



NORWEGIAN MINISTRY  
OF FOREIGN AFFAIRS



Norad



# ENDING PLASTIC POLLUTION INNOVATION CHALLENGE

COMPETITION PACKAGE





## INTRODUCTION

Welcome to the **ENDING PLASTIC POLLUTION INNOVATION CHALLENGE (EPPIC)**!

We look forward to your application to **#BeatPlasticPollution** together.

Please review this guidebook in advance of your application. It includes everything you need to know to apply to the challenge and maximize your chance of being selected as one of the top 10-15 finalists for the incubation training and the final EPPIC Pitching Competition.

### CONTENTS

- ▶ [BASELINE ON PLASTIC WASTE IN HA LONG BAY](#)
- ▶ [BASELINE ON PLASTIC WASTE ON SAMUI ISLAND](#)
- ▶ [TERMS AND CONDITIONS](#)
- ▶ [CONTACTS](#)

EPPIC 2020 LOCATION I

# HA LONG BAY, VIET NAM



## BASELINE ON PLASTIC WASTE IN HA LONG BAY

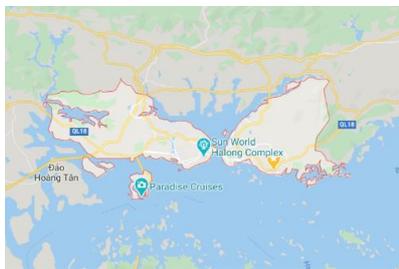
- 1. HA LONG BAY ..... 4**
- 2. POPULATION AND ECONOMIC ACTIVITIES ..... 4**
- 3. WASTE MANAGEMENT ..... 5**
  - Plastic waste entering the ocean..... 5
  - Plastic waste composition..... 6
- 4. FOUR KEY PLASTIC WASTE ISSUES IN HA LONG BAY..... 7**
  - Tourism activities..... 7
  - Fishing..... 8
  - Small island municipalities..... 8
  - Land-based generation of waste..... 9
- REFERENCES ..... 10**

# 1. HA LONG BAY

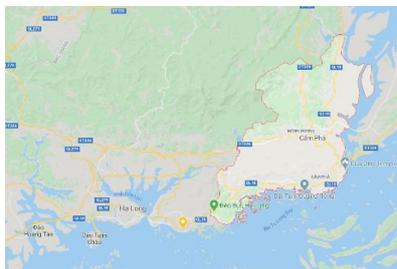
**Ha Long Bay** is a World UNESCO Heritage site. As such, it has developed several specific plans dealing with environmental protection, tourism development and management, and conservation planning. These include *Ha Long Bay to 2020*, the master plan on its conservation, management, and development approved by the Prime Minister in 2001, and the *Comprehensive Management Plan for the Ha Long Bay World Heritage Site 2010 - 2015* approved by provincial authorities in 2010.

## 2. POPULATION AND ECONOMIC ACTIVITIES

From an administrative standpoint, the sea of Ha Long Bay is mainly shared among the three districts of Van Don (pop. 45,700), Cam Pha (pop. 190,500), and Ha Long (pop. 240,800) in Quang Ninh Province. Ha Long City is the most populous of the province’s 14 districts, out of a total provincial population of 1,265,000 (Quang Ninh Statistics Office, 2017).



**Ha Long City**



**Cam Pha City**



**Van Don City**

Tourism and fishing figure prominently in the economy of Ha Long Bay, but it also relies on a number of other industries, including mining.

- ▶ **Tourism:** Tourism is one of the most important economic activities in Ha Long Bay. According to a report by the Quang Ninh Department of Tourism at a recent Review Conference, Quang Ninh province welcomed 14 million visitors in 2019 – 14% more than in 2018 – with a total financial turnover of VND 29,000 billion (USD 1.25 billion) against a planned target of around VND 2,000 billion (USD 86 million). The majority of these tourists stay in the Ha Long Bay area.
- ▶ **Fishing:** As reported in VietFish Magazine (2019), in 2017 the province of Quang Ninh had 20,600 ha of farming ponds and 9,600 cages producing over 54,000 tons, with the key species being shrimp (10,603 ha/11,558 tons), bivalve molluscs (3,446 ha/23,216 tons), freshwater fish (3,200 ha/10,507 tons) and marine fish (1,700 ha/5,615 tons).
- ▶ **Other:** Ha Long City has 1,470 industry and handicrafts manufacturing units, including coal mining and processing, ship building, building materials, mechanics, wood processing, food, foodstuffs, and garments.

### 3. WASTE MANAGEMENT

#### SUMMARY OF FINDINGS

- ▶ Solid waste collected in Quang Ninh province has reached **464,040 tons** per year.
- ▶ Plastic waste generated by the three districts of Van Don, Cam Pha, and Ha Long is estimated to be **28,283 tons** per year.
- ▶ Plastic waste entering the ocean generated by the three districts of Van Don, Cam Pha, and Ha Long is estimated to be **5,272 tons** per year.
- ▶ Plastic waste entering the ocean from the whole of Quang Ninh province is estimated to be **9,502 tons** per year.
- ▶ Waste collected from the waters of Ha Long Bay area during the tourist season is estimated to be **6-7 tons** per day.
- ▶ The most frequently found plastic waste components are Styrofoam boxes, lunch boxes, plastic bags, porous buoys, and fishing nets.

#### PLASTIC WASTE ENTERING THE OCEAN

Based on a draft report on solid waste management in Quang Ninh province (Department of Natural Resources and Environment of Quang Ninh Province, Socialist Republic of Vietnam, 2020), a survey at the end of 2015 showed that the volume of solid waste collected in Quang Ninh province reached 464,040 tons per year. This amount does not include uncollected waste, which can be estimated on the basis of the collection rates provided by the districts.

Assuming an average percentage of plastic on the order of 15% (Duc Luong et al., 2013, and Vetter-Gindele et al., 2019) a reasonable 2020 estimate for Quang Ninh province has been calculated at 28,283 tons per year.

A statistical model (Hoang Minh Giang, 2020) has been developed under the EPPIC project for estimating the release of plastic waste into the ocean. The model has been fed with data provided under the draft report

mentioned above. Preliminary results of the modelling effort are reported in **Table 1** below. Based on this model, the largest contribution in the province of plastic waste coming to the ocean is from the Ha Long municipality (3,484 tons per year), which by itself is larger than the total contribution from countryside areas where the collection rate is low (2,954 tons per year). The contribution from the Cam Pha district is 1,459 tons per year, while Van Don contributes 329 tons per year.



Following these calculations, around 5,272 tons per year are discharged in the ocean by the 3 districts which are part of the Ha Long Bay area. However, a significant contribution is also expected from other municipalities, as the model calculated that a total of around 9,503 tons of plastic waste is discharged per year into the sea off Quang Ninh province.

Considering that this preliminary observation provides a figure of about 1,000 tons of waste per year collected from the sea in the Ha Long Bay area (Truong Giang, 2019), and that it has been reported from several sources that around 7 tons per day of waste are thrown in the sea by tourists (Lã Nghĩa Hiếu, 2019), this figure seems realistic.

Table 1 Model calculation of plastic waste entering the ocean from land-based sources (tons/year)

City/District	Urban	Countryside	Total
Ba Che	0	102	102
Tien Yen	84	400	485
Dam Ha	76	326	402
Binh Lieu	4	8	12
Hoang Bo	147	240	387
Ha Long	3483	0	3,483
Cam Pha	1281	178	1,459
Van Don	102	226	329
Mong Cai	676	241	917
Hai Ha	114	409	523
Quang Yen	39	51	90
Uong Bi	0	8	8
Co To	92	70	161
Dong Trieu	449	694	1,143
<b>Total</b>	<b>6,548</b>	<b>2,954</b>	<b>9,502</b>

## PLASTIC WASTE COMPOSITION

Some estimations of the typology of plastic waste can be made based on the survey carried out by Green Hub in several areas of Viet Nam (Fabres, 2019). The survey included the collection of plastic waste in 10 sites, among which were some in Quang Ninh province. Based on that survey, the most represented categories of plastic waste were porous buoys, small nets, Styrofoam containers, shopping bags, solid plastic, and bottle caps.

Based on officials reports cited by Lã Nghĩa Hiếu (2019), 70 percent of the trash collected from the Coc Cheo and Ang Du beaches is Styrofoam, and the rest was plastic bags and bottles, food packaging, fishing nets, and clothing.

A very preliminary survey carried out under the EPPIC project (Carlo Lupi, 2020) using an innovative photographic method, conducted in the vicinity of one channel in the Ha Long district, has confirmed that Styrofoam and lunch boxes represent more than 70% of plastic waste, and that the second most common category is single-use shopping bags (around 20%). Data from this survey are, however, limited to a very small area (300 m<sup>2</sup>).

In all cases, the relative importance of Styrofoam boxes, lunch boxes, and plastic bags as compared to other items is quite evident. This may also be due to the relative difficulty of recycling these waste categories in comparison with other types like plastic bottles, which may be more easily sold on the market of recyclable materials.



## 4. FOUR KEY PLASTIC WASTE ISSUES IN HA LONG BAY

### TOURISM ACTIVITIES

According to the Ha Long City People's Committee, each day about 7 tons of garbage on average is thrown by locals and tourists into the sea, of which most is floating plastic waste. Each year, about 1,000 tons of rubbish are collected in the Bay. In the first 6 months of 2019, 573 tons of garbage were collected, of which 220 tons were coastal garbage and 353 tons were collected at sea (Lã Nghĩa Hiếu 2019).

As reported by Trường Giang (2019), waste is generated continuously from the coast from sewage discharges into Ha Long Bay. Looking from the sea along the Bai Chay - Hon Gai area of Ha Long City, Cam Pha City, or Van Don District, residential areas and tourist areas are closely connected. At Bai Chay Beach in particular, in the summer around 6 tons of trash are left on the sand at the end of each day which have to be removed by environmental sanitation workers.

Mackay and Vrans (2018) calculated the waste from the tourist boats operating in Ha Long Bay (day-boats and overnight boats). Based on their estimation, the total waste generated on the operational boats (day boats and overnight boats combined and land-based tourists) is:

- ▶ **Boat solid waste:** 9 tons per day
- ▶ **Boat wastewater (grey):** 101.9 m<sup>3</sup> per day
- ▶ **Boat wastewater (black):** 386.7 m<sup>3</sup> per day
- ▶ **Land solid waste:** 25 tons per day (tours, climbing, caves, trekking, beaches, etc.)

Based on the above, pilot measures to ban selling of single-use plastic items in the boats have been launched starting from August 2019. The management board of Ha Long Bay said that 15 local firms providing tourist boats, kayaks, and high-speed boats would embark on a pilot program banning the use of plastic products on sightseeing boats, starting from August 1 (Nguyen Quy, 2019). The boat owners have replaced bottled water with fixed large water jars, and travellers have been given glasses made of environmentally friendly materials. Wet paper towels have been replaced with cloth towels collected after use. Data has not been collected measuring the effect of this pilot program on the bay's plastic pollution.





## FISHING

Reliable data concerning the waste generated from fishing activities is not available. Research carried out by Richardson et al. (2019) estimated that 5.7% of all fishing nets, 8.6% of all traps, and 29% of all lines were lost to the world's oceans in 2017. The same research also estimated that on average 26 units of net gear and 47.4 gillnets and entangling nets were lost annually per vessel.

The massive presence of Styrofoam boxes and fishing nets seems indeed to testify that, together with tourism, fishing is a leading cause of ocean plastic waste pollution. However, both tourism and fishing rely on a large number of boats, from large to very small in size. These could become part of the solution by providing transportation of waste in the area.

## SMALL ISLAND MUNICIPALITIES

Of the roughly 2,000 islands in Ha Long Bay, around 40 are inhabited. Although the amount of waste generated by these islands is limited compared to the overall amount generated in Ha Long Bay, the collection, treatment, and disposal of plastic waste generated by island communes is very difficult, and mostly not performed in an environmentally sound way. The incinerator in Van Don, for instance, is too small to manage the waste generated in that district. A survey carried out under the EPPIC project by the UNDP team in Quan Lan island (Van Dong district) on June 05, 2020, confirmed the above. The island has a population of around 7,000 people which almost doubles during the tourist season and on the weekends. Quan Lan has 8 villages, but waste is only collected in 6. From there, it is transported to centralized treatment facilities for burning. In 2 villages far from the center (small island villages), there is no bridge connecting to the island commune, meaning that people instead collect and burn waste in their gardens. The coasts of the island are affected by plastic waste transported in from the sea. Small island municipalities are at the same time both targets and sources of plastic waste pollution.





## **LAND-BASED GENERATION OF WASTE**

Although not all waste generated on land reaches the ocean, considering that most of the population of Quang Ninh is based on land, the amount of plastic waste generated on land may be greater than the amount generated through marine-based activities. As most of the waste generated in Quang Ninh ends up in sub-standard landfills, there is a high probability that a significant fraction of light plastic waste is re-mobilised and finds its way to Ha Long Bay. Approaches based on reduction of plastic consumption (including limiting or banning the use of single-use plastic items), better management of waste, and improvement of waste segregation could therefore lead to a reduced input of plastic waste into the ocean. Calculations carried out for the province of Quang Ninh found that around other 4,230 tons of plastic waste generated from inland districts also reach the bay through rivers and channels.

## REFERENCES

- Department of Natural Resources and Environment of Quang Ninh Province, Socialist Republic of Vietnam, 2020. *Report on the solid waste management in Quang Ninh province [draft]*.
- Duc Luong, N., Minh Giang, H., Xuan Thanh, B. & The Hung, N., 2013. *Challenges for municipal solid waste management practices in Vietnam*. 1(1), pp. 17-21. DOI: 10.12777/wastech.1.1.2013.17-21.
- Fabres, B., 2019. *Analyzing plastic pollution in Ha Long City and Ha Long Bay technical issues, sources, inputs: Report to the Centre for Supporting Green Development*. GreenHub.
- FLC Group, 2019. *Without being affected by low season, Quang Ninh tourism gains huge success in 2019*. [Online]  
Available at: <https://www.flc.vn/en/bai-viet/without-being-affected-by-low-season-quang-ninh-tourism-gains-huge-success-in-2019/>  
[Accessed 16 June 2020].
- Hoang Minh, G., 2020. *Estimating Plastic Waste Leakage Into the Ocean*, Hanoi.
- Lã Nghĩa, H., 2019. *Vịnh Hạ Long mỗi ngày phải 'gánh' 7 tấn rác thải*. [Online]  
Available at: <https://thanhnien.vn/doi-song/vinh-ha-long-moi-ngay-phai-ganh-7-tan-rac-thai-1105336.html>
- Lupi, C., 2020. *Photo survey on marine macro and mega litter along Vietnamese coasts. Prepared for UNDP: methodology testing*, Hanoi: UNDP.
- Mackay, J. & Vrins, W., 2018. *Report on the advisory mission to Ha Long Bay World Heritage Site, Quang Ninh Province, Viet Nam, from 16<sup>th</sup> July to 20<sup>th</sup> July 2018*, s.l.: International Union for the Conservation of Nature.
- Nguyen, Q., 2019. *Ha Long Bay to pilot plastic ban on tourism boats*. VNExpress International, 30 July. [Online]  
Available at: <https://e.vnexpress.net/news/travel/places/ha-long-bay-to-pilot-plastic-ban-on-tourism-boats-3959573.html>
- Richardson, K., Hardesty, B.D., Wilcox, C., 2019. Estimates of fishing gear loss rates at a global scale: a literature review and meta-analysis. *Fish Fish* 20 (6), 1218–1231. DOI:10.1111/faf.12407.
- Trường Giang, 2019. *Kỳ quan Vịnh Hạ Long có thể bị hủy hoại vì rác thải nhựa*. VOV E-magazine, 9 August. [Online]  
Available at: <https://magazine.vov.vn/20190809/racthainhuahalong/index.html>
- Vetter-Gindele, J., Braun, A., Warth, G., Bui, T.T.Q., Bachofer, F., Eltrop, L., 2019. Assessment of household solid waste generation and composition by building type in Da Nang, Vietnam. *Resources* 8 (4), 171. DOI: 10.3390/resources8040171.
- VietFish Magazine, 2019. *Quang Ninh aims to become the north's shrimp capital*. Viet Fish, March 11. [Online]  
Available at: <http://vietfishmagazine.com/aquaculture/quang-ninh-aims-become-norths-shrimp-capital.html>  
[Accessed 6 May 2020].

# EPPIC 2020 LOCATION II

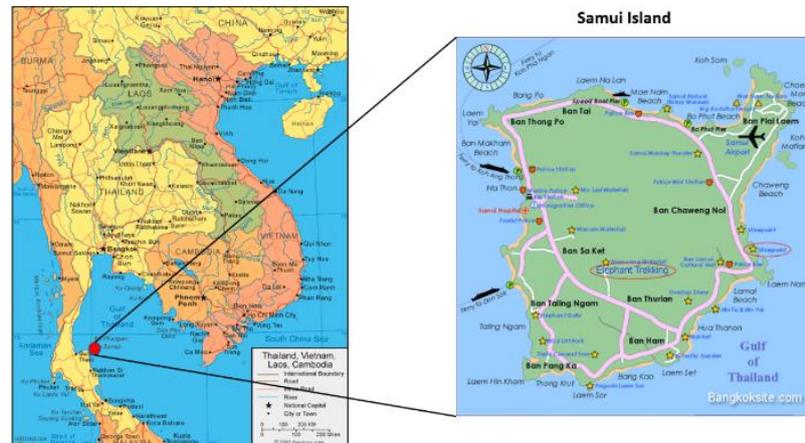
# KOH SAMUI, THAILAND



## BASELINE ON PLASTIC WASTE ON SAMUI ISLAND

<b>1. SAMUI ISLAND .....</b>	<b>12</b>
<b>2. POPULATION AND ECONOMIC ACTIVITIES .....</b>	<b>12</b>
<b>3. WASTE MANAGEMENT .....</b>	<b>13</b>
3.1. Land-based municipal waste .....	13
3.2. Marine litter .....	15
<b>4. KEY PLASTIC ISSUES ON KOH SAMUI .....</b>	<b>16</b>
4.1. Land-based generation of plastic waste .....	17
4.2. Marine litter .....	18
<b>REFERENCES .....</b>	<b>19</b>

**Figure 1: Samui Island**



## 1. SAMUI ISLAND

**Samui Island** (Koh Samui) is the largest island in an archipelago located in the Central Gulf of Thailand, around 20 km off the north-eastern coast of Surat Thani Province. With an area of about 227 km<sup>2</sup>, it is the country's third-largest island (**Figure 1**).

Samui is one of Thailand's world-famous tourist destinations, and its popularity means that the number of visitors keeps on increasing. According to the municipality, it receives an average of 3,000 tourists per day, with a hosting capacity of 22,623 hotel rooms.

The central part of Koh Samui is mostly tropical jungle and includes its largest mountain, Khao Pom (635 m).

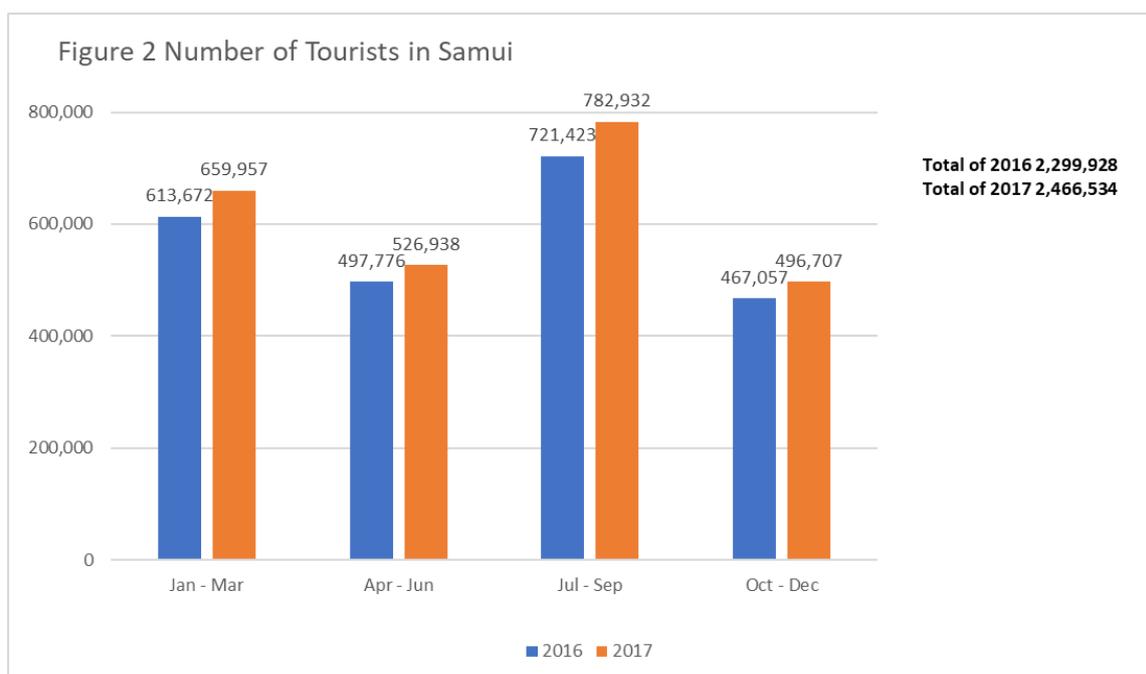
On the west coast of the island is the original capital, Nathon, which still houses many government offices, as well as two of the island's five major piers. Nathon is the main port for fisheries and for transportation of vehicles and goods from the mainland. Its position as the main port and the closest city to the mainland has made Nathon the commercial centre for Samui locals. More recently, the transition from dependence on the local coconut industry, along with the continued development of the tourist industry and the location of the airport, has led to an increase in commercial activity in the north-eastern towns of Chaweng and Bophut.

## 2. POPULATION AND ECONOMIC ACTIVITIES

In 2017, the total population of Samui was 1,950,768, of which 67,265 are registered and 1,883,503 are latent.

**Tourism.** Although agriculture and fisheries still play an important role in its economy, since the 1980s Samui has been focusing on the much more profitable tourism sector. According to the Ministry of Tourism and Sports, the number of visitors in 2017 was 2,511,617, a 7.23% increase from the previous year (**Figure 2**).

- ▶ **Fisheries.** Most of the activity is from small local fisheries along the coastline of the island for human consumption in the local market. The minority are freshwater fisheries, where 30% is for household consumption and the remaining 70% is for local markets and restaurants.
- ▶ **Livestock.** This sector is relatively small, and mostly for local consumption or use on farms. Livestock include pigs, ducks, chickens, buffaloes, and cows.
- ▶ **Commerce and services.** Most activity is concentrated in the communities and tourist areas.
- ▶ **Industry.** Light industry on the island mainly includes furniture made from coconut wood, coconut-related agroindustry (e.g. coconut oil), drinking water, and ice.



### 3. WASTE MANAGEMENT

#### 3.1. LAND-BASED MUNICIPAL WASTE

- ▶ The generation of municipal waste increased from approximately 52,000 tons in 2012 to more than 59,000 tons in 2017 (avg. 150 tons per day). (Table 1)
- ▶ Plastic waste represents 18% of the total waste generated, which is around 10,800 tons per year.
- ▶ A limited survey revealed that the plastic waste generated by convenience stores is mostly milk bottles and food boxes (36%), followed by low-density polyethylene (LDPE) (34%) and polypropylene (PP) (10%) items. The amount generated is estimated at 17.27 kg/store/week. There are around 227 stores on Samui, six of which are department stores and the rest of which are convenience stores.
- ▶ A similar survey conducted in restaurants revealed that most of their plastic waste is composed of PET bottles (71%). The amount generated is estimated at 132 kg/store/week. There are more than 1,700 restaurants on Samui.

**Table 1** Municipal solid waste in Koh Samui Municipality

Year	Amount of municipal waste (tons)
2012	51,942
2013	56,114
2014	41,914
2015	51,589
2016	59,927
2017	59,055

(Source: Sanitation Technician Division, Koh Samui Municipality)

- ▶ Most of the municipal waste is disposed of in a sanitary landfill, in which some types of recyclable materials (e.g. plastic, glass bottles, paper, metal, etc.) are found that could have been sold at junk stores for eventual transportation to recycling plants. The recycling rate is unknown.
- ▶ Given the limited capacity of the landfill, the municipal waste is compressed, wrapped in plastic cubes of approximately one ton each, and shipped to the mainland for management. An estimated 20-30 cubes are made per day.
- ▶ Samui Island possesses a limited waste management system, awareness levels are low, and illegal dumping is a common practice.

A **waste composition analysis** of land-based municipal waste revealed that food scraps represented the largest proportion (63%), followed by plastic (18%) and paper (11%) (**Table 2**).

**Types of plastic waste** generally found on Koh Samui are mostly from everyday life, such as:

- ▶ **Personal items:** e.g. toothbrushes, toothpaste tubes, shampoo, bags, shoes, napkins, etc.
- ▶ **Food packaging:** e.g. plastic bags, plates, bowls, spoons, forks, straws, water bottles, milk bottles, food boxes, snack packages, etc.
- ▶ **Home products:** e.g. plastic containers, carpets, canvases, tubes, spouts, ropes, glue, etc.
- ▶ **Household electrical appliances:** e.g. cell phones, facsimiles, furniture, refrigerators, AC remote controls, TV remote controls, thermoses, etc.
- ▶ **Medical supplies:** e.g. medicine bottles, medicine tubes, etc.

**Table 2** Waste composition of Koh Samui Municipality

Waste types	Waste composition (%)
Food scraps	63%
Paper	11%
Plastic	18%
Glass	2%
Rubber/leather	1%
Fabric scraps	4%
Other	1%

(Source: Sanitation Technician Division, Koh Samui Municipality)



A survey of 5 stores and 5 restaurants on Samui revealed that, by percentage, the composition of plastic waste matches the data reported in the following table (**Table 3**):

**Table 3:** Composition of plastic waste on Samui from a short survey of restaurants and convenience stores (UNDP Bangkok, 2020)

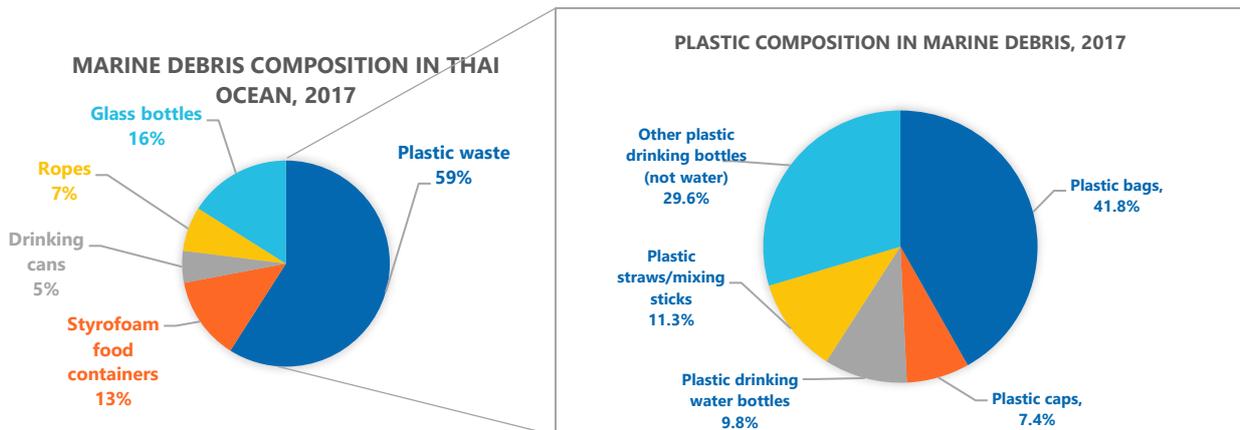
Type of plastic	Amount of waste generated (kg/week/store)	Proportion of waste generated (%)	Amount of waste generated (kg/week/restaurant)	Proportion of waste generated (%)
1) <b>Polyethylene terephthalate</b> (PETE): plastic bottles for soft drinks	0.70	4.05	20.60	15.59%
2) <b>High-density polyethylene</b> (HDPE): bottles for milk, cosmetics, shampoo, etc.; grocery bags	0.60	3.47	5.25	3.97%
3) <b>Polyvinyl chloride</b> (PVC): blister packs, food wrap, vegetable oil bottles	0.57	3.30	0.00	0.00%
4) <b>Low-density polyethylene</b> (LDPE): plastic bags for bread, frozen food, household garbage, etc.	5.80	33.58	20.00	15.14%
5) <b>Polypropylene</b> (PP): containers for takeout meals, medicine bottles, yogurt containers, etc.	1.70	9.84	40.00	30.28%
6) <b>Polystyrene</b> (PS): Food service items, e.g. cups, plates, bowls, cutlery	1.60	9.26	15.00	11.36%
7) <b>Other:</b> Reusable water cans, custom packaging, etc.	6.30	36.48	31.25	23.66%
<b>Total (kg/week)</b>	<b>17.27</b>	<b>100.00</b>	<b>132.1</b>	<b>100%</b>
<b>Number of shops:</b>	<b>227</b>		<b>1,750</b>	

### 3.2. MARINE LITTER

A significant amount of marine debris drifts to Samui's seashores throughout the year. Unfortunately, no official statistics on marine plastic have been monitored and recorded specifically for this island. Data from a 2017 analysis of marine debris in Thai waters is considered to be the best proxy, accurately representing its status and providing key messages on plastic waste. The analysis showed that plastic waste accounted for approximately 51% of total marine debris, followed by glass bottles (16%), Styrofoam food containers (13%), ropes (7%), and drinking cans (5%).

Within the plastic waste category, plastic bags were the most commonly found item (42%), followed by plastic bottles not for drinking water (30%), plastic straws and mixing sticks (11%), and plastic bottles for drinking water (10%). Unfortunately, classifications of waste were not strictly followed the international guidelines (i.e. the 2019 Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean).

Figure 3 Composition of marine litter in Thai oceans



(Source: Department of Marine and Coastal Resources, Thailand, 2017)

Plastic bottles not for drinking water come in various forms, for e.g. soft drinks, milk, fruit juice, etc., and are mostly made of PET and HDPE. Generally, in Thailand, there are two types of plastic bottle for drinking water (**Figure 4**):

- ▶ clear, glass-like plastic bottles made of polyethylene terephthalate (PET), and
- ▶ white bottles made of polyethylene (PE)

Figure 4 Plastic drinking water bottles generally used in Thailand



#### 4. KEY PLASTIC ISSUES ON KOH SAMUI

**Tourism.** Reliable data regarding the waste generated by individual tourists and visitors is not available. However, Thailand's Pollution Control Department calculated that the amount of waste generated was 1.13 kg/person/day at the national level.

Most tourists and vendors still prefer plastic to other types of containers because of hygiene concerns, especially regarding food and drinking water, and because they are convenient and relatively low-cost. This plastic waste is thrown away without separation for the reasons outlined below.

## 4.1. LAND-BASED GENERATION OF PLASTIC WASTE

### *Too much waste to handle*

Approximately 120-150 tons of domestic waste are generated per day on Samui. Plastic with economic value, such as PET bottles, is generally segregated and sold to recycling shops. Non-marketable plastic, such as HDPE and flexible plastic, is discarded and mixed with the other municipal solid waste to be brought by authorities to dumping sites. Samui is facing a significant challenge from waste that has accumulated over time, with about 300,000 tons piled up in an area of 15 hectares.

At the moment, the low-hanging fruit solution is to compress and wrap the waste in plastic cubes and ship it unsegregated to the mainland for disposal. Reasons for this include:

- ▶ Some individuals and communities perceive that waste separation is the mandate of the municipal authorities, given that a waste collection fee is charged.
- ▶ Lack of innovative solutions to support management of waste and plastic pollution.
- ▶ Lack of recycling and disposal facilities to treat plastic pollution.
- ▶ Lack of alternatives to single-use products, or knowledge thereof.
- ▶ Awareness of waste separation and management is not widespread across the island, and there is only limited participation from entrepreneurs and communities in waste separation.
- ▶ Lack of plastic drop-off points or ease of access.

### *Illegal dumping*

Midnight dumping or illegal dumping in remote areas makes it difficult for the municipality to monitor and collect waste because of its limited resources (both manpower and finance).



*Photo by Supapong Chaolan, Bangkok Post*





Source: <https://www.samuimala.com/trash-hero/>

## 4.2. MARINE LITTER

Marine debris floats in from elsewhere, emphasizing the need to focus on monitoring, reporting, and evaluation on Samui (and Thailand in general). Findings from our interview with an activist from the Trashhero group are in line with the information from the Ministry of Natural Resources and Environment that marine debris in Thailand comes mostly from tourist areas and includes plastic bottles, glass bottles, Styrofoam, fishing nets, ropes, plastic bags, plastic caps, cigarettes, straws, and other waste from human activities that drifts downstream from inland rivers to the sea.

On Koh Samui, there is no systematic approach to handling marine debris. Hotels usually clean up the beaches in front of their premises. Only a few groups work on a voluntary basis to collect marine waste on the beaches every Sunday. According to the interview with the Trashhero team on Koh Samui, the plastic bags collected by their activities are brought to be cleaned and dried for the Eco-bricks project (pictured above)s. Eco-bricks are used PET bottles which have been cleaned and dried, then filled with plastic to a specific density. They are then sealed with an ordinary cap, at which point they become hard and durable enough to be used as construction material. Non-usable plastic waste is gathered for Koh Samui Municipality staff to collect and dispose of.

## REFERENCES

- Bright Management Consulting, Co., Ltd., 2019. *Final report for Development of Carbon Footprint for City and the Low Carbon Sustainable Urban Development Planning for Koh Samui Municipality*.
- Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment, Thailand, 2017. [Online]  
Available at: <http://tcc.dmcrc.go.th/>  
[Accessed 15 June 2020].
- Ministry of Tourism and Sports, 2017. [Online]  
Available at: <http://mots.go.th/>  
[Accessed 11 June 2020].
- Personal communication with a representative from Samui Gold Bin in June 2020.
- Personal communication with a representative from Trash Hero in June 2020.
- Pollution Control Department, Ministry of Natural Resources and Environment, 2018. *Thailand State of Pollution Report 2017*, Bangkok. [Online]  
Available at: <http://www.oic.go.th/FILEWEB/CABINFCENTER3/DRAWER056/GENERAL/DATA0001/00001279.PDF>
- Samui Mala, 2019. *Ecobrick*. [Photo] [Online]  
Available at: <https://www.samuimala.com/ecobrick1/>  
[Accessed 15 June 2020].
- Tom O'Connell, 2018, The eco-warriors striving to save Koh Samui's breath taking beaches. [Online]  
Available at: <https://southeastasiaglobe.com/saving-koh-samui/>  
[Accessed 15 June 2020].

# TERMS AND CONDITIONS

## I. ORGANISER

The Ending Plastic Pollution Innovation Challenge (subsequently referred as “EPPIC”) is organized by the United Nations Development Programme (UNDP) in Viet Nam. In the following, UNDP is referred to as “the Organiser”.

## II. THE EPPIC CONTEST

It is open to any individuals and organisations (including businesses, non-profit organisations, and academic and public institutions) that want to contribute to the reduction of plastic waste and pollution in ASEAN.

The contest will last from June to November in 2020 and from February to July 2021. It will target Ha Long Bay (Viet Nam) and Koh Samui (Thailand) in 2020 and two more locations in Indonesia and the Philippines in 2021. Each year, the period for receiving applications will be open for 6-8 weeks: in 2020 from the 25 June to the 20 August 2020.

Then UNDP team of experts will select 10 to 15 finalists to participate in a 3-month solution incubation programme. At the end of the 3-month programme, the 10 to 15 finalists will present their solutions during the EPPIC Final Pitching Competition.

2 to 4 finalists will be selected as winners of the EPPIC 2020. Each of the winners will receive up to USD \$18,000 each and they will be enrolled into a 9-month Impact Acceleration programme. In 2020, the incubation and acceleration programme will be delivered by [UNDP Impact Aim](#). UNDP Impact Aim is an accelerator that aims to help Viet Nam in achieving Sustainable Development Goals by 2030 by amplifying the positive social and environmental impact of local start-ups.

## III. APPLICATIONS

In order to apply, participants must abide by all of the following minimum requirements:

1. At least one member of the team must be a **citizen of an ASEAN country**.
2. At least one member of the team must be able to **communicate clearly** and present the solution in **English**.
3. Participants do not need to be a legal entity at the time of application. If they are selected as a winner in the EPPIC Final Pitching Competition in November 2020, however, the organization or individual must **register as a legal entity** in one of the ASEAN member states in order to receive the incubation training and seed funding.

Participants can apply to one project site per year. For 2020, they need to specify if they are applying to the Ha Long Bay (Viet Nam) or Koh Samui (Viet Nam) challenge sites. Participants are allowed to apply to the challenge in both 2020 and in 2021.

The applications should respond to the questions outlined on the website and upload the following documents:

1. **One-page CV** of team members who will participate in the incubation programme, if selected. (Maximum 3 persons). Include an address, email address, and phone numbers.

2. One of the following options:
  - A. **Slide deck** about the solution (max 5 slides)
  - OR
  - B. **Concept note** about the solution (max 2 pages)
3. *Optional:*
  - ▶ Applicants are encouraged to utilise creative and innovative formats for presenting their idea, including using video (max. one minute), graphics, or other formats.
  - ▶ Applicants are encouraged to submit any awards, certificates, or patents received related to their solution.

Participants must upload their applications on the EPPIC website: <http://www.plasticchallenge.undp.org.vn/>

Entries will be selected based on six critical factors – viability, innovativeness, local potential, scalability, sustainability, and impact – as well as the composition of their teams.

## 1. THE SOLUTION

- ▶ **Viability (20%):** Criteria to demonstrate the viability of your solution in terms of its effectiveness in reducing plastic pollution. Proven success of reducing plastic pollution is desirable.
- ▶ **Innovativeness (20%):** Criteria to demonstrate the innovativeness of your idea in terms of using new products, services, technologies or other approaches to combat plastic pollution. Solutions that have been successful elsewhere but have not yet been applied in the EPPIC challenges sites are welcome to apply.
- ▶ **Local Potential (15%):** Criteria to estimate the extent to which your solutions will effectively target the specific challenges of combatting plastic waste and pollution in the two project sites. The solutions should fit the local needs and address the local context.
- ▶ **Scalability (10%):** Criteria to assess the ability of the solutions to be scaled up and be replicated in other contexts. The potential of the solutions to grow and be applied in other communities in Viet Nam, Thailand, and even across ASEAN countries will be assessed.
- ▶ **Sustainability (10%):** Criteria to assess the operational and financial sustainability of the solutions. The solution should have a long term business plan to ensure its sustainability, including the possibility of securing investment for your solution.
- ▶ **Impact (10%):** Criteria to demonstrate potential social and environmental impacts of the solutions, including the potential impact of the solution on local livelihoods, gender equality and the wider local community development. The applications must demonstrate contribution to the achievement of the Sustainable Development Goals (SDGs) and Targets, in particular:
  - SDG 14.1: Reduce marine pollution
  - SDG 1: End poverty in all its forms everywhere
  - SDG 5: Achieve gender equality and empower all women and girls
  - SDG 10: Reduce inequalities within and among countries

## 2. THE TEAM

- ▶ **Diversity & Inclusion (10%):** Criteria to assess diversity among the team and the inclusion of woman.
- ▶ **Complementary Skills (5%):** Criteria to assess how team members' technical and operational abilities balance each other.

The applications will be evaluated by a panel composed of experts from UNDP, while the final pitches will be assessed by a Judging Panel.

In 2020, the jury will be composed of Kari Synnove, Regula Schegg, Sara Wingstrand, Giulio Quaggiotto, Supinya Srithongkul, and two more to be confirmed. There is no right of appeal against the Jury's decision, and the Jury reserves the right not to select a winner.

Incomplete applications will be disqualified. The top 10-15 winners will have 7 days to contact the organizers and provide them with their personal information. If such period expires without the said contact taking place, organizers will contact the following finalist for that challenge. The same rule applies to the finalists.

### **3. REQUIREMENTS AND CONDITIONS**

By submitting an application, applicants affirm that they own the solutions and any related intellectual/property rights. Entries cannot be the property of third parties. UNDP and any other partners involved in the contest shall not be held liable for any complaint related to this contest. Participants are solely responsible for their entries. UNDP reserves the right to disqualify any participant who cannot prove the authorship of the solutions.

As per the UNDP Programme and Operations Policies and Procedures, the intellectual property rights of the final winning solutions under the EPPIC remain with UNDP. Following the selection of the winning solutions, UNDP will agree with the winning teams on the issuance of appropriate licenses to the developer of the idea, including, where appropriate, granting perpetual license to the teams.

UNDP can modify, interpret, and give solutions to any problem related to the contest rules or awarding the prize. Decision shall be without appeal. First and foremost, UNDP will take action in case the principles of the UN are not respected.

### **4. CONFIDENTIALITY**

By participating in the EPPIC competition, individual(s) and/or teams are accepting the conditions stated in these terms and conditions, agreeing to be bound by the decisions of the organisers and/or judging panel, and warranting that entrants are eligible to participate in the Competition. If entrants cannot accept all of these official terms and conditions, please do not submit an entry to the Competition.

### **5. COMMUNICATION**

The selected teams and finalists will be published on the EPPIC [website](#), social networks, and in the press release.

## **CONTACTS**

Do you have any questions about EPPIC?

**CONTACT US:** [marine.plastics@undp.org](mailto:marine.plastics@undp.org)