste is now redirected massively to Indonesia and Turkey[15].

2 COMPOSITION OF MSW IN THE EAST ASIA PACIFIC REGION

The level of development influences also strongly the waste composition of the given country or region. Indeed, in the case of low-income countries, the economy is mainly agriculture-based[16], which leads to the production of a higher proportion of organic waste. Below are the waste compositions based on the countries' different income levels:



Source: World Bank, What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, 2018

Among these different sources of waste, "food and green" can be composted and **plastic, paper, cardboard, metal, and glass represent "dry" waste that can be recycled**. In the case of the EAP region, **the main source of waste is still organic waste** (53% of the total) when recyclable waste accounts for **a third of the total waste produced**.

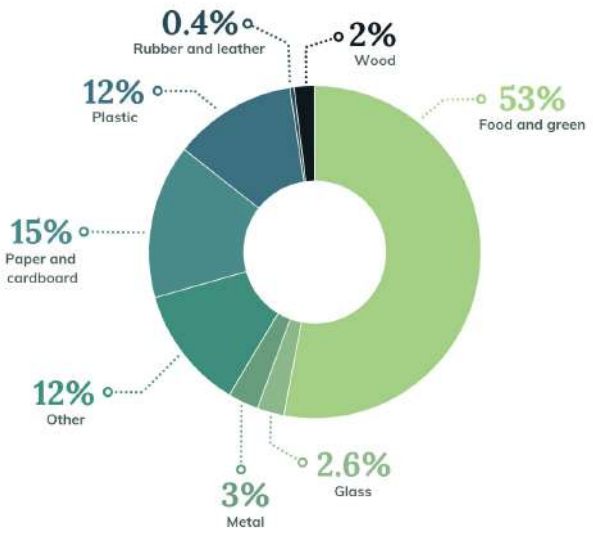
The waste composition is an important part to understand the waste situation in a specific country because it helps define the proper waste management infrastructures needed and which measures have the potential to have the biggest impact on waste reduction or recycling.

In the case of the EAP region for example, **composting would be the most appropriate technology for efficiently reducing waste** while on the contrary incineration would not be a suitable option due to the extreme

mercial aviation to approximately 5 percent of the world's climate-warming problem". As a consequence, **proper management of the organic waste would help reduce air pollution**, which is the most pressing environ-

> IN ASIA PACIFIC, BAD AIR QUALITY ACCOUNTS FOR 70% OF THE ANNUAL 6.5 MILLION DEATHS PER YEAR

Waste Compostition in East Asia and Pacific



Source: World Bank, What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, 2018

moisture content and the low calorific value of organic waste[17]. Composting would also reduce the externalities due to improper decomposition of organic waste, like methane emissions, a greenhouse gas 20 times more potent than CO_2. According to the World Bank[18], **emissions from solid waste treatment and disposal, account for about 5% of total global GHG emissions**, produced mainly by uncontrolled landfills (with no gas recuperation), uncontrolled burning or ineffective waste collection systems (garbage trucks). As a comparison, according to the Environmental and Energy Study Institute[19], "*total contribution of com*

mental health crisis in the world. It is particularly needed in **Asia Pacific, where bad air quality accounts for 70% of the annual 6.5 million deaths per year**[20].

Additionally, **compost can also become a financial resource**. In 2011, the Asian Development Bank[21] estimated that the region (including India) had the potential to produce around 8 million tonnes of compost **worth an estimated $709 million, or alternatively, an estimated 3,340 million kilowatt-hours/year of electricity (from biogas) with a market value of around $701 million/year.**

Interestingly, **organic waste also represents the biggest share in the solid waste composition in the region's hotels**. According to the two field studies in Hoi Na and the Thai Golden Triangle (covering areas in Thailand, Myanmar and Laos), both studies find that the waste composition in the different hotels is predominantly organic (with 58.5% and 56% of organic waste respectively). However, when it comes to organic waste, the source of the waste is also to be taken into account: in middle- and low-income countries for example, most organic waste is from **food "loss"**, caused by a

disruption in the food supply chain that cannot be avoided given the current technology, infrastructures and processes. In high-income countries, most of the food that goes unconsumed is from **food "waste"**, an intended behavior like food that has spoiled, expired, or been left uneaten after preparation. In the hospitality industry, **most of the food that is discarded comes from food waste and could be avoided: about 95% could typically be recycled or composted**[22]. In 2018, the Pacific Asia Travel Association (PATA) started to tackle this specific issue with its BUFFET initiative (Building an Understanding For Food Excess in Tourism)[23].

In the two studies, **the second source of waste for the hotels studied were dry recyclable waste** (17% of the total waste production in the Thai Golden Triangle and 25.8% in Vietnam). This is most likely due to the large quantity of single-use items that are used in the hospitality industry: **a single 200-room four-star hotel can use about 300,000 pieces of single-use plastic in a month if it is at full-capacity**[24]. From these 300,000 pieces, about 70% were **pieces of plastic for food and beverage operations** and 17% were plastic amenities and amenity packages. The rest were plastic water bottles and plastic bags. The composi tion of the hospitality industry's waste actually shows that a large majority of the organic and dry waste that guests generate could be avoided with appropriate measures.

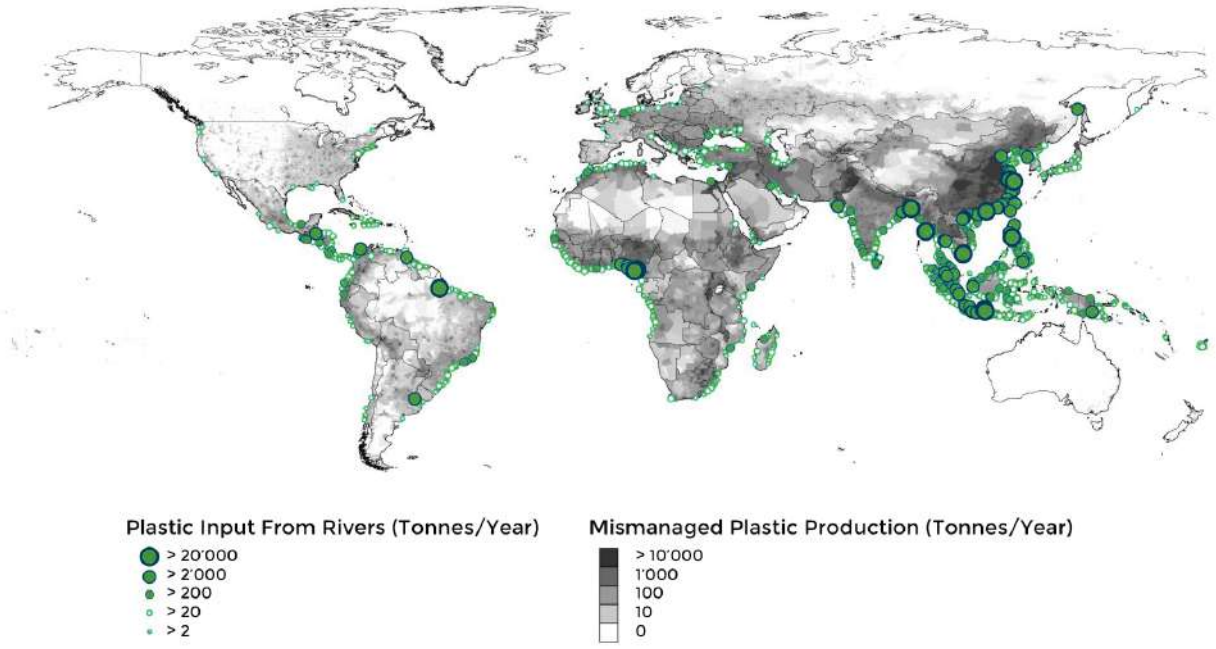
EVERY YEAR, THE YANGTZE, DUMPS UP TO AN ESTIMATED 1.5 MILLION METRIC TONNES OF PLASTIC WASTE INTO THE YELLOW SEA

The single-use plastics used by the hospitality industry represent **an important stress on the environment in the form of marine litter**, especially in the East Asia Pacific region where most of the population in the region is living on coasts or islands. Apart from that fact, there is also a huge concentration of marine waste because of rivers pouring into the oceans. A study by The Ocean Clean Up estimated that, from the eight million metric tonnes of ocean waste added in the oceans each year, **88-95% of the global load into the sea comes from 10 rivers, and half of them are located in the East Asia Pacific region**[25] (see map below).

Every year, the most polluting river, **the Yangtze, dumps up to an estimated 1.5 million metric tonnes of plastic waste into the Yellow Sea**. The consequences or marine pollution are now well-known, among which[26]:

- The suffocation, entanglement and death of marine species
- The transportation of non-indigenous marine species thereby threatening marine biodiversity and the food web
- The accumulation of toxic pollutants on their surface that can lead to environmental pollution, or serve as a vector for toxic pollutants that accumulate in the food webs (also called "bio-accumulation of contaminants")

Global Yearly Plastic Inputs from Rivers into Oceans



Source: Lebreton, L., Andrady, A. Future scenarios of global plastic waste generation and disposal.

3 MSW MANAGEMENT SYSTEMS IN THE EAST ASIA PACIFIC REGION

The waste management system corresponds to the **collection, transport, processing and final disposal of waste materials**. As countries develop and especially urbanize, the waste management system becomes crucial so as to ensure the safety of the population and further development of cities.

When it comes to collecting and transporting the waste, it is again urbanization and development level which influence the collection rate. According to the World Bank, at a national level, **waste collection coverage in East Asia and Pacific averages about 71%**, with highest rates in urban areas (about 77%) and **only 45 % in rural communities**.

This discrepancy between collection rates in urbanized and rural areas can have a **negative impact in the remote rural areas where tourism is used as a development tool**. Indeed, for both developed and developing countries, tourism is viewed as a solution to revert population decline, unemployment and development disparities with cities. It is also a popular option among travelers in search for a more "traditional" experience. However, these rural areas are also the ones that are particularly sensitive to an increase in waste production due to tourism because of the low collection rate. Similarly, **tourism being mostly seasonal, it puts an additional stress on the waste management infrastructures**: countries need time to monitor closely the seasonal flows of their hospitality infrastructures in touristic regions so as to avoid being overflown by garbage during high season or, on the contrary, spend too much money on waste collection and management in low season.

Developed countries in the region such as Singapore, Hong Kong SAR, Japan, and Korea are less sensitive to tourism impacts, as the percentage of waste collected is close to 100%.

The lack of waste collection in the rural parts of the region also helps understand the preferred waste disposal method: **46% of the waste produced in the region is sent to unspecified landfills, and open dumping accounts for 18% of the discarded waste**. However, **waste mismanagement** (material which is at high risk of entering the ocean via wind, tidal transport, or from

inland waterways) is a big problem in the region as Asia produced most mismanaged waste in the world in 2015[27].

Even if the percentage of open dumping is relatively low compared with other regions with similar development level, **open landfills still constitute a threat to the population**. According to the UN[28], the incidence of diarrhea in areas with poor service coverage is twice as high and acute respiratory infections are six times higher than in areas with frequent waste collection.

ed together for the 2015 GWMO[29] (the United Nations Environmental Program's Global Waste Management Outlook) suggests that **the global economic costs to society of inaction are 5–10 times greater than the financial costs of proper waste management**.

This **"cost of inaction" also exists** for the tourism sector, especially since the region relies on the attractiveness of its pristine beaches and virgin environment to fuel its development. There have been many examples of exces-

> "POOR WASTE MANAGEMENT BECOMES A COST FOR SOCIETY

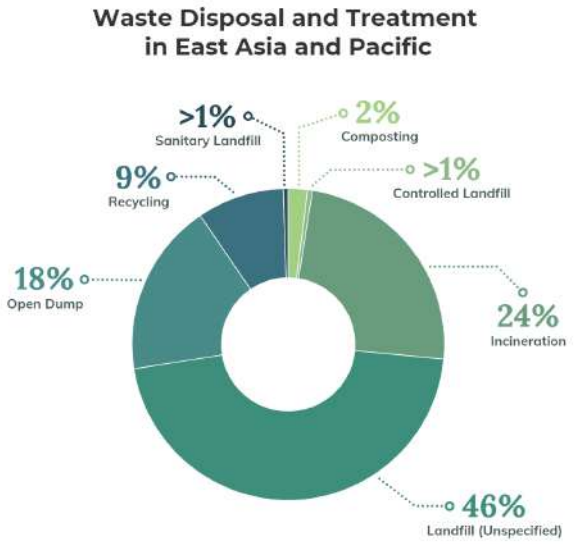
Dumped waste can also be a source of food and shelter for rats, mosquitoes, and scavenging animals, **which can carry diseases** such as dengue fever. Uncontrolled landfills have also weaker structures and can become security threats, especially for the already most fragile populations living next to them, just like in 2000 in the Philippines, where the Payatas municipal dumpsite collapsed on a slum community after 10 consecutive days of heavy rain, killing nearly 300 people.

As a consequence, when one takes into account the health problems arising because of poor hygiene; the environmental damages on water and on air quality, or the money needed to fix an open landfill which became a landslide, poor waste management becomes a cost for society. It is also true for hotels, restaurants and all businesses depending on tourism. Even if it is hard to measure, the evidence collect-

sive waste and environmental damage harming the tourism industry. The first way has been by **driving away guests**, as it was the case in In Tangier, Morocco, in the late 1990s, where pollution of beaches by solid wastes was cited as the leading cause of tourism decline that cost hotels in the area $23million/year in lost revenues[30]. The second way is by **implementing emergency measures that need to be enforced to save touristic spots from irreversible damage**. It was the case in the Philippines in April 2018, when the famous Boracay beach closed for six months. There, the special taskforce inspectors found **over 800 environmental violations and figures showed that rubbish generated per person on Boracay was more than 3 times higher than in the capital, Manila**[31]. According to an article in TIME[32], about 2 million visitors came to enjoy the beauty of the small island in 2017. The tourism industry there generated **more than USD1 billion** that

year and employed more than 30,000 people. This sudden closure of the iconic beach was then expected to cost **hundreds of millions of dollars to the local economy** and drive the most fragile businesses to bankruptcy, despite the limited 30-days cash-for-work scheme deployed by the government, where 5,000 residents received a small salary in return for helping with the island's clean up efforts. Despite the obvious need to clean the beach, this experience shows how **a sustainable tourism approach by both local governments and businesses would be economically better for both** of them, saving on the cost of cleaning the beach and compensating businesses, and the other the economic loss of not having tourists anymore for months.

Unlike open dumping, where the waste is simply dumped in low-lying areas on open land haphazardly, a better dumping method is **controlled landfills**, which are operated on a designated site, and where the waste is compacted with daily topsoil coverage to prevent nuisance. In the case of sanitary landfills, gases and leachate[33] emissions from waste decomposition are intercepted and treated so as to avoid air and water pollution. In the East Asia Pacific region, **less than 2% of the waste goes to sanitary or controlled landfills**. 24% of the waste is **incinerated**, which is a method mainly used in **high-income countries with limited land availability, such as Japan (80%); Taiwan (64%) or Singapore (37%), but it has also become common practice in China (30%)**.



Source: World Bank, What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, 2018

Source: The Ocean Cleanup, 2017

When analyzing the distribution of the disposal methods in the East Asia Pacific region, one can see a certain discrepancy between the type of waste produced and the disposal method. For example, organic waste accounts for 53% of the total waste, but **only 2% goes to compost and the region doesn't use any anaerobic digestion**. This processing method uses natural microorganisms to digest organic waste in the absence of oxygen and results in methane production. Unlike composting, which releases CO2, the resulting emissions of anaerobic digestion can then become a resource to produce biogas. Mainly used for animal wastes from high intensity livestock farm, this process can also be applied to many sorts of waste, including crops waste[34].

ABOUT 30% OF THE TOTAL WASTE IS RECYCLABLE, BUT ONLY 9% GOES TO RECYCLING

Similarly, about 30% of the total waste is recyclable, but **only 9% goes to recycling**. One reason for this low rate could be of course the lack of recycling facilities, but also because recycling depends critically on two aspects of 'segregation[35]. The first aspect is the composition of the product (if it is made of different material which can be easily sorted), and the second is the extent to which the waste stays "uncontaminated" by other waste streams. Efficient segregation can be achieved through proper sorting upfront or by relying on the informal sector to recover valuable material and valorize it once dumped[36].

As a matter of fact, **the informal sector is active in the EAP region**, with up to an estimated 200,000 waste pickers in Beijing, and 16,000 in Ho Chi Minh City. Waste picker services are also formalized in certain cities like in Baruni, capital of Papua New Guinea, or in Port Vila, the capital of Vanuatu. According to the UN-HABITAT report, the informal sector is a valuable resource for a city and **can save up to 15-20% of its waste management budget**. The UN-HABITAT[37] even advocates to rely on their organization and expertise when building an Integrated Waste Management System for a city. More generally, in lower-income countries, the informal sector is often achieving recycling rates of 20 to 30% for MSW[38] and also account for a large part of the market of reused or repaired objects.

4 MSW GOVERNANCE IN THE EAST ASIA PACIFIC REGION

Waste governance encompasses the **set of measures and incentives encouraged by governmental institutions to improve the waste management system**. It is usually operated by local public entities (they directly oversee about 70% of waste services in the world)[39] but requires also the involvement of the national government to define the regulatory frameworks. Waste governance is then about:

Planification and goal-setting

Communication and community involvement

Technology selection and roll-out of infrastructures

Use of policy instructions through direct regulation and economic incentives

Financial sustainability of the waste management system

As a consequence, even if countries don't need to be part of the high-income group to launch waste management policies, part of the region still struggles with more institutional and financial challenges when addressing solid waste problems, especially when applied to the tourist population.

When it comes to taking leadership roles in the fight against waste, **most of the countries in the East Asia Pacific region are aware of their responsibility concerning waste and have taken action**. In high-income economies such as Japan, South Korea or Taiwan, governments have succeeded in reducing the amount of MSW and in rolling out effective waste management systems despite the lack of available landmass through state-of-the-art infrastructures and by **including the principles of the 3 "R" in their regulations (Reduce, Reuse, Recycle)**[40].

Middle-income countries such as the ones belonging to ASEAN[41] have also established national strategies to address the challenge. According to a UN report on waste management in ASEAN countries[42], these strategies are for most part embedded in a broader policy and regulatory framework dealing with green growth, sustainable development or climate change. Countries like Indonesia, Malaysia, Philippines, and Thailand have specific acts/laws on waste management but only two countries (Cambodia and Vietnam) have regulations focusing exclusively on green growth. **In all ASEAN countries** (except for Brunei Darussalam), **MSW are being regulated both at national and local level**.

In practice though, the rapidly urbanizing countries of the region face specific challenges. A 2017 paper[43] examines the case study of the Tha Khon Yang Subdistrict Municipality, in Thailand, and finds that the main barriers to effective municipal solid waste management there were **insufficient infrastructure** (mainly on the collection and sorting part and the lack of alternative when the government launched a "no open dumping" regulation), **lack of organization** (lack of planning and strategy, inadequate policy, lack of engagement of the population, poor communication) and **financial barriers** (including insufficient funding and lack of clarity in the fee system for waste collection services). Indeed, in low- and middle-income countries, solid waste management accounts on average for respectively 19% and 11% of the total municipal budget[44]. More generally, developing countries can face as well a **lack of coordination** among the different institutions and stakeholders involved (for example, overlapping of the responsibilities and authority of the different administrative bodies involved). This is mainly caused by the lack of decentralization and empowerment of urban local governments as excessive controls on the functional and financial responsibilities of local authorities can lead to a mismatch between their functional responsibilities and their financial resources[45].

After several failed trials due to similar problems[46] China launched an ambitious plan to solve its ever growing MSW problem. According to the World Bank, around **47% of waste in the region is generated by the economic hub of China** (202 major cities in China produced a total of 202 million tonnes of MSW in 2017). This is why, in 2017, the government launched a new municipal solid waste (MSW) classification strategy in which Shanghai was selected, among others, as a pilot city. The new policy is described and analyzed in an article of the International Journal of Environmental Research and Public Health[47]. According to the authors, the Shanghai Municipal Solid Waste Management Regulation came into effect on 1st July 2019 and was the **first local mandatory regulation** for MSW classification in China. It is under this plan that, among other restrictive rules, the city's restaurants, shops, and hotels are now forbidden from offering free disposable items to customers on their own initiative. With that plan, which ranges from the construction of 10 new treatment plants to educational programs at school, the Chinese government plans to build "a complete, world-class MSW classification system by the end of 2020". If the trial proves satisfactory, Shanghai's MSW classification policy will serve as a benchmark to other cities.

> **47%** OF WASTE IN THE REGION IS GENERATED BY THE ECONOMIC HUB OF **CHINA**

However, even if rules and regulations on waste exist, touristic areas can be more difficult to manage because of the tourists' behaviors. Indeed, so as to build a waste management system that is efficient, communication and community engagement on the issue is crucial. It requires a good understanding of local behavior and involves creating new norms and habits, which can take time. Tourists are also not always aware of how waste management in a specific region is supposed to function and they are not the ones suffering long-term repercussions of their behavior. A study from the URBANWASTE project of the European Union[48] also explores different factors which could divert tourists from their eco-friendly behavior that they can have at home, like the context of being on holiday, which is about pleasure and leisure, or the lack of waste infrastructure. Infrastructure is something that governments can control, but they have little leverage on the behavior of a diverse population that is bound to stay for a short time.

As the first interface between tourists and the country, the hospitality sector and tourists hot spots have then a strong role to play into changing tourists behaviors. On that point, the European Union's study found that: "*According to tourists [...], it is not a lack of motivation that prevents them from sorting waste, but scarce information about waste facilities, inadequate infrastructure as well as scarce information about consequences.*" Hotels and restaurants can then provide large-scale information about sustainability and environmental challenges that countries face and even make guests bring their good habits back at home or with them when travelling to another destination. Governments also have a role to play in regulating and monitoring the tourism sector and encouraging good practices such as the ones advocated by the Global Sustainable Tourism Council (GSTC). So far, particular sustainable policies under national tourism offices were not yet found in the studied countries, except Bhutan.

In the case of a lack of national guidelines, the hospitality industry actors can also look at international initiatives such as the Global Tourism Plastic Initiative, developed by the Sustainable Tourism Programme of the One Planet network and led by the UN Environment Programme (UNEP) and the World Tourism Organization (UNWTO), in collaboration with the Ellen MacArthur Foundation. This ambitious plan aims at sensibilizing the industry and significantly reduce the use of plastics in the hospitality industry by 2025. It includes measures through the whole supply chain and aims to improve products packaging and design, recycling rates and use.

CONCLUSION

To sum up, the composition and volume of waste produced in the East Asia Pacific region follows traditional development models and is positively correlated with the increase in GDP of the region: under the current development model and consumption shifts, the volume is bound to keep increasing, and the composition of waste will slowly drift from organic waste to "dry" waste.

Travel and tourism will be a strong factor in this increase: the UNEP's 2011 Green Economy Report indicated that, in a 'business-as-usual' scenario, tourism would generate through 2050 an increase by 154% in energy consumption, 131% in greenhouse gas emissions, 152% in water consumption and 251% in solid waste disposal. This represents a huge stress for a region which already needs to improve its waste management systems.

As a consequence, the waste management system, the governance but also the travel and tourism industry in the region need to follow these evolutions so as to solve the current environmental challenges incurred by improper waste management like marine litter, air pollution or health and security issues for the population. Otherwise, neglecting the environmental aspect in business could become a serious economic threat, as it is the case for famous beaches like Boracay in the Philippines or Maya Bay, in Thailand. If nothing is done, the economic disaster that follows an environmental one is just a question of time.

Tourism in the East Asia and Pacific region has already had a big impact on the environment, especially since a lot of countries are not properly equipped to cope in the most efficient way with the excess amount of waste it generates. It implies that the tourism and hospitality industries become more sustainable environmentally to become more sustainable economically. Only then can they turn into a reliable source of development for most of the countries in the East Asia Pacific region.

> **"THE TOURISM AND HOSPITALITY INDUSTRY NEED TO BECOME MORE SUSTAINABLE ENVIRONMENTALLY TO BECOME MORE SUSTAINABLE ECONOMICALLY**

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SOAP 再皂福 CYCLING

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research@greenhospitality.io

www.greenhospitality.io