Institute for TOURISM SUSTAINABILITY



## Study on the use of Single Use Plastic, Packaging and Waste Management in the tourism sector and municipalities with a focus on the destination sites Trang and Koh Tao in Thailand

# Part A: Plastic Waste in the Tourism Sector v.4.0



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#### 1 Executive Summary

#### **Project Scope and Objectives**

This report provides a comprehensive assessment of Single-Use Plastic (SUP) consumption and management in two key tourism areas in Thailand: Koh Tao and the Trang region, which includes Koh Libong, Koh Mook, Koh Kradang, and Pak Meng. The focus is on identifying effective voluntary reduction strategies for SUP use within the tourism sector, with recommendations tailored to the unique environmental, operational, and community needs of each location. WWF's role as a mediator supports these strategies to align sustainable tourism practices with the broader goals of environmental preservation and community engagement. The project lead partner, Plastics Institute of Thailand (PITH), covers particularly handling as well as the legal and administrative perspectives of current waste management for Koh Tao and Trang city.

The assessment is embedded in the MA-RE-DESIGN project, funded by the German Federal Ministry for the Environment and Consumer Protection (BMUV) and implemented in collaboration with the German International Cooperation Society (GIZ) and the Coordinating Body on the Seas of East Asia (COBSEA) under the United Nations Environment Programme (UNEP).

Special attention in this report is paid to waste management in the tourism sector. To understand the consumption patterns of tourists and tourism operators in the study regions tourist volumes and characteristics in the project sites were analyzed. Types and quantities of plastic waste were assessed in a sample of tourism-related operations in both destinations leading to an estimation of per capita plastic waste generation of tourists. For an ongoing assessment of plastic waste volumes a monitoring tool was developed to be applicable by tourism businesses in the regions. Roundtables, on-site interviews and two stakeholder workshops have been organized in Koh Tao and Trang. The workshops brought together tourism operators, local authorities, and community representatives to prioritize sustainable practices and facilitate collaboration. They served as a platform for stakeholders to evaluate the project's findings, refine recommendations, and outline actionable strategies.

#### Key findings by region:

- Koh Tao:
  - Waste management infrastructure is limited, with insufficient public waste bins and inconsistent waste collection practices. Some tourism operators have implemented waste separation for PET, HDPE, glass, and aluminium, with a segregated collection for recycling. However, SUP remains a major component of the waste stream due to convenience and hygiene preferences among tourists.
  - Koh Tao tourism generates approximately 439–525 tons of SUP waste annually, with plastic accounting for 18% of the waste stream. Tourism plays a significant role in waste generation: The estimated total solid waste per tourist and day amounts to 1.1 kg, adding to an average daily waste production of 1.79 kg per capita of residents. The estimated plastic waste per overnight tourist and day amounts to 150 grams.
  - Local "junk shop" initiatives were noted for their role in diverting some recyclable materials from the landfill. However, the disposal process often ends with landfill sites where waste may leak into the environment due to limited containment.

#### • Trang Region (Koh Libong, Koh Mook, Koh Kradang, and Pak Meng):

- Waste management practices vary across destinations. In Pak Meng, infrastructure supports limited recycling and composting, with some businesses separating waste for reuse or resale. However, SUP remains common, particularly in food and beverage packaging.
- The region produces an estimated 89–123 tons of SUP waste annually. The estimated plastic waste per overnight tourist and day amounts to 105 grams and per day trip visitor to 89 grams per day.

 Koh Kradang's SUP ban for day-trippers and the Plastic Smart Cities initiative in Pak Meng demonstrate localized progress. However, the lack of broader policy frameworks and coordination hinders region-wide impacts.

#### Key findings from both regions:

- While it may seem logical to prioritize plastics with the highest volumes, such as PET, the greater challenge lies with materials like LDPE, HDPE, and PS. These plastics are particularly problematic due to the lack of effective collection and recycling systems. By focusing on these harder-to-recycle materials first, stakeholders can address critical gaps in the waste management process, paving the way for more comprehensive and impactful long-term solutions.
- Both Koh Tao and the Trang region face challenges in sourcing sustainable alternatives to SUP, particularly given high costs and limited availability. Stakeholders urge caution in promoting biodegradable or compostable options without evaluating their full environmental impact, noting that some alternatives may have high carbon footprints or be incompatible with current waste processing facilities. Effective alternatives to SUP should prioritize both environmental benefits and lifecycle sustainability, aligning with waste management capabilities in each area.
- Stakeholders across both regions identified an urgent need for increased awareness among tourism employees and tourists about waste segregation and disposal practices. They underscored the need for enhanced collaboration, voluntary commitments to SUP reduction, and targeted investments in waste management infrastructure to address these challenges effectively.
- Discussions highlighted gaps in waste disposal practices, especially regarding post-landfill leakage and the limited integration of "junk shops" into waste systems. Until the framework conditions for disposal, recycling and management have improved, the tourism industry needs to close the prevalent gap by avoiding, reducing and reusing plastic waste.

## Recommendations and actionable strategies discussed and approved in the 2<sup>nd</sup> stakeholder workshop:

- Adopt the Plastic Waste Monitoring Tool for tourism businesses: The new Plastic Waste Monitoring Tool was introduced, enabling tourism businesses to track their SUP usage and reduction efforts consistently. The tool received broad endorsement, with stakeholders recognizing its potential to standardize data collection and improve accountability across the sector.
- **Expand refill and reuse initiatives**: Refill stations and deposit-return systems were identified as an important region-wide activity to reduce SUP and foster collaboration among businesses.
- Launch awareness campaigns to foster behavior change: Awareness campaigns were identified as critical for fostering sustainable behaviors among tourists, staff, and local communities. Proposed initiatives include informational signage, multilingual workshops, and targeted outreach programs for ferry operators, hospitality staff, and tourists to reduce SUP use.
- **Establish trainings for employees**: Trainings in SUP reduction, waste segregation, and awareness strategies are considered crucial to reduce SUP in tourism operation.
- Setting up partnerships and stakeholder networks for collaborative actions: Stakeholders called for partnerships among municipalities, tourism operators, and NGOs to bridge policy gaps and ensure alignment in SUP reduction initiatives.
- Reduce SUP during transportation to and from the islands: Engaging ferry operators to reduce SUP onboard and facilitate waste collection during transit has been identified as an important factor for success.

- Establish municipal policies and increase investment in waste management: Calls for municipal investment in waste management infrastructure were echoed across both workshops, emphasizing the need for segregated collection systems, local recycling facilities, and consistent public education on waste management. It is crucial to collaborate with stakeholders to establish clear policies and incentives for SUP reduction.
- Work with suppliers to reduce packaging waste: Especially businesses on islands need to work with suppliers to reduce or reuse plastic packaging to and from the islands, whether by buying in bulk, returning for reuse or setting up a waste-efficient procurement cooperative.

#### Plastic Waste Reduction Scenarios

To guide sustainable waste reduction efforts, Plastic Waste Scenarios were developed projecting the potential impact of varying levels of SUP reduction strategies through 2030. 23 different measures were arranged in three different scenarios, A, B, and C, representing varying levels of effort and difficulty. Consequently, it was proposed that the measures should be implemented gradually over time, rather than all at once. Specifically, the different target years were associated with the different scenarios: Scenario A measures by 2025, Scenario B measures by 2028, and Scenario C measures by 2030. The three scenarios differ particularly in the number of businesses and other stakeholders subscribing to the proposed measures under the assumptions that all measures are taken voluntarily:

- **Baseline Scenario**: Annual SUP waste remains at 439–525 tons in Koh Tao and 89–123 tons in Trang under current practices.
- Scenario 2025 Plastic Footprint Reduction Pioneer: Voluntary measures achieve a 14% reduction in SUP waste by 2025.
- Scenario 2028 Progressive Plastic Minimization Pathway: Expanded efforts reduce waste by 25% by 2028, to 329–394 tons in Koh Tao and 67–92 tons in Trang.
- Scenario 2030 Comprehensive Circular Success: Full stakeholder commitment delivers a 38% reduction by 2030, to 272–326 tons in Koh Tao and 55–76 tons in Trang.

#### WWF's Role and Strategic Implications

The regional analyses, combined with stakeholder workshops, underscore WWF's critical role as a mediator and facilitator in advancing SUP reduction goals for both Koh Tao and the Trang region. By fostering collaboration among tourism stakeholders, government bodies, and local communities, WWF is well-positioned to drive impactful change through the following approaches:

- Facilitating Stakeholder Collaboration: WWF can create a unified platform that brings together tourism operators, local authorities, NGOs, and waste management entities to share resources, align strategies, and support each other in SUP reduction initiatives. This collaborative approach allows stakeholders to collectively tackle common challenges, coordinate efforts, and amplify the effectiveness of SUP reduction measures.
- Supporting Awareness and Education Initiatives: Through targeted campaigns, WWF can raise awareness across all levels—from local residents and tourism staff to tourists themselves—on the environmental impacts of SUP. WWF's support in developing and delivering educational programs, workshops, and eco-friendly practices can help establish a long-lasting culture of sustainability in these tourism destinations.
- Promoting Sustainable Tourism Practices: WWF can work directly with tourism operators to implement sustainable business practices, emphasizing voluntary SUP reduction as a strategic asset for eco-friendly tourism. By showcasing success stories and sustainable models, WWF can position both Koh Tao and the Trang region as leaders in responsible tourism, appealing to environmentally conscious travelers.

- Advocating for Infrastructure Improvements: While voluntary reduction efforts are essential, WWF can advocate for local governments to support these initiatives by investing in recycling, composting, and waste management infrastructure. Improved facilities will enable effective waste processing and complement the SUP reduction goals set forth by stakeholders.
- Monitoring Progress and Evaluating Impact: During this project a unique and straightforward Plastic Waste Monitoring Tool has been developed specifically for tourism businesses. This tool enables operators to track their plastic usage and reduction efforts consistently, encouraging data-driven progress. WWF encourages every tourism operator to adopt this tool as part of their commitment to SUP reduction. By consolidating the reported data, WWF will provide valuable feedback to stakeholders and tourists, showcasing the collective impact and achievements in SUP reduction across Koh Tao and the Trang region. This monitoring framework will ensure transparency, accountability, and sustained commitment from all involved parties.

By advancing SUP reduction as a voluntary initiative, WWF can position both Koh Tao and the Trang region as frontrunners in sustainable tourism. These efforts not only help mitigate the environmental impacts of plastic waste but also enhance the destinations' appeal to eco-minded tourists. WWF's facilitative role underscores the significance of collaboration, education, and strategic planning, paving the way for lasting environmental and economic benefits for both regions.

#### 2 Objectives

#### 2.1. Objectives of MA-RE-DESIGN:

The project "Marine Litter Prevention through Reduction, Sustainable Design and Recycling of Plastic Packaging (MA-RE-DESIGN)" (duration 2023 – 2025) aims at reducing plastic waste leakage into the sea through reducing and better managing plastic waste. A substantive amount of plastic waste currently generated in Thailand originate from the tourism sector and private households, much of it from single-use plastic (SUP) packaging.

WWF aims to reduce plastic waste leakage originating from the tourism sector and municipalities by motivating and capacitating stakeholders from these sectors in Koh Tao and Trang to reduce and better manage plastic waste. The targeted output of this project is: Key stakeholders along the packaging value chain have developed strategies to avoid and reduce single-use plastic packaging.

#### 2.2. Objectives of the baseline assessment:

A consortium between the Institute for Tourism Sustainability (ITS) and the Plastics Institute of Thailand (PITH) has been assigned to carry out a baseline assessment to support the WWF, GIZ, UNEP and COBSEA work in Koh Tao and Trang province under the MA-RE-DESIGN project. Profound knowledge and information about waste management in general and plastic waste generation and management specifically in the destinations Koh Tao and Trang are needed to identify appropriate measures and mobilize and motivate the stakeholders from both sectors (tourism and municipalities) to avoid and reduce SUP and packaging. With the results from the baseline assessment, WWF shall be able to support ambitious hotels and tourism enterprises to reduce their plastic consumption and local governments to improve policies and waste management in regions where local waste management relies largely on landfills and features low recycling rates.

The assessment aims to:

- Assess SUP consumption and management (including handling and disposal) in the tourism sector in Pak Meng, Koh Libong and Koh Mook, Trang province, and Koh Tao.
- Formulate recommendations on how the use of SUP (packaging) in the tourism sector can be avoided or reduced.

#### 2.3. Methodology and work plan

The consortium between the Institute for Tourism Sustainability (ITS) and the Plastics Institute of Thailand (PITH) considers the following approach and methodology to achieve the targeted outcome as described in the ToR.

There are four work plans included in the baseline assessment (outlined in the project proposal as well as in the Inception Report):

- Desk research on plastic waste generation and disposal in Thailand including existing legislation to ban SUP (PITH)
- Assessment of plastic waste generation and handling in the project sites for tourism (ITS Workplan B)
- Development of recommendations for concrete measures and pilot projects to avoid SUP and packaging for tourism businesses (ITS = Workplan C))
- Development of a Plastic Waste Monitoring Tool for Tourism Businesses (ITS).





## 3. Workplan B: Assessment of plastic waste generation and handling of the tourism sector in the project sites

#### 3.1 Tourism level – Koh Tao

#### 3.1.1 Overview of the current plastic waste management of tourism operators in Koh Tao

ITS worked on complementing the MSW generation and its composition (particularly the plastic part) with data from the tourism sector. Primary data was collected to quantify the generated waste (per customer for the particular day) and to elaborate on more realistic ratios for formal and informal disposal (see Annex: Measuring Plastic Waste in the Tourism Sector). General ratios are available for Thailand only. For the selected sites these ratios are complemented with 'hard' data from the regions and with approximations based on expert conversations.

Secondary and primary data sources inform the estimates necessary to feed the Waste Flow Diagram and quantifying plastic leakage. To gather information on the tourism level ITS conducted research regarding waste management practices during the fieldwork in Trang and Koh Tao.

To collect the relevant data and information the following activities were carried out:

- Expert roundtables with local tourism stakeholders on March 11 in Koh Tao and on March 25 in Hat Pak Meng (Trang) (see Annex: Interview Guidelines for Experts and Stakeholder Representatives)
- Individual interviews with tourism operators in Koh Tao between March 12 and March 20 2024. ITS conducted qualitative interviews about SUP (usage, recycling, reusing and avoiding/replacing) in English and/or Thai. A semi-structured interview guideline was used (see Annex: Interview Guidelines for Accommodation Operations and Interview Guidelines for other Tourism-related Operations)
- ITS carried out a waste assessment at tourism operators (hotels, restaurants, retail shops, diving shops, ferry operators) in Koh Tao to get a comprehensive overview of plastic waste generation on a specific day, aiding in the analysis and development of strategies for waste reduction and management.

- The development of the daily waste sampling (see above) instrument is the foundation for the new Plastic Waste Monitoring Tool for Tourism Businesses created during this project.
- Modelling the volume and structure of tourists to Koh Tao since official overnight statistics were absent (see Annex: Measuring Plastic Waste in the Tourism Sector for more details).

#### 3.1.2 Key findings from the stakeholder Roundtable in Koh Tao

The Table 3.1 summarizes the comments and findings from the stakeholder roundtable in Koh Tao:

Table 3.1 Key findings from the roundtable in Kon Tao on March 11 202
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Торіс	Summary				
Current Situation:	Waste segregation:				
• What is the current state of plastic waste management in Koh Tao, and how does it impact the tourism sector and local community?	<ul> <li>Metal cans and PET bottles are separated into two different bags</li> <li>High-density Polyethylene (HDPE, plastic No 2) is sometimes separated, sometimes together with PET bottles</li> <li>Glass: since the effort from PCD and municipality to ban beer glass bottles, there are much fewer glass bottles left to throw away</li> <li>Food and organic waste is sometimes separated from general waste (restaurants are obliged to separate)</li> <li>Foam boxes: if not sent back to the mainland, re-purposed or re-used and then into general waste (Koh Tao municipality has a rule that they won't collect Foam boxes to take to the landfill by the municipality trash trucks. They don't give solutions on where to dispose so some people dispose of it with the general waste)</li> <li>Card box and paper: most businesses separate and sell it to junk shops</li> <li>The municipality collects general waste (including any plastic protected and the sequence)</li> </ul>				
	<ul> <li>waste) and moves it to the landfill site.</li> <li>No waste bins existing in public spaces.</li> <li>Where the trash trucks cannot easily access there is no waste collection and waste is likely to be burnt, buried of thrown into the landscape</li> <li>Tourists cannot separate waste easily: some tourism operators (botels, restaurants) provide separate bins</li> </ul>				
<ul> <li>Stakeholder Roles:</li> <li>Can you describe the role of your organisation and eventually your stake in managing plastic waste in the area?</li> </ul>	<ul> <li>WWF Thailand (Koh Tao field coordinator)</li> <li>Koh Tao Municipality</li> <li>Plas-Tao</li> <li>Chaiwat Supermarket</li> <li>12 Resorts</li> <li>1 restaurant (most of the resorts attended have their own restaurants too)</li> <li>3 Diving operators</li> <li>Ban's Conservation Learning Center</li> <li>Midori: new plastic recycling company</li> <li>Koh Tao Tourism Association</li> <li>Chor Recycle (Junk shop, same family with Chaiwat Supermarket)</li> </ul>				
<ul> <li>Tourism Attractiveness</li> <li>How does plastic waste affect the attractiveness of Koh Tao as a tourist destination?</li> </ul>	<ul> <li>Most tourists are from Europe; hence they are used to waste separation and there is no big behavioral barrier toward waste segregation</li> <li>However, when arrive, they do not find usually separate bins for different waste</li> <li>Trash can be found everywhere alongside the roads</li> </ul>				

Торіс	Summary
	<ul> <li>Operated beaches are cleaned every day by the operators' staff</li> <li>Divers (one of the main customer segments) help with beach and water cleaning activities</li> </ul>
<ul> <li>Major Challenges:</li> <li>What are the main challenges in managing plastic waste effectively in these tourist areas?</li> </ul>	<ul> <li>One cannot rely on individual behavior only.</li> <li>Lack of education among locals and partially tourists</li> <li>Waste collection by the municipality is not regular and not completely reliable (geographically not covering all areas): there are not enough trucks and staff to take care of it.</li> <li>Plastic waste that comes on shore from the sea</li> <li>Water shortage/cost of fresh water: barrier for cleaning efforts of SUP</li> <li>Lack of public trash bins</li> <li>Use of SUP increased during COVID-19: not yet back to pre-COVID behavior and compliance</li> <li>The successful reduction of glass bottles in circulation led to an increase of metal cans (and to some extent to increased use of plastic bottles) (glass and aluminum cans are taken back to the mainland)</li> <li>No solution for plastic waste that cannot be sold for recycling to the mainland</li> </ul>
<ul> <li>Are there any successful initiatives or practices that have been implemented to reduce plastic waste? Can you share examples?</li> </ul>	<ul> <li>Many tourism operators (including bars and restaurants) changed from plastic straws to either paper or metal (some bamboo)</li> <li>Plastic trays and bowls are very often replaced by recycled paper trays, boxes</li> <li>Plastic cutlery is replaced by either wood or bio-degradable items</li> <li>Buying in bulk (bags for re-fill smaller containers): toiletries in accommodations, kitchen ingredients, condiments</li> <li>Repurposing plastic waste (bin bags, food and grocery bags, bottle lids, PET) converting into durable items: artwork, gifts, handbags, chairs</li> </ul>
<ul> <li>Stakeholder Collaboration:</li> <li>How do different stakeholders (government, NGOs, tourism operators, community) collaborate in plastic waste management?</li> </ul>	<ul> <li>In general, the operators – present at the roundtable – confirm a high degree of willingness to collaborate and to support initiatives to reduce and recycle plastic waste.</li> <li>Initiatives start at home, at the own business and its practices, trainings of staff ('leading by example'): showcasing, inspire</li> </ul>
<ul> <li>What strategies are in place or proposed for reducing and better managing plastic waste?</li> </ul>	<ul> <li>Information campaigns for tourists: videos on Lomprayah ferries</li> <li>Re-fill water bottles at receptions of resorts and diving shops</li> <li>SUP is being avoided on boats of diving operators; whatever SUP is taken on board is taken back, food and beverages on board are mainly served without plastic</li> <li>Re-fill of condiments, sauces, etc. and toiletries</li> <li>Partially: no plastic shopping bags in shops</li> <li>No plastic straws: using other materials instead</li> </ul>
<ul> <li>Innovations and Technologies:</li> <li>Are there any innovations or technologies being considered or used to tackle plastic waste issues?</li> </ul>	<ul> <li>3-month life experiment by Midori company to recycle PET, HDPE together with LDPE producing durable items like building blocks (bricks), table tops</li> </ul>

Торіс	Summary			
<ul> <li>Policy and Regulation:</li> <li>How do policies and regulations impact plastic waste management, and are there any gaps or needs for new regulations?</li> </ul>	<ul> <li>No clear policies in place or enforced</li> <li>More government support needed (for better management regarding waste collection and separation)</li> <li>Better information for locals and tourists to increase awareness</li> </ul>			
<ul> <li>Long-term Goals:</li> <li>What are the long-term goals for plastic waste management in Koh Tao?</li> </ul>	<ul> <li>Better waste management in place</li> <li>Rules are implemented and followed by a majority of involved stakeholders and tourists</li> </ul>			
<ul> <li>Improving Stakeholder Engagement:</li> <li>How can stakeholder engagement be improved to tackle plastic waste issues more effectively?</li> </ul>	<ul> <li>Solving the discrepancy between operator/business engagement and the services/responsibilities rendered by the municipality</li> <li>Many operators do not contribute to SUP reduction initiatives, partially due to a lack of alternative materials which are affordable and/or available.</li> <li>Increased awareness among tourists</li> </ul>			
Support and Resources Needed:	<ul> <li>To raise awareness of the harm of unmanaged plastic waste</li> <li>For getting the plastic waste already in the sea out of the water</li> </ul>			
<ul> <li>What kind of support, resources, or interventions are needed to enhance plastic waste management efforts?</li> </ul>	<ul> <li>For a functioning incinerator</li> <li>Budget for staff and equipment for proper waste collection</li> </ul>			

#### 3.1.3 Key findings from the interviews with tourism operators in Koh Tao

ITS conducted individual interviews with 15 tourism operators (**accommodation and other tourismrelated operations) in Koh Tao** between March 12 and March 20 2024 in Koh Tao. The following businesses were interviewed:

- Barracuda & Juicy Burger
- Breeze Restaurant and Black Turtle Dive
- Koh Tao Cabana
- The Dearly Hostel (+ dive school)
- Koh Tao Resort
- Lomprayah Ferry operator
- New Haven Dive Resort (dive operator and accommodation)
- O'Chai Bungalows
- Pen Market, wholesale of building material, Seacrest Ferry
- Pranee Bungalow + Amata
- Regal Resort and Beach Club
- Sairee Cottage
- Pen Market
- Ban's Diving Resort
- Crystal Dive

The following summary consolidates insights from these accommodation providers, restaurants, dive shops, ferry operators, and other tourism-related operations. It serves to inform about current practices, document efforts for a comprehensive project report, and lay the foundation for new strategies and recommendations aimed at enhancing sustainability on the island.

The tourism sector in Koh Tao has been engaging in practices and facing challenges related to the management and reduction of SUP usage.

<u>Current Practices:</u> Many operations do not systematically monitor or document SUP usage. However, initiatives like offering water refill stations, using biodegradable packaging, and segregating waste are

common. Some establishments, notably dive operators and restaurants, have made significant strides in reducing SUP by adopting reusable containers and alternatives to single-use items.

PET bottles, HDPE (cat. 2) plastic, metal cans and carton boxes are segregated by companies allowing staff to sell these materials to so-called junk shops while keeping this revenue for buying rice and other snacks. Foam boxes are not allowed to be disposed of in the landfill. Many operators try to send these foam boxes/Styrofoam containers back to the mainland. Once broken or damaged, these foam boxes do not have any value for sale or re-purposing (container, gardening, etc.).

Other plastic materials are mixed with the general waste and are commonly collected in big black plastic bin bags which are collected by the municipality to be transported to the landfill site.

<u>Challenges:</u> The primary challenges identified include the convenience of SUPs, lack of infrastructure for effective waste management and recycling, and the need for greater awareness and commitment among both tourists and locals. The interviews highlighted a common struggle with the re-introduction of single-use items post-COVID-19, and a general lack of enforcement of environmental regulations. The initiative introduced by TRASH HERO (using metal re-fillable water bottles for accommodation and dive shop customers) is currently dormant due to the lack of sufficient support resources.

<u>Engagement and Collaboration</u>: Efforts to engage guests and staff in sustainability practices are varied, with some operators conducting training programs and others initiating beach clean-ups. However, regional collaboration and collective action are limited, pointing to an opportunity for improvement. Repurposing plastic trash into objects of art, decorative items (e.g. Plas Tao) and products like shopping bags or chairs is practised and can help increase awareness about the SUP waste problem in general. However, these initiatives do not solve the problems related to plastic waste generation and its proper recycling management.

Recommendations raised by the stakeholders for future strategies:

1. Enhanced Collaboration: Foster stronger cooperation among tourism operators, local authorities, and NGOs to create a unified approach to reducing SUP usage and improving waste management on Koh Tao.

2. Infrastructure Improvement: Advocate for the development of better waste management infrastructure, including recycling facilities that are accessible to all operators.

3. Awareness and Education: Launch comprehensive awareness campaigns targeting both locals and tourists, emphasizing the environmental impact of SUPs and promoting sustainable alternatives.

4. Regulatory Support: Work with local government to strengthen regulations on SUP usage and enforce existing laws to ensure compliance across all tourism-related operations.

5. Innovation and Alternatives: Encourage and support the adoption of innovative practices and alternatives to SUPs, such as bulk purchasing, refill stations, and sustainable packaging solutions.

<u>Conclusion</u>: The commitment to reducing SUP usage and managing plastic waste varies significantly among tourism operators on Koh Tao. While many have taken commendable steps toward sustainability, there remains a substantial need for enhanced collaboration, infrastructure, awareness, and regulatory support. The insights gained from these interviews will serve as a crucial foundation for developing effective strategies and recommendations to propel Koh Tao toward a more sustainable tourism sector.

#### 3.1.4 Modelling the volume and structure of tourists to Koh Tao

To be able to calculate waste volumes from the tourism sector ITS had to come up with a calculation for the volume and structure of tourists to Koh Tao. Since there are no accommodation-based arrival and overnight statistics available, expert judgements are used to build a tourist structure model based on different average lengths of stay (yielding an estimate of overnights generated by the reported arrival numbers [see Annex: Measuring Plastic Waste in the Tourism Sector for more details]) and within these segments differentiating between different activity profiles (resulting in a different SUP waste volume for each tourist segment).

In 2023 about 453.000 tourists arrived by boat on the island. According to local stakeholders, there are no day-trip visitors to Koh Tao. Excursionists, snorkelers, and divers are coming by boat close to the shore but do not come to the shore. The number of tourist arrivals used is based on the records from ferry boat operators reported to the Tourist Assistance Center (TAC). The estimate is for the complete year of 2023. For 2024 we can assume an increase of about 50% YoY based on the January to September 2024 numbers from TAC. The market share of Lomprayah is estimated by themselves to be 80%. Lomprayah estimated a share of 5 to 10% of locals using the ferries (data provided by Lomprayah station manager).

This assumption would imply:

a) assuming that the population numbers are correct (a 100% increase of the migrant workers from Myanmar during the year 2024 was reported by WWF Thailand)

b) assuming that the Burmese population does not leave the island

c) an average frequency of 3 trips to other islands or the mainland for every one of the local population per vear

According to the calculation from ITS tourists on Koh Tao generate 4.032.891 overnight stays per year.

		Estimate	d Arrivals at	Pier 2023					
		476983		476983		Population	permanent / 365 days		average # of trips to mainland
		Tourists	95%	5%	Locals	Thai	Other Foreigne	Myanmar	and other islan
			453134	23849	$ \longrightarrow $	2500	5000	4500	3
		-							
Average length of stay		3			7		30	90	
Proportion within tourist		55%			35%		7%	3%	
# number of tourists (arrivals)		249224			158597		31719	13594	
Generating # overnights		747671			1110178		951581	1223461	4032891
# overnights in non-commercial accommodations							475791	611731	1087521

Figure 3.2: Modelling the volume of tourists 2023 (arrivals and overnights) in Koh Tao

The total amount of overnight stays of 4,032,891 with an average length of stay of 8.9 days resulting in a tourist population equivalent of 11,049. Assuming that 50% of the long-term tourists stay at private accommodations, around 3,000 tourists per day generate (plastic) waste mainly in regular households.

Figure 3.3: Tourists	Population	Equivalent and	Arrivals versus	<b>Bednights</b>
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	Total average	Population	Business Segments / pax		Business Se	egments / nights
Total	length of stay	equivalent				
			203684	45% Divers	1156624	29% Divers
	Tourists /					
	hotels	8070	138659	31% Fun	672904	17% Fun
453134	Tourists / private	2980	110791	24% Leisure	2203363	55% Leisure
4032891	8.9	11049	453134	Arrivals	4032891	Overnights

#### 3.1.5 Modeling daily plastic waste related to tourism activities in Koh Tao

ITS carried out a waste assessment via 12 waste samples from tourism and tourism-related businesses (see Annex: Measuring Plastic Waste in the Tourism Sector for more details) to get a comprehensive overview of plastic waste generation on a specific day, aiding in the analysis and development of strategies for waste reduction and management. ITS sorted and weighed all plastic waste from one particular day at the following businesses:

Retail Supermarket: Restaurant: Restaurant: Restaurant: Resort with restaurant: Resort with restaurant: Integrated resort with restaurant and dive shop: Resort no restaurant: Diving resort: Hostel (also dive shop, but irrelevant here): Diving school (also accommodation, but irrelevant here): Ferry (per arrival): Pen Breeze Juicy Burger Barracuda Regal Cabana Resort Ban's Diving Resort Beach Club Crystal IDC The Dearly New Heaven Lomprayah

This waste sampling together with the projection of additional plastic waste generated by tourists outside the covered tourism-related business sectors enabled first an estimation of plastic waste profiles for each of the main segments of tourists and second – using the tourist volume and structure model described above – an estimation of a Baseline Model for Plastic Waste generation in Tourism (see Annex: Measuring Plastic Waste). This model resulted in daily plastic waste related to and caused by tourism activities in Koh Tao of 439 tons per year based on the estimate of 150 gram plastic waste per overnight tourist and day. The composition of the plastic types is as follows with the national averages for municipal solid household waste in brackets (PCD report):





Three different mixtures for the segments based on the average length of stay result in different SUP waste volumes per year as shown in Table 3.2. This simulation should demonstrate the extent of variation in volume in case the initial assumptions about the distribution of length of stay in Koh Tao is not 10% but 12% or even 15% for long stay tourists. The table indicates that the total amount of plastic waste ranges from 1.2 to 1.4 tons/day depending on the share of long-term tourists. If the share of long-term tourists is higher the amount of SUP increases (long-term tourists have similar patterns as locals and tend to generate more SUP).

Plastic type	1	2	3	4	5	6	Waste Share of long-term	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Low	46%	5%	12%	33%	2%	1%	41%	439	1.2
Medium	46%	5%	12%	33%	2%	1%	47%	477	1.3
High	47%	5%	12%	33%	2%	1%	53%	525	1.4

Table 3.2 Share	of SUP	volume	depending	on the	share	of long-term	tourists
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Further remarks regarding SUP in the tourism sector in brief:

- PET plastic is the dominant SUP waste volume followed by LDPE. The overwhelming share of PET packaging material comes from bottles. Cups and lids are also manufactured using PET. Yet, there are not used that much.
- LDPE plastic (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) accounts for the second-highest weight volume on average, driven by the relatively high importance of long-term stay tourists (partially staying for business/job reasons for periods of 1 to 3 months and up to 1 year).
- The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Smaller foam boxes are – kind of – banned from sale to and on the island. PS-based dishes, bowls and cutlery are almost not visible and used any more. Large foam boxes are officially not picked by the waste collection staff. Part of these used boxes are sent back to the mainland.

#### 3.2 Tourism level – Trang

#### 3.2.1 Overview of the current plastic waste management of tourism operators in Trang

IST worked on complementing the MSW generation and its composition (particularly the plastic part) with data from the tourism sector. To collect the relevant data and information the following activities were carried out in Trang. Primary data was collected to quantify the generated waste (per customer for the particular day) and to elaborate on more realistic ratios for formal and informal disposal (see Annex: Measuring Plastic Waste in the Tourism Sector). General ratios are available for Thailand only. To collect the relevant data and information the following activities were carried out:

- Expert roundtables with local tourism stakeholders on March 25 in Hat Pak Meng (Trang) (see Annex: Interview Guidelines for Experts and Stakeholder Representatives)
- Individual interviews with tourism operators between March 25 and April 1. ITS conducted qualitative interviews about SUP (usage, recycling, reusing and avoiding/replacing) in English and/or Thai. A semi-structured interview guideline was used (see Annex: Interview Guidelines for Accommodation Operations and Interview Guidelines for Other Tourism-related Operations).
- ITS carried out a waste assessment at tourism operators (hotels, restaurants, tour operators) in Trang to get a comprehensive overview of plastic waste generation on a specific day, aiding in the analysis and development of strategies for waste reduction and management.
- Modelling the volume and structure of tourists in the selected destinations in Trang.

#### 3.2.2 Key findings from the stakeholder Roundtable in Trang

The following table summarizes the findings from the stakeholder roundtable in Hat Pak Meng:

•	rrent Situation: What is the current state of plastic waste management in Pak Meng / Koh Libong / Koh Muk, and how does it impact the tourism sector and local community?	•	<ul> <li>Waste segregation:</li> <li>Metal cans and PET bottles in the first step, then separated into cans and PET (they don't put these 2 together as the selling price of aluminium cans is significantly higher. They separate them into 2 different bags)</li> <li>Plastic No. 2 (HDPE) is sometimes separated together with PET bottles and sold to a junk shop (accommodations give it to collectors/staff for free to sell it to junk shops); PET bottles are 4 Bath per Kg</li> <li>Glass bottle reuse project (part of the Plastic Smart City Initiative): approximately 20% of restaurants joined</li> <li>Food and organic waste: sometimes separated, especially businesses with a garden separate it to convert into fertilizer.</li> <li>Paper boxes: All businesses that were interviewed used paper boxes instead of foam boxes, also for take-away food.</li> <li>Card box and paper is collected together by most businesses The municipality collects general remaining waste (including any plastic waste) and moves it to the landfill site. I Waste pickers separate PET, Metal, Glass, and HDPE at the landfill to sell to junk shops.</li> <li>Waste and particularly plastic waste are also transported from inside the land by the rivers.</li> <li>The trash trucks have easy access, due to the small size of the area</li> </ul>
		•	separate PET, Metal, Glass, and HDPE at the landfill to sell to junk shops. Waste and particularly plastic waste are also transported from inside the land by the rivers. The trash trucks have easy access, due to the small size of the
		•	area. Local shops receive free strong plastic bags from recycled plastic material from larger companies. The shops give away these recycled and reusable shopping bags for free at special occasions like festivals.

### Table 3.3 Key findings from the roundtable in Hat Pak Meng on March 25, 2024

Торіс	Summary			
	<ul> <li>Local people are not aware of how to segregate waste properly. Hence, some waste is thrown into the river or ocean.</li> </ul>			
<ul> <li>Stakeholder Roles:</li> <li>Can you describe the role of your organisation and eventually your stake in managing plastic waste in the area?</li> </ul>	<ul> <li>WWF Thailand</li> <li>Pak Meang Municipality District.</li> <li>Yok Yor Restaurant</li> <li>Ms. Chat (owner of Li Bong Camp Resort)</li> <li>Khem thong Shop</li> <li>Khem Thong Resort (same owner with Khem Thong Shop)</li> <li>1 restaurant (most of resorts attended have their own restaurants too)</li> <li>1 Diving operators (Mr. Palm) from Koh Mook who was working for Ja Ra Wee Tour.</li> <li>Subdistrict Administrative Organization of Mai Fad subdistrict (look after Pak Meang Beach.)</li> <li>Pak Meng school (bin bank)</li> <li>Trang Tourism Association: apology</li> <li>Mr. Soon, staff at Si Wa Lai Resort (Junk shop owner in Koh Mook)</li> <li>Director (Mr. Seang Suree) of Hat Chao Mai National Park</li> <li>Header of Mai Fad subdistrict (Mai Fad is a subdistrict, a part of the national park)</li> <li>Tourism company: Jarayee tour. Koh mook tourism</li> </ul>			
<ul> <li>How does plastic waste affect the attractiveness of Trang as a tourist destination?</li> </ul>	<ul> <li>Tourism company. Jaravee tour, Kon mook tourism</li> <li>Most tourists are from southern parts of Thailand; they prefer to use bottled (SUP) plastic drinking water instead of reusable bottles (perceived as more hygienic) or favor Singha glass bottles, which is a trusted brand.</li> <li>Tourism companies usually have separate bins for different waste</li> <li>The boat operators take responsibility by collecting trash (that tourists bring for the trip) back to manage on the mainland.</li> <li>Trash cannot be found in the touristy area, but in the village that is close-by.</li> <li>Operated beaches are cleaned every day by local restaurants.</li> <li>During boat excursions the staff is responsible to take care of any plastic waste.</li> </ul>			
<ul> <li>Major Challenges:</li> <li>What are the main challenges in managing plastic waste effectively in these tourist areas?</li> </ul>	<ul> <li>The main plastic pollution is due to the proximity of this area to several villages.</li> <li>There is a lack of education among villagers and partially tourists about the types of SUP and avoidance methods.</li> <li>Plastic waste floats on shore across the sea from other countries like Malaysia, Indonesia and even Australia.</li> <li>Thai people are very much used to using SUP due to hygienic factors and convenience.</li> <li>The convenience factor extends to business operators and their employees. This is partially due to a lack or high cost of clean drinking water.</li> <li>The Trang Re-usable glass bottle for drinking water project has been facing a good adoption rate among businesses before COVID-19. Bute the demand from customers was too low.</li> <li>When COVID-19 occurred, SUP-use resurged for many purposes and applications.</li> </ul>			
<ul> <li>Are there any successful initiatives or practices that have been implemented to reduce plastic waste? Can you share examples?</li> </ul>	<ul> <li>Restaurants accept the Plastic Smart Cities project of reusable glass bottles for drinking water and are aware of SUP that affects their image.</li> <li>For takeaway orders, many operators changed from plastic trays and bowls which are very often replaced by recycled paper trays and boxes.</li> <li>However, they also use plastic spoons for takeaway orders.</li> </ul>			

Торіс	Summary			
Stakeholder Collaboration: • How do different stakeholders (government, NGOs, tourism operators, community) collaboratio in plantic waste	<ul> <li>Many restaurants provide reusable food trays and bowls and use condiment containers suitable for refill.</li> <li>Some business owners buy in bulk (bags for re-fill smaller containers) for: toiletries in accommodations, kitchen ingredients and condiments.</li> <li>Many junk shops are offering solutions for the logistics to recycling companies.</li> <li>At Dugong Resort the repurpose plastic waste (bin bags, food and grocery bags, bottle lids, PET) to make artwork and decorate the resort with those items.</li> <li>Some local suppliers are using reusable baskets instead of plastic packaging.</li> <li>The Tourism Association of Trang Province is campaigning with the government to keep looking after this area because this is the main tourist destination of the province.</li> <li>NGOs train so-called Marine Guardians who are working in taama an isint public classing optimize op</li></ul>			
management?	teams on joint public cleaning events.			
Reduction and Management: • What strategies are in place or proposed for reducing and better managing plastic waste?	<ul> <li>Some tourism operators practice sustainable processes: they train their staff, share knowledge, inspire via lead behavior, reusing bottles and glass, bags, etc.</li> <li>To use media to show the life of dugongs and sea turtles, and how waste affects their life.</li> <li>Campaigns for tourists: bring your rubbish back, take responsibility for your activity.</li> <li>Tourism operators give only 1 plastic bottle of drinking water for free which everyone can refill later from a cooler that they provide to the tourists.</li> <li>Restaurant provide clients with reusable bottles if they do not ask for SUP-bottles.</li> <li>Campaigns for young generation people: In the school students can bring SUP to be sold to the junk shop to make some money.</li> </ul>			
<ul> <li>Innovations and Technologies:</li> <li>Are there any innovations or technologies being considered or used to tackle plastic waste issues?</li> </ul>	<ul> <li>Dugong resort creates textile tags and other artwork with PET and HDPE together with fishing net. Artists around the world came to create the art from the non-recycled trash.</li> </ul>			
<ul> <li>Policy and Regulation:</li> <li>How do policies and regulations impact plastic waste management, and are there any gaps or needs for new regulations?</li> </ul>	<ul> <li>The country's political leadership changes frequently. These frequent changes impede a continuous project implementation.</li> <li>Different government agencies operate with different, sometimes opposing, directions.</li> <li>More government support needed (for better management regarding waste collection and separation).</li> <li>More information for locals and tourists to increase awareness.</li> </ul>			
<ul> <li>Future directions - Long-term Goals:</li> <li>What are the long-term goals for plastic waste management in Trang?</li> </ul>	<ul> <li>Co-working between the national park and subdistrict to support the use of reusable items: for example director of the subdistrict suggests entering the national park for free for those who use lunchbox instead of SUP.</li> <li>Better waste management in place</li> <li>Rules are implemented and followed by a majority of involved stakeholders and tourists</li> </ul>			
<ul> <li>Improving Stakeholder Engagement:</li> <li>How can stakeholder engagement be improved to tackle plastic waste issues more effectively?</li> </ul>	• Coordinate with the agencies in charge; The river links the urban region of Trang city with the sea shore. Pak Meng Beach is a place next to the Trang River, which discharges plastic waste into the ocean.			

Торіс	Summary
	<ul> <li>Solving the discrepancy between operator/business engagement and the services/responsibilities rendered by the municipality.</li> <li>Many operators do not contribute to SUP reduction initiatives partially due to a lack of alternative materials which are affordable and/or available.</li> <li>Increased awareness among tourists.</li> </ul>
<ul> <li>Support and Resources Needed:</li> <li>What kind of support, resources, or interventions are needed to enhance plastic waste management efforts?</li> </ul>	<ul> <li>Improve the quality and taste of bottled water produced by the subdistrict (reuse glass bottles) to be on par with popular brands in the market and to increase tourists' decision-making options.</li> <li>Understand the needs and conditions of the villagers in this area (with respect to waste and waste management)</li> <li>Raising awareness of the harm of unmanaged plastic waste</li> <li>For getting the plastic waste already in the sea out of the water.</li> <li>Budget for staff and equipment for better waste collection and segregation.</li> </ul>

ITS conducted individual interviews with tourism operators (accommodation and other tourismrelated operations) in Trang between March 25 and April 1, 2024.

The following summary consolidates insights from accommodation providers, restaurants, tour operators, and other tourism-related operations. It serves to inform about current practices, document efforts for a comprehensive project report, and lay the foundation for new strategies and recommendations aimed at enhancing sustainability on the island.

#### 3.2.3 Key findings from the interviews with tourism operators in Trang

Based on the detailed interviews conducted with 18 tourism and hospitality operators in Trang, a comprehensive understanding of the practices, challenges, and efforts towards managing and reducing SUP usage within this sector has been gained. This summary report synthesizes key findings from these interviews, providing insights into the current state of SUP management among different stakeholders, including accommodation providers, restaurants, and tourism companies. It aims to inform project team members, document ongoing initiatives, and lay the groundwork for future strategies and recommendations to enhance sustainability practices in the region.

The following operators were interviewed:

Pak Meng:

- Andaman Sea Travel
- Dugong Village Resort
- Jaravee Tour
- Koh Poo Restaurant
- Komee Restaurant
- Libong Travel Tour
- Pakmeng Resort
- Pakmeng Seafood Restaurant
- PM Shop
- YokYor Restaurant

Koh Mook:

- PP Restaurant
- Smile Resort
- Team Restaurant

Koh Libong:

- Koh Libong Beach Homestay
- Le Dugong Resort
- Libong Beach Resort

- Libong Camp
- PM Shop

#### 3.2.4 Executive Summary from Interviews at Hat Pak Meng

The tourism sector in Pak Meng, Trang Province, is actively engaged in addressing the environmental impacts of SUP usage through various practices and initiatives. The interviews highlighted efforts across different sectors, including accommodations, dining, and tourism services, to reduce SUP usage, manage waste effectively, and engage both guests and the local community in sustainability efforts. Despite these efforts, challenges such as customer expectations, convenience, and the lack of infrastructure for waste management and recycling persist, indicating the need for a more coordinated approach to achieving significant reductions in SUP usage.

#### **Key Findings**

- **Current Practices:** Initiatives to reduce SUP usage include offering refillable water stations, using biodegradable or reusable packaging, and implementing waste separation and recycling programs. Several operators also engage in educational efforts to raise awareness among guests and staff about the importance of reducing plastic waste.
- **Challenges:** Common challenges include the reliance on SUPs for guest convenience, difficulties in sourcing sustainable alternatives, and the need for more effective waste management and recycling systems. The lack of strict regulatory frameworks and enforcement further complicates efforts to reduce SUP usage comprehensively.
- Engagement and Collaboration: While there are examples of individual operators taking initiative, there is a notable gap in widespread collaboration among businesses, local authorities, and NGOs. Efforts tend to be fragmented, with limited sharing of best practices or joint initiatives to tackle SUP usage and waste management on a larger scale.

#### Recommendations by the local stakeholders for future strategies

1. Enhanced Collaboration and Coordination: Establish a platform for stakeholders across the tourism sector, local government, and NGOs to share resources, and best practices, and collaborate on regional initiatives aimed at reducing SUP usage and improving waste management.

2. **Infrastructure and Regulatory Support:** Advocate for and work with local authorities to improve waste management infrastructure and implement stricter regulations on SUP usage, with clear guidelines and enforcement mechanisms.

**3. Awareness and Education Campaigns:** Develop comprehensive campaigns targeting both locals and tourists to promote understanding of the environmental impacts of SUPs and encourage the adoption of sustainable practices.

**4. Sourcing and Supply Chain Innovations**: Encourage and support efforts to source sustainable alternatives to SUPs, including bulk purchasing, reusable products, and packaging innovations that reduce plastic waste.

**5. Monitoring and Documentation:** Implement systems for monitoring and documenting SUP usage and waste management practices, to measure progress and identify areas for improvement.

#### Conclusion

While the challenges of reducing SUP usage in Pak Meng's tourism sector are significant, the collective efforts and initiatives of various stakeholders highlight a commitment to environmental sustainability. By focusing on collaboration, infrastructure improvement, awareness, and regulatory support, Pak Meng

can make substantial progress towards reducing the environmental impact of tourism-related plastic waste.

#### 3.2.5 Executive Summary from Interviews on Koh Mook

Drawing from the three interviews with stakeholders on Koh Mook, this summary synthesizes the key findings regarding SUP usage and waste management practices within the island's tourism and hospitality sectors. It aims to inform project team members, document current efforts, and establish a foundation for future sustainability strategies on Koh Mook.

#### Executive Summary

Koh Mook's approach to managing SUP usage among its tourism operators showcases a blend of innovative practices, challenges, and opportunities for enhancing environmental sustainability. Stakeholders from various sectors, including restaurants and resorts, have shared their experiences and efforts in reducing SUP usage, engaging with guests and staff on sustainability, and facing operational challenges. This summary highlights the collective insights from these interviews, aimed at guiding the development of comprehensive strategies for reducing SUP usage and improving waste management on the island.

#### Key Findings

- **Current Practices:** Stakeholders have implemented several initiatives to manage SUP usage, including selling recyclables to junk shops, using paper boxes for food packaging, and promoting the use of refillable water bottles. Despite these efforts, the reliance on SUPs, particularly for water and food packaging, remains a significant challenge.
- **Challenges:** Key challenges include the high cost and logistical difficulties of obtaining reusable alternatives on the island, the popularity of SUP-packaged brands among consumers, and the need for improved waste management infrastructure. Additionally, there's a gap in guest participation in sustainability practices, partly due to the convenience culture and the operational focus on guest satisfaction.
- Engagement and Collaboration: Efforts to engage guests in sustainability practices are mostly informal, relying on personal interactions to convey environmental messages. There is notable collaboration with local suppliers to minimize packaging waste and with regional initiatives for waste management. However, broader collaboration across the island's tourism sector and with external organizations is needed to amplify impact.

#### Recommendations by the local Stakeholders for Future Strategies

1. Enhanced Infrastructure for Waste Management: Advocate for and invest in the development of local recycling and composting facilities to handle waste more efficiently and reduce the island's reliance on external waste management solutions.

**2. Collaborative Network for Sustainability:** Establish a collaborative network of tourism operators, local communities, NGOs, and governmental bodies to share resources, knowledge, and strategies for reducing SUP usage and enhancing waste management on Koh Mook.

**3. Education and Awareness Campaigns:** Launch targeted campaigns to educate both locals and tourists about the environmental impacts of SUPs and promote sustainable practices. This could include signage, workshops, and interactive activities that emphasize the role of individuals in conservation efforts.

**4. Sourcing and Supply Chain Innovation:** Encourage local sourcing and bulk purchasing to reduce packaging waste. Support local suppliers in adopting sustainable packaging solutions and explore innovative supply chain models that minimize SUP usage.

**5. Policy Advocacy and Support:** Work with local authorities to explore the introduction of policies that support SUP reduction, including restrictions on certain types of plastics, incentives for sustainable practices, and enhanced regulatory frameworks for waste management.

#### Conclusion

The experiences and practices shared by stakeholders on Koh Mook reveal a community at the forefront of tackling SUP usage challenges in the tourism sector. While individual efforts show promise, a coordinated, island-wide approach that includes improved infrastructure, collaboration, education, and policy support is essential for achieving significant and sustainable reductions in SUP usage on Koh Mook

#### 3.2.6 Executive Summary from Interviews on Koh Libong

Drawing on the four interviews with stakeholders in Koh Libong, this summary report outlines the current practices, challenges, and strategies related to the management and reduction of SUP usage within the tourism and hospitality sectors. This summary aims to inform project team members, document ongoing efforts, and serve as a basis for developing new strategies and recommendations to enhance sustainability practices on the island.

#### Executive Summary

The interviews conducted with operators on Koh Libong reveal a diverse range of practices and challenges in managing SUP usage. From homestays to retail shops, stakeholders are navigating the complexities of reducing plastic waste while maintaining service quality and convenience for guests. The insights gleaned highlight the critical need for improved waste management infrastructure, greater awareness and education on environmental impacts, and collaborative efforts to address the SUP challenge.

#### Key Findings

- **Current Practices:** Efforts to reduce SUP usage include selling recyclables to junk shops, using refillable water stations, and providing reusable or biodegradable alternatives for packaging and utensils. Despite these efforts, the reliance on SUP remains a challenge due to logistical constraints, guest expectations, and the lack of affordable alternatives.
- **Challenges:** Key challenges include the logistical difficulties of waste management on an island, the higher costs associated with reusable items, and the need to balance environmental initiatives with guest convenience. Moreover, external factors such as waste brought by sea currents and animal interference with waste bins exacerbate the issue.
- Engagement and Collaboration: Stakeholders employ various methods to engage guests and staff in sustainability efforts, including educational talks, beach clean-up activities (either organized/initiated by accommodation providers or by NGOs) and incentivizing the reduction of SUP usage. However, there's a recognized need for more systematic education and awarenessraising activities.

#### Recommendations by the local Stakeholders for Future Strategies

1. **Infrastructure Improvement:** Advocate for the establishment of better waste management systems in Koh Libong, including facilities for recycling and composting, to handle waste more effectively and reduce reliance on off-island solutions.

**2. Collaborative Initiatives:** Foster partnerships among tourism operators, local communities, NGOs, and governmental agencies to create island-wide initiatives aimed at reducing SUP usage and managing waste more sustainably.

**3. Education and Awareness:** Develop comprehensive programs to educate both locals and tourists about the environmental impacts of SUP and promote sustainable practices. This could include information sessions, signage, and campaigns highlighting the importance of reducing plastic waste.

**4. Sustainable Alternatives:** Encourage and facilitate the transition to sustainable alternatives for SUP, including sourcing bulk goods to reduce packaging, using biodegradable materials, and providing incentives for guests who participate in sustainability efforts.

**5.** Policy and Regulation Support: Work with local authorities to explore the introduction of policies and regulations that support SUP reduction, including bans on certain types of SUP, incentives for sustainable practices, and enforcement of existing environmental regulations.

#### Conclusion

The insights from Koh Libong's tourism and hospitality sectors underscore the complexity of addressing SUP usage in island contexts. While individual efforts show promise, there is a clear need for collective action, improved infrastructure, and sustained education to make significant progress. By implementing the recommended strategies, Koh Libong can move towards a more sustainable future, setting an example for other island communities facing similar challenges.

#### 3.2.7 Modelling the volume and structure of tourists to Trang

Before Covid-19 in 2019, the official statistics reported 1.564 mn visitors to the Trang Province (www.trang.nso.go.th). 79% or 1.239 mn were overnight tourists and 21% or 0.325 mn were excursionists without overnight. A total of 2.043.665 overnight stays were generated in 2019 (see Annex: Measuring Plastic Waste in the Tourism Sector Section 'Modelling the volume and structure of tourists to Trang Province') for more details).

	Official Tourism Statistics Trang Province 2019					
Visitors		1563563				
	Excursionists	21%	79%	Tourists		
		324978	1238585	$ \longrightarrow $		
Average length of stay	< 1 day			1,65		
Proportion of visitors	21%			79%		
† number of Thai tourists (arrivals)	286632			1081095		
# number of Foreign tourists (arrivals)	38346			157490		
Generating # overnights				2043665		

#### Figure 3.4: Modelling the volume of tourists 2019 (arrivals and overnights) in Trang

The number of tourist arrivals is based on the official statistics released by the Provincial Tourism Authority. In the absence of current figures for the year 2023, we assume that the pre-COVID level of about 1.5 million visitors has not been achieved yet: maybe 80% for 2023.

There are no regional breakdowns of the tourism figures for the different zones and islands. There are no official records of person movements to and from the islands. One way to approximate the visitors and overnight volume is via the room capacity. The average size of accommodations is 25 rooms in the province. This has to be adjusted for the different destinations:

The total number of accommodation businesses is based on the inventory found on <u>www.booking.com</u> and <u>www.agoda.com</u> and exceeds the official statistics by 20% of no. of accommodations. Furthermore, we estimate that 15% of the total room capacity is not mapped into the official statistics.

In the absence of any official tourism statistics or boat operator or pier pax numbers for sub-regions and the islands, we allocate the total visitor number to the following sub-regions according to the estimated room capacities assuming a shortfall of official accommodation numbers by 20% and an underreporting of room capacities by 15%. For the baseline estimation (Mixture Medium), the official visitor counts are used.

Sub-region	# hotels/ resorts	Total rooms	Share of total visitors	Overnights	Daytrippers
Pak Meng	30	750	16%	328564	52247
Koh Libong	18	360	8%	157711	25079
Koh Mook	53	795	17%	348277	55382
Koh Kradang	9	180	4%	78855	12539
Trang City	50	2000	43%	876169	139326
Koh Ngai	12	240	5%	105140	16719
Koh Sukorn	17	340	7%	148949	23685
Total	189	4665	100%	2043665	324978

## Table 3.4 Room capacities in Trang regions and calculation of overnight guests / day trippers

## 3.2.8 Modeling daily plastic waste related to tourism activities in Trang (coastal and island regions)

ITS carried out plastic waste assessments for 11 businesses to get a comprehensive overview of plastic waste generation on a specific day, aiding in the analysis and development of strategies for waste reduction and management (see Annex: Measuring Plastic Waste in the Tourism Sector Section 'Baseline Estimation of SUP Waste Generated by Tourists' for more details). The waste assessment was carried out at the following operations:

Hat Pak Meng:

- Yok Yor (restaurant)
- Pakmeng Seafood (restaurant)
- Koh Poo (restaurant)
- Pakmeng Resort
- Dugong Village

Koh Libong:

- Lam Lay (Restaurant with homestay)
- Le Dugong Resort
- Libong Beach Resort

Koh Mook:

- PP (restaurant)
- Team (restaurant)
- Smile Resort

This waste sampling together with the projection of additional plastic waste generated by tourists outside the covered tourism-related business sectors enabled first an estimation of plastic waste profiles for each of the main segments of tourists and second – using the tourist volume and structure model described above – an estimation of a Baseline Model for Plastic Waste generation in Tourism (see Annex: Measuring Plastic Waste). This model resulted plastic waste related to tourism activities in Trang (coastal and island regions) of 108 mt per year based on the estimate of average plastic waste per overnight tourist and day of 105 grams and per day trip visitor of 89 grams per day. The composition of the plastic types is as follows (% in brackets refer to the Thai average municipal solid plastic waste according to the PCD report):



#### Figure 3.5: Plastic waste composition in tourism in Trang

The calculation of plastic volumes in the tourism sector in the project sites follows the facts and corresponding assumptions:

- 87% of the overnight tourists are Thais, 13% are foreigners. 89% of the excursionists are Thai, the others are foreigners. On average, overnight tourists stay 1.65 nights.
- For the estimation of the daily SUP waste generation, only two different profiles are applied: one for the average overnight tourist and one for the average day trip visitor.
- PS packaging material and foam boxes could not be traced and apportioned to a particular number of daily visitors. The empty cells under plastic category 6 do not signify that there is no PS SUP in use.
- First, the tourism-induced plastic waste volume for the entire Trang Province is exhibited for the two segments (baseline or Mixture Medium assumptions).
- Followed by three different mixtures for the two visitor segments (considering inaccuracies of the official statistics) resulting in different SUP waste volumes per year for each sub-region.
- The High Mixture assumes 10% day trip visitors, 90% overnight tourists and an overall visitor volume increase of 15% compared to the 2019 figures.
- The Low Mixture assumes 25% (20% for Pak Meng) day trip visitors, 75% (80% for Pak Meng) overnight tourists and an overall reduction of the visitor volume by 15% compared to the 2019 figures.

For the plastic waste modelling, ITS distinguishes only between overnight tourists and day-trippers. Not much difference is expected between business and leisure travelers due to the very short average length of stay overall.

It is reported by local stakeholders that visitors from Bangkok prefer to stay overnight in Trang City due to more food options (particularly in the morning) in the city. Hence, we can assume a substantial proportion of tourists in the city come to visit the beach area and the islands.

The SUP waste generated by the two different visitor segments follow the estimates documented in the separate Excel file (see Annex: Measuring Plastic Waste in the Tourism Sector Section 'Baseline Estimation of SUP Waste Generated by Tourists') which is based on the empirical data about SUP collected in situ.

Plastic type	1	2	3	4	5	6	Waste Share of overnight	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Total Tourism	124	25	5	59	28	0		241	0.66
Overnight tourists only	109 t	24 t	5 t	54 t	21 t	0 t	100%	212	0.58
Day trip visitors only	15 t	0.8 t	0.3 t	5.9 t	7 t	0 t	0%	29	0.08
ln kg									
Pak Meng									
Low	46	9	2	22	11	0	82%	33	0.09
Medium	55	11	2	26	12	0	88%	39	0.11
High	63	13	3	30	13	0	91%	45	0.12
Koh Libong									
Low	22	4	1	10	6	0	78%	16	0.04
Medium	26	6	1	13	6	0	88%	19	0.05
High	30	6	1	15	6	0	91%	21	0.06
Koh Mook									
Low	48	9	2	23	12	0	78%	34	0.09
Medium	58	11	2	28	13	0	88%	41	0.11
High	67	14	3	32	14	0	91%	47	0.13
Koh Kradang									
Low	9	2	0	4	2	0	100%	6	0.02
Medium	11	3	1	6	2	0	100%	8	0.02
High	14	3	1	7	3	0	100%	10	0.03

Table 3.5: Shares of SUP volume by main visitor segments and study sub-regions

Further remarks regarding SUP in the tourism sector in Trang in brief:

- PET plastic is dominant with about 50% for both visitor segments (mainly bottles of any size; cups and lids are available from PET material, however not frequently in use). Within the overnight segment, LDPE (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) has the second highest share with about 25%. In contrast, PP SUP has a more prominent share of the day trip segment with 24% compared to LDPE with only 20%.
- The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Foam boxes are still in use everywhere. PS-based dishes, bowls and cutlery are also still in use.
- For Koh Kradang, it is not allowed for day trip visitors to bring any SUPto the island. This explains why the waste generation table above does not consider any SUP waste generated on the island.

## 3.3 Development of Tourism Plastic Waste Scenarios for Review during the 1<sup>st</sup> Stakeholder Workshops

As a baseline for recommendations, various sources of studies and reports were screened and their recommendations for actions – particularly in the tourism sector – were reviewed and assessed. The consultants came up with areas of interventions and recommendations which had been reviewed and discussed with local experts, particularly during the stakeholder workshops.

Two series of workshops were scheduled during the lifespan of this project. The first workshops were organized to address tourism operators and municipality representatives together in both locations. The stakeholder workshop in Koh Tao was scheduled on June 4 and the workshop in Trang was scheduled on June 7. 2024.

During the first workshop, the assessment findings were presented followed by a discussion of the MSWM options/scenarios, including the tourism sector. The final stakeholder workshop in Trang and Koh Tao are dedicated to assessing and prioritizing concrete MSWM options, including measures addressing the tourism sector. Final workshops were scheduled for the beginning of November.

The following tables exhibit potential measures given the current practices (compiled during the expert roundtable and individual expert interviews). Actions/measures are structured by their main function (reducing SUP, improving collection, re-purposing) and then by the type of plastic affected. The two columns to the right briefly address what businesses can do and what the public sector should do to support implementational efforts. These cells make references to particular measures proposed in the Scenario section below.

#### 3.3.1 Potential Measures for Improving Plastic Waste Management in Koh Tao: Reducing

The measures outlined in this report are divided into two categories:

- 1. **Measures for Businesses**: These are practical, actionable steps that tourism businesses—such as hotels, restaurants, and activity providers—can directly implement within their operations. These measures are designed to reduce SUP(SUP) waste, improve waste management, and encourage sustainable practices at the ground level. They are often specific, operational actions that businesses can take to contribute to the broader plastic waste reduction goals for their destination.
- 2. **Measures for Policies**: These measures are strategic recommendations aimed at policymakers and regulatory bodies. They encompass the broader legislative, regulatory, and supportive frameworks needed to create an enabling environment for sustainable practices. Policy measures include actions like introducing regulations, providing financial incentives, developing infrastructure, and supporting collaborations among stakeholders to drive systemic change in plastic waste management at the local, regional, and national levels.

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
Drinking water (mainly PET)	<ul> <li>Many accommodation providers, restaurants and diving operators provide refill stations</li> <li>Reduction strategies vary: no plastic bottles at all, only first day in the room – then refill, re-usable glass bottles</li> </ul>	<ul> <li>Use re-fill station opportunities more pro-actively to engage with customers</li> <li>Offer re-usable and returnable drinking bottles (from glass, metal or plastic)</li> </ul>	<ul> <li>Promote using local water resources at refill stations</li> <li>Develop a transparent network of re-fill stations: stand-alone or in collaboration with e.g. Trash Hero</li> <li>Join the Plastic Smart Cities initiative</li> <li>Branding of a KT-bottle for refill</li> </ul>
Toiletries	<ul> <li>Some accommodation providers use ready-made small single-use bottles for shower gel, shampoo and conditioner</li> <li>many are using re-fill systems: either pump containers attached to the wall or small jars with pumps</li> </ul>	<ul> <li>Re-assess the pros and cons towards adopting re-fill alternatives: use of refillable plastic or metal containers</li> <li>Highlight reduced costs and recognition through eco-certification.</li> <li>No amenity kits, amenity kits only on request</li> <li>Switch to soap tablets</li> <li>Switch from single-use containers for refill to large returnable containers</li> </ul>	

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
Milk containers, dishwashing and laundry detergent containers, bottled kitchen ingredients (HDPE)	<ul> <li>Some containers are separated and sold to junk shops</li> <li>Some containers are re- purposed</li> <li>Most smaller bottles are mixed with general waste</li> </ul>	<ul> <li>Better train staff for increased awareness that HDPE is a valuable recyclable material</li> </ul>	<ul> <li>Increase awareness among the population that HDPE is valuable and should be separated for recycling</li> </ul>
Shrink wrap (PVC)	<ul> <li>Heavily used by manufacturers to protect and maintain the stability of parcels</li> </ul>	Sourcing alternatives	<ul> <li>Promote supply chains avoiding shrink-wrap commodities for the entire island</li> </ul>
Grocery bags (LDPE)	<ul> <li>Refusing to use SUP shopping bags is a rare business practice</li> <li>Unfortunately, 7-11 resumed handing out voluntarily and for free plastic bags</li> </ul>	<ul> <li>Offer durable alternatives such as linen, cotton or reusable plastic bags for retail customers</li> <li>Offer carton boxes or reusable plastic trays or wood baskets for delivery instead of plastic bags</li> <li>Levy a charge for disposable bags</li> <li>Initiative to "Bring your Own" (BYO) Bag, or provide an option to rent a bag (island businesses can let visitors rent a reusable bag at a price equivalent to its retail price. Visitors who would like to keep the bag as a souvenir can choose not to return the bag. If they choose to return it, a certain amount of the rent deposit will be refunded as long as the bag is in good condition.)</li> <li>Lobby for an island-wide ban on plastic bags as introduced successfully pre-COVID. Elaborate the opportunity to start a BBPB Team on KT, e.g. in cooperation with schools (https://byebyeplasticbags.org/team/)</li> </ul>	<ul> <li>Develop trendy fashionable reusable shopping bags for sale that would help promoting the SUP awareness on the island</li> <li>Develop incentives and promotions for – local – suppliers who avoid plastic bags for delivery</li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
Trash bags (LDPE)	<ul> <li>Most of the accommodations use single-use bin bags for guest rooms which are cleared daily</li> <li>Larger trash bags are used in the kitchen and other areas and ultimately, for the preparation for waste collection</li> </ul>	<ul> <li>Rethinking the necessity of using plastic bin bags in every guest room</li> <li>No bin liners in the garbage can(s)</li> <li>Caution and vigilance are recommended for using bio-degradable and recycled plastic bags</li> </ul>	<ul> <li>Using alternative methods for waste collection avoiding the majority of large plastic trash bags</li> </ul>
Food wrapping films (LPDE)	<ul> <li>Wherever food preparation is necessary, intermediary storage is enabled via food wrapping clingfilm</li> </ul>	<ul> <li>In most cases, reusable plastic containers will serve the same purpose</li> <li>Invest in alternative storage facilities and increase awareness among staff: e.g. reusable plastic trays with lids or reusable silicone bags (not easy to recycle properly)</li> </ul>	
Food plastic bags (PP)	<ul> <li>For takeaway and intermediary storage of wet/moist food and ingredients, plastic bags are heavily used</li> <li>Particularly, simple food vendors, stalls on the street and other temporary providers make use of this method</li> <li>Cooking ingredients which are pre-packed (frozen, chilled or dry) and ordered from the mainland cannot be avoided or replaced</li> </ul>	<ul> <li>Where possible paper boxes should be used for takeaway</li> <li>Incentives should be developed and implemented for ' bring-your-own' (as successfully introduced pre- COVID) food container, particularly for locals and long-term tourists</li> </ul>	
Food cups, bowls, trays (PP)	<ul> <li>Similar to food plastic bags: are still heavily used, particularly for takeaway purposes</li> </ul>	<ul> <li>Wherever reasonable, reusable glass, metal, melamine or pottery cups and bowls should be used</li> <li>Initiative to "Bring your Own" (BYO) or provide an option to rent reusable</li> </ul>	<ul> <li>Develop Koh Tao branded multi- use cups for beverages, food bowls and trays with a financial deposit system in place</li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>cups and food and beverage containers.</li> <li>Development of a branded reusable crockery system for take-away crockery in which all catering outlets participate.</li> </ul>	
Plastic straws (PP) Plastic stirrers	<ul> <li>Many restaurants changed already to either paper, bamboo or metal straws</li> </ul>	<ul> <li>No-straw policy, reusable variants as required (on demand)</li> <li>Make changes to the supplies</li> <li>Collaborate with other businesses to gain better purchasing conditions for reusable metal, bamboo or glass straws and stirrers</li> </ul>	<ul> <li>Financial incentives for the use of alternatives to SUP straws should be offered to smaller – street – vendors.</li> </ul>
Foam Food Packaging (PS) Plastic ice cream spoon (PS)	Can be still found particularly for fruit	<ul> <li>Switch to suppliers who use paper material or biodegradable pulp cutlery</li> </ul>	
Food trays, cutlery	<ul> <li>Not used by restaurants throughout the island</li> </ul>	Replace with paper boxes and cutlery made from wood	
Foam boxes	<ul> <li>Only larger boxes in use</li> <li>There is a ban on smaller foam boxes</li> <li>Boxes are partially returned to the mainland</li> </ul>	<ul> <li>Shorten supply chains wherever possible to avoid the usage of foam boxes. Where impossible businesses could change to PP or other materials.</li> </ul>	<ul> <li>Support the promotion of alternatives like bamboo or cornstarch materials</li> </ul>
Reducing SUP usage in general	• The majority of businesses, stakeholders and consumers/tourists are not aware of their SUP footprint.	<ul> <li>Businesses should monitor plastic and other waste volumes regularly, e.g. daily monitoring with monthly summaries : e.g. bi-annual waste audits</li> <li>Businesses should prefer suppliers who comply with sustainability standards and use environmentally friendly packaging</li> <li>Communicate SUP policies internally and to the online world: own website, booking platforms, destination websites</li> </ul>	<ul> <li>Implement an ordinance for annual reporting about SUP usage and disposal.</li> <li>Develop informational campaigns targeting tourists about the impacts of plastic waste and how they can help reduce their plastic footprint during their stay (e.g. information video presented on ferry boats and other digital channels)</li> <li>Encourage local sourcing of products to reduce packaging</li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
			<ul> <li>waste and support local economies.</li> <li>Implement policy measures that incentivize businesses to reduce SUP usage, such as recognition programs for low plastic usage.</li> <li>Enforce stricter regulations on the use and sale of SUP products on the island, including a potential ban on particularly harmful items like styrofoam containers and plastic straws.</li> </ul>

#### 3.3.2 Potential Actions for Improving Plastic Waste Management in Koh Tao: Collection, Recycling

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
Waste disposal	Tourists are not able to find trash bins in public space	<ul> <li>Businesses partially take over the waste disposal of SUP not originating from their own business (e.g. SUP from retail products end up at accommodations, SUP from street vendors end up at the bins of retail shops, restaurants and accommodations)</li> </ul>	<ul> <li>Installing and maintaining robust bins at various touristic hotspots which are clearly marked by color codes and instructions.</li> <li>Organizing regular cleaning and clearing of those bins</li> </ul>
Waste separation	• Currently, the public administration provides neither segregated waste collection nor a central waste segregation station	<ul> <li>Improve and deepen the private waste acquisition and handling (The publicly administered waste collection and landfill do not consider waste segregation; hence it is up to private initiatives to handle it.)</li> </ul>	<ul> <li>Implement incentives for a more comprehensive waste collection system</li> <li>Implement a waste separation station to reduce the volume of waste remaining for landfill or incineration.</li> <li>Offer training on waste separation and recycling for staff and entrepreneurs.</li> </ul>
Waste collection	• The public administration organizes the daily waste collection from dense, touristic zones.		• Garbage bins are installed in public spaces and beaches and cleared in appropriate intervals (with support from the government)

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
	<ul> <li>More remote areas are not served at all or served occasionally.</li> </ul>		<ul> <li>Ashtrays, e.g. made from bamboo or other organic material, are made available at the beaches</li> <li>Elaborate opportunities to enter into a partnership with Ranong Recycle for Environment, the Jan&amp; Oscar Foundation and #Tide (https://www.tide.earth/en/collaborations/ partnerships)</li> </ul>

Areas, Applications	Assessment	Actions for Businesses	Measures for Policies
Waste recycling and disposal	<ul> <li>The public administration just offers an unsanitized landfill without systematic waste separation.</li> <li>3 junk shops purchase PET, HDPE waste, glass, cartons, and metals and sell them to recycling companies on the mainland.</li> </ul>		<ul> <li>Support the expansion and enhancement of recycling facilities on the island to cope with specific types of SUP waste, especially plastics.</li> <li>Levy a fair waste management fee on tourists</li> <li>Re-assess the current waste collection fee for households and businesses</li> </ul>
Cleanliness of the public space	<ul> <li>Particularly accommodation and restaurant operators sitting directly at the beach do the daily beach cleaning</li> <li>Diving operators invite customers and diving instructors once a week for water and coral cleaning activities.</li> </ul>		<ul> <li>Support regular community-led clean-up events to maintain the environment and promote public awareness of waste issues.</li> <li>Continue to support Baan Koh Tao school schools and other community initiatives in e.g. beach/village cleaning activities</li> </ul>
Stakeholder involvement	•	<ul> <li>Supporting an island-wide clear, manageable and forward-looking data collection system to track performance (e.g. using a tool like Weeva).</li> <li>Tourism businesses share useful tips to help guest pack and prepare pre- arrival. Guests are pledged not to bring any SUP items to the island.</li> </ul>	Organize regular meetings with all relevant stakeholders, including business owners, local authorities, and environmental NGOs, to discuss progress, share best practices, and update strategies based on real-world feedback.

Areas, Applications	Assessment	Actions for Businesses	Measures for Policies
		<ul> <li>KT-branded zero waste items that help guests travel SUP-free are offered in gift shops.</li> <li>Make waste areas (with bins for recycling) visible for guests creating a reminder for opportunities for improvement.</li> <li>Create a benchmarking system and/or award system for businesses to compare their efforts.</li> </ul>	<ul> <li>Ensure that all recommendations and guidelines are easily accessible digitally, allowing businesses and tourists alike to access information readily.</li> </ul>

#### 3.3.3 Coordinated Efforts along the Plastic Value Chain in Koh Tao

The following table reviews and combines the previous two perspectives into recommended ways to implement measures, addressing the organisational issues.

Measure(s)		Objectives					
● l c r	mplement an officially recognized platform coordinating campaigns for reducing SUP waste and better plastic waste management	To make efforts towards reducing SUP waste and plastic waste management more effective					
• ( 1	Compile programs, events and actions of different stakeholders, NGOs and initiatives	<ul> <li>Make the collaborative efforts for reducing SUP and increase recycling of SUP waste more visible to the public including tourists</li> </ul>					
<ul> <li>Produce information videos for the population, business owners and tourists about SUP waste</li> </ul>		<ul> <li>Increase commitment towards more individual action and contribution for SUP avoidance, proper disposal and recycling</li> </ul>					
• F	Re-establish a Trash Hero working group or strengthen similar activity groups	<ul> <li>To continue with coordinated actions like         <ul> <li>Beach cleaning</li> <li>Selling reusable water bottles and shopping bags</li> <li>Assisting in the dissemination of water re-fill stations</li> </ul> </li> </ul>					
• ( 6	Campaigns and trainings for the population, business operators and their staff	<ul> <li>Increase awareness of the seriousness of the problems of SUP</li> <li>Explain the opportunities and necessities to avoid, reduce SUP and better handle SUP waste</li> </ul>					
•   e i	ntroducing a tourist tax or 'SUP Waste Fee' for tourists entering Koh Tao (additionally to the existing 20 Baht fee which s collected irregularly)	<ul> <li>Increasing awareness and demonstrating commitment towards working for a more sustainable environment</li> </ul>					
● F	Reassessing the municipal waste fee for households and ousinesses	Increase income for more effective waste management on the island					
•	nstallation of public waste bins with proper management	Increase the opportunity for visitors to dispose of waste properly					
• F	Resume the campaigning towards 'no free plastic shopping pags' supporting reusable bag alternatives	<ul> <li>Reduce the use of LDPE shopping bags</li> <li>Retail shops offer a separate dropbox for empty and clean shopping bags</li> </ul>					
• [ t	Develop a concept of re-usable cups and food containers for a care and businesses with a deposit system	<ul> <li>Reduce SUP (PP) which is currently not recycled</li> <li>Make SUP reduction and SUP recycling efforts more visible and tangible</li> </ul>					
• F V	Formalize the waste segregation in practice and run municipal waste segregation stations	<ul> <li>Increase the collection rate of 'not so easy' waste categories: LDPE, PP, PS, glass, hazardous waste</li> <li>Operate a new channel (e.g. via junk pickers, decentralized waste collection points or a separate collection from the publicly organized waste collection system) for collecting LDPE plastic waste</li> </ul>					
Measure(s)	Objectives						
--	---	--	--	--	--	--	--
	<ul> <li>Convincing the population that their effort for waste collection and segregation is not useless</li> </ul>						
<ul> <li>Promote the development and adoption of alternative packaging systems to reduce the volume of Styrofoam (PS) boxes: bamboo, cornstarch or other durable material like the solution demonstrated by <u>https://www.koolpakbox.com/</u> with NFC technology.</li> </ul>	<ul> <li>Help seriously remove PS foam boxes (e.g. used for seafood and meat) by offering reasonably priced alternatives with added value .</li> <li>This has pioneering potential if driven by the entire island.</li> </ul>						

## 3.3.4 SUP Waste Scenarios for Koh Tao

The following scenarios are combinations of recommended initiatives, measures, policies and programs developed by the consultant team and local stakeholders. These recommendations are based on the steps described above under section 2.3 and focus mainly on measures to reduce SUP and measures of improving SUP collection management with the interaction of tourism businesses. The three scenarios differ in scope and difficulty level to implement the proposed measures and differ particularly in the number of businesses and other stakeholders subscribing to the proposed measures under the assumption that all measures are taken voluntarily. The different measures rely on the commitment and contribution of different stakeholders: we simplify and group those stakeholders into three sectors: the private sector representing companies, the public sector representing mainly different administrative levels, and NGOs comprising registered organizations and non-registered groups of the civil society. Scenarios exhibit and describe different outcome configurations assuming different conditions that facilitate and/or weaken desired and undesired effects. Scenarios represent a more holistic approach to configuring different mixtures of input and output factors. The scenario technique allows for a more comprehensive evaluation of changes in the ecosystem and their impacts.

#### Scenario A: "Plastic Footprint Reduction Pioneer – 2025"

This Scenario captures the essence of starting the journey towards significant SUP reduction, highlighting the pioneering actions taken to initiate change.

#### Scenario B: "Progressive Plastic Minimization Pathway – 2028"

This Scenario emphasizes the advanced steps taken beyond the foundational measures of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. Yet, it is assumed that Scenario A measures are more effective due to higher commitment levels.

#### Scenario C: "Comprehensive Circular Success – 2030"

This Scenario reflects the highest level of commitment and action, aligning closely with Thailand's Roadmap on Plastic Waste Management 2018 – 2030. It conveys the achievement of a fully integrated and sustainable waste management system. It is assumed that Scenario A measures are more effective than in Scenario B and the additional Scenario B measures are also more effective due to higher commitment levels.

The tables with the recommended measures assess briefly which segments in the destination are directly affected or involved (via compliant behaviors): tourists and/or locals (including foreigners and non-local workforce). The second part of the table classifies the main objective of the action. Six different hierarchically arranged objectives are listed: waste generation, repurposing waste material, waste collection, leakage of waste before, during and after transportation to a dump site, recycling of waste material and treatment at the end-of-life of waste material.

Once, the SUP waste flow diagram is completely calibrated for the tourism and the residential/municipal sector, each Scenario undergoes an exhaustive assessment of outcomes resulting in a quantitative and qualitative description of the desired reduction of SUP waste and improved waste management which – ultimately – yields a substantial reduction of Ieakages of SUP waste into the sea.

Abbrev.	Explanation	Abbrev.	Explanation
Pri	Private sector	Tour	Tourists: affected, involved
Pub	Public sector: municipality, provincial administration, ministries	Local	Locals: affected, involved
NGO	Non-governmental organizations, civil initiatives		
	Main objective: to increase/decrease		Main objective: to increase/decrease
Gen	Waste generation	Rep	Repurpose waste material (other than recycling)
Coll	Collection of waste	Leak	Leakage to the environment (nature, rivers, sea)
Rec	Proper recycling of waste material	EoL	Treatment of end-of-life of waste material
Hi	High responsibility/involvement	Med	Medium responsibility/involvement
Low	Low responsibility/involvement		

## Initial Parameters for Scenario A: "Plastic Footprint Reduction Pioneer - 2025"

Action successfully implemented	Index	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Water re-fill station	A1	Hi		Med	Х		Х						Reduction of PET consumption
Re-usable drinking bottles	A2	Hi	Low	Med	х	Х	Х						Reduction of PET consumption
Toiletries	A3	Hi			х		Х						Reduction of LDPE packaging
Avoid grocery shopping bags	A4	Hi	Hi	Low	х	Х	Х						Reduce LDPE plastic
Avoid food-wrapping films (LDPE) by applying other solutions	A5	Hi	Low		x	x	х						Reduce LDPE plastic

Action successfully implemented	Index	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid PS food trays and cutlery by applying other materials	A6	Hi	Low		х	х	х						Reduce PS plastics in general waste
Regular SUP waste monitoring	A7	Me d	Med				Х		Х				Reduce PET, HDPE, LDPE, PP SUP waste
Installing trash bins in public space	A8		Hi		х	х			х				Increase collection rate particularly in public spaces
Staff training and population campaigns about HDPE	A9	Me d	Hi		х	х			x		х		Increase collection rate for HDPE
Organizing / resuming regular cleaning events: at – remote – beaches and village areas	A10	Low	Med	Hi	х	х			x	x			Collect garbage (SUP waste) which would stay in the environment otherwise
Extend collaboration with schools acting as a waste bank	A11		Hi			х			x				Gradually increase collection rate for recyclable material

## Initial Parameters for Scenario B: "Progressive Plastic Minimization Pathway - 2028"

Scenario B includes all measures of Scenario A but adds the following initiatives:

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid trash bags used for													Reduce the volume of
internal waste collection	B1	Hi	Low		Х	Х	Х						LDPE plastic (in the
by applying alternatives													general waste)

Action successfully	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid food plastic bags (PP) for ready-to-eat food and beverages by alternative solutions	B2	Hi	Hi	Med	х	х	х						Reduce PP plastic bags
Avoid food cups, bowls and trays (PP) by other solutions	В3	Hi	Hi	Med	х	х	х						Reduce PP SUP in general waste
Further avoid plastic straws (PP), and stirrers	B4	Hi	Med		Х		Х						Reduce PP SUP in general waste
Establish a collection system for used, clean shopping bags	B5	Hi	Hi		х	х			х				Increase collection of LDPE plastic
Improve and extend segregated waste collection including decentralized waste collection stations, partially supporting existing initiatives (Koh Libong, Koh Mook)	B6	Med	Hi	Low		х			х				Increase collection rates for PET, HDPE, LDPE and PP
Extend the waste collection coverage	B7	Low	Hi			х			х				Increase collection coverage by formal sector
Install ashtrays at beaches	B8	Low	Hi	Low	х	х			х				Increase the collection rate of 'other' plastic waste
Organize international cleaning events / camps	В9	Med	Med	Hi	Х	Х			Х	Х			Collect garbage (SUP waste) which would

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
in the off-season, particularly for Koh Mook													stay in the environment otherwise
Establish a Trash Hero Working Group	B10	Med	Low	Hi		x	х		x	х			Reducing the generation of PET waste, increasing collection rates of SUP waste

## Initial Parameters for Scenario C: "Comprehensive Circular Success - 2030"

Scenario C includes all measures of Scenario A and Scenario B but adds the following initiatives:

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid and/or reduce shrink wrap (PVC)	C1	Hi		Low	Х	Х	Х						Reducing the amount of PVC in general waste
Avoid the usage of larger trash bags (LDPE) by alternative collection systems	C2	Med	Hi		х	х	х						Reduce the volume of LDPE plastic (in the general waste)
Avoid food suppliers using PS for wrapping	C3	Hi		Low	Х	Х	Х						Reducing PS in general waste
Completely ban foam boxes for food transportation	C4	Hi	Hi	Low	х		х			х		х	Reducing PS in general waste, leakage and landfill

The following tables exhibit potential measures given the current practices (compiled during the expert roundtable and individual expert interviews). Measures are structured by their main function (reducing SUP, improving collection, re-purposing) and then by the type of plastic affected. The two columns to the right briefly address what businesses can do and what the public sector should do to support implementational efforts. These cells make references to particular measures proposed in the Scenario section below.

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
Drinking water (mainly PET)	<ul> <li>Some accommodation providers, restaurants and diving operators provide refill stations</li> <li>Reduction strategies vary: no plastic bottles at all, re-usable glass bottles from local production (participating in the SmartPlasticCities initiative)</li> </ul>	<ul> <li>Use re-fill station opportunities more pro-actively to engage with customers</li> <li>Offer re-usable drinking bottles (from glass, metal or plastic) other than single-use plastic</li> </ul>	<ul> <li>Promote using local water resources from certified suppliers</li> <li>Develop a transparent network of re-fill stations: stand-alone or in collaboration with Trash Hero</li> </ul>
Single-use packages of Toiletries	<ul> <li>Several accommodation providers use small single-use bottles for shower gel, shampoo and conditioner</li> <li>others are using re-fill systems: either pump containers attached to the wall or small jars with pumps</li> </ul>	<ul> <li>Re-assess the pros and cons towards adopting re-fill alternatives: use of refillable plastic or metal containers</li> <li>Highlight reduced costs and recognition through eco- certification.</li> <li>No amenity kits, amenity kits only on request</li> <li>Switch to soap tablets</li> </ul>	

## 3.3.5 Potential Measures for Improving Plastic Waste Management in Trang: Reducing

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>Switch from single-use containers for refill to large returnable containers</li> </ul>	
Milk containers, dishwashing and laundry detergent containers, bottled kitchen ingredients (HDPE)	<ul> <li>Some containers are separated and sold to junk shops</li> <li>Some containers are re- purposed</li> <li>Most smaller bottles are mixed with general waste</li> </ul>	<ul> <li>Better train staff for increased awareness that HDPE is a valuable recyclable material</li> </ul>	<ul> <li>Increase awareness among the population that HDPE is valuable and should be separated for recycling</li> </ul>
Shrink wrap (PVC)	<ul> <li>Heavily used by manufacturers to protect and maintain the stability of parcels</li> </ul>	Sourcing alternatives	<ul> <li>Promote supply chains avoiding shrink-wrap commodities</li> </ul>
Grocery bags (LDPE)	<ul> <li>Refusing to use SUP shopping bags is a rare business practice</li> <li>Unfortunately, 7-11 is handing out plastic bags voluntarily and for free</li> </ul>	<ul> <li>Offer durable alternatives such as linen, cotton or reusable plastic bags for retail customers</li> <li>Offer carton boxes or reusable plastic trays or wood baskets for delivery instead of plastic bags</li> <li>Levy a charge for disposable bags</li> <li>Initiative to "Bring your Own" (BYO) Bag, or provide an option to rent a bag (island businesses can let visitors rent a reusable bag at a price equivalent to its retail price. Visitors who would like to keep the bag as a souvenir can choose not to return the bag.</li> </ul>	<ul> <li>Develop fashionable reusable shopping bags for sale that would help promoting the SUP awareness for the entire region</li> <li>Develop incentives and promotions for – local – suppliers who avoid plastic bags for delivery</li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>If they choose to return it, a certain amount of the rent deposit will be refunded as long as the bag is in good consition.)</li> <li>Lobby for a ban on plastic bags. Elaborate the opportunity to start a <u>BBPB Team</u> on KT, e.g. in cooperation with schools</li> </ul>	
Trash bags (LDPE)	<ul> <li>Most of the accommodations use single-use bin bags for guest rooms which are cleared daily</li> <li>Larger trash bags are used in the kitchen and other areas and ultimately, for the preparation for waste collection</li> </ul>	<ul> <li>Rethinking the necessity of using plastic bin bags in every guest room</li> <li>No bin liners in the garbage can(s) or switch to compostable bin liners (caution and vigilance are recommended for using biodegradable plastic bags)</li> </ul>	<ul> <li>Using alternative methods for waste collection avoiding the majority of large plastic trash bags</li> </ul>
Food wrapping films (LPDE)	<ul> <li>Wherever food preparation is necessary, intermediary storage is enabled via food- wrapping clingfilm</li> </ul>	<ul> <li>In most cases, reusable plastic containers will serve the same purpose</li> <li>Invest in alternative storage facilities and increase awareness among staff: e.g. reusable plastic trays with lids or reusable silicone bags (not easy to recycle properly)</li> </ul>	
Food plastic bags (PP)	<ul> <li>For takeaway and intermediary storage of wet/moist food and</li> </ul>	Where possible paper boxes     should be used for takeaway	

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies			
	<ul> <li>ingredients, plastic bags are heavily used</li> <li>Particularly, simple food vendors, stalls on the street and other temporary providers make use of this method</li> <li>Cooking ingredients which are pre-packed (frozen, chilled or dry) and ordered from the mainland cannot be avoided or replaced</li> </ul>	<ul> <li>Incentives should be developed and implemented for 'bring- your-own' food container, particularly for locals and long- term tourists</li> </ul>				
Food cups, bowls, trays (PP)	<ul> <li>Similar to food plastic bags: are still heavily used, particularly for takeaway purposes</li> <li>Excursion boat operators switched to metal or melamine products</li> </ul>	<ul> <li>Wherever reasonable, reusable glass, metal, melamine or pottery cups and bowls should be used</li> <li>Initiative to "Bring your Own" (BYO) or provide an option to rent reusable cups and food and beverage containers.</li> <li>Development of a branded reusable crockery system for take-away crockery in which all catering outlets participate.</li> </ul>	<ul> <li>Develop Trang branded multi-use cups for beverages, food bowls and trays with a financial deposit system in place</li> </ul>			
Plastic straws (PP) Plastic stirrers	<ul> <li>Not many restaurants changed already to either paper, bamboo or metal straws</li> </ul>	<ul> <li>No-straw policy, reusable variants as required (on-demand)</li> <li>Make changes to the supplies</li> </ul>	<ul> <li>Financial incentives for the use of alternatives to plastic straws should be offered to smaller – street – vendors.</li> </ul>			

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>Collaborate with other businesses to gain better purchasing conditions for reusable metal, bamboo or glass straws and stirrers</li> <li>Initiate and/or support a local initiative to produce straws made from bamboo (e.g. like the <u>BambooLao initiative</u>)</li> </ul>	
Foam Food Packaging (PS) Plastic ice cream spoon (PS)	Still used particularly for fruit	<ul> <li>Switch to suppliers who use paper material or biodegradable pulp cutlery</li> </ul>	
Food trays, cutlery	<ul> <li>Still used by restaurants and street vendors (exception: Baan Modtanoi on Koh Libong)</li> </ul>	<ul> <li>Replace with paper boxes and cutlery made from wood</li> </ul>	
Foam boxes	<ul> <li>Boxes of any size are in use</li> <li>Boxes are partially repurposed and re-used.</li> </ul>	<ul> <li>Shorten supply chains wherever possible to avoid the usage of foam boxes</li> </ul>	<ul> <li>Support the promotion of alternatives like bamboo or cornstarch materials</li> </ul>
Reducing SUP usage	<ul> <li>The majority of businesses, stakeholders and consumers/tourists are not aware of their SUP footprint.</li> </ul>	<ul> <li>Businesses should monitor plastic and other waste volumes regularly: e.g. bi-annual waste audits</li> <li>Businesses should prefer suppliers who comply with sustainability standards.</li> </ul>	<ul> <li>Implement an ordinance for annual reporting about SUP usage and disposal.</li> <li>Develop informational campaigns targeting tourists about the impacts of plastic waste and how they can help</li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>Communicate SUP policies internally and to the online world: own website, booking platforms, destination websites</li> </ul>	<ul> <li>reduce their plastic footprint during their stay (e.g. information presented on ferry boats, pamphlets and other digital channel information)</li> <li>Encourage local sourcing of products to reduce packaging waste and support local economies.</li> <li>Implement policy measures that incentivize businesses to reduce SUP usage, such as recognition programs for low plastic usage.</li> <li>Enforce stricter regulations on the use and sale of SUP products on the island, including a potential ban on particularly harmful items like styrofoam containers and plastic straws.</li> </ul>

# 3.3.6 Potential Measures for Improving Plastic Waste Management in Trang: Collection, Recycling

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies		
Waste disposal	<ul> <li>Tourists are not able to find trash bins in public spaces: exceptions are the</li> </ul>	Businesses partially take     over the waste disposal of	<ul> <li>Installing and maintaining robust bins at various touristic hotspots</li> </ul>		

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
	boat piers and National Park areas	SUP not originating from their own business	<ul> <li>which are identified by colour codes and instructions.</li> <li>Organizing the regular cleaning and clearing of those bins</li> </ul>
Waste separation	<ul> <li>Currently, the public administration provides neither segregated waste collection nor a central waste segregation station.</li> </ul>	<ul> <li>Improve and deepen the private waste acquisition and handling</li> </ul>	<ul> <li>Implement incentives for a more comprehensive waste collection system</li> <li>Implement a waste separation station to reduce the volume of waste remaining for landfill or incineration.</li> <li>Offer training on waste separation and recycling for staff and entrepreneurs.</li> </ul>
Waste collection	<ul> <li>The public administration organizes the daily waste collection.</li> <li>More remote areas are not served at all or served occasionally or areas are omitted (e.g. Koh Mook)</li> <li>PET, metal, glass and carton material are picked and/or sold to waste pickers who sell to junk shops for recycling.</li> </ul>		<ul> <li>Garbage bins are installed in public spaces and beaches and cleared in appropriate intervals</li> <li>Ashtrays, e.g. made from bamboo or other organic material, are made available at the beaches</li> <li>Schools are partially doing the job of a waste bank on Koh Libong: this collaboration could be regionally extended.</li> <li>Elaborate opportunities to enter into a partnership with a social enterprise like <u>Ranong Recycle for</u></li> </ul>

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
			<u>Environment</u> and <u>#Tide</u> or <u>Wongpanik Krabi</u> .
Waste recycling and disposal	<ul> <li>The public administration runs         <ul> <li>a sanitized landfill for Trang City and surrounding Tambons,</li> <li>a landfill with an incinerator on Koh Libong,</li> <li>no landfill site on Koh Mook.</li> </ul> </li> <li>Different junk shop operators purchase PET, HDPE waste, glass, cartons, and metals and sell them to recycling companies on the mainland.</li> </ul>		<ul> <li>Support the expansion and enhancement of recycling facilities on the island to cope with specific types of SUP waste, especially plastics.</li> <li>Levy a fair waste management fee on tourists</li> <li>Re-assess the current waste collection fee for households and businesses</li> </ul>
Cleanliness of the public space	<ul> <li>Particularly accommodation and restaurant operators sitting directly at the beachfront do the daily beach cleaning however not consistently: not enough staff, operation ceased.</li> </ul>	•	<ul> <li>Support regular community-led clean-up events to maintain the environment and promote public awareness of waste issues.</li> <li>Collaborate with schools and other community initiatives</li> </ul>
Stakeholder involvement		<ul> <li>Setting up a clear, manageable and forward-</li> </ul>	• Organize regular meetings with all relevant stakeholders, including

Areas, Applications	Assessment	Measures for Businesses	Measures for Policies
		<ul> <li>looking data collection system to track performance</li> <li>Tourism businesses share useful tips to help guests pack and prepare pre- arrival. Guests are pledged not to bring any SUP items to Trang (especially the islands).</li> <li>Trang-branded zero waste items that help guests travel SUP-free are offered in gift shops.</li> <li>Make waste areas (with bins for recycling) visible for guests creating a reminder for opportunities for improvement.</li> <li>Create a benchmarking system and/or award system for businesses to compare their efforts.</li> </ul>	<ul> <li>business owners, local authorities, and environmental NGOs, to discuss progress, share best practices, and update strategies based on real-world feedback.</li> <li>Ensure that all recommendations and guidelines are easily accessible digitally, allowing businesses and tourists alike to access information readily.</li> </ul>

# 3.3.7 Coordinated Efforts along the Plastic Value Chain in Trang

Action(s)	Objectives
<ul> <li>Implement an officially recognized platform coordinating campaigns (to increase awareness of the harm and negative impacts as well as campaigns about current measures: their goals, their efforts, their intended outcome and the necessary involvement/compliance of different stakeholders)</li> <li>for reducing SUP waste and better plastic waste management for each destination separately.</li> </ul>	<ul> <li>To make efforts towards reducing SUP waste and plastic waste management more effective</li> </ul>
<ul> <li>Compile programs, events and actions of different stakeholders, NGOs and initiatives</li> </ul>	<ul> <li>Make the collaborative efforts for reducing SUP and increase recycling of SUP waste more visible to the public including tourists</li> </ul>
<ul> <li>Produce information videos for the population, business owners and tourists about SUP waste</li> </ul>	<ul> <li>Increase commitment towards more individual action and contribution for SUP avoidance, proper disposal and recycling</li> </ul>
Establish a Trash Hero working group	<ul> <li>To continue with coordinated actions like         <ul> <li>Beach cleaning</li> <li>Selling reusable water bottles and shopping bags</li> <li>Assisting in the dissemination of water re-fill stations</li> </ul> </li> </ul>
<ul> <li>Organize regular, international 'beach cleaning' camps for young volunteers off-season for Koh Mook</li> </ul>	<ul> <li>Increasing awareness about the harm of plastic pollution</li> <li>Increasing commitments from other stakeholders, NGOs and the private sector</li> <li>Cleaning the beaches and particularly the villages</li> <li>Learning effect for the local residents</li> </ul>
<ul> <li>Support existing community-led trash initiatives:</li> <li>Second Life members in Koh Libong</li> <li>Environmental Justice Foundation in Koh Mook</li> </ul>	<ul> <li>To continue with coordinated actions like         <ul> <li>Beach cleaning</li> <li>Selling valuable waste material like PET, metal cans and HDPE containers</li> </ul> </li> </ul>
<ul> <li>Campaigns and pieces of training for the population, business operators and their staff</li> </ul>	• Increase awareness of the seriousness of the problems of SUP

Action(s)	Objectives
	<ul> <li>Explain the opportunities and necessities to avoid, reduce SUP and better handle SUP waste</li> </ul>
<ul> <li>Introducing a 'SUP Waste Fee' for tourists entering an island</li> </ul>	<ul> <li>Increasing awareness and demonstrating commitment towards working for a more sustainable environment</li> </ul>
<ul> <li>Reassessing the municipal waste fee for households and businesses</li> </ul>	• Increase income for more effective waste management on the island
Installation of public waste bins	• Increase the opportunity for visitors to dispose of waste properly
<ul> <li>Resume the campaigning towards 'no free plastic shopping bags' supporting reusable bag alternatives</li> </ul>	<ul> <li>Reduce the use of LDPE shopping bags</li> <li>Retail shops offer a separate dropbox for empty and clean shopping bags</li> </ul>
• Develop a concept of re-usable cups and food containers for takeaway businesses with a deposit system	<ul> <li>Reduce SUP (PP) which is currently not recycled</li> <li>Make SUP reduction and SUP recycling efforts more visible and tangible</li> </ul>
<ul> <li>Formalize the waste segregation in practice and run municipal waste segregation stations</li> </ul>	<ul> <li>Increase the collection rate of 'not so easy' waste categories: LDPE, PP, PS, glass, hazardous waste</li> <li>Operate a new channel for collecting LDPE plastic waste</li> <li>Convincing the population that their effort for waste collection and segregation is not useless</li> </ul>
• Promote the development and adoption of alternative packaging systems to avoid Styrofoam (PS) boxes: bamboo, cornstarch or other durable material like the solution demonstrated by <a href="https://www.koolpakbox.com/with">https://www.koolpakbox.com/with</a> with NFC technology to support the initiative of foam-free zones in Trang.	<ul> <li>Help seriously remove PS foam boxes by offering reasonably priced alternatives with added value.</li> <li>This has pioneering potential if driven by the entire province.</li> </ul>

## 3.3.8 SUP Waste Scenarios for Trang

The following scenarios are combinations of recommended initiatives, measures, policies and programs developed by the consultant team and local stakeholders. These recommendations are based on the steps described above under section 2.3 and focus mainly on measures to reduce SUP and measures of improving SUP collection management with the interaction of tourism businesses. The three scenarios differ in scope and difficulty level to implement the proposed measures and particularly on the number of businesses and other stakeholders subscribing to the proposed measures under the assumption that all measures are taken voluntarily. The different measures rely on the commitment and contribution of different stakeholders: we simplify and group those stakeholders into three sectors: the private sector representing companies, the public sector representing mainly different administrative levels, and NGOs comprising registered organizations and non-registered groups of the civil society. Scenarios exhibit and describe different outcome configurations assuming different conditions that facilitate and/or weaken desired and undesired effects. Scenarios represent a more holistic approach to configuring different mixtures of input and output factors. The scenario technique allows for a more comprehensive evaluation of changes in the ecosystem and their impacts.

#### Scenario A: "Plastic Footprint Reduction Pioneer – 2025"

This Scenario captures the essence of starting the journey towards significant SUP reduction, highlighting the pioneering measures taken to initiate change.

#### Scenario B: "Progressive Plastic Minimization Pathway – 2028"

This Scenario emphasizes the advanced steps taken beyond the foundational measures of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. Yet, it is assumed that Scenario A measures are more effective due to higher commitment levels.

#### Scenario C: "Comprehensive Circular Success – 2030"

This Scenario reflects the highest level of commitment and action, aligning closely with Thailand's Roadmap on Plastic Waste Management 2018 – 2030. It conveys the achievement of a fully integrated and sustainable waste management system. It is assumed that Scenario A measures are more effective than in Scenario B and the additional Scenario B measures are also more effective due to higher commitment levels.

The tables with the recommended measures assess briefly which segments staying in the destination are directly affected or involved (via compliant behaviors): tourists and/or locals (including foreigners and non-local workforce). The second part of the table classifies the main objective of the action. Six different hierarchically arranged objectives are listed: waste generation, repurposing waste material, waste collection, leakage of waste before, during and after transportation to a dump site, recycling of waste material and treatment at the end-of-life of waste material.

Once, the SUP waste flow diagram is completely calibrated for the tourism and the residential/municipal sector, each Scenario undergoes an exhaustive assessment of outcomes resulting in a quantitative and qualitative description of the desired reduction of SUP waste and improved waste management which – ultimately – yields a substantial reduction of Ieakages of SUP waste into the sea.

Abbrev.	Explanation	Abbrev.	Explanation
Private	Private sector	Tour	Tourists: affected, involved
Public	Public sector: municipality, provincial administration, ministries	Local	Locals: affected, involved
NGO	Non-governmental organizations, civil initiatives		
	Main objective: to increase/decrease		Main objective: to increase/decrease
Gen	Waste generation	Rep	Repurpose waste material (other than recycling)
Coll	Collection of waste	Leak	Leakage to the environment (nature, rivers, sea)
Rec	Proper recycling of waste material	EoL	Treatment of end-of-life of waste material
Hi	High responsibility/involvement	Med	Medium responsibility/involvement
Low	Low responsibility/involvement		

## Initial Parameters for Scenario A: "Plastic Footprint Reduction Pioneer - 2025"

Action successfully implemented	ln- dex	Pri- vate	Pub- lic	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Water re-fill station	A1	Hi		Med	Х		х						Reduction of PET consumption
Re-usable drinking bottles	A2	Hi	Low	Med	Х	Х	Х						Reduction of PET consumption
Toiletries	A3	Hi			Х		Х						Reduction of LDPE packaging
Avoid grocery shopping bags	A4	Hi	Hi	Low	Х	Х	Х						Reduce LDPE plastic
Reduce food-wrapping films (LDPE) by applying other solutions	A5	Hi	Low		х	х	х						Reduce LDPE plastic

Action successfully implemented	ln- dex	Pri- vate	Pub- lic	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Reduce PS food trays and cutlery by applying other materials	A6	Hi	Low		х	х	x						Reduce PS plastics in general waste
Regular SUP waste monitoring	A7	Med	Med				Х		Х				Reduce PET, HDPE, LDPE, PP SUP waste
Installing trash bins in public space	A8		Hi		х	х			х				Increase collection rate particularly in public spaces
Staff training and population campaigns about HDPE	A9	Med	Hi		х	х			х		х		Increase collection rate for HDPE
Intensify regular cleaning events: at – remote – beaches and village areas (e.g. together with KTDT)	A10	Low	Med	Hi	х	х			х	х			Collect garbage (SUP waste) which would stay in the environment otherwise

## Initial Parameters for Scenario B: "Progressive Plastic Minimization Pathway - 2028"

Scenario B includes all measures of Scenario A but adds the following initiatives:

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid trash bags used for internal waste collection by applying alternative solutions	B1	Hi	Low		х	х	х						Reduce the volume of LDPE plastic (in the general waste)
Avoid food plastic bags (PP) for ready-to-eat food	B2	Hi	Hi	Med	Х	Х	х						Reduce PP plastic bags

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
and beverages by applying alternative solutions													
Avoid food cups, bowls and trays (PP) by using other solutions	В3	Hi	Hi	Med	х	х	х						Reduce PP SUP in general waste
Further reduce plastic straws (PP), and stirrers	B4	Hi	Med		Х		Х						Reduce PP SUP in general waste
Establish a collection system for used, clean shopping bags	B5	Hi	Hi		х	х			х				Increase collection of LDPE plastic
Improve and extend segregated waste collection including decentralized waste collection stations	В6	Med	Hi	Low		х			х				Increase collection rates for PET, HDPE, LDPE and PP
Extend the waste collection coverage to include remote areas currently not served	Β7	Low	Hi			х			х				Increase collection coverage by formal sector
Install ashtrays at beaches	B8	Low	Hi	Low	х	х			х				Increase the collection rate of 'other' plastic waste
Organize international cleaning events in the off- season, dedicated for young people doing social work/volunteering with a recognized organization	В9	Med	Med	Hi	Х	Х			Х	Х			Collect garbage (SUP waste) which would stay in the environment otherwise

## Initial Parameters for Scenario C: "Comprehensive Circular Success - 2030"

Scenario C includes all measures of Scenario A and Scenario B but adds the following initiatives:

Action successfully implemented	Inde x	Pri	Pub	NGO	Tour	Local	Gen	Rep	Coll	Leak	Rec	EoL	Outcome
Avoid and/or reduce shrink wrap (PVC)	C1	Hi		Low	Х	Х	Х						Reducing the amount of PVC in general waste
Avoid the usage of larger trash bags (LDPE) by alternative collection systems	C2	Med	Hi		х	х	х						Reduce the volume of LDPE plastic (in the general waste)
Avoid food suppliers using PS for wrapping	C3	Hi		Low	Х	Х	Х						Reducing PS in general waste
Completely ban foam boxes for food transportation	C4	Hi	Hi	Low	х		х			х		х	Reducing PS in general waste, leakage and landfill

# 4 Recommendations for concrete measures and pilot projects to avoid SUP and packaging for tourism businesses (especially hotels and activity providers) and visitors

## 4.1 Section Overview

This section outlines potential pathways for the tourism sector in Koh Tao and Trang to mitigate plastic waste. It presents concrete measures and pilot projects for tourism businesses, focusing on hotels and activity providers, to reduce SUP and packaging waste. Finally, the section provides a summary on the outcome of the 2<sup>nd</sup> stakeholder workshops for implementing the proposed recommendations, enabling stakeholders to take concrete steps (will be completed after 2<sup>nd</sup> Stakeholder Workshops).

# 4.2 Final Scenario and Recommendations for the Tourism Sector in Koh Tao

## 4.2.1 The current situation for the tourism sector in Koh Tao in brief:

- In 2023 about 453.000 tourists arrived by boat at the island (based on arrival statistics of ferry operators).
- According to local stakeholders, there are no day-trip visitors to Koh Tao. Excursionists, snorkelers, and divers are coming by boat close to the shore but do not come to the shore.
- Since there are no accommodation-based arrival and overnight statistics available, expert judgements are used to build a tourist structure model based on different average lengths of stay (yielding an estimate of overnights generated by the reported arrival numbers) and within these segments differentiating between different activity profiles (resulting in a different SUP waste volume for each tourist segment).
- With the average length of stay assumptions, the tourist arrival numbers can be converted into a population equivalent of around 11,000. Since it was assumed that 50% of the long-term tourists stay in private and not in commercial accommodation, 3,000 persons are treated as local households for the waste flow analysis.
- Three different mixtures for the segments based on the average length of stay (see Annex Measuring the Plastic Waste in the Tourism Sector for the detailed structure of segment sizes) result in different SUP waste volumes per year:

Plastic type	1	2	3	4	5	6	Waste Share of long-term	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Low (Baseline)	46%	5%	12%	33%	2%	1%	41%	439	1.2
Medium	46%	5%	12%	33%	2%	1%	47%	477	1.3
High	47%	5%	12%	33%	2%	1%	53%	525	1.4

## Table 4.1: Share of SUP volume depending on the share of long-term tourists

• PET plastic is the dominant SUP waste volume followed by LDPE.

 LDPE plastic (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) accounts for the second-highest weight volume on average, driven by the relatively high importance of long-term stay tourists (partially staying for business/job reasons for periods of 1 to 3 months and up to one year).

• The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Smaller foam boxes are – kind of – banned from sale to

and on the island. PS-based dishes, bowls and cutlery are almost not visible and used any more. Large foam boxes are officially not picked by the waste collection staff. Part of these used boxes are sent back to the mainland.

• Considering current volumes, recycling practices and environmental impacts, a clear priority can be derived starting with reducing (and if not entirely avoidable, increasing the recycling volume of) LDPE and PET plastics followed by PP and PVC.

## 4.2.2 Review of the proposed measures and recommendations

The baseline assessment of the SUP waste generated by overnight tourists was presented to the audience during the Stakeholder Workshop on June 4, 2024, at Koh Tao Regal Resort in Koh Tao. This assessment was based on the plastic waste generated by 12 different businesses the previous business day.

A preliminary proposal of 23 measures had been compiled based on the initial discussions at the Expert Roundtable with 14 participants from Koh Tao on March 11, 2024, and the subsequent individual talks with owners and managers from 12 businesses during March 11 and 22, 2024. These actions were briefly explained and categorized by criteria such as 'Who is mainly involved in the implementation?', 'Who is mainly affected by this action?', and 'What is the main effect within the entire waste management process?'.

The 23 measures were arranged in three different scenarios, A, B, and C, representing varying levels of effort and difficulty. Consequently, it was proposed that the measures should be implemented gradually over time, rather than all at once. Specifically, the different target years were associated with the different scenarios: Scenario A measures by 2025, Scenario B measures by 2028, and Scenario C measures by 2030.

The participants of the Stakeholder Workshop in June 2024 were invited to review these measures and scenarios, providing ratings for **the priority and effectiveness** of each proposed action, and to review the timeline for implementing these measures. The detailed results of this feedback are documented in the Annex.

The feedback from the 19 participants of the Tourism part of the Stakeholder Workshop led to a revision of all recommended measures. One major outcome of the Workshop was the development of two separate Scenarios: one for the Tourism sector and one for the Municipal sector. Additionally, the feedback on the timeline of the initial three scenarios recommended starting with most of the high-priority and effective measures in 2024 and 2025. Only the most effortful measures and implementation activities should start a little later. To determine the priority and effectiveness of each action, the share of attendees who assigned a very high priority to an action was multiplied by the share who assigned a very high effectiveness to that action. This resulted in a score ranging from 0 to 100, with 100 representing high priority and high effectiveness in achieving a particular outcome.

Table 3-2 below lists the measures ranked from highest to lowest score, based on the priority and effectiveness as assessed by the Stakeholder Workshop participants. The private sector will have a high to medium level of involvement in implementing these measures. The other two columns to the right indicate the approximate extent to which other stakeholders from the public administration and non-governmental organizations will also play a role in the successful implementation.

For the Koh Tao tourism community, promoting the use of reusable shopping bags holds the highest priority to reduce the bulk of SUP waste that is currently not recycled. Similarly, replacing food trays and cutlery made from polystyrene is also a top priority concern. Ranked third is the implementation of a regular SUP waste monitoring system, which will be supported by WWF Thailand through the provision of a tool, support, and feedback. Additionally, the reduction of plastic straws and stirrers with other materials is given a high priority, with a score of 62 out of 100.

Measures in the mid-range of the priority and effectiveness scores include individual businesses taking steps to reduce different types of single-use plastics. These include promoting the use of reusable drinking bottles, replacing plastic bags, cups, and bowls for ready-to-consume food and beverages, completely banning foam boxes, finding alternative provisions for toiletries in accommodation

bathrooms, and replacing food-wrapping films with other solutions. The idea of retail shops offering a free collection system for empty plastic shopping bags was also considered relevant and effective. However, this approach is only reasonable if the subsequent steps towards LDPE recycling can be assured. The remaining seven action items in the list are not given high priority and/or effectiveness.

Action/measures successfully implemented	Index	Pri	Pub	NGO	Score	Outcome
Avoid grocery shopping bags	A4	Hi	Hi	Low	83	Reduce LDPE plastic
Avoid PS food trays and cutlery	A6	Hi	Low		79	Reduce PS plastics in general waste
Regular SUP waste monitoring	A7	Hi	Low	Med	66	Reduce PET, HDPE, LDPE, PP SUP waste
Further reduce plastic straws (PP), and stirrers	B4	Hi	Med		62	Reduce PP SUP in general waste
Re-usable drinking bottles	A2	Hi	Low	Med	48	Reduction of PET consumption
Avoid food plastic bags (PP) for ready-to-eat food and beverages	B2	Hi	Hi	Med	48	Reduce PP plastic bags
Single-use packages of Toiletries	A3	Hi			47	Reduction of HDPE packaging
Establish a collection system for used, clean shopping bags	B5	Hi	Hi		45	Increase collection of LDPE plastic
Completely ban foam boxes for food transportation	C4	Hi	Hi	Low	45	Reducing PS in general waste, leakage and landfill
Avoid food cups, bowls and trays (PP)	B3	Hi	Hi	Med	39	Reduce PP SUP in general waste
Reduce food-wrapping films (LDPE)	A5	Hi	Low		38	Reduce LDPE plastic
Staff training and population campaigns about HDPE	A9	Med	Hi		34	Increase collection rate for HDPE
Avoid and/or reduce shrink wrap (PVC)	C1	Hi		Low	30	Reducing the amount of PVC in general waste
Water re-fill station	A1	Hi		Med	27	Reduction of PET consumption
Avoid food suppliers using PS for wrapping	C3	Hi		Low	26	Reducing PS in general waste
Organize international cleaning events/camps in the off-season	B9	Med	Med	Hi	21	Collect garbage (SUP waste) which would stay in the environment otherwise
Avoid trash bags used for internal waste collection	B1	Hi	Low		9	Reduce the volume of LDPE plastic (in the general waste)
Avoid the usage of larger trash bags (LDPE) by using alternative collection systems	C2	Med	Hi		9	Reduce the volume of LDPE plastic (in the general waste)

## Table 4.2: Measures ranked by a combination of Priority and Effectiveness – Koh Tao

The remaining five measures from the initial list require the lead of the public administration, which includes providing resources, policies, supervision, consent, and similar support for several measures deemed very high in priority and effectiveness. Tourism businesses are indirectly affected by the absence or lack of sufficient waste collection infrastructure; a destination where household waste and plastic waste are visible everywhere loses attractiveness.

## Table 4.3: Measures with the required lead of the Public Administration – Koh Tao

Measures successfully implemented	Index	Pri	Pub	NGO	Score	Outcome
Installing trash bins in public space	A8		Hi		66	Increase collection rate particularly in public spaces
Extend the waste collection coverage	B7	Low	Hi		56	Increase collection coverage by the formal sector

Measures successfully implemented	Index	Pri	Pub	NGO	Score	Outcome
Organizing/resuming regular cleaning events: at – remote – beaches and village areas	A10	Low	Med	Hi	51	Collect garbage (SUP waste) which would stay in the environment otherwise
Improve and extend segregated waste collection including decentralized waste collection stations, partially supporting existing initiatives	В6	Med	Hi	Low	47	Increase collection rates for PET, HDPE, LDPE and PP
Install ashtrays at beaches	B8	Low	Hi	Low	41	Increase the collection rate of 'other' plastic waste

The WWF Report "Stop the flood of plastic. Effective measures to avoid SUP and packaging in hotels" assessed multiple measures that businesses individually and collectively with the support of the public administration and NGOs can implement to improve plastic waste management. Almost all proposed measures for Koh Tao and Trang are covered by this WWF Top 10 most important measures listed. The following Exhibit extracted this Top 10 list adding the reference number of the proposed measures for the two assessment areas. A few more measures are regionally specific and considered relevant: A8, B5 (high relevance), A10, B8, B9 (medium relevance), C2 (low relevance).

## Exhibit 4.1: 10 Top Most Important Measures to Reduce Plastic Waste in Tourism



	3. Avoid single-use packaging
Practicability	Avoid single-use packaging and pre-portioned products for one-time consumption in all areas of your hotel.
Financial impact	
Environmental impact 😡	
	4. Avoid single-use plastic products
Practicability	Avoid single-use products, e.g. made of plastic, in all areas of your hotel.
Financial impact	Use reusable alternatives for dishes, cutlery, cups, lunch boxes or disposable toiletries.
Environmental impact 😡	B1 B4
	5. Reusable returnable containers for beverages
Practicability	In your current range of products, prioritise beverages in reusable containers, both when buying and serving drinks.
Financial impact	A2
Environmental impact 😡	
	6. Make drinking water available and communicate effectively with guests
Practicability	Inform your guests about the quality of the tap water and if possible, make it available to them instead of water in plastic
Financial impact	bottles. If the tap water quality does not meet the quality standards or expectations of your guests, install a water treatment system.
Environmental impact 😡	If this is not possible, provide water dispensers.
1973	7. Avoid single-use packaging in purchasing A4 A5 and procurement processes
Practicability	Require low-waste or reusable returnable transport packaging when buying products.
Financial impact	Ask suppliers to take back single-use packaging. If they are not willing, use bulk containers for food.
Environmental impact 😡	C1 C3 C4

	8. Staff training
Practicability	Inform your employees on a regular basis about which measures are implemented in your hotel to avoid and reduce plastic waste.
Financial impact	Train them in the correct use of packaging and disposable products, avoidance and waste separation.
Environmental impact 😡	A9
<b>(</b> 4)	9. Information and integration of guests
Practicability	Communicate to your guests which measures have been undertaken in the hotel to avoid waste and how they can contribute.
Financial impact	Share information with your guests about environmental protection measures and waste management in the region.
Environmental impact 🥺	Involve guests in projects and initiatives.
	10. Collective action and cooperation in the region
Practicability	With alliances, partnerships and collaborations, pressure on municipal and supraregional decision-makers as well as on
Financial impact	suppliers can be increased D1 to D8
Environmental impact 😡	

## 4.2.3 Plastic Waste Reduction Scenario for the Tourism Sector

The revised assessment of action priorities and effectiveness leads to the following trajectory of plastic waste reduction. We describe three different scenarios for 2025, 2028, and 2030 by applying the simulation described in the method section in the Annex (see Measuring Plastic Waste in the Tourism Sector Section 'Simulating Scenario Outcomes for Different SUP Measures'). In summary: the plastic waste volume is estimated by multiplying the average plastic waste profiles of different visitor segments by the expected visitor volume for a particular year in the destination. The expected reduction effects are then assessed for each proposed action and plastic category based on expert judgments. The documentation for the scenario trajectory and assumed reduction effects can be found after the brief scenario state descriptions. The essence of the Plastic Waste Scenario is depicted in the following graphic (see Figure 3-1).



## Figure 4.1: The principle of Plastic Waste Scenarios 2025 to 2030 for the Tourism Sector

## 4.2.3.1 Scenario State 2025: "Plastic Footprint Reduction Pioneer"

This scenario state captures the essence of initiating the journey towards significant SUP reduction, highlighting the pioneering measures taken to catalyze change. In this initial development stage of the scenario, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 14%, representing between 162 and 190 kg of plastic waste per day. The highest reduction effect in absolute weight and volume would be for PET, followed by LDPE. The additional collection efforts could increase the estimated collection rate from 94% to 94.5%, helping to reduce mainly LDPE and PET plastic that would otherwise be burned individually or ends up in the environment.

## 4.2.3.2 Scenario State 2028: "Progressive Plastic Minimization Pathway"

This Scenario state emphasizes the advanced steps taken beyond the foundational measures of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. However, it is assumed that all Scenario measures may be more effective due to higher commitment levels.

In this Scenario state, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 23%, representing between 277 and 324 kg of plastic waste per day. The highest reduction effect in absolute weight and volume would be for PET, followed by LDPE.

The additional collection efforts increase the estimated collection rate from 94% to 96%, helping to reduce mainly HDPE, LDPE, and PET plastic which would otherwise be burned individually or end up in the environment. In the absence of reliable data on the smoking behavior of locals and tourists, it is not possible to produce exact estimates. However, based on irregular beach cleaning activities, it can be assumed that the volume of cigarette butts that could be collected and recycled properly at the beaches starts at a few kilograms per day.

## 4.2.3.3 Scenario State 2030: "Comprehensive Circular Success"

This Scenario state reflects the highest level of commitment and action, closely aligning with Thailand's Roadmap on Plastic Waste Management 2018 – 2030. It conveys the achievement of a fully integrated and sustainable waste management system. Scenario 2025 measures are assumed to be more effective than in Scenario 2028, and the additional Scenario 2028 measures are also more effective due to higher commitment levels.

In this Scenario state, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 38%, representing between 460 and 538 kg of plastic waste per day. The highest reduction effect in absolute weight and volume would be for PET, followed by LDPE.

The additional collection efforts increase the estimated collection rate from 94% to 96.7%, helping to reduce mainly HDPE, LDPE, and PET plastic that would otherwise be burned individually or end up in the environment. Due to the absence of reliable data on the smoking behavior of locals and tourists, it is not possible to produce exact estimates. However, based on irregular beach cleaning activities, it can be assumed that the volume of cigarette butts that could be collected and recycled properly at the beaches starts at a few kilograms per day.

The table below summarizes the key Scenario outcomes over time.

	Koh Tao
Per year in mt	
SUP Volume: low	439
SUP Volume: high	525
Reducing SUP waste	14% to 38%
SUP Waste Reduction per day in kg	
Scenario State 2025	162 – 190
Scenario State 2028	277 – 324
Scenario State 2030	460 – 538
Highest reduction	PET
Increase in collection rate in %-points	+0.5% - 2.7%

#### Table 4.4: Synopsis of Scenario Outcomes for Koh Tao

Tourism Plastic Waste Reduction Scenario 2025 - SUP Waste	in kg per da	iy - Koh Tao	)				
	PET	HDPE	PVC	LDPE	PP	PS	Total
	1	2	3	4	5	6	SUP
Baseline SUP Volume	557	59	149	399	24	13	1,202
Reduction effect:							
Avoid grocery shopping bags (LDPE)				7%			
Regular SUP waste monitoring	5%	5%	5%	5%	5%	5%	
Avoid plastic straws and stirrers (PP)					2%		
RE-usable drinking bottles (PET)	5%						
Toiletries in accommodations (HDPE)		20%					
Reducee food-wrapping films (LDPE)				1%			
Water re-fill stations (PET)	5%						
Total reduction effect	15%	25%	5%	13%	7%	25%	14%
Remaining plastic waste	474	44	142	347	23	10	1039
Reduction	84	15	7	52	2	3	162

## Table 4.5: Tourism Plastic Waste Reduction Scenario 2025 for Koh Tao

Note: reduction effects (in %) are based on expert judgements.

Tourism Plastic Waste Reduction Scenario 2028 - SUP Waste	e in kg per day	/ - Koh Tao					
	PET	HDPE	PVC	LDPE	PP	PS	Total
	1	2	3	4	5	6	SUP
Baseline SUP Volume	557	59	149	399	24	13	1,202
Reduction							
Avoid grocery shopping bags (LDPE)				10%			
Reduce PS food trays and cutlery						25%	
Regular SUP waste monitoring	7%	7%	7%	7%	7%	7%	
Avoid plastic straws and stirrers (PP)					3%		
RE-usable drinking bottles (PET)	7%						
Avoid food plastic bags (PP)					5%		
Toiletries in accommodations (HDPE)		25%					
Avoid food cups, bowls and trays (PP)					10%		
Reduce food-wrapping films (LDPE)				2%			
Water re-fill stations (PET)	10%						
Avoid trash bags for internal waste collection (LDPE)				7%			
Total effect	24%	32%	7%	26%	25%	32%	23%
Remaining	423	40	139	295	18	9	925
Reduction	134	19	10	104	6	4	277

## Table 4.6: Tourism Plastic Waste Reduction Scenario 2028 for Koh Tao

Note: reduction effects (in %) are based on expert judgements.

	PET	HDPE	PVC	LDPE	PP	PS	Total
	1	2	3	4	5	6	SUP
Baseline SUP Volume	557	59	149	399	24	13	1,202
Reduction							
Avoid grocery shopping bags (LDPE)				15%			
Reduce PS food trays and cutlery						30%	
Regular SUP waste monitoring	10%	10%	10%	10%	10%	10%	
Avoid plastic straws and stirrers (PP)					4%		
RE-usable drinking bottles (PET)	10%						
Avoid food plastic bags (PP)					10%		
Toiletries in accommodations (HDPE)		30%					
Avoid food cups, bowls and trays (PP)						50%	
Reduce food-wrapping films (LDPE)					15%		
Water re-fill stations (PET)				4%			
Avoid trash bags for internal waste collection (LDPE)			20%				
Total effect				5%			
Remaining	15%						
Reduction						1%	
Baseline SUP Volume				10%			
Reduction	35%	40%	30%	44%	39%	91%	38%
Avoid grocery shopping bags (LDPE)	362	35	105	224	15	1	742
Reduce PS food trays and cutlery	195	23	45	176	10	12	460

## Table 4.7: Tourism Plastic Waste Reduction Scenario 2030 for Koh Tao

Note: reduction effects (in %) are based on expert judgements.

## 4.2.4 Steps towards implementation

Additional joint measures are proposed (they have not been assessed by a quantitative rating) to complement many of the individually implemented measures. Communities and destinations need to share with their members, stakeholders and the public (travelers, media, NGOs) what they plan to do to reduce and better manage SUP waste and what the outcome finally is. Therefore, a couple of measures are listed here in brief and discussed in more detail in the following sub-section (This short list of implementational steps will be updated with the input and commitments compiled during the 2<sup>nd</sup> Stakeholder Workshop):

- Campaigning via various media channels
- Assisting businesses and staff with training and implementation of SUP reduction measures
- Promote the voluntary use of a Plastic Waste Monitoring Tool for businesses
- Raise money for better waste management resources
- Implement island-/province-wide branded re-usable cups, food trays and cutlery under a deposit system and central management.

Joint Measures to be implemented	Index	Pri	Pub	NGO	Score	Outcome
Resume the campaigning towards 'no free plastic shopping bags' supporting reusable bag alternatives	D7	Med	Hi	Med	Hi	Reduce the use of LDPE     shopping bags
Support existing community- led trash initiatives	D3		Hi	Hi	Hi	<ul> <li>To continue with coordinated actions like         <ul> <li>Beach cleaning</li> <li>Selling valuable waste material like PET, metal cans and HDPE containers</li> </ul> </li> </ul>
Develop a concept of branded re-usable cups and food containers for takeaway businesses with a deposit system	D8	Hi	Hi	Med	Hi	<ul> <li>Reduce SUP (PP) which is currently not recycled</li> <li>Make SUP reduction and SUP recycling efforts more visible and tangible</li> </ul>
Implement an officially recognized platform coordinating campaigns for reducing SUP waste and better plastic waste management for each destination	D1		Ŧi	Med	Med	To make efforts towards reducing SUP waste and plastic waste management more effective
Compile programs, events and actions of different stakeholders, NGOs and initiatives	D2		Hi	Hi	Med	Make the collaborative efforts for reducing SUP and increase recycling of SUP waste more visible to the public including tourists
Develop campaigns, information videos and pieces of training for the population, business operators and their staff and tourists about SUP waste	D4		Hi	Hi	Med	<ul> <li>Increase awareness of the seriousness of the problems of SUP</li> <li>Explain the opportunities and necessities to avoid, reduce SUP and better handle SUP waste</li> <li>Increase commitment towards more individual action and contribution for SUP avoidance, proper disposal and recycling</li> </ul>

## Table 4.8: Joint measures to support to improve plastic waste management in Koh Tao

Joint Measures to be implemented	Index	Pri	Pub	NGO	Score	Outcome
Extending the 'Tourist Tax' (introduced under the BIOFIN project in Dec. 2022) for tourists which is dedicated to improving sustainable practices in the area of waste management	D5		Hi	Med	Med	Increasing awareness and demonstrating commitment towards working for a more sustainable environment
### 4.3 Final Scenario and Recommendations for the Tourism Sector in Trang Province

### 4.3.1 The current situation for the tourism sector in Trang in brief:

- Before Covid-19 in 2019, the official statistics reported 1.564 mn visitors to the Trang Province. 79% or 1.239 mn were overnight tourists and 21% or 0.325 mn were excursionists without overnight.
- In the absence of any official tourism statistics or boat operator or pier pax numbers for subregions and the islands, we allocate the total visitor number to the following sub-regions according to the estimated room capacities assuming a shortfall of official accommodation numbers by 20% and an underreporting of room capacities by 15%. For the baseline estimation (Mixture Medium), the official visitor counts are used.

Sub-region	# hotels/ resorts	Total rooms	Share of total visitors	Overnights	Daytrippers
Pak Meng	30	750	16%	328,564	52,247
Koh Libong	18	360	8%	157,711	25,079
Koh Mook	53	795	17%	348,277	55,382
Koh Kradang	9	180	4%	78,855	12,539
Trang City	50	2000	43%	876,169	139,326
Koh Ngai	12	240	5%	105,140	16,719
Koh Sukorn	17	340	7%	148,949	23,685
Total	189	4665	100%	2,043,665	324,978

### Table 4.9: Approximation of accommodation capacities and demand volumes for Trang 2019

- 87% of the overnight tourists are Thais, 13% are foreigners. 89% of the excursionists are Thai, the others are foreigners. On average, overnight tourists stay 1.65 nights.
- For the estimation of the daily SUP waste generation, only two different profiles are applied: one for the average overnight tourist and one for the average day trip visitor.
- PS packaging material and foam boxes could not be traced and apportioned to a particular number of daily visitors. The empty cells under plastic category 6 do not signify that there is no PS SUP in use.
- First, the tourism-induced plastic waste volume for the entire Trang Province is exhibited for the two segments (baseline or Mixture Medium assumptions).
- Followed by three different mixtures for the two visitor segments (considering inaccuracies of the official statistics) resulting in different SUP waste volumes per year for each sub-region.
- The High Mixture assumes 10% day trip visitors, 90% overnight tourists and an overall visitor volume increase of 15% compared to the 2019 figures.
- The Low Mixture assumes 25% (20% for Pak Meng) day trip visitors, 75% (80% for Pak Meng) overnight tourists and an overall reduction of the visitor volume by 15% compared to the 2019 figures.

 Table 4.10: Share of SUP volume depending on the mixture between overnight and daytrip

 visitors - Trang

Plastic type	1	2	3	4	5	6	Waste Share of overnight	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per vear	Per dav
Total Tourism Trang	124	25	5	59	28	0		241	0.66
Overnight tourists only	109 t	24 t	5 t	54 t	21 t	0 t	100%	212	0.58
Day trip visitors only	15 t	0.8 t	0.3 t	5.9 t	7 t	0 t	0%	29	0.08
In kg									
Pak Meng									
Low	46	9	2	22	11	0	82%	33	0.09
Medium	55	11	2	26	12	0	88%	39	0.11
High	63	13	3	30	13	0	91%	45	0.12
Koh Libong									
Low	22	4	1	10	6	0	78%	16	0.04
Medium	26	6	1	13	6	0	88%	19	0.05
High	30	6	1	15	6	0	91%	21	0.06
Koh Mook									
Low	48	9	2	23	12	0	78%	34	0.09
Medium	58	11	2	28	13	0	88%	41	0.11
High	67	14	3	32	14	0	91%	47	0.13
Koh Kradang									
Low	9	2	0	4	2	0	100%	6	0.02
Medium	11	3	1	6	2	0	100%	8	0.02
High	14	3	1	7	3	0	100%	10	0.03

- PET plastic is dominant with about 50% for both visitor segments. Within the overnight segment, LDPE (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) has the second highest share with about 25%. In contrast, PP SUP has a more prominent share of the day trip segment with 24% compared to LDPE with only 20%.
- The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Foam boxes are still in use everywhere. PS-based dishes, bowls and cutlery are also still in use.
- For Koh Kradang, it is not allowed for day trip visitors to bring any SUP to the island. This explains why the waste generation table above does not consider any SUP waste generated on the island.

### 4.3.2 Review of the proposed measures and recommendations

During the Stakeholder Workshop on June 6, 2024, at Thumrin Thana Hotel in Trang City, the baseline assessment of the SUPwaste generated by overnight and day trip tourists was presented to the audience. This assessment was based on the plastic waste generated by 10 different businesses (4 resorts, 5 restaurants, 1 homestay, 7 in Pak Meng, 2 in Koh Libong, 1 Koh Mook) of the previous business day.

A preliminary proposal of 25 measures had been compiled based on the first conversations at the Expert Roundtable with 16 participants from Pak Meng, Koh Libong and Koh Mook on March 25, 2024 and the consecutive individual talks with owners and managers from 18 businesses (10 from Pak Meng, 5 from Koh Libong, 3 from Koh Mook) during March 25 and April 2, 2024. These measures were briefly explained and categorized by criteria such as 'Who is mainly involved in the implementation?', 'Who is mainly affected by this action?', and 'What is the main effect within the entire waste management process?'.

All 25 measures were arranged in three different Scenarios A, B and C which represented different effort and difficulty levels associated with the different measures. Consequently, it was proposed that not all measures should be implemented at once and immediately. Hence, different target years were associated with the different Scenarios: A = 2025, B = 2028, C = 2030.

The participants of the Stakeholder Workshop in June 2024 were invited to review these measures and Scenarios by giving ratings for the priority and the effectiveness of each proposed action and to review the timeline of the implementation of these measures. The detailed results of this feedback are documented in Annex.

The feedback of the 24 participants of the Tourism part of the Stakeholder Workshop led to a revision of all recommended measures. One major outcome of the Workshop leads to the development of two separate Scenarios: one for the Tourism (mainly private) sector and one for the Municipal sector (mainly in charge of the waste management system). Another feedback on the timeline of the initial three scenarios was to eliminate this differentiation and – instead – start with most of the proposed action immediately. For this reason, the share of those attendants assigning a very high priority to an action was multiplied with the share of those assigning a very high effectiveness to this action. This resulted in a score ranging from 0 to 100 with 100 representing high priority and high effectiveness of this measure to achieve a particular outcome.

Table 3-13 below lists those measures ranked from highest to lowest score for which the private sector will have a high to medium involvement. The other two columns to the right ('Pub' and 'NGO') indicate roughly whether and to which extent other stakeholders from the public administration and non-governmental organisations will play a role for the successful implementation.

For the Trang tourism community, it is of utmost priority to – further – reduce the relatively small plastic bags used – particularly for wet – food and cups made from PP plastic for drinks. The popularization of using reusable drinking bottles ranges on top of their action list could further reduce plastic (PET) and glass waste. The third most pressing issue refers to the use of so-called foam boxes made from polystyrol (PS). A complete ban would be appreciated. The following action in this list (Avoid PS food trays and cutlery with other materials) would also help reducing PS plastic waste.

The next important measures would help to reduce the LDPE plastic: Avoid food-wrapping films (LDPE) with other solutions and reduce trash bags used for internal waste collection by alternative solutions. Avoiding plastic shopping bags is not seen as a top priority. This is followed by another area (Further replacing plastic straws (PP), and stirrers with other materials) which helps reduce PP plastic waste. With a much lower priority x effectiveness score, the action 'Avoid food cups, bowls and trays (PP) with other solutions' would also contribute to the reduction of this type of plastic which is rarely brought into recycling.

Three measures which rely much on the collaboration of the private sector are ranked with medium priority and effectiveness. All three are not directly reducing single-use plastic. However, all three have an important learning and awareness effect in common:

- a) The continuous monitoring of SUP waste within one's own business. This action will be supported by WWF Thailand with a tool, support and feedback.
- b) Organizing cleaning events / camps inviting young people to join forces for cleaning beaches / villages from plastic waste. Even though such events would have to be organized by trustworthy international NGOs, the private sector can support these activities particularly in the off-season with in-kind contributions.

c) Similarly, the establishment of a Trah Hero working group is primarily the initiative of NGO(s), but this will only work with the strong local support of tourism businesses.

Measures successfully implemented	Index	Pri	Pub	NGO	Score	Outcome
Avoid food plastic bags (PP) for ready-to-eat food and beverages	B2	Hi	Hi	Med	53	Reduce PP plastic bags
Re-usable drinking bottles	A2	Hi	Low	Med	48	Reduction of PET consumption
Completely ban foam boxes for food transportation	C4	Hi	Hi	Low	48	Reducing PS in general waste, leakage and landfill
Reduce PS food trays and cutlery with other materials	A6	Hi	Low		45	Reduce PS plastics in general waste
Avoid food-wrapping films (LDPE)	A5	Hi	Low		45	Reduce LDPE plastic
Reduce trash bags used for internal waste collection	B1	Hi	Low		43	Reduce the volume of LDPE plastic (in the general waste)
Further reduce plastic straws (PP), and stirrers with other materials	B4	Hi	Med		43	Reduce PP SUP in general waste
Regular SUP waste monitoring	A7	Hi	Low	Med	40	Reduce PET, HDPE, LDPE, PP SUP waste
Organize international cleaning events/camps in the off-season, particularly for Koh Mook	B9	Med	Med	Hi	40	Collect garbage (SUP waste) which would stay in the environment otherwise
Establish a Trash Hero Working Group	B10	Med	Low	Hi	39	Reducing the generation of PET waste, increasing collection rates of SUP waste
Avoid grocery shopping bags	A4	Hi	Hi	Low	39	Reduce LDPE plastic
Reduce food cups, bowls and trays (PP)	B3	Hi	Hi	Med	37	Reduce PP SUP in general waste
Avoid food suppliers using PS for wrapping	C3	Hi		Low	37	Reducing PS in general waste
Reduce the usage of larger trash bags (LDPE) by alternative collection systems	C2	Med	Hi		34	Reduce the volume of LDPE plastic (in the general waste)
Staff training and population campaigns about HDPE	A9	Med	Hi		32	Increase collection rate for HDPE
Establish a collection system for used, clean shopping bags	B5	Hi	Hi		29	Increase collection of LDPE plastic
Water re-fill station	A1	Hi		Med	27	Reduction of PET consumption
Toiletries	A3	Hi			27	Reduction of LDPE packaging
Avoid and/or reduce shrink wrap (PVC)	C1	Hi		Low	20	Reducing the amount of PVC in general waste

Table 4.11: Measures ranked by a combination of Priority and Effectiveness – Trang

The remaining five measures from the initial list require the lead of the public administration: providing resources, policies, supervision, consent and similar for a couple of measures deemed very high in terms of priority and effectiveness. Tourism businesses are indirectly affected by the absence or lack

of sufficient waste collection infrastructure: a destination where household waste and plastic waste are visible everywhere loses attractiveness.

Measures successfully implemented	Index	Pri	Pub	NGO	Score	Outcome
Improve and extend segregated waste collection including decentralized waste collection stations, partially supporting existing initiatives (Koh Libong, Koh Mook)	В6	Med	Hi	Low	60	Increase collection rates for PET, HDPE, LDPE and PP
Extend the waste collection coverage	B7	Low	Hi		60	Increase collection coverage by formal sector
Extend collaboration with schools acting as a waste bank	A11		Hi		56	Gradually increase collection rate for recyclable material
Installing trash bins in public space	A8		Hi		50	Increase collection rate particularly in public spaces
Organizing/resuming regular cleaning events: at – remote – beaches and village areas	A10	Low	Med	Hi	48	Collect garbage (SUP waste) which would stay in the environment otherwise
Install ashtrays at beaches	B8	Low	Hi	Low	44	Increase the collection rate of 'other' plastic waste

Table 4.12: Measures with the required lead of the Public Administration – Trang

The WWF Report "Stop the flood of plastic. Effective measures to avoid SUP and packaging in hotels" assessed multiple measures that businesses individually and collectively with the support of the public administration and NGOs can implement to improve plastic waste management. Almost all proposed measures for Koh Tao and Trang are covered by this WWF Top 10 most important measures listed. The following Exhibit extracted this Top 10 list adding the reference number of the proposed measures for the two assessment areas. A few more measures are regionally specific and considered relevant: A8, B5 (high relevance), A10, B8, B9 (medium relevance), C2 (low relevance).

### Exhibit 4.2: 10 Top Most Important Measures to Reduce Plastic Waste in Tourism







# 4.3.3 Plastic Waste Reduction Scenario for the Tourism Sector in Trang (coastal and island assessment areas)

The revised assessment of action priorities and effectiveness leads to the following trajectory of plastic waste reduction. We describe three different scenarios for 2025, 2028, and 2030 by applying the simulation described in the method section in the Annex. In summary: the plastic waste volume is estimated by multiplying the average plastic waste profiles of different visitor segments by the expected visitor volume for a particular year in the destination. The expected reduction effects are then assessed for each proposed action and plastic category based on expert judgments. The documentation for the

scenario trajectory and assumed reduction effects can be found after the brief scenario state descriptions. The essence of the Plastic Waste Scenario is depicted in the following graphic (see Figure 4.2).



### Figure 4.2: The principle of Plastic Waste Scenarios 2025 to 2030 for the Tourism Sector

### 4.3.3.1 Scenario State 2025: "Plastic Footprint Reduction Pioneer"

This scenario state captures the essence of initiating the journey towards significant SUP reduction, highlighting the pioneering measures taken to catalyze change. In this initial development stage of the scenario, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 17%, representing between 51 (for Mixture 1) and 58 kg (for Mixture 3) of plastic waste per day (Mixture 2 = Baseline: 54 kg). The highest reduction effect in absolute weight and volume would be for PET, followed by LDPE. The additional collection efforts could increase the estimated collection rate by 2.6 to 10.4 %-points helping to reduce mainly LDPE and PET plastic that would otherwise be burned individually or end up in the environment.

### 4.3.3.2 Scenario State 2028: "Progressive Plastic Minimization Pathway"

This Scenario state emphasizes the advanced steps taken beyond the foundational measures of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. However, it is assumed that all Scenario measures may be more effective due to higher commitment levels.

In this Scenario state, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 24%, representing between 77 and 92 kg of plastic waste per day. The highest reduction effect in absolute weight and volume would be for LDPE, followed by PET.

The additional collection efforts increase the estimated collection rate by 2.6 to 10.4 %-points helping to reduce mainly HDPE, LDPE, and PET plastic which would otherwise be burned individually or end up in the environment. In the absence of reliable data on the smoking behavior of locals and tourists, it is not possible to produce exact estimates. However, based on irregular beach cleaning activities, it can be assumed that the volume of cigarette butts that could be collected and recycled properly at the beaches starts at a few kilograms per day.

### 4.3.3.3 Scenario State 2030: "Comprehensive Circular Success"

This Scenario state reflects the highest level of commitment and action, closely aligning with Thailand's Roadmap on Plastic Waste Management 2018 – 2030. It conveys the achievement of a fully integrated and sustainable waste management system. Scenario A measures are assumed to be more effective than in the previous Scenario states, and the additional Scenario measures are also more effective due to higher commitment levels.

In this Scenario State, the implemented measures and activities yield a total reduction of SUP waste generation from the tourism sector by 39%, representing between 119 and 136 kg of plastic waste per day. The highest reduction effect in absolute weight and volume would be for LDPE, followed by PET.

The additional collection efforts increase the estimated collection rate by 3.5 to 11.6 %-points helping to reduce mainly HDPE, LDPE, and PET plastic that would otherwise be burned individually or end up in the environment. Due to the absence of reliable data on the smoking behavior of locals and tourists, it is not possible to produce exact estimates. However, based on irregular beach cleaning activities, it can be assumed that the volume of cigarette butts that could be collected and recycled properly at the beaches starts at a few kilograms per day.

The table below summarizes the key Scenario outcomes over time.

	Pak Meng	Koh Libong	Koh Mook	Koh Kradang	Total
Per year in mt					
SUP Volume: Mixture Low	33	16	34	6	89
SUP Volume: Mixture Medium	39	19	41	8	107
SUP Volume: Mixture High	45	21	47	10	123
Reducing SUP waste	17% to 39%	16% to 39%	16% to 39%	16% to 39%	16% to 39%
SUP Waste Reduction per day in kg					
Scenario State 2025	20	10	19	4	54
Scenario State 2028	33	16	30	7	85
Scenario State 2030	48	23	44	10	125
Highest reduction	PET	PET	PET	PET	PET
Increase in collection rate in %-points	+2.6% - 10.4%	+2.6% - 10.4%	+3.5% – 11.6%		

Table 4.13: Synopsis of Scenario Outcomes - Trang

Tourism Plastic Waste Reduction Scenario 2025 - SUP Waste in kg per day – Trang (coastal assessment areas)										
	PET	HDPE	PVC	LDPE	PP	PS	Total			
	1	2	3	4	5	6	SUP			
Baseline SUP Volume	152	30	6	73	34	0	295			
Reduction										
Avoid grocery shopping bags (LDPE)					5%					
Avoid PS food trays and cutlery	5%									
Regular SUP waste monitoring						10%				
Avoid plastic straws and stirrers (PP)				1%						
RE-usable drinking bottles (PET)						20%				
Reduce food plastic bags (PP)										
Toiletries in accommodations (HDPE)					3%					
Completely ban foam boxes (PS)	5%	5%	5%	5%	5%	5%				
Reduce food cups, bowls and trays (PP)				5%						
Reduce food-wrapping films (LDPE)										
Avoid or reduce shrink wrap (PVC)										
Reduce trash bags for waste collection (LDPE)										
Water re-fill stations (PET)	10%									
Avoid food supplies using PS for wrapping		15%								
Reduce trash bags for internal waste collection (LDPE)			5%							
Total effect	20%	20%	10%	11%	13%	35%	17%			
Remaining	121	24	6	65	29	0	245			
Reduction	33	7	1	10	4	0	54			

### Table 4.14: Tourism Plastic Waste Reduction Scenario 2025 for Trang (coastal assessment areas)

Note: reduction effects (in %) are based on expert judgements.

Tourism Plastic Waste Reduction Scenario 2028 - SUP Waste in kg per day – Trang (coastal assessment areas)										
	PET	HDPE	PVC	LDPE	PP	PS	Total			
	1	2	3	4	5	6	SUP			
Baseline SUP Volume	152	30	6	73	34	0	295			
Reduction										
Avoid PS food trays and cutlery					7%					
Regular SUP waste monitoring	7%									
Avoid plastic straws and stirrers (PP)						25%				
RE-usable drinking bottles (PET)				2%						
Reduce food plastic bags (PP)						25%				
Toiletries in accommodations (HDPE)				7%						
Completely ban foam boxes (PS)					2%					
Reduce food cups, bowls and trays (PP)	7%	7%	7%	7%	7%	7%				
Reduce food-wrapping films (LDPE)				7%						
Avoid or reducee shrink wrap (PVC)					10%					
Reduce trash bags for waste collection (LDPE)	15%									
Water re-fill stations (PET)		20%								
Avoid food supplies using PS for wrapping			10%							
Reduce trash bags for internal waste collection (LDPE)	29%	27%	17%	23%	26%	57%	27%			
Total effect	108	22	5	56	25	0	216			
Remaining	44	8	1	17	9	0	79			

### Table 4.15: Tourism Plastic Waste Reduction Scenario 2028 for Trang (coastal assessment areas)

Note: reduction effects (in %) are based on expert judgements.

Tourism Plastic Waste Reduction Scenario 2030 - SUP Waste in kg per day – Trang (coastal assessment areas)									
	PET	HDPE	PVC	LDPE	PP	PS	Total		
	1	2	3	4	5	6	SUP		
Baseline SUP Volume	152	30	6	73	34	0	295		
Reduction									
Avoid PS food trays and cutlery					10%				
Regular SUP waste monitoring	10%								
Avoid plastic straws and stirrers (PP)						50%			
RE-usable drinking bottles (PET)				4%					
Reduce food plastic bags (PP)						30%			
Toiletries in accommodations (HDPE)				10%					
Completely ban foam boxes (PS)					2%				
Reduce food cups, bowls and trays (PP)	10%	10%	10%	10%	10%	10%			
Reduce food-wrapping films (LDPE)				10%					
Avoid or reduce shrink wrap (PVC)					15%				
Reduce trash bags for waste collection (LDPE)						1%			
Water re-fill stations (PET)				5%					
Avoid food supplies using PS for wrapping	20%								
Reduce trash bags for internal waste collection (LDPE)		25%							
Total effect			25%						
Remaining	40%	35%	35%	39%	37%	91%	39%		
Reduction	91	20	4	44	21	0	180		
Avoid PS food trays and cutlery	65	13	2	31	14	0	125		

### Table 4.16: Tourism Plastic Waste Reduction Scenario 2030 for Trang (coastal assessment areas)

Note: reduction effects (in %) are based on expert judgements.

### 4.3.4 Steps towards implementation

Additional joint measures are proposed (they have not been assessed by a quantitative rating) to complement many of the individually implemented measures. Communities and destinations need to share with their members, stakeholders and the public (travelers, media, NGOs) what they plan to do to reduce and better manage SUP waste and what the outcome finally is. Therefore, a couple of measures are listed here in brief and discussed in more detail in the following sub-section (This short list of implementational steps will be updated with the input and commitments compiled during the 2<sup>nd</sup> Stakeholder Workshop):

- Assisting businesses and staff with training and implementation of SUP measures
- Promote the voluntary use of a Plastic Waste Monitoring Tool for businesses
- Campaigning via various media channels
- Promote international camps for beach and village cleaning-ups
- Raise money for better waste management resources
- Implement island-/province-wide branded re-usable cups, food trays and cutlery under a deposit system and central management.

Joint Measures to be implemented	Index	Pri	Pub	NGO	Score	Outcome
Resume the campaigning towards 'no free plastic shopping bags' supporting reusable bag alternatives	D7	Med	Hi	Med	Hi	Reduce the use of LDPE     shopping bags
Support existing community- led trash initiatives: Second Life members in Koh Libong Environmental Justice Foundation in Koh Mook	D3		Hi	Hi	Hi	<ul> <li>To continue with coordinated actions like         <ul> <li>Beach cleaning</li> <li>Selling valuable waste material like PET, metal cans and HDPE containers</li> </ul> </li> </ul>
Develop a concept of branded re-usable cups and food containers for takeaway businesses with a deposit system	D8	Hi	Hi	Med	Hi	<ul> <li>Reduce SUP (PP) which is currently not recycled</li> <li>Make SUP reduction and SUP recycling efforts more visible and tangible</li> </ul>
Implement an officially recognized platform coordinating campaigns for reducing SUP waste and better plastic waste management for each destination (e.g. Koh Libong, Koh Mook) separately.	D1		Ŧi	Med	Med	To make efforts towards reducing SUP waste and plastic waste management more effective
Compile programs, events and actions of different stakeholders, NGOs and initiatives	D2		Hi	Hi	Med	Make the collaborative efforts for reducing SUP and increasing recycling of SUP waste more visible to the public including tourists
Develop campaigns, information videos and pieces of training for the population, business operators and their staff and tourists about SUP waste	D4		Hi	Hi	Med	<ul> <li>Increase awareness of the seriousness of the problems of SUP</li> <li>Explain the opportunities and necessities to avoid, reduce SUP and better handle SUP waste</li> </ul>

### Table 4.17: Joint Measures to support the improve Plastic Waste Management in Trang

Joint Measures to be implemented	Index	Pri	Pub	NGO	Score	Outcome
						<ul> <li>Increase commitment towards more individual action and contribution for SUP avoidance, proper disposal and recycling</li> </ul>
Introducing a 'Tourist Tax' for tourists which is dedicated to improving sustainable practices in the area of waste management	D5		Hi	Med	Med	Increasing awareness and demonstrating commitment towards working for a more sustainable environment

# 4.4 Suggested measures with reference to international practical examples and tools

In the initial phase of this project, the consulting team engaged directly with local business owners and operators to better understand their current practices in plastic waste management. The focus was on identifying the measures already in place to reduce SUP and exploring their effectiveness. This dialogue revealed a variety of measures, including waste reduction initiatives, recycling practices, and several individual efforts to minimize SUP usage.

Following these discussions, the team compiled a comprehensive list of potential measures that can be implemented, primarily targeting the reduction of single-use plastics. These measures were formulated based on both the feedback from local businesses and best practices observed elsewhere. Importantly, the consultants sought to ensure these measures would be scalable and adaptable over time, culminating in the creation of Plastic Waste Scenarios aimed at progressive reductions in SUP through 2030.

A critical element in this process was the assessment of the proposed measures along two dimensions: priority and effectiveness. These evaluations were made through discussions with local and regional stakeholders, allowing for a broad consensus on what measures should be prioritized for implementation.

Two key considerations arose from this process:

1. Diverse Approaches Beyond Individual Measures: While it might seem straightforward to select the top five or ten measures based solely on stakeholder rankings, this would overlook the nuanced and interdependent nature of these interventions. Most of the measures put forward emphasize individual actions by businesses to reduce SUP usage. However, an equally important aspect lies in promoting collaborative measures. Joint efforts involving business groups, associations, and governmental authorities could greatly amplify the impact of individual initiatives, creating a broader network of support that drives change at a more systemic level.

2. Waste Volume vs. Recycling Challenges: From a quantitative standpoint, one might argue for starting with those types of plastic waste that generate the highest volumes, such as PET. However, the actual challenge may be more pressing with plastics like LDPE, HDPE, and PS, for which effective collection and recycling systems are still underdeveloped. Tackling these plastics first could have a significant long-term impact, as addressing the hardest-to-recycle materials will help close critical gaps in the waste management process.

In the following sub-chapters, we illustrate good practice examples that can serve as models for the tourism stakeholders in Koh Tao and Trang. These examples demonstrate the potential pathways for reducing SUP, improving waste collection systems, and fostering collaboration among key actors in the region.

# 4.4.1 Individual Commitments and good practice examples4.4.1.1 Replacing SUP products in the tourism operation:

When replacing SUP products, it is important to carefully consider the waste hierarchy with the preferred option to prevent any waste instead of looking for alternative SUP products. The key aim of any plastic reduction plan should be to avoid, reduce and reuse plastic waste. It is suggested to start developing reusable options for water bottles, shopping bags, toiletries, straws/stirrers and F&B containers across tourism businesses on the island. Businesses can be encouraged to consult the <u>Decision Trees</u> developed by Futouris, a tourism industry initiative for sustainability in Germany. These Decision Trees are a simple step by step process that businesses can follow to reduce or eliminate waste. They have been designed to guide readers through different decision-making scenarios that follow the waste reduction hierarchy.

It is not always obvious for businesses which materials to choose as alternative material to their plastic products. For example, misperceived alternatives like compostable plastics or oxo-degradable packaging should be avoided. Or, if paper is used instead of plastics, it should be FSC certified. In any

case, a choice of materials needs to take into account the recycling opportunities in the respective region. If tourism businesses intend to replace SUP and are considering alternative products, they can be guided through a tool developed by WWF Singapore. In cases where reusable packaging is not possible, the <u>Alternative Materials Tool</u> guides businesses towards single-use packaging materials with a lower environmental footprint, without transferring the environmental cost to another system. It provides a precise ranking of alternative materials and allows material comparisons. where they can check whether better alternatives are available. The environmental impacts are calculated to cover raw material extraction, manufacturing, and the impacts of waste treatment in the country of disposal — currently Thailand, Singapore, Malaysia, Philippines, Korea and Hong Kong.

Besides the material, size matters when purchasing and replacing products, like e.g. toiletries. Guidelines published by the Spanish Agency of Medicines and Medical Devices (AFMP) in 2021 show that the shampoo supply of 45.4 litres for a small hotel leads to a production of 5.46 kg of plastic if served in mini toiletries (50 ml) compared to 0,2 kg of plastics if refilled by a large container.<sup>1</sup> Therefore it is highly recommended that hotels on Koh Tao and Trang switch to large returnable containers to fill small reusable bottles.



Figure 4.3: Example of plastic generation by shampoo supply in a small hotel

<sup>&</sup>lt;sup>1</sup> A guide to honest alternatives to single-use plastic for the hospitality industry, Plastic Free Balearics, 2022

### 4.4.1.2 Sourcing sustainable alternatives for SUP

A common barrier to adopting more sustainable solutions for food and beverage packaging is the cost of non-plastic or non-recyclable material. Through collaborative efforts and economies of scale, joint purchasing decisions supported by cooperative wholesalers can open less expensive alternatives. (See also cooperative procurement below).

### 4.4.1.3 Training for business owners and staff

To effectively reduce SUP waste in Koh Tao's and Trang's tourism sector, comprehensive training programs for business owners and their staff are crucial. These trainings should focus on providing practical knowledge and skills to minimize plastic consumption and transition towards sustainable alternatives.

A key aspect of the training will involve educating participants on different types of plastics, their environmental impact, and the importance of waste segregation. This will include identifying recyclable and non-recyclable plastics commonly used in tourism businesses. Practical workshops can demonstrate proper waste sorting techniques and emphasize the benefits of reducing contamination to improve recycling rates.

Furthermore, the training will equip participants with practical strategies to reduce SUP within their operations. This includes exploring reusable alternatives for common single-use items, implementing refill systems for water and toiletries, and promoting BYO (bring your own) initiatives for customers. Interactive sessions can guide businesses in adapting their purchasing practices to prioritize sustainable and plastic-free products. By providing concrete examples and success stories from other tourism businesses, the training will empower participants to implement tangible changes and contribute to a plastic-conscious Koh Tao and Trang.

The Pacific Asia Travel Association (PATA) together with UNESCO and Expedia Group have developed a free online course on plastic waste reduction for tourism businesses in English and Thai (<u>EN, TH</u>). It is suggested to elaborate opportunities for cooperation and synergies.

### 4.4.1.4 Using the Plastic Waste Monitoring Tool for Tourism Businesses

The Plastic Waste Monitoring Tool for Tourism Businesses is a valuable resource for businesses in any destination seeking to measure and reduce their plastic footprint. However, to fully leverage the tool's capabilities and ensure accurate data collection, dedicated support from WWF in the form of face-to-face training is highly recommended.

#### Packaging Plastic Waste Monitoring Tool for Tourism Businesses

Reporting year	2567	÷	Year of monitoring
Business ID	KT-007	÷	Use the ID assigned by WWF Office
Business Name	Dream Bay Resort		
Location	Shark Bay		
Contact person	Mr. Thai	email:	xxxxx@gmail.com
Baseline/Benchmarking		June <b>Month</b>	2567 <b>Year</b>

	Select here the main service departments of your business for which the plastic waste is measured together	Describe here the capacity for each department with a number	Select the appropriate unit	Default proportions of plastic waste volume per customer	Your estimate for these proportions starting with "1" for your main service
Main service	Accommodation	50	Rooms	1.0	1
Other service 1	Restaurant	75	Seats	0.2	0.25
Other service 2	Spa / Massage	12	Massage beds/cha	0.4	0.2
Other service 3					
Other service 4					
Other service 5					
Staff accommodation	Staff housing			0.3	0.8

Please list the specific actions your business is taking to reduce single-use plastic waste. Include details on the types of plastic items you are replacing or eliminating, such as straws, cups, utensils, bags, food packaging, and toiletries. Describe any changes to your operations that will impact the volume of plastic waste generated and collected from your business. Providing this information will help us better understand and track the plastic waste reduction efforts across the tourism sector.

### Figure 4.4: Screenshot of the Business Profile Page of the Monitoring Tool

Experience from the pilot testing phase highlighted the importance of practical guidance in navigating the tool's features and interpreting its outputs. A short training session would equip business owners and staff with the necessary skills to effectively utilize the tool, ensuring data accuracy and consistency across participating businesses.

Furthermore, the training would provide an opportunity to address the crucial aspects of internal waste collection processes. WWF experts can guide businesses in establishing standardized procedures for waste segregation, collection, and recording, aligning with the tool's requirements. This hands-on support will not only enhance data reliability but also promote a culture of responsible waste management within businesses, maximizing the impact of the monitoring initiative.

### 4.4.1.5 Work with suppliers to reduce packaging waste

Any business should strive to buy in bulk, as long as all the products will be used. And where possible, packaging should be returned to suppliers for reuse. Businesses should encourage their staff to provide feedback when food and other items seem to be over-packaged or packaging is bigger than necessary and avoid buying products which are over-packaged. It is recommended to work with suppliers to reduce packaging waste. (See also cooperative procurement below).

### 4.4.2 Sectoral Collaboration: Collaborating with the tourism sector on pilots

### 4.4.2.1 Plastic Bags:

It is suggested to lobby for an island-wide or province-wide ban on plastic bags as introduced successfully pre-COVID in Koh Tao. A collaborative pilot activity for the tourism sector could be to develop and incentivize island-wide "BYO-bag" (Bring your Own) and "Rent-a-bag" options. The incentivization could be a giveaway of a reusable linen or cotton bag (branded with a slogan and a destination logo) for tourists staying at the SUP frontrunner businesses. The bags should also be for sale and rent at the local shops. Parallel shops should levy a charge for any disposable bags. Island businesses can let visitors rent a reusable bag at a price equivalent to its retail price. Visitors who would like to keep the bag as a souvenir can choose not to return the bag. If they choose to return it, a certain amount of the rent deposit will be refunded as long as the bag is in good condition.

If it is not feasible to provide a bag to sell or borrow, the businesses should consider procuring singleused bags that are from recycled paper (FSC certified) or from recycled HDPE plastic.

Furthermore, the opportunity could be elaborated to start a BBPB Team on Koh Tao, e.g. in cooperation with the local school. BBPB stands for "Bye Bye Plastic Bag", which is a global youth movement that was started in Bali and currently has teams in over 30 countries in the world. The founders recently started an E-learning-platform for young changemakers from around the globe to connect and learn from each other which is called <u>Youthtopia</u>. It offers among others a masterclass on Ocean Plastic Pollution for young changemakers for free.

### 4.4.2.2 Reusable Bottles:

As an important initiative for the plastic waste-free movement, an island-wide Bring-your-own (BYO) bottle campaign is suggested for the tourism sector of Koh Tao. Businesses should encourage visitors to bring their own bottles or refer them to places where they can buy or borrow one and where bottles can be refilled. Tourism businesses should also have a stock of reusable bottles, ideally with iconic branding. Of course, it would be necessary to intensify the opportunities to refill the bottles. It could be elaborated on whether it is feasible to sell reusable water bottles with a filter to be able to drink tap water.

### 4.4.2.3 BYO (Bring your own) F&B cups/containers:

If feasible it is suggested to encourage visitors (and staff) to bring their own F&B containers for takeaway of food and drinks. Furthermore, providing visitors the option to rent reusable F&B containers on the island would help tourists to reduce the amount of waste generated in the first place. This would entail providing convenient stations around Koh Tao for customers to return these cups and other containers. (rented out by a deposit), and would need to factor in hygiene and redistribution of cleaned containers. Visitors who would like to keep the rented takeaways as a souvenirs can choose not to return them. If they choose to return it, a certain amount of the rent deposit will be refunded (see the legislation on The Balearic Islands: Article 25, 27 & 28 about EPR; see Table under 3.4.5. for a web link).

It is suggested to implement green nudge techniques that aim to change tourists' (and citizens') behaviours around SUP use. A rewards system could be devised by involving restaurants, bars and hotels in Koh Tao to offer a discount for customers who bring their own F&B containers, or vice versa - charge extra for disposable cups or containers. With respect to the nudging theory, the effectiveness of interventions combining information and prompts is confirmed. Businesses that agree—or businesses that already allow BYO containers—could display a BYO demonstrating tourists that they can purchase food and beverages in their own or rented container hassle-free. To keep this initiative running smoothly, a central coordinating body and platform is recommended. Such an initiative can incorporate incentivising BYO bags for greater impact. A citywide reward system is being tested in the city of Copenhagen/Denmark, called <u>CopenPay</u>, where attractions reward climate-friendly actions by tourists.

### 4.4.2.4 Reusable straws:

It is recommended that all tourism businesses on Koh Tao avoid SUP straw; if necessary replace with a reusable option and offer straws to customers on demand. Ideally an own production of bamboo straws could be developed for an island-wide shift from SUP straws to reusable bamboo straws, following the example of the <u>BambooLao initiative</u>. This project origins from the city of Luang Prabang in Lao where local villagers produce and supply reusable bamboo straws to the tourism businesses. It was launched in 2017 at the Mekong Tourism Forum. Here low-income families and people living with a disability make bamboo straws to create income for their families. According to their own record already in their first year, they produced over 50,000 straws and prevented over five million plastic straws ending up in the Mekong, since each straw can be used many times:

### 4.4.2.5 Open a Bring Your Own Bottle (BYOB) Store and start a cooperative procurement:

The BYOB Store could be initiated in partnership with local producers and manufacturers like Bans Conservation Center, which already produces and sells eco-friendly products. A BYOB Store is a zero-waste refilling station where people can take reusable bottles and containers and have them refilled at a cheaper cost with the condiments that they need at home.

The shop should serve locals and tourists alike as well as act as a procurement cooperative for local businesses. The cooperative purchases a selection of refill products, from laundry detergent, floor cleaner, bathroom cleaner and dishwashing liquid to shampoo, conditioner and hand sanitizers. If purchasing collectively larger amounts and bigger containers the cooperative can bargain with suppliers for better prices. Examples from Bangkok are the <u>Refill Station Bangkok</u> or <u>Atnest Hotel</u> which doubles as a hostel and bulk store.



Figure 3-5: Refill station at Atnest Hostel, Bangkok (Credit: www.fb.com/atnesthostel)

The products purchased in larger quantities and larger containers could also be for sale e.g. in the 7-Eleven markets or Pen Market on Koh Tao. The procurement cooperative could extend their purchases to farm products produced on the islands or at a shorter distance to the islands to increase the use of locally produced food in hotels and restaurants on Koh Tao. This can reduce transportation and thus packaging. But for many individual tourism businesses, it is often too complicated and too expensive to shop locally. A great example is the Ljubljana Green Supply Chains Project from Slovenia which links local food producers with hotels and restaurants. With the help of an online system, hotels and restaurants can easily access local small farmers and vice versa. Offers are online at prices negotiated by the cooperative on behalf of its members. By involving the cooperative as an intermediary, and since prices are negotiated on behalf of multiple clients and thus larger volumes are purchased, both parties get a better deal than if they were acting alone. In addition, the cooperative carries out checks to ensure that the locally produced goods are of sufficient quality and quantity. To reduce transport even further, a zero km philosophy was implemented by positioning local farmers higher on the platform than farmers living further away.

Another procurement example from Thailand is the <u>Sampran Model</u> which is based on an organic social movement and fair trade. To extend the Sampran Model movement amongst businesses in the travel industry the Thai Health Promotion Foundation sponsored the project <u>Organic Tourism</u>. Hotels and restaurants can connect directly with organic farmers to buy supplies at fair prices, while they engage their consumers in various activities such as organic farming workshops, chef's tables and local farm visits. The procurement cooperative could elaborate opportunities to connect tourism businesses with organic farmers participating in the project.

### 4.4.2.6 Development of criteria and a signet for plastic-conscious tourism businesses

Another recommendation as an initiative for sectoral collaboration is the development of a brand/signet for plastic-conscious tourism businesses. Based on an agreed set of criteria businesses shall be able to communicate and promote their efforts in plastic reduction. These efforts shall be visualized by developing a seal demonstrating the level of achievement. A role model from a German island is the partner project "Plastic-Conscious Accommodations on Föhr". Here accommodations that meet certain criteria are awarded a signet. The bronze, silver and gold levels symbolize different degrees of plastic reduction from the first steps to getting close to being a plastic-free accommodation. So far over 200 accommodations on the island of Föhr have been awarded a "Plastic-conscious accommodation" label issued by the DMO. These are accommodations that are equipped and furnished with a special awareness for the avoidance of plastic. This includes, for example, a plastic-free welcome gift in the form of a reusable bag for fruit and vegetables, a supply of suitable storage containers for food, the provision of reusable shopping bags and plastic-free bottles for drinking water to take away. In the accommodation you will find tips on how to avoid plastic and packaging waste as well as information on local stores that offer packaging-free shopping.

Another example comes from the <u>Balearic Islands</u> in Spain, where a certification has been developed to incentivize the reduction of SUPin the hospitality industry of the Balearic Islands.



Figure 4.6: Signets for plastic-conscious accommodations from Spain and Germany

### 4.4.2.7 Cooperation with international tour operators

International tour operators tend to be keen in getting engaged in destinations they send their customers to. It is suggested to elaborate on possibilities for joint projects with regard to plastic avoidance in the destination. For example, TUI has offers in Koh Tao and the <u>TUI care foundation</u> would be potentially an interesting partner to cooperate with.

## 4.4.3 Capacity-Building (Tools, Training, Awareness raising among businesses and travellers)

### 4.4.3.1 Beach waste container

A low-threshold capacity building and engagement initiative is to install beach waste containers that allow guests to easily dispose of plastic waste collected on the beach. It should be elaborated whether the municipality could manage to collect the waste disposed of in these containers.

### 4.4.3.2 SUP-free Koh Tao pledge

To spread the word about Koh Tao's initiative and goals to reduce SUP on the island it is recommended to implement a pledge for tourists to sign upon arrival (e.g. when paying the tourist tax upon arrival at the pier). The pledge could include a commonly agreed declaration of what Koh Tao is aiming for and what visitors To Koh Tao should aspire to comply with, e.g. to avoid SUP bottled water. The pledge shall encourage tourists to make the right choices while being on the island and make them aware of how the locals would like them to behave. Whether the pledge is to be signed mandatory or not depends on how far the destination is prepared to offer SUP-free offers to their clients. In any case, pledges are becoming famous among tourism destinations. The Icelandic Pledge, created by Visit Iceland in the summer of 2017 kicked off the pledge movement, closely followed by the Palau Pledge. Then came New Zealand's Tiaki Promise in 2018 and the Sustainable Finland Pledge in 2019. There are also more localized pledges, introduced in popular spots across the US such as: Aspen and Telluride (with its Tell-U-Right Pledge) or in California's coastal Big Sur region. The islands of Hawai'i, Kauai and Maui all have their own pledges, as does the Haida Gwaii archipelago in Canada, and Maria Island in Tasmania, Lady Elliott Island in Queensland, and Byron Bay in northern NSW, Australia. It could also be elaborated on whether to cooperate or align with the Travelers Against Plastic (TAP) campaign and their Travelers Against Plastic pledge.

### 4.4.3.3 Digital service for residents and tourists:

An online inventory of businesses that collaborate and commit to reduce SUP is needed to provide the tourists with an overview e.g. where to stay, where to shop or where to refill their bottles. This creates a great opportunity to communicate and market the businesses' efforts while also educating the visitors. It could be a Facebook site, a sub-website of the Tourism Association's website, its own website or it could even be boosted as an app, a digital island guide with SUP avoidance as the primary factor.

An example is the digital service launched by the city of Helsinki in Finland. The <u>Think Sustainably</u> digital service resembles a regular city guide but focuses on environmental sustainability. When users open the app or website, they see listings of cafes, restaurants, bars, shops, cultural centres and other venues — the most sustainable among them marked with a green tag. Another great example is the island nation of Palau, which offers exclusive experiences based on how tourists treat the environment and culture, not by how much they spend. The programme is managed via a custom app called <u>Ol'au</u> <u>Palau</u>, a reward-based gaming app, that teaches eco-friendly etiquette to visitors and offers points to those who treat the island nation gently by making sustainable decisions like using reef-safe sunscreen, visiting culturally important sites or eating sustainably sourced local food. Guests can then redeem their points to unlock cultural and nature-based experiences that are normally reserved for Palauans and their close friends, such as taking an unmarked hike, swimming at a secret cave, sharing a meal with locals and elders and more.

### 4.4.4 Upcycling Initiatives

Upcycling initiatives can create awareness among customers and staff. As an example from Europe, the Paloma hotel group (Turkey) creatively uses and upcycles packaging waste. Staff and guests are encouraged to design usable products from packaging waste. In the mini club, packaging waste is used to produce handicrafts and toys. In addition, around the premises you find upcycled items such as waste bins at the front entrance of the hotel. This not only reuses plastic waste but also creates awareness among staff and guests.

This example is similar to what Koh Tao Cabana Resort has been practicing already for years. Another example is the PlasTao initiative at Sairee Beach which is open to tourists and residents.



Figure 4.7: Example pictures from Paloma Hotel Group (Turkey)

### 4.4.5 Recommendations/Tools and Best Practices

Title	How to source?	
Recommendations and Tools		
Stop the flood of plastic - Effective measures to avoid single-use plastics and packaging in hotels	WWF Germany, 2019: https://www.wwf.de/fileadmin/user_upload/WWF_Plastikstudi e_Hotelmaßnahmen_eng.pdf	
Training on the identification of reusable solutions	Global Tourism Plastics Initiative, 2023: <u>https://www.oneplanetnetwork.org/sites/default/files/2024-02/Training%201_Reuse%20Models%20-</u> <u>%20First%20training%20Nov%202023 withnotes 0.pdf</u> <u>https://www.oneplanetnetwork.org/sites/default/files/2024-02/Training%202_Reuse%20Models%20-</u> <u>%20Alternative%20Products%20and%20Good%20Practice%</u> <u>20Examples%20-%20Jan%202024_withnotes_0.pdf</u>	

Title	How to source?
Training of staff engagement and communication with customers	Global Tourism Plastics Initiative: <u>https://www.oneplanetnetwork.org/sites/default/files/2024-</u> <u>02/Training%203_Reuse%20Models%20-</u> <u>%20Engaging%20Staff%20and%20Guests_withnotes.pdf</u>
Plastics Measurement Methodology for Accommodation Providers	Global Tourism Plastic Initiative, UNEP, UNWTO, 2022: <u>https://www.oneplanetnetwork.org/sites/default/files/from-</u> <u>crm/Measurement%2520Monitoring%2520Methology%2520-</u> <u>fv%25202023.pdf</u> <u>PowerPoint Presentation</u>
Priority Single-Use Plastic Products Decision Trees	UNEP, WTTC 2021: https://www.oneplanetnetwork.org/sites/default/files/from- crm/unep-wttc-suppfull_decisiontrees.pdf
Single-use plastic factsheet	Sustainable Hospitality Alliance: https://www.oneplanetnetwork.org/sites/default/files/from- crm/Plastic-factsheet.pdf
Manual for implementing the Less Plastic Guide	Circular Caribbean, 2023: https://www.oneplanetnetwork.org/knowledge- centre/resources/less-plastic-guide
A guide to honest alternatives to single-use plastics for the hospitality industry	Plastic Free Baleares, 2022: https://en.plasticfreebalearics.org/about-6
Toolkit for plastic waste-free tours	IUCN, Norad, Searious Business, 2020: https://www.oneplanetnetwork.org/sites/default/files/from- crm/Toolkit_Plastic_Waste_Free_Tours-compressed.pdf
Toolkit for plastic waste-free hospitality	IUCN, Norad, Searious Business, 2020: https://www.oneplanetnetwork.org/sites/default/files/from- crm/Toolkit_Plastic_Waste_Free_Hospitality-compressed.pdf PowerPoint
Plastics Measurement Methodology for Accommodation Providers	Global Tourism Plastic Initiative, 2022: https://www.oneplanetnetwork.org/knowledge- centre/resources/gtpi-plastic-measurement-methodology- tools-accommodation-providers
Plastic Measurement Spreadsheet for Tour Operators	Futouris: https://plastic-action.asia/wp-content/uploads/2020/08/WWF- Guide-to-Zero-Waste-Events.pdf
Recommendations and guidance on addressing plastic pollution in tourism through sustainable procurement	Global Tourism Plastics Initiative, UNEP, UNWTO, 2022: https://www.oneplanetnetwork.org/sites/default/files/from- crm/GTPI%2520Sustainable%2520Procurement.pdf
Rating charts: Guidance for tourism businesses for alternatives to SUP items consumed in hotels	Futouris: https://plastic-reduction.futouris.org/wp- content/uploads/sites/2/2023/05/4C_Plastic-toolkit_Ratings- Chart-Booklet.pdf
Guide to Bring-Your-Own Initiatives	WWF, PACT NO Plastics in Nature: https://plastic-action.asia/wp-content/uploads/2020/09/WWF- BYO-Guide-for-FB.pdf
WWF-Tool for choosing alternative materials	WWF Singapore: https://plastic-action.asia/alternative-materials-tool/
Guidelines (decision trees) for businesses to make choices how to avoid SUP	Futouris: https://plastic-reduction.futouris.org/decision-trees/
Guideline for hotels to plastic-free alternatives	Plastic Free Balearics, 2022: https://www.beyondplasticmed.org/en/resources/a-guide-to- honest-alternatives-to-single-use-plastics-for-the-hospitality- industry/
E-learning platform for young changemakers, e.g. regarding SUP	Youthtopia: https://www.youthtopia.world/

Title	How to source?
Input methodology to track waste volumes	GTPI, 2022: https://www.oneplanetnetwork.org/news-and- events/news/gtpi-issued-plastics-measurement-methodology- accommodation-providers
Input methodology to track waste volumes	Futouris: https://plastic-reduction.futouris.org/management-tools/
Hotel waste measurement methodology	WWF, 2021: https://sustainablehospitalityalliance.org/resource/hwmm/
Recommendation for alternatives to plastic tableware	UNEP, 2021: https://www.lifecycleinitiative.org/wp- content/uploads/2021/03/UNEP-D001-Tableware- Report_Lowres.pdf
Recommendation for alternatives to SUP bags	UNEP, 2020: https://www.lifecycleinitiative.org/library/single-use-plastic- bags-and-their-alternatives-recommendations-from-life-cycle- assessments/
Recommendation for alternative beverage cups	UNEP, 2021: https://www.lifecycleinitiative.org/wp- content/uploads/2021/03/UNEP-D002-Beverage-Cups- Report_lowres.pdf
Recommendation for an alternative for plastic bottles	UNEP, 2020: https://www.lifecycleinitiative.org/wp- content/uploads/2020/07/UNEP_PLASTIC-BOTTLES- REPORT_29-JUNE-2020_final-low-res.pdf
Plastic Free Toolkit for tour operators	PATA, Switch Asia (Thai Version) <u>https://static1.squarespace.com/static/5f24290fd0d0910ecab</u> <u>2b02e/t/620c6b872e564b710c3d108a/1644981132810/Thai-</u> <u>PlasticFree-TourOperator-2022-4Feb.pdf</u> English version: https://static1.squarespace.com/static/5f24290fd0d0910ecab 2b02e/t/601d0015cbe7a12057dbde0d/1612513305647/Plasti cFree-TourOperator-2021-Feb2.pdf
(free) Online course in English and Thai "Targeting Zero Plastics in Tourism Businesses – with UNESCO, PATA & Expedia Group	UNESCO, PATA, Expedia Group: https://src.pata.org/courses/targeting-zero-plastics-in-tourism- businesses/
Tips on how to team up with your suppliers	Futouris, 2024: https://plastic-reduction.futouris.org/team-up-with-your- suppliers/
Guide for all businesses on Sentosa Island (Singapore) for reducing disposables	WWF Singapore, 2023: https://file.go.gov.sg/sentosadisposablesplaybook.pdf
3R Guidebook for hotels in Singapore	Singapore Hotel Association and Singapore's National Environment Agency, 2022: https://www.nea.gov.sg/docs/default-source/default- document-library/3r-guidebook-for-hotels.pdf
WWF's guide to zero waste events	WWF, 2020: https://plastic-action.asia/wp-content/uploads/2020/08/WWF- Guide-to-Zero-Waste-Events.pdf
Decision trees for guidance following the waste reduction hierarchy	Futouris, 2024: https://plastic-reduction.futouris.org/decision-trees/
Plastic Free communities; Business toolkit	Surfers against sewage: https://www.sustainablewoodstock.co.uk/SAS%20Business% 20Toolkit.pdf
Plastic waste reduction manual for hotels	Futouris 2023:

Title	How to source?		
	https://plastic-reduction.futouris.org/wp- content/uploads/sites/2/2023/03/PlasticManualForHotels_end .pdf		
Zero Plastic Waste toolkits for islands	Searious Business, 2019: https://www.seariousbusiness.com/islands https://static1.squarespace.com/static/63933dd8487359657df a1563/t/65f040998b54d01322db907c/1710243996223/iucn_ blue-print-report_final+online+version.pdf		
Traveler's Pledge Against Plastic	TAP: https://www.travelersagainstplastic.org/		
Resources for hotels to reduce plastics, train staff and communicate to guests	Cyprus Sustainable Tourism Initiative: Keep Our Sand and Sea Plastic Free' campaign: https://sandseaplasticfree.org/index.php/resource-download/		
Guide to Bring-Your-Own Initiatives, an Implementation Guide for Food and Beverage outlets	WWF, 2020: https://plastic-action.asia/wp-content/uploads/2020/09/WWF- BYO-Guide-for-FB.pdf		
Market Study for Thailand: Plastics Circularity Opportunities and Barriers	World Bank: https://www.worldbank.org/en/country/thailand/publication/ma rket-study-for-thailand-plastics-circularity-opportunities-and- barriers		
Plastic Waste Material Flow Analysis for Thailand	World Bank: https://www.worldbank.org/en/country/thailand/publication/pla stic-waste-material-flow-analysis-for-thailand		
Scaling up circular strategies to achieve zero plastic waste in Thailand	WWF Thailand, 2020: https://wwfint.awsassets.panda.org/downloads/zero_plastic_ waste_in_thailand_en.pdf		
EPR Toolbox   Know-how to enable Extended Producer Responsibility for packaging	Prevent Waste Alliance: https://prevent-waste.net/wp- content/uploads/2024/03/PREVENT-Toolbox- interactivePDF_2024.pdf		
Methodology to track performance via plastic waste reduction criteria and indicators for hotels: Food & Plastic Waste Reduction Standards for Tourism Businesses	PATA, Switchasia -Tourlink, 2022: https://static1.squarespace.com/static/5f24290fd0d0910ecab 2b02e/t/6375f371a24ed0289feb3853/1668674452278/Food+ and+Plastic+Waste+Reduction+Standards+For+Tourism+Bu sinesses_final.pdf		
Rethinking Single-use plastic products in travel and tourism – impacts, management practices and recommendations	UNEP, WTTC, 2021: https://www.oneplanetnetwork.org/sites/default/files/from- crm/rethinking_single- use_plastic_products_in_travel_tourismunep_wttc.pdf		
3 Steps to Reduce Plastic and Benefit Your Business: A guide for restaurants and eateries	Product Stewardship Institute, 2018: https://www.oneplanetnetwork.org/sites/default/files/from- crm/psi_plastic_reduction_guide.pdf		
Plastic Guide for Hotels: Let's reduce single-use	Travel Without Plastic, 2018: https://www.oneplanetnetwork.org/sites/default/files/from- crm/lets_reduce_single-use_free_introduction.pdf		
Moving away from single-use – Guide for national decion makers to implement the single-use plastics directive	Rethink Plastic alliance & Break Free from Plastic, 2019: https://rethinkplasticalliance.eu/wp- content/uploads/2019/10/2019_10_10_rpa_bffp_sup_guide.p df		

Title	How to source?	
Journey to plastic freedom, 82 solutions for hotels	Six Senses Playbook, 2024 https://media.sixsenses.com/B60H3R33/as/2f8s73fs9fbv9nxj ckgnmf4/Six_Senses_Journey_to_Plastic_Freedom_Playboo k	
Best Practice Examples		
Youth initiative to lobby for a plastic bag ban Webinar on Cities and	Bye Bye Plastic Bag: https://byebyeplasticbags.org/ https://www.oneplanetnetwork.org/news-and-	
Businesses Tackling the Tourism Plastic Crisis – 21 May 2024	events/webinars/cities-and-businesses-tackling-tourism- plastic-crisis	
Reusable straws: own production of bamboo straws	Bamboo Lao: https://www.facebook.com/BambooLao2017	
Sustainable local procurement	Ljubljana Green Supply Chains Project: https://www.visitljubljana.com/en/visitors/food-and- drink/projects/green-supply-chains/	
Signet for plastic-conscious accommodations on Föhr island / Germany	Plastic-Conscious Accommodations on Föhr, German island: https://www.plastikfrei-wird-trend.de/	
Certification to incentivize the reduction of single-use plastic in the hospitality industry of the Balearic Islands	Plastic Free Balearics: https://en.plasticfreebalearics.org/	
Digital service to increase awareness and to empower citizens, businesses and tourists to make more sustainable choices	Helsinki's Think Sustainably digital service: https://www.myhelsinki.fi/en/think-sustainably	
Incentivizing sustainability choices by visitors	Ol'au Palau: https://olaupalau.com/	
Khiri Travel Myanmar - Partnership with Bagan Plastic Campaign to increase and finance local clean-ups	Khiri Reach: https://khirireach.org/portfolio-item/bagan-plastic-campaign	
EXO Travel in Laos- Requesting customers to travel with a reusable water bottle and providing water refill systems in cars	Exo Laos: https://www.exotravel.com/blog/en/laos-water-refill/	
Refill station at a Hotel in Bangkok	Atnest Hostel: www.fb.com/atnesthostel	
Reusable cups and boxes and reverse vending machine (only in German)	Fair Cup: https://www.fair-cup.de/	
Zero Waste Adventures, 12 lessons learned	Natural Habitat: https://www.nathab.com/conservation/reducing-waste/zero- waste-travel-lessons/ https://www.nathab.com/uploaded- files/pdfs/NatHab_ZWA_Lessons.pdf	
Plastic fishing company Amsterdam: Corporate volunteering and circular furniture	Plastic Whale: https://plasticwhale.com/	
Six Senses Laamu, Maldives has removed all Styrofoam boxes from its sourcing operations, by providing suppliers with biodegradable thermo boxes.	Biodegradable thermos box: https://www.biobiene.com/umweltfreundliche- isolierverpackungen	

Title	How to source?
Remove PS foam boxes (e.g. used for seafood and meat) by offering reasonably priced alternatives with added value. This has pioneering potential if driven by the entire island or even introduced nationwide.	Promote the development and adoption of alternative packaging systems to replace Styrofoam (PS) boxes: bamboo, cornstarch or other durable material like the solution demonstrated by Tomkat Koolpak with NFC technology: https://www.koolpakbox.com/
Marina Bay Sands Singapore, provides their suppliers with reusable hard plastic baskets when supplying fresh produce such as fruits and vegetables.	Marina Bay Sands: https://www.sands.com/news/sands-makes-progress-in- reducing-plastic-use/
The Sampran Model: inclusive business model in Thailand based on an organic social movement and fair trade	Sampran Model: https://www.scb.co.th/en/personal-banking/stories/business- maker/sampran-model.html
The Refill My Bottle App, supported by EXO Foundation	Refill my Bottle App: https://exofoundation.org/project/refill-my-bottle/
Seas at Risk's Best Practices To Reduce And Phase Out Single- Use Plastics In Europe	Sea at Risk: https://seas-at-risk.org/wp- content/uploads/2023/01/ENGLISH_2023-1.pdf
CopenPay: The capital of Copenhagen/Denmark rewards climate-friendly choices by tourists	CopenPay: https://www.visitcopenhagen.com/copenpay
Madonna di Campiglio: Destination-wide measures to eliminate plastic and ducate residents and guests	Lets's Green - No Time to Waste: https://www.campigliodolomiti.it/en/letsgreen

# 4.5 Summary of the 2<sup>nd</sup> Stakeholder Workshops about Implementational Steps

The 2nd Stakeholder Workshops of the MA-RE-DESIGN project, held in November 2024 across Koh Tao and the Trang region, provided a vital platform to advance discussions on sustainable waste management and SUP reduction strategies within the tourism sector. Key stakeholders from tourism, municipal authorities, and community organizations collaborated to address regional waste management challenges, evaluate proposed recommendations, and outline actionable next steps. Here is a top-level summary taken from the comprehensive Workshop Report written by WWF Thailand (2024):

### Workshop Objectives

- 1. Review findings from the baseline assessments, including current waste flows, plastic usage, and waste management practices within the tourism sector.
- 2. Present and refine scenarios and recommendations for SUP reduction tailored to Koh Tao and the Trang tourism regions.
- 3. Facilitate group discussions to develop actionable plans focusing on financing, behavioral change, SUP reduction, and improved waste collection and recycling.

### Key Outcomes and Highlights

### Koh Tao

- Behavioral Change and Commitments:
  - Tourism operators emphasized the need for awareness campaigns targeting both tourists and staff, with a focus on SUP alternatives and responsible waste disposal.
  - Stakeholders expressed strong interest in the newly introduced Plastic Waste Monitoring Tool, which provides an accessible method for tracking SUP usage and progress toward reduction goals.
- Pilot Initiatives:
  - The rollout of refill water stations by several pilot businesses was praised as an example of effective SUP reduction, aligning with the broader strategy to replace disposable water bottles.
  - Tourism operators showcased innovative practices, such as offering discounts to tourists using reusable containers, and repurposing waste into locally crafted goods.

### • Infrastructure Gaps:

 Significant gaps in waste segregation and recycling infrastructure were identified, with stakeholders calling for municipal support to expand waste collection coverage and improve waste treatment facilities.

### **Trang Region**

- Strengthening Waste Management Systems:
  - The Plastic Smart Cities initiative was highlighted as a cornerstone project, with 20% of restaurants now using reusable glass bottles. Expanding participation remains a priority.
  - Tourism operators expressed a need for clearer regulations and incentives to adopt SUP-free practices.

- Community and Educational Involvement:
  - Local schools are successfully implementing waste-back-to-school programs to instill sustainable behaviors in younger generations.
  - Collaborative clean-up events involving tourism businesses and community groups were identified as key drivers for raising awareness and enhancing waste management practices.

#### Actionable Recommendations for Tourism Stakeholders

#### 1. Expand the Plastic Waste Monitoring Tool:

• Encourage wider adoption of the monitoring tool to standardize data collection and support progress reporting across tourism businesses.

### 2. Promote Refill and Reuse Practices:

• Increase the availability and visibility of refill water stations and reusable container systems within hotels, restaurants, and tourist activities.

#### 3. Enhance Collaboration Across Stakeholders:

• Facilitate partnerships between tourism operators, municipal authorities, and NGOs to address systemic challenges, such as waste segregation and low recycling rates.

#### 4. Invest in Training and Education:

 Develop tailored training materials in multiple languages for tourism staff, focusing on waste segregation and SUP reduction strategies.

### 5. Annexes

Institute for
TOURISM SUSTAINABILITY



Study on the use of Single Use Plastic, Packaging and Waste Management in the tourism sector and municipalities with a focus on the destination sites Trang and Koh Tao in Thailand

# Part A: Annex – Measuring Plastic Waste in the Tourism Sector v.4.0



Submitted by ITS November 2024

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Koh Tao: Municipality and tourism sector jointly93
Trang: Tourism sector (Dugong Village, Hat Pak Meng; 11th Nov)
Trang: Municipality (Tamarind Hotel, Trang; Tue, 12th Nov)
Presentation Slides prepared by ITS98
Plastic Waste in Tourism Koh Tao 202498
Poster: How to assess Plastic Waste from Tourism and the Potential for Reduction Koh Tao 2024 
Plastic Waste in Tourism Trang (coastal areas) 2024108
Poster: How to assess Plastic Waste from Tourism and the Potential for Reduction Trang 2024 
References

### Measuring Plastic Waste in the Tourism Sector: An Overview

For waste flow analyses, examining the waste generated by different units within a particular administrative region is common. These units typically include households and non-households. Non-households encompass the public sector, the private sector with businesses, and other social entities.

One common approach to measuring generated household waste is through household surveys. Typical results from such surveys provide information about household waste composition and weight, expressed in kilograms or grams per day and per capita.

For the other sectors and businesses, recording per capita and per day is not feasible for most of the units, which necessitates consideration and inclusion of alternative approaches. Hence, overall waste volumes per business unit or the total business sector are estimated and reported. Commonly, the solid waste generated by non-households is aggregated and added to the waste recorded from households. This figure represents the total municipal solid waste, which is then commonly divided by the number of the registered population.

This approach takes the waste generated by tourists and businesses involved in tourism consumption, and indirectly inflates the waste volume calculated for the residents.

Thailand has a population of about 72 million. Domestic tourism can be excluded from the bigger picture, as it entails a temporary movement of generated waste from the residential to another region within the same country. In contrast, waste from international tourists represents an additional volume that would otherwise be generated in the tourists' home countries. Let's consider the volume of international tourist arrivals in Thailand before COVID-19: around 40 million. Assuming the average length of stay for these international arrivals, this would result in 360 million overnights. This figure can be converted into a population equivalent by dividing it by 365 days, which is roughly 1 million.

Allocating the waste generated by international tourists while staying in Thailand slightly inflates the average household waste per capita and day, by approximately 1.4%. This figure is insignificant given the tolerances we must respect for any estimates from household surveys or samples of solid waste analyses taken from landfill sites. However, these proportions can be very different for touristic hotspots where the average touristic population is substantially higher than the number of registered residents.

The following table illustrates these relations.

Table 1: Residential	and touristic popu	ulation in selected	tourism destinations
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	Population	Tourists (population equivalent)	Tourists as a % of the Total
Koh Tao (2023)	12,000	11,000	48%
Pak Meng (2019)	8,300	1,200	13%
Koh Libong (2019)	3,500	580	13%
Koh Mook (2019)	2,000	940	32%
Koh Samui (2021)	83,800	38,000	31%
Tenerife (Canary Islands 2019)	933,400	115,100	11%

Sources: for Koh Tao, Pak Meng, Koh Libong and Koh Mook see the main report and sub-sections further down; for Koh Samui: Center of Excellence on Hazardous Substance Management (2022); for Tenerife: Diaz-Farina et al. (2020).

Understanding the sources and factors influencing solid municipal waste is critical for tracing and estimating single-use plastic waste generation in a municipality or destination. A recent study published in the Journal of Waste Management by Diaz-Farina, Díaz-Hernández, and Padrón-Fumero (2020) applied a mixed supply-demand approach to demonstrate the complexities of estimating waste generation by residents, overnight guests, and tourism sector employees. The authors adapted the mixed perspective from United Nations (2010) recommendations, using 12 years of data covering 25 local entities to explain total mixed waste using 15 variables.

Tenerife, a Spanish island with a population of around 933,000 residents, experiences annual overnight tourism of approximately 42 million bednights. Consequently, the converted population equivalent accounts for 11% of the total population. The random-effects model based on the panel data set described above estimates a marginal increase of municipal solid waste (MSW) of 0.4 kg per overnight tourist. This can be divided into 0.33 kg for accommodation and 0.07 kg for restaurants. Additionally, the results show a slightly higher waste volume of 0.39 kg per hotel overnight stay compared to 0.24 kg for an apartment stay. The authors also reference other studies that have reported much higher waste volumes per guest, such as a hotel in Kerbala during a major religious festival, accommodation on the largest island of Hawaii, and Park Inn hotels in the UK, France, and Germany.

On average, one additional resident is responsible for 1.19 kg of municipal solid waste (MSW) per day, which is about three times the volume caused by one overnight tourist. This finding is consistent with results from similar tourist regions, such as the Balearic Islands, Menorca, and Crete. Considering the proportions between residential and tourist populations, the model estimates that the accommodation and food and beverage (F&B) sector contributes 3.3% to the total MSW generated. In comparison, a model that only considers supply-side variables would give an 11.3% contribution, which aligns with results from other island destinations like Hawaii (10.7%) and Menorca (12%). However, the authors argue that both alternative modelling approaches, using only demand-side or supply-side variables, result in an overestimation of the real waste generation of the tourism sector.

Another comparison can be drawn with the waste generation of the Nosy Be island northwest of Madagascar. The population of around 110,000 inhabitants generate twice the volume of the tourism sector (Ferronato et al., 2024). Pirani und Arafat (2014) conclude based on a meta-analysis of several studies that the total solid waste per day and room varies between 0.45 and 0.91 kg. Other studies – referenced in the recent WWF report prepared by Antonschmidt et al. (2024) – even describe higher volumes between 1.0 and 1.69 kg per night and guest. The study of waste generation in the hotel sector of the city of Hue, Vietnam, exhibited average solid waste volumes of around 600 gram per guest and day (for guest houses and 1-star hotels), 480 gram (for 2-star hotels), 1.7 kg (for 3-star hotels), 2.3 kg for 4-star hotels and 6.6 kg for 5-star hotels. Organic waste ranged between 38% and 58% whereas plastic waste was between 10.7% and 15.5% (Son et al., 2018).

To quickly estimate reasonable ranges for the share of municipal solid waste (MSW) generated by the accommodation and restaurant sector at the assessment sites, we can consider the proportions of the tourist population equivalent to the entire population count depicted in the table above. This would suggest a range of 4% to 12% for Pak Meng and Koh Libong, 10% to 36% for Koh Mook, and 13% to 50% for Koh Tao. In Koh Tao, we have to accommodate a special effect of a substantial proportion of long-term tourists (both leisure and business). For further modelling of household and tourism-related (plastic) waste, it is assumed that 50% of long-term tourists' overnights occur in private accommodations. Hence, 3,000 daily tourists (population equivalent) are moved to be counted as households. Given the relative weakness of other major business activities in these areas, the role of
tourism-related businesses and their contribution to MSW is likely to be toward the higher end of these ranges.

In general, different approaches are available to measure plastic waste in the tourism sector.

- 1. One common method for measuring plastic waste in the tourism sector is to ask tourists about their activities and shopping habits during their stay. This approach is similar to household surveys conducted for this purpose. However, this method has significant limitations in coverage. Much of the plastic waste generated is not visible to the tourist. Either the service departments keep the plastic waste before delivery to the customer, or other suppliers generate this waste which is never even delivered to the hotel or restaurant. As a result, this method provides a very incomplete picture of the total plastic waste associated with tourism.
- 2. Another way to measure waste is to record the input factors of a business. Whenever a business buys and receives plastic materials, this information can be recorded in a dedicated plastic material flow sheet. Based on standard averages for item weights, the plastic waste can be estimated according to the reduction of stock of these items. Once an appropriate number of customers served is known for that observation period, the total volume of plastic waste can be expressed per capita. This method has two main disadvantages: (1) it requires a significant administrative effort from businesses, and (2) all major business sub-sectors serving tourists with goods or services of any kind would need to be included.
- 3. A similar approach involves the same selection of businesses. However, instead of focusing on the input side, this method considers the output side of waste. Waste is regularly collected from all departments of a business and prepared for collection. In many instances, a minimum of waste segregation is already practised. This method is described in more detail in the next section for the sampling of plastic waste in the baseline assessment regions and another section explaining the new WWF Packaging Plastic Waste Monitoring Tool for tourism businesses.

The following illustration maps the final results combining estimates using approach no. 1 with the plastic waste samples of tourism-specific and tourism-connected businesses in Koh Tao using approach no. 3. This model had to complement the plastic waste consumption/generation of different tourist segments by consumption areas which were not covered in the plastic waste samples. To bridge the tourism fraction with the terminology and waste volumes commonly used in a Waste Flow Diagram, the diagram shows in the lower part the household consumption. Plastic waste can be found in the trash bins of households and plastic waste is generated and left in the trash bins of businesses, the public sector and other institutions. While tourism has only a few tourism-specific sub-sectors (e.g. accommodation, tour operators, tourist attractions), there is a huge overlap of tourism-connected sub-sectors (e.g. restaurants, cultural services, retail shops, spas) which serve both households/residents and tourists. Finally, there are many other sub-sectors (so-called non-household sectors in the Waste Flow Diagram terminology) which do not come in direct contact with tourists.

#### Figure 1: Plastic Waste through a demand-side approach for Koh Tao

The demand-side approach of Plastic Waste in Koh Tao: in t/year (2023)



# Description of the Plastic Waste Sampling Method applied to the Assessment Sites

Following the approach no. 3 briefly described above, would ideally require first, a comprehensive inventory of all those businesses that serve tourists directly, of any kind. Quickly, we will realize that there are only a few business sub-sectors that serve exclusively tourists. Many sub-sectors serve both segments, tourists and residents. Determining which sub-sectors to include and which to exclude is a matter of relevance and accuracy. A similar problem of defining the boundaries arises when the Tourism Satellite Accounts attempt to calculate the economic impact of tourism activities. Similar to the methodology of the Tourism Satellite Accounts, we must distinguish between direct effects and indirect and induced effects that are triggered by the consumption of products and services by tourists.

Due to the limited resources available for this study, it was decided to focus on the direct effects of tourism consumption, monitoring a very limited selection of businesses as follows:

Business sector	Koh Tao 11. – 19. March 2024	Trang 25. March – 2. April 2024
Accommodation/Resorts (with and without restaurants	6	4
Homestay	-	1
Restaurants	3	5
Retail shop	1	-
Diving shop	1	-
Ferry operator	1	-

Table 2: Sample composition of the Plastic Waste Assessment for Koh Tao and Trang

The following documentation for the recording of the plastic waste generated during the previous working day was applied:

# **SUP Waste of 1-day Operation**

This form is designed to provide a comprehensive overview of plastic waste generation by tourism operators on a specific day, aiding in the analysis and development of strategies for waste reduction and management.

Item	Remark
Site Location:	[Location Name]
สถานที่ตั้ง:	
Operator Name:	[Name of the Operation]
ผู้ดำเนินการ:	
Size:	[Small/Medium/Large - Approximate
ขนาด:	number of rooms/seating
	capacity/etc.]
Clients/Customore Served:	Number of clients (sustements conved
	that dayl
จำนวนลูกคา:	
Waste Handling Practices and Routines:	- Description of how plastic waste is
   แนวทางปภิบัติและกิจวัตรในการจัดการของเสีย:	collected and segregated.
ليه	
Waste Handling Practices and Routines:	Any recycling or reduction initiatives
แนวทางปฏิบัติและกิจวัตรในการจัดการของเสีย:	in place.
Waste Handling Practices and Poutines:	Specific disposal methods used for
พันธรรร เกิดเกิดเกิด การเกิดกัน 100 เกาะ	different types of plastic waste
ี เหห.งท.เ⊿าจำกุณฑ∞าแส.งญรุษทุก เริ.สุณกุกรุณภู.	

### Plastic Waste Analysis Form/ แบบวิเคราะห์ขยะพลาสติก

Instructions for Completion:

1. For each category of plastic waste, list the types of items disposed of during the day by marking or underlining

2. Estimate the quantity of each type of item, if possible, or indicate the presence of each item type.

3. Note any observations on the condition of the waste (e.g., clean, contaminated, mixed with other waste types) and make a note on the colour of the plastic waste material: e.g. only transparent or clear, white, other colours or various colours.

4. Record any additional comments on waste handling practices or challenges faced in waste management.

Category/ ประเภท	Examples/ ตัวอย่าง	<b>Weight/</b> น้ำหนัก	Note
PET (polyethylene	Drinking Bottled Water, Carbonated		
terephthalate)	Bottled Water, Cooking Product		1
	Container, Ready to Drink Tea/Coffee,		1
	Food Tray, other		
HDPE (high-	Drinking Milk Products, Toilet Liquid		
density	Cleaner, Drinking Yogurt Products,		2
polyethylene)	Dishwashing, Facial and Body Care,		2
	other		
PVC (polyvinyl	Pipe and Tube, Artificial Leather, Shrink		
chloride)	wrap, Boots, Construction Products,		3
	Other		
LDPE (low-density	Grocery Bags, Food Packaging, Personal		
polyethylene)	Care Packaging, Food Wrapping Films,		4
	Bubble Wrap, Other		
PP (poly-	Food Tray/Cup/Bowl, PP Plastic Bags,		
propylene)	Household Products, Straw,		5
	Medicine/Supplement Bottles, Other		
PS (polystyrene,	Foam/PS Food Packaging, Cutlery, Food		6
Styrofoam)	Tray, Yakult Bottle, PS Cups, Other		0

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The raw data from the Plastic Waste sample look like the following: Table 3 for Koh Tao, Table 4 for Trang.

N	Modelling daily plastic waste related to tourism activities - Koh Tao								
		PET	HDPE	PVC	LDPE	PP	PS		
Type of operations	Pax	1	2	3	4	5	6	Sum	Sum/ Pax
Retail supermarket	200	315	15	2190	965	0	55	3540	18
Restaurant	250	785	150	0	1100	130	0	2165	9
Restaurant with take-away	80	2105	320	0	2560	10	0	4995	62
Restaurant	150	0	0	0	2900	0	0	2900	19
Resort with restaurant	108	2420	1495	0	3450	0	0	7365	68
Resort with restaurant	110	2000	1200	0	635	0	0	3835	35
Integrated Resort with rest.	630	7900	4067	150	3548	200	5867	21732	34
Resort no restaurant	60	3000	310	270	3800	0	0	7380	123
Diving resort	80	2095	180	0	1920	0	0	4195	52
Hostel	90	2880	430	0	1580	0	0	4890	54
Diving school	24	610	25	210	0	5	0	850	35
(Ferry per arrival (!))	200	5625	0	0	1400	350	0	7375	37

### Table 3: Raw Data from Plastic Waste samples from businesses in Koh Tao

\*) Only the last ferry per day drops some bin bags offshore. Other waste is moved back to the mainland.

I	Modelling daily plastic waste related to tourism activities - Trang								
			in gram						
Type of operations		PET	HDPE	PVC	LDPE	PP	PS		
Pak Meng	Рах	1	2	3	4	5	6	Sum	Sum/ Pax
Restaurant	25	300	0	50	950	0	0	1300	52
Restaurant	45	500	510	100	620	10	0	1740	39
Restaurant with take-away	25	660	0	0	100	0	0	760	30
Restaurant	120	990	110	100	660	40	0	1900	16
Resort with restaurant	60	1098	830	150	1917	0	0	3995	67
Resort with restaurant	52	5830	90	500	2996	0	0	9416	181
Koh Libong									
Restaurant with homestay	10	200	0	0	0	0	0	200	20
Resort with restaurant	35	960	0	0	50	0	0	1010	29
Resort with restaurant	20	325	280	0	500	0	0	1105	55
Koh Mook									
Restaurant	20	250	50	50	100	0	0	450	23
Restaurant	20	150	35	0	50	0	0	235	12
Resort	35	455	485	0	100	0	0	1040	30

#### Table 4: Raw Data from Plastic Waste samples from businesses in Trang

From these records, averages for similar business operations can be calculated. To arrive at a comprehensive estimate for the overall plastic waste generated by tourists, it is necessary to make assumptions about the average behaviour and activities of tourists while at the destination. If we can assume that most tourists in the destination generate similar amounts of plastic waste, we can skip this step and move on to aggregate the plastic waste from the sample analyses in a meaningful way. If there are doubts about the homogeneity of the tourist population, we must draw a proxy profile of the plastic waste-generating activities of different segments of tourists. For Koh Tao, there were good reasons to assume that only overnight tourists are relevant. For Trang (Pak Meng, Koh Libong, Koh Mook), it was known that the destinations attract a considerable volume of day-trip-tourists next to the overnight segment.

Another consideration relates to the activity profiles of different traveller segments. For example, sports tourists, business tourists, leisure and fun tourists, or tourists travelling for educational purposes may exhibit very different consumption patterns. Since there is no empirical data available for both assessment sites, we recommended making assumptions about the segments in Koh Tao based on expert judgments. For Trang, it was assumed to be sufficient to differentiate between day-trip and overnight tourists.

Considering the limited scope of the plastic waste samples collected at the assessment sites, it was recommended to provide estimates, particularly for the self-catering domain. Two levels of self-catering were estimated based on observed behavior and standard weights for various packaging materials. Only additional consumption was added that had not been considered in the list of waste samples before.

Estimation of self-catering plastic packaging material									
			in gram						
Koh Tao		PET	HDPE	PVC	LDPE	PP	PS	Sum	
Partial self-catering		20	0	0	9	10	0	39	
Intense self-catering		30	1	0	16	15	0	62	
Trang									
Partial self-catering		35	0	0	9	20	0	64	
Intense self-catering		45	1	0	16	25	0	87	

# Table 5: Estimates of plastic waste generated by partial- and intense-self catering tourists percapita and day

Since the waste samples were taken from accommodation, restaurant, diving and retail businesses while other activities which lead to plastic waste were added by estimation and simulation, it was necessary to adjust for the natural movement of goods, food and drinks from the purchasing location / business to the place where the waste is disposed of. Table 6 below exhibits those assumptions. E.g. it is assumed that 100% of the plastic waste generated by hotel operations stays on the premises. Restaurants offer takeaway options, therefore we assume that 10% of the waste moves to accommodation and 10% is dropped somewhere in a public space (environment). The food & beverage purchases from retail shops are particularly prone to movements: 75% go to accommodation, 3% to restaurants, 2% to bars, 5% to dive shops, 10% to the environment while only 5% remains on the premises. A similar pattern is assumed for the plastic waste generated by street (food & beverage) vendors.

Source	%	Destination
Accommodation	100%	Accommodation
Restaurants	80%	Restaurants
Restaurants	10%	Accommodation
Restaurants	10%	Environment
Bars	90%	Bars
Bars	10%	Environment
Retail F&B	5%	Retail F&B
Retail F&B	75%	Accommodation
Retail F&B	3%	Restaurants
Retail F&B	2%	Bars
Retail F&B	5%	Dive shops
Retail F&B	10%	Environment
Street vendors	5%	Street vendors
Street vendors	70%	Accommodation
Street vendors	5%	Restaurants
Street vendors	5%	Bars
Street vendors	5%	Retail F&B
Street vendors	10%	Environment
Dive shops	100%	Dive shops
Personal services	100%	Personal services
other retail shops	40%	other retail shops
other retail shops	60%	Accommodation
		Environment

### Table 6: Assumption about Plastic Waste Transfers from Point of Purchase to Disposal

Taking these movements into account, we can see impressively from the chart in Figure 2 that it makes a huge difference where waste analysis sheds its perspective. Since we do not have comprehensive data from either side we have to incorporate – at least – the major and obvious waste transfers during consumption.

Tourism Plastic Waste in Koh Tao: from Generation to Disposal 150 gram per tourist and day / shares in %



#### Figure 2: Plastic Waste Transfers from the Point of Generation to the Point of Disposal

Based on the plastic waste profiles for different business operations and the very likely movement of plastic waste from sales to disposal location, a more comprehensive plastic waste generation profile for different tourist segments was modelled. For Koh Tao, the divers' segment appears to be significant and typical for the island. The plastic waste generation profile considers different sources of waste, assuming that 70% of the divers stay in a typical diving resort and 30% in a hostel. They buy something from a supermarket once a day, generate some waste during their activities in or at the diving shop, and purchase additional food and beverages outside their accommodation and dive operations (see Table 7 below).

		in gram					
Koh Tao	PET	HDPE	PVC	LDPE	PP	PS	Sum
Diver profile							
70% Diving resort	18.3	1.6	0.0	16.8	0.0	0.0	37

#### Table 7: Modelling the plastic waste generated by an average diving tourist per capita and day

		in gram					
Koh Tao	PET	HDPE	PVC	LDPE	PP	PS	Sum
Diver profile							
30% Hostel	9.6	1.4	0.0	5.3	0.0	0.0	16
Supermarket share	1.6	0.1	11.0	4.8	0.0	0.3	18
Diving shop	25.4	1.0	8.8	0.0	0.2	0.0	35
Partial Self-catering	4.0	0.0	0.0	1.8	2.0	0.0	8
Total Diver profile	58.9	4.1	19.7	28.7	2.2	0.3	114

For the "Party/Fun" segment of tourists at Koh Tao, a different activity and waste profile was modelled: 50% staying at a hostel, 50% in a resort. Catering is a mix of restaurant meals and self-catering.

Table 8: Modelling the plastic waste generated by an average	"Party/Fun"	tourist per	capita ai	nd
day				

		in gram					
Koh Tao	PET	HDPE	PVC	LDPE	PP	PS	Sum
Party/Fun profile							
50% Hostel	16.0	2.4	0.0	8.8	0.0	0.0	27
50% Resort (no restaurant)	25.0	2.6	2.3	31.7	0.0	0.0	62
Supermarket share	1.6	0.1	11.0	4.8	0.0	0.3	18
30% Restaurant	1.4	0.2	0.0	3.3	0.1	0.0	5
70% Intense self-catering	4.2	0.1	0.0	2.2	2.1	0.0	9
Total Party/Fun profile	48.2	5.4	13.2	50.8	2.2	0.3	120

The third segment in Koh Tao was briefly characterized as "Leisure".

Koh Tao	PET	HDPE	PVC	LDPE	PP	PS	Sum
Leisure profile							
50% Resort with restaurant	6.9	3.8	0.1	4.3	0.1	3.3	18
50% Resort (no restaurant)	25.0	2.6	2.3	31.7	0.0	0.0	62
50% Restaurant	2.2	0.4	0.0	5.5	0.1	0.0	8
50% Partial self-catering	2.0	0.0	0.0	0.9	1.2	0.0	4
Total Leisure profile	36.3	6.8	2.3	42.3	1.2	3.3	92

Table 9: Modelling the plastic waste generated by an average "Leisure" tourist per capita and day

For modelling of the entire plastic waste generated by all tourists, we identified two more segments that stay much longer than the previous three segments: tourists who stay more than 2 weeks and up to one year. Among these long-term visitors, we typically find those who stay for work, education, or relaxation. It was assumed that 50% of this segment are divers and 50% are others who resemble locals in their waste generation profile. 50% of these long-stay tourists are counted as household persons since it is assumed that these 50% do not stay overnight in commercial accommodations.

Table 10: Modelling the plastic waste generated by an average "Long-term" tourist per capita and day

		in gram							
Koh Tao	PET	HDPE	PVC	LDPE	РР	PS	Sum		
Long-stay profile									
50% Divers' profile	29.5	2.1	9.9	14.3	1.1	0.1	57		
50% Local profile	33.0	5.5	6.1	27.1	2.1	1.8	75		
Total Long-stay profile	62.6	7.1	15.9	41.4	3.2	1.9	132		

For Trang (the coastal areas), only two segments are distinguished: the overnight and the day trip segment. The overnight profile was generated by four different items:

Table 11: Modelling the plastic waste generated by an avera	ge "Overnight"	' tourist per	capita and
day			

Trang (coastal areas)	PET	HDPE	PVC	LDPE	PP	PS	Sum
Overnight profile							
50% Resort with restaurant	23.8	3.4	1.8	15.4	0.0	0.0	44
50% Resort no restaurant	6.5	6.9	0.0	1.4	0.0	0.0	15
50% Restaurant catering	5.6	1.4	0.6	4.9	0.1	0.0	13
50% partial self-catering	17.5	0.0	0.0	4.5	10.0	0.0	32
Total Leisure profile	53.4	11.7	2.4	26.2	10.1	0.0	104

The day trip segment was further split into three groups with different interests and activities:

			in gr	am			
Trang (coastal areas)	PET	HDPE	PVC	LDPE	РР	PS	Sum
Day trip profile							
50% island tour	46.2	2.8	1.2	18.7	20.2	0.0	89
partial self-catering	35	0	0	9	20	0	64
1 meal restaurant/onboard	11.2	2.8	1.2	9.7	0.2	0.0	25
25% beach or other sights	46.2	2.8	1.2	18.7	20.2	0.0	89
1 meal restaurant	11.2	2.8	1.2	9.7	0.2	0.0	25
partial self-catering	35	0	0	9	20	0	64
25% beach or other sights							
intense self-catering	45	1	0	16	25	0	87
Total Day trip profile	45.9	2.3	0.9	18.0	21.4	0.0	89

### Table 12: Modelling the plastic waste generated by an average "day trip" tourist per capita and day

With the different average plastic waste volumes generated by the different tourist segments, it is possible to calculate and estimate of the total plastic waste volume for a destination during a given period provided that the total tourist numbers are known.

### Modelling the volume and structure of tourists to Koh Tao

To estimate the volume and structure of tourists to Koh Tao, ITS had to build a calculation model, as there were no accommodation-based arrival and overnight statistics available. The model relied on expert judgments to differentiate between tourist segments based on average lengths of stay and activity profiles.

In 2023, about 477,000 people arrived by boat on the island. According to local stakeholders, there are no day-trip visitors to Koh Tao. Excursionists, snorkelers, and divers come by boat close to the shore but do not come ashore. However, the local population also travels by the different ferry boats serving Koh Tao. No official statistics differentiate between tourists and locals. Therefore, an educated guess had to be made. Assuming that 5% of these arrivals are local people leaving the island for various reasons and that people from Myanmar have no motivation to leave the island, this share of ferry boat customers represents about 24,000 movements. This would mean that every resident leaves the island on average 3 times a year. The remaining 453,000 ferry boat customers can be considered tourists.

The number of arrivals is based on the records from ferry boat operators The number of arrivals is based on the records from ferry boat operators reported to the Tourism Authority of Thailand (TAT). The estimate is for the complete year of 2023. For 2024, it was reported that an increase of about 50% year-over-year (YoY) is expected, based on the January to September 2024 numbers.

ITS carried out a segmentation of the entire touristic arrivals into 4 groups based on their length of stay:

- 1. staying 3 nights on average (range 1 to 5 nights): 55% of arrivals
- 2. staying around one week on average (range 5 to 14 nights): 35% of arrivals
- 3. staying around 1 month on average (range 2 to 8 weeks): 7% of arrivals
- 4. staying around 3 months on average (range 2 to 12 months): 3% of arrivals

The shares of these 4 segments have been validated by local tourism experts. Those foreigners who live year-round are considered part of the local population count. Assuming that these segment assumptions accurately reflect the real tourism volume, we can conclude that the 453,000 touristic arrivals generate approximately 4.03 million overnights. This number can be converted into an average population equivalent of 11,049 headcounts. Out of these 3,000 are considered as 'locals' since they are not staying overnight in commercial accommodations but in private houses or apartments. For the waste flow analysis, they are treated like households.

Year: 2023	Length of stay – Segments									
	3 nights	7 nights	1 month	3 months	Total					
Number of arrivals	249,224	158,597	31,719	13,594	453,134					
Overnights	747,671	1,110,178	951,581	1,223,461	4,032,891					

Table 13: Tourist Sea	gments in Koh	Tao based on	the length of stav
10010 201 1001101 00	3	140 84004 011	

In the next step, ITS further segmented the tourists into 4 major groups based on their activity profiles while in Koh Tao.

- Divers: who come mainly for diving and snorkelling (of course partying is part of their mission) spend most of the daytime in the pool (for practice) or on the boat or in the sea.
- Fun and party travellers (enjoying the vibe of young people around) spending most of their time at the beach, on the road, shopping and nightlife.
- Leisure (staying more in upscale resorts, dining more in restaurants, not much selfcatering) spending most of the time at the resorts, making boat excursions, exploring restaurants and the beach.
- And long-stay tourists (1- and 3-months average with a wide range of variation) who show similar activity patterns to locals, either working in the diving or educational and conservational sector.

The following picture shows the number of tourists and corresponding overnights for each of these activity profile:

	Av	Average 3 nights			erage 7 nigl	1 month	3 months	
Type of tourist	Divers	Party/Fun	Leisure	Divers	Party	Leisure	Long-term 1	Long-term 3
Proportion within duration seg.	45%	35%	20%	50%	30%	20%	100%	100%
# number of tourists (arrivals)	112,151	87,228	49,845	79,298	47,579	31,719	31,719	13,594
Generating # overnights	336,452	261,685	149,534	555,089	333,053	222,036	951,581	1,223,461

### Table 14: Detailed Segmentation of Tourists in Koh Tao: main travel purpose and length of stay

### Modelling the volume and structure of tourists to Trang Province

Before the COVID-19 pandemic in 2019, the official statistics (source: https://trang.nso.go.th/reports-publications/provincial-statistics-report/รายงานสถิติจังหวัด-ปี-66.html) reported 1.564 million visitors to Trang Province. Of these, 79% or 1.239 million were overnight tourists, and 21% or 0.325 million were excursionists without overnight stays. This resulted in a total of 2,043,665 overnight stays generated in 2019. The number of tourist arrivals is based on the official statistics released by the Provincial Tourism Authority. In the absence of current figures for 2023, we assume that the pre-COVID level of about 1.5 million visitors has not yet been fully recovered, perhaps reaching around 80% of the pre-pandemic level in 2023.

Modelling the structur	e of tourists	in Trang									
	Offi	Official Tourism Statistics Trang Province 2019									
Visitors			1563563								
		Excursionists	21%	79%	Tourists						
			324978	1238585							
Average length of stay		< 1 day			•						
Proportion of visitors		21%			79%						
# number of Thai tourists (arriv	vals)	286632			1081095						
# number of Foreign tourists (a	arrivals)	38346			157490						
Generating # overnights					2043665						
Population equivalent		890			5599						

### Table 15: Modelling the structure of tourists in Trang

Unfortunately, there are no regional breakdowns of the tourism figures for the different zones and islands of Trang Province. Additionally, there are no official records of person movements to and from the islands. To approximate the visitors and overnight volume, one approach is to consider the room capacity. The average size of accommodations is 25 rooms in the province, but this needs to be adjusted for the different destinations.

- 1. Pak Meng: 30 rooms / 30 resorts
- 2. Koh Libong: 20 rooms / 18 resorts
- 3. Koh Mook: 15 rooms/ 53 resorts
- 4. Koh Kradang: 25 rooms/ 9 resorts
- 5. Trang City: 50 rooms/ 50 hotels
- 6. Koh Ngai: 20 rooms/ 12 resorts
- 7. Koh Sukorn: 25 rooms/ 17 resorts

The total number exceeds the official statistics by 20% of no. of accommodations. We estimate that 15% of the total room capacity is not mapped into the official statistics.

Without any official tourism statistics or data on boat passenger numbers for sub-regions and the islands, we allocate the total visitor number to the following sub-regions based on estimated room capacities. This assumes a shortfall of 20% in official accommodation numbers and a 15% underreporting of room capacities. The official visitor counts are used as the baseline estimation.

Sub-region	# hotels/ resorts	Total rooms	Share of total visitors	Overnights	Daytrippers
Pak Meng	30	750	16%	328564	52247
Koh Libong	18	360	8%	157711	25079
Koh Mook	53	795	17%	348277	55382
Koh Kradang	9	180	4%	78855	12539
Trang City	50	2000	43%	876169	139326
Koh Ngai	12	240	5%	105140	16719
Koh Sukorn	17	340	7%	148949	23685
Total	189	4665	100%	2043665	324978

Table 16: Room capacities in Trang regions and calculation of overnight guests/day trippers 2019

### Baseline Estimation of Single-use Plastic Waste Generated by Tourists

### Koh Tao

To estimate the total single-use plastic waste generated by tourists, the modelled tourist numbers per year (8,079 for the year 2023) must be multiplied by the modelled single-use plastic waste for each tourist segment at each assessment site.

- In 2023, approximately 453,000 tourists arrived by boat on the island.
- According to local stakeholders, no day-trip visitors to Koh Tao exist. Excursionists, snorkelers, and divers come by boat close to the shore but do not disembark.
- Since no accommodation-based arrival and overnight statistics were available, the researchers used expert judgments to build a tourist structure model. This model differentiated tourists based on their average lengths of stay and activity profiles.
- Three different estimations for the tourist segments based on average lengths of stay result in varying single-use plastic waste volumes per year. The Low Estimate reflects segment sizes confirmed by local tourism experts. To accommodate doubts about the actual volume of potentially unregistered long-term tourists perceived by locals as residents, two additional estimates are assessed with 10%, 12%, and 15% shares of long-term tourists for the Low, Medium, and High Estimates, respectively.

Plastic type	1	2	3	4	5	6	Waste Share of long-term	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Low	46%	5%	12%	33%	2%	1%	41%	439	1.2
Medium	46%	5%	12%	33%	2%	1%	47%	477	1.3
High	47%	5%	12%	33%	2%	1%	53%	525	1.4

# Table 17: Modelling Plastic Waste Generation for Koh Tao considering different mixtures of tourist segments

- PET plastic is the dominant SUP waste volume followed by LDPE.
- LDPE plastic (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) accounts for the highest weight volume on average, driven by the relatively high importance of long-term stay tourists (partially staying for business/job reasons for periods of 1 to 3 months and up to one year).
- The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Smaller foam boxes are kind of banned from sale to and on the island. PS-based dishes, bowls and cutlery are almost not visible and used any more. Large foam boxes are officially not picked by the waste collection staff. Part of these used boxes are sent back to the mainland.
- The plastic waste volume structure does not vary significantly if we consider a higher share of long-term tourists. However, the total volume increases from about 439 tons to 525 tons per year or 1.2 tons to 1.4 tons per day for a fictitious average.

Graphically, these shares are visualized in the following pie chart, which exhibits in brackets the shares of the different plastic types for the average population in Thailand.



Figure 3: Estimated shares of single-use plastic waste types from Tourism in Koh Tao

The following simulation takes the – admittedly very small – database about the plastic waste of a sample of tourism businesses in Koh Tao and estimates the shares of the main business sub-sectors directly serving tourists. This simulation had to work with strong assumptions about sub-sectors whose plastic waste has not been directly measured. However, given the structure of the businesses and the plausible tourist activities, it would have been a much larger error to simply ignore, for example, the street vendors, personal services, and the large scope of retail shops. Attention: these shares of plastic waste generated through tourists do not represent the total waste or plastic waste generated by these sub-sectors. The more individual businesses serve residents, the lower the share of plastic waste generated by tourists. their share exhibited in the chart compared to the real total waste volume.



Figure 4: Simulation of the volume of single-use plastic waste induced by touristic consumption at different business sub-sectors in Koh Tao

### Trang

Before the COVID-19 pandemic in 2019, the official statistics reported 1.564 million visitors to Trang Province. Of these, 79% or 1.239 million were overnight tourists, while 21% or 0.325 million were excursionists without overnight stays.

In the absence of any official tourism statistics or boat operator or pier passenger numbers for subregions and the islands, we allocate the total visitor number to the following sub-regions based on the estimated room capacities. We assume a shortfall of 20% in official accommodation numbers and a 15% underreporting of room capacities. The official visitor counts are used as the baseline estimation.

- For the estimation of the daily SUP waste generation, only two different profiles are applied: one for the average overnight tourist and one for the average day trip visitor.
- PS packaging material and foam boxes could not be traced and apportioned to a particular number of daily visitors. The empty cells under plastic category 6 do not signify that there is no PS SUP in use.
- Eventual overestimation from touristic consumption outside hotels and restaurants (moving products, food & beverage and its packaging material to hotels and restaurants) is compensated with the omission of other touristic service sectors which have been covered neither by the waste samples nor through the detailed simulation of tourist profiles.
- First, the tourism-induced plastic waste volume for the entire Trang Province is exhibited for the two segments (baseline or Mixture Medium assumptions).
- Followed by two different mixtures for the two visitor segments (considering inaccuracies of the official statistics) resulting in different SUP waste volumes per year for each sub-region.
- The High Mixture assumes 10% day trip visitors, 90% overnight tourists and an overall visitor volume increase of 15% compared to the 2019 figures.
- The Low Mixture assumes 25% (20% for Pak Meng) day trip visitors, 75% (80% for Pak Meng) overnight tourists and an overall reduction of the visitor volume by 15% compared to the 2019 figures.
- The share of the islands and Pak Meng area counts for about 45% of the tourism volume of the entire province. The total plastic waste generated in the entire province is estimated at 241 tons per year. For the assessment site: 108 tons. Depending on the assumptions about the current or real mixture between day trips and overnight tourists this may be lower or higher translating into a daily plastic waste volume between 60 and 130 kg.

# Table 18: Modelling Plastic Waste Generation for Trang considering different mixtures of tourist segments

Plastic type	1	2	3	4	5	6	Waste Share of overnight	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Trang									
Province									

Plastic type	1	2	3	4	5	6	Waste Share of overnight	Total in tons	Total in tons
SUP Volume	PET	HDPE	PVC	LDPE	PP	PS	Tourists	Per year	Per day
Total Tourism	124 t	25 t	5 t	60 t	28 t	0 t		241	0.66
Overnight tourists only	109 t	24 t	5 t	54 t	21 t	0 t	100%	212	0.58
Day trip visitors only	15 t	0.8 t	0.3 t	5.9 t	7 t	0 t	0%	29	0.08
In kg									
Pak Meng									
Low	46	9	2	22	11	0	82%	33	0.09
Medium	55	11	2	26	12	0	88%	39	0.11
High	63	13	3	30	13	0	91%	45	0.12
Koh Libong									
Low	22	4	1	10	6	0	78%	16	0.04
Medium	26	6	1	13	6	0	88%	19	0.05
High	30	6	1	15	6	0	91%	21	0.06
Koh Mook									
Low	48	9	2	23	12	0	78%	34	0.09
Medium	58	11	2	28	13	0	88%	41	0.11
High	67	14	3	32	14	0	91%	47	0.13
Koh Kradang									
Low	9	2	0	4	2	0	100%	6	0.02
Medium	11	3	1	6	2	0	100%	8	0.02
High	14	3	1	7	3	0	100%	10	0.03

- PET plastic is dominant with about 50% for both visitor segments. Within the overnight segment, LDPE (grocery bags, food packaging, food wrapping, clingfilm, bubble wrap) has the second highest share with about 25%. In contrast, PP SUP has a more prominent share of the day trip segment with 24% compared to LDPE with only 20%.
- The collection rate for PET is relatively high in the tourism zones. HDPE is sold to junk shops, however, at a significantly lower rate. Foam boxes are still in use everywhere. PS-based dishes, bowls and cutlery are also still in use.
- For Koh Kradang, it is not allowed for day trip visitors to bring any single-use plastic to the island. This explains why the waste generation table above does not consider any SUP waste generated on the island.

Graphically, these shares are visualized in the following pie chart, which exhibits in brackets the shares of the different plastic types for the average population in Thailand.





### Simulating Scenario Outcomes for Different Single-use Plastic Actions

Once the waste-generating model for the tourism sector has been developed and calibrated, we can use a baseline reference volume of plastic waste and query the effect of a particular reduction or replacement action in a specific tourism sub-sector. For more precise attribution, each action should be specific in its function and its impact on different types of plastic. The estimated reduction effect depends on various contextual factors that must be determined case-by-case.

- To what extent have the tourism businesses already implemented reduction/replacement measures
- The availability of alternative materials and/or solutions
- The cost of alternative materials and/or solutions
- The extent of collaborative efforts
- The extent of incentives
- The extent of awareness building and support through training.

Table 19 below illustrates the simulation assumptions for the example of the Tourism Plastic Waste Reduction Scenario 2030 for Koh Tao. The individual assumptions of the achievable reduction effects are first of all expert estimates considering the above-mentioned contextual factors and the experience collected through the stakeholder conversations in Koh Tao and Trang. Roughly speaking, it is expected to further reduce plastic waste in the different categories 1 to 5 between 30% and 44%. Category 6 is expected to be reduced by 90% based on the assumption that a legally binding ban can be introduced. The estimated outcomes are projected into the year 2030 under the assumption that a high level of voluntary commitment from both sides, businesses and tourists, can be met.

The complete results for both assessment areas are documented in the main report. From the previous steps of modelling tourist structures, tourist volumes and average plastic waste volumes for each tourist segment, we arrive at the estimated – baseline SUP volume (on top of the table). The following rows below list in total 15 actions with an estimated reduction effect for each plastic category expressed as a percentage of the baseline volume. This accumulates – if implemented properly and comprehensively – to a total effect expressed as a percentage and a reduction effect expressed as metric tons per year. In the example for Koh Tao, PET will be further reduced by 35%, HDPE by 40%, PVC by 30%, LDPE by 44%, PP by 39% and PS by 91%. From the initial 1,799 kg of daily single-use plastic waste, 689 kg or 38% will be avoided.

	PET	HDPE	PVC	LDPE	РР	PS	Total
	1	2	3	4	5	6	SUP
Baseline SUP Volume in kg/day	557	59	149	399	24	13	1,202
Reduction							
Avoid grocery shopping bags (LDPE)				15%			
Replace PS food trays and cutlery						30%	
Regular SUP waste monitoring	10%	10%	10%	10%	10%	10%	

### Table 19: Tourism Plastic Waste Reduction Scenario 2030 for Koh Tao

	PET	HDPE	PVC	LDPE	PP	PS	Total
	1	2	3	4	5	6	SUP
Replace plastic straws and stirrers (PP)					4%		
RE-usable drinking bottles (PET)	10%						
Replace food plastic bags (PP)					10%		
Toiletries in accommodations (HDPE)		30%					
Completely ban foam boxes (PS)						50%	
Replace food cups, bowls and trays (PP)					15%		
Replace food-wrapping films (LDPE)				4%			
Avoid or replace shrink wrap (PVC)			20%				
Replace trash bags for waste collection (LDPE)				5%			
Water re-fill stations (PET)	15%						
Avoid food supplies using PS for wrapping						1%	
Replace trash bags for internal waste collection (LDPE)				10%			
Total effect	35%	40%	30%	44%	39%	91%	38%
Remaining kg/day	362	35	105	224	15	1	742
Reduction kg/day	195	23	45	176	10	12	460

Interview Guidelines for Experts and Stakeholder Representatives

# Interview Guidelines for Experts and Stakeholder Representatives

คู่มือการสัมภาษณ์สำหรับผู้เชี่ยวชาญและตัวแทนผู้มีส่วนได้ส่วนเสีย

V2 March 7, 2024

V2 7 กุมีนาคม 2024

This guideline aims to facilitate comprehensive discussions with experts and stakeholders, capturing their insights and experiences to inform the project's strategies for reducing and managing plastic waste in Koh Tao and Trang.

Based on the information target list and the details outlined for fieldwork in Koh Tao/Trang, the interview or discussion guidelines for experts and stakeholder representatives can be structured to address the broad impacts and management strategies for plastic waste in the project sites, focusing on community-wide perspectives and the role of various stakeholders. Here's an outline for the interview guidelines:

คู่มือนี้มีจุดมุ่งหมายเพื่ออำนวยความสะดวกในการอภิปรายอย่างครอบคลุม โดยรวบรวมข้อมูลเชิงลึกและประสบการณ์จากผู้เชี่ยวชาญและผู้มีส่วนได้ส่วนเสีย เพื่อเป็นข้อมูลและแนวทางของยุทธศาสตร์ของโครงการเพื่อในการลดและจัดการขยะพลาสติก ในเกาะเต่าและจังหวัดตรัง

จากรายการเป้าหมายข้อมูลและรายละเอียดที่ระบุไว้สำหรับงานภาคสนามในเกาะเต่าและจังห วัดตรัง คู่มือการสัมภาษณ์หรือการอภิปรายของผู้เชี่ยวชาญและตัวแทนผู้มีส่วนได้ส่วนเสียนี้ สามารถเป็นแนวทางเพื่อติดตามผลกระทบในวงกว้างและยุทธ์การการจัดการขยะพลาสติกใน พื้นที่ของแต่ละโครงการ โดยมุ่งเน้นไปที่ภาพรวมของชุมชนและบทบาทของผู้มีส่วนได้ส่วนเสียต่างๆ ซึ่งมีรายละเคียดดังต่อไปนี้.

### Introduction/ บทนำ

- Brief introduction of the project, its objectives, and the importance of the interviewee's insights.
- แนะนำโครงการอย่างย่อ, วัตถุประสงค์, และความสำคัญของข้อมูลเชิงลึกของผู้ให้สัมภาษณ์

### Overview of Plastic Waste Management/ ภาพรวมการจัดการขยะพลาสติก

- Current Situation: What is the current state of plastic waste management in Koh Tao/Trang, and how does it impact the tourism sector and local community?
- Stakeholder Roles: Can you describe the role of your organization/authority in managing plastic waste in the area?
- Tourism Attractiveness: How does plastic waste affect the attractiveness of Koh Tao/Trang as a tourist destination?
- สถานะการณ์ปัจจุบัน:

สถาณการณ์ปัจจุบันของการจัดการขยะพลาสติกในเกาะเต่า/จังหวัดตรัง เป็นอย่างไร? มีผลกระทบต่อภาคการท่องเที่ยวและชุมชนท้องถิ่นอย่างไร?

๖ บทบาทของผู้มีส่วนได้ส่วนเสีย:

คุณสามารถอธิบายบทบาทขององค์กร/หน่วยงานราชการ ของคุณ ในการจัดการขยะพลาสติกในพื้นที่ได้หรือไม่ อย่างไร**?** 

แหล่งท่องเที่ยว: ขยะพลาสติกส่งผลต่อการดึงดูดนักท่องเที่ยวของเกาะเต่า/จังหวัดตรัง ในฐานะแหล่งท่องเที่ยวอย่างไร?

### Challenges and Opportunities/ ความท้าทายและโอกาส

- Major Challenges: What are the main challenges in managing plastic waste effectively in these tourist areas?
- Success Stories: Are there any successful initiatives or practices that have been implemented to reduce plastic waste? Can you share examples?

- Stakeholder Collaboration: How do different stakeholders (government, NGOs, tourism operators, community) collaborate in plastic waste management?
- ความท้าทายหลัก: อะไรเป็นความท้าทาย (อุปสรรค) ในการจัดการขยะพลาสติกอย่างมีประสิทธิภาพในแหล่งท่องเที่ยวบริเวณนี้?
- ➤ เรื่องราวความสำเร็จ: มีความคิดริเริ่มหรือแนวปฏิบัติที่ประสบความสำเร็จในการลดขยะพลาสติกหรือไม่? คุณสามารถแบ่งปันตัวอย่างได้หรือไม่?
- ความสำเร็จที่ผ่านมา: มีความคิดริเริ่มหรือแนวทางปฏิบัติที่เคยประสบความสำเร็จในการลดขยะพลาสติกหรือ ไม่? คุณสามารถแบ่งปันตัวอย่างได้หรือไม่?

### Strategies and Solutions/ กลยุทธ์และการแก้ไขปัญหา

- Reduction and Management: What strategies are in place or proposed for reducing and better managing plastic waste?
- Innovations and Technologies: Are there any innovations or technologies being considered or used to tackle plastic waste issues?
- Policy and Regulation: How do policies and regulations impact plastic waste management, and are there any gaps or needs for new regulations?
- การลดและการจัดการ: มีการใช้กลยุทธ์ใดหรือข้อเสนอใด เพื่อลดขยะพลาสติกและเพื่อการจัดการที่ดีขึ้น?
- นวัตกรรมและเทคโนโลยี: ได้มีการใช้หรือพิจารณานำนวัตกรรมหรือเทคโนโลยีมาใช้ เพื่อลดปัญหาขยะพลาสติกหรือไม่?
- ➤ นโยบายและกฎหมาย: นโยบายและกฎข้อบังคับมีผลต่อการจัดการขยะพลาสติกอย่างไร? และมีช่องโหว่หรือความจำเป็นสำหรับร่างกฎข้อบังคับใหม่เพิ่มเติมหรือไม่?

### Future Directions/ แนวทางในอนาคต

- Long-term Goals: What are the long-term goals for plastic waste management in Koh Tao/Trang?
- Improving Stakeholder Engagement: How can stakeholder engagement be improved to tackle plastic waste issues more effectively?
- Support and Resources Needed: What kind of support, resources, or interventions are needed to enhance plastic waste management efforts?
- เป้าหมายในระยะยาว: อะไรคือเป้าหมายระยะยาวของการจัดการขยะพลาสติกในเกาะเต่า/จังหวัดตรัง?
- เสริมสร้างความร่วมมือของผู้มีส่วนได้ส่วนเสีย: ทำอย่างไรให้ผู้มีส่วนได้ส่วนเสียมีส่วนร่วมมากขึ้นเพื่อให้จัดการกับปัญหาขยะพลาสติก มีประสิทธิภาพมากยิ่งขึ้น?
- การสนับสนุนและทรัพยากรที่จำเป็น: การสนับสนุน, ทรัพยากร และหรือการลงทุนในด้านใด แบบใด ที่จำเป็นและต้องการเพื่อยกระดับการจัดการขยะพลาสติกให้ดีขึ้น?

# Closing/ ข้อสรุป

- Opportunity for the interviewee to add any additional comments or insights not covered.
- > Thank the interviewee for their time and contribution.
- ให้โอกาสกับผู้ให้สัมภาษณ์ในการแสดงความคิดเห็น หรือข้อมูลเชิงลึกเพิ่มเติมที่คิดว่ายังไม่ครอบคลุม
- ▶ ขอขอบคุณผู้ให้สัมภาษณ์สำหรับเวลาและข้อมูลที่มีค่าของท่าน

Interview Guidelines for Accommodation Operations

# Interview Guidelines for Accommodation Operations

คู่มือการสัมภาษณ์สำหรับการดำเนินงานที่พัก

## V2 26 มีนาคม 2024

V2 March 7, 2024

This guide is tailored to extract in-depth information from hotel operators about their current practices, challenges faced in reducing single-use plastic (SUP), and the strategies employed to engage both staff and guests in sustainability efforts. It also aims to uncover collaborative initiatives and the support needed to overcome barriers, driving toward a more sustainable and environmentally responsible tourism sector. The objective is to address the current practices, challenges, and potential strategies for reducing single-use plastic usage within the hospitality sector, keeping in mind the unique environmental, regulatory, and cultural contexts of the project sites:

คู่มือนี้จัดทำขึ้น เพื่อเข้าถึงข้อมูลเชิงลึกจากผู้ประกอบการโรงแรม เกี่ยวกับแนวทางปฏิบัติในปัจจุบัน, ความท้าทายที่ต้องเผชิญในการลดการใช้พลาสติกแบบใช้ครั้งเดียว (SUP), และกลยุทธ์ที่ใช้ในการดึงดูดพนักงาน และแขกผู้เข้าพัก เพื่อเข้าร่วมในความพยายามด้านความยั่งยืน นอกจากนี้ยังมีจุดมุ่งหมายเพื่อเปิดเผยโครงการร่วมมือ และการสนับสนุนที่จำเป็นในการเอาชนะอุปสรรคเพื่อขับเคลื่อนไปสู่ภาคการท่องเที่ยวที่ยั่งยืน และรับผิดชอบต่อสิ่งแวดล้อมมากขึ้น วัตถุประสงค์คือ การจัดการกับปฏิบัติการปัจจุบัน, ความท้าทาย, และกลยุทธ์ที่เป็นไปได้สำหรับการลดการใช้พลาสติกแบบใช้ครั้งเดียว ในภาคการบริการโรงแรม โดยคำนึงถึงบริบทด้านสิ่งแวดล้อม, กฏหมาย, และบริบททางวัฒนธรรมของพื้นที่โครงการ

### **Introduction /** บทนำ

- Brief introduction of the project, its objectives, and the importance of the interviewee's insights.
- Assure confidentiality and the intent to use insights to develop practical solutions.
- name of the hotel, size, category, function, certification, clientele
- แนะนำโครงการอย่างย่อ, วัตถุประสงค์, และความสำคัญของข้อมูลเชิงลึกของผู้ให้สัมภาษณ์
- ยืนยันการรักษาความลับ และจุดประสงค์ในการใช้ข้อมูลที่ได้ เพื่อพัฒนาแนวทางแก้ไขที่ใช้งานได้จริง
- ≻ ชื่อของโรงแรม, ขนาด, ประเภท, การทำงาน, การรับรอง, ลูกค้า

# Monitoring and Documentation of SUP Usage / การติดตาม และบันทึกการใช้งาน SUP

### Inventory Practices / แนวทางปฏิบัติด้านสินค้าคงคลัง

- How do you monitor and document the usage of SUP products and packaging within your hotel?
- What tools or systems are in place to track SUP waste generation?

ผลคุณติดตาม และบันทึกการใช้งานผลิตภัณฑ์ และบรรจุภัณฑ์ SUP ภายในโรงแรมของคุณอย่างไร?

📕มีเครื่องมือ หรือระบบใดบ้างที่ใช้ในการติดตามการสร้างขยะ SUP?

### <u>Waste Separation and Recycling / การแยกขยะ และการรีไซเคิล</u>

Describe the waste separation and recycling practices. How are these facilitated and encouraged among both guests and staff?

### <u>Challenges and Solutions / ความท้าทาย และวิธีแก้ไข</u>

What are the specific challenges faced in reducing SUP in your hotel operation, and what innovative solutions have been found?

ความท้าทายอะไรบ้างที่คุณพบ ในการลดการใช้พลาสติกแบบใช้ครั้งเดียวในการดำเนินงานโรงแรมของคุณ และพบวิธีการแก้ปัญหาที่เป็นนวัตกรรมใดบ้าง

# SUP Reduction Strategies /

# กลยุทธ์การลดการใช้พลาสติกแบบใช้ครั้งเดียว

### <u>Elimination and Alternatives / การกำจัด และทางเลือก</u>

- Kitchen
  - Bulk Purchasing: How do you incorporate bulk purchasing to reduce SUP in kitchen operations?
  - Have you considered purchasing non-perishable food unpackaged or not individually shrink-wrapped?

Do you use reusable gloves?

- Sustainable Packaging for Deliveries: Describe any initiatives to work with suppliers to reduce packaging waste in deliveries, especially for fresh produce.
- Alternatives to Single-Use Items: What alternatives to single-use items (e.g., condiment packets, plastic wrap) are used in the kitchen?

 การซื้อสินค้าในปริมาณมาก: คุณรวบรวมการซื้อสินค้าในปริมาณที่มาก เพื่อลดการใช้พลาสติกแบบใช้ครั้งเดียวในงานครัวอย่างไร?
 คุณเคยพิจารณาซื้ออาหาร ที่ไม่เน่าเสียง่าย โดยไม่ใช้วัสดุห่อหุ้มหรือไม่มีการหุ้มด้วยพลาสติกแยกชิ้นหรือไม่?
 คุณใช้ถุงมือที่สามารถนำมาใช้ซ้ำได้หรือไม่?
 บรรจุภัณฑ์ที่ยั่งยืนสำหรับการส่งมอบ: อธิบายโครงการใดๆ ในการทำงานร่วมกับซัพพลายเออร์ เพื่อลดขยะบรรจุภัณฑ์ในการส่งมอบ โดยเฉพาะอย่างยิ่งสินค้าที่ต้องอาศัยความสดใหม่
 ทางเลือกอื่นสำหรับรายการแบบใช้ครั้งเดียว: มีทางเลือกใดบ้าง สำหรับสินค้าใช้ครั้งเดียว (เช่น ซองเครื่องปรุง, พลาสติกที่ใช้ห่อหุ้ม) ที่ใช้ในครัว?

### Housekeeping/Rooms

- Is waste separated in the rooms, and if yes, how?
- Toiletries: Do you avoid single-use toiletries? How have you implemented dispenser systems for toiletries to replace single-use bottles?
- Guest Amenities: How do you balance offering guest amenities with the need to reduce SUP? Are there alternative products being used?
- Coffee: Do you give preference to filter or sieve machines over capsule and pad machines?
- Souvenirs: Do you avoid pre-packaging for gifts or souvenirs?
- Laundry service: Have you thought of alternatives to plastic packaging for laundry services, e.g. paper?
- Drinking water: Do you avoid PET bottles and offer refill stations instead?
- Do you resell Trash Hero's reusable bags and bottles?
- Reusable Items: Have you considered the transition to reusable items (e.g., glass bottles for water, refillable soap dispensers) in guest rooms?
- การทำความสะอาด/ห้องพัก
  - 4มีการแยกขยะในห้องหรือไม่ และถ้ามี ทำอย่างไร?

∔สิ่งอำนวยความสะดวกในห้องน้ำ: คุณหลีกเลี่ยงสิ่งอำนวยความสะดวกแบบใช้ครั้งเดียวหรือไม่? คุณได้ใช้ระบบจ่ายสำหรับสิ่งอำนวยความสะดวกในห้องน้ำ เพื่อแทนที่ขวดแบบใช้ครั้งเดียวได้อย่างไร? 4สิ่งอำนวยความสะดวกของแขกผู้เข้าพัก: คุณจัดสรรสิ่งอำนวยความสะดวกให้แขกอย่างไร เพื่อให้สอดคล้องกับความต้องการลดการใช้ SUP? มีผลิตภัณฑ์ทางเลือกที่ใช้หรือไม่? 4กาแฟ: คุณให้ความสำคัญกับเครื่องกรอง หรือเครื่องกรองกาแฟมากกว่าเครื่องใช้แคปซูลและแผ่นหรือไม่? 槹ของที่ระลึก: คุณหลีกเลี่ยงการบรรจุหรือใช้กระดาษห่อ ของขวัญ ของที่ระลึก หรือไม่ 4 บริการซักรีด: คุณเคยคิดที่จะใช้ถุงใส่ผ้าซักรีดที่เป็นวัสดุแบบอื่น แทนถุงแบบพลาสติกหรือไม่? เช่น ถุงที่ทำจากกระดาษ 斗น้ำดื่ม: คุณหลีกเลี่ยงการใช้ขวดน้ำดื่ม PET หรือไม่? และมีตู้กดเติมน้ำให้บริการแทนหรือไม่? 4คุณจำหน่ายถุงและขวดที่นำกลับมาใช้ซ้ำได้ของ แทรซฮิโร่ หรือไม่? 4ของที่นำกลับมาใช้ซ้ำได้: คุณเคยมีความสนใจ หรือพิจารณาที่จะเปลี่ยนไปใช้สิ่งของที่สามารถนำกลับมาใช้ซ้ำได้ (เช่น ขวดน้ำที่เป็นแก้วแทน หรือ ที่กล่องสบู่เหลว) ภายในห้องพักหรือไม่?

### Service/Bar/Outside Area/Catering/Administration

Eliminating Single-Use Cutlery and Plates: What measures are in place to eliminate single-use cutlery and plates, especially in outdoor and catering services?

- Beverage Options: How do you manage the use of single-use beverage containers in bars and service areas? Are there any initiatives for using returnable bottles or cups?
- Have you eliminated plastic straws, stirrers and coasters?

Are snacks and ice cream offered in reusable containers?
- Do you offer condiments (ketchup, mayonnaise, mustard, jams, vinaigrette, butter) in dispensers instead of in plastic or foil packaging?
- Does your business provide sugar, salt and pepper in dispensers, shakers or paper sachets instead of plastic ones?
- Do you take any measures to eliminate plastic bags and disposable containers for take-away?
- How relevant are reusable alternatives in outdoor areas (pool and beach)?

Event Management: Describe the strategies for managing events with a focus on reducing SUP usage.

บริการ/บาร์/พื้นที่ภายนอก/การจัดเลี้ยง/การบริหาร

4 การกำจัดเครื่องใช้แบบใช้ครั้งเดียว:

มีมาตรการอะไรบ้างในการกำจัดเครื่องใช้และจานแบบใช้ครั้งเดียว

โดยเฉพาะในบริการกลางแจ้งและการจัดเลี้ยง?

∔ตัวเลือกเครื่องดื่ม:

คุณจัดการการใช้ภาชนะเครื่องดื่มแบบใช้ครั้งเดียวในบาร์และพื้นที่บริการอย่างไร? มีโครงการใดสำหรับการใช้ขวดหรือแก้วที่คืนได้หรือไม่?

4 คุณได้กำจัดหลอด, แท่งคนพลาสติก และที่รองแก้วแล้วหรือไม่?

คุณให้บริการอาหารจำพวกขนม และ ไอศกรีม

ในบรรจุภัณฑ์ที่นำกลับมาใช้ใหม่ได้หรือไม่?

- แครื่องปรุงรส (ซอสมะเขือเทศ, มายองเนส, มัสตาร์ด, แยม, น้ำสลัด และ เนย) มีการใช้เครื่องจ่ายแทนการใช้เครื่องปรุงที่มีบรรจุภัณฑ์พลาสติกหรือฟอยล์หรือไม่?
- 🖶ธุรกิจของคุณใช้ น้ำตาล เกลือ และพริกไทย

ในขวดหรือแบบที่บันจุในซองกระดาษแทนอันที่บรรจุโดยห่อพลาสติกหรือไม่? ∔คุณมีมาตรการใดๆ

ในการกำจัดถุงพลาสติกและภาชนะที่ใช้แล้วทิ้งสำหรับอาหารที่สั่งกลับหรือไม่? ทางเลือกที่ใช้ซ้ำได้มีความสำคัญอย่างไรในพื้นที่กลางแจ้ง (สระว่ายน้ำและชายหาด)? คารจัดการงานอีเวนต์: อธิบายกลยุทธ์ในการจัดการงานอีเวนต์โดยมุ่งเน้นลดการใช้ SUP.

### Staff Areas

Staff Facilities: How are staff facilities managed to minimize the use of SUP (e.g., in staff cafeterias or break rooms)?

# พื้นที่สำหรับพนักงาน

สิ่งอำนวยความสะดวกสำหรับพนักงาน: สิ่งอำนวยความสะดวกสำหรับพนักงานจัดการอย่างไรเพื่อลดการใช้พลาสติกแบบใ ช้ครั้งเดียวให้น้อยที่สุด (เช่น ในโรงอาหารหรือห้องพักผ่อนของพนักงาน)?

### Purchasing and Procurement / การซื้อและการจัดหา

- How does your procurement process support the reduction of SUP usage? Are there challenges in sourcing alternatives?
- Discuss any collaborations with suppliers to reduce packaging or to procure in bulk.
- กระบวนการจัดซื้อของคุณช่วยสนับสนุนการลดการใช้พลาสติกแบบใช้ครั้งเดียวได้อย่า งไร? มีความท้าทายอะไรในการหาทางเลือกหรือไม่?
- พูดคุยเกี่ยวกับการทำงานร่วมกับซัพพลายเออร์เพื่อลดบรรจุภัณฑ์หรือเพื่อซื้อสินค้าเป็น จำนวนมาก.

### Staff Training and Engagement /

### การฝึกอบรมและการมีส่วนร่วมของพนักงาน

### Training Programs / โปรแกรมการฝึกอบรม

Can you describe your staff training programs related to environmental sustainability and SUP reduction?

How do you handle challenges such as changing routines or increasing awareness among your staff?

- คุณสามารถอธิบายโปรแกรมการฝึกอบรมของพนักงานที่เกี่ยวข้องกับความยั่งยืนทางสิ่ง งแวดล้อมและการลดการใช้พลาสติกแบบใช้ครั้งเดียวได้หรือไม่?
- คุณจัดการกับความท้าทายเช่นการเปลี่ยนแปลงกิจวัตรประจำวันหรือการเพิ่มความตระ หนักรู้ในหมู่พนักงานของคุณอย่างไร?

## Guest Integration and Communication / การรวมและการสื่อสารกับแขก

### Engaging Guests / การดึงดูดแขก

- How do you communicate your environmental efforts, particularly regarding SUP reduction, to guests?
- Have you implemented any initiatives to involve guests in your sustainability practices (e.g., waste separation in rooms, beach clean-ups)?

 คุณสื่อสารความพยายามทางสิ่งแวดล้อมของคุณ
 โดยเฉพาะเกี่ยวกับการลดการใช้พลาสติกแบบใช้ครั้งเดียว ต่อแขกได้อย่างไร?
 คุณได้ดำเนินโครงการใดๆ เพื่อให้แขกมีส่วนร่วมในปฏิบัติการที่ยั่งยืนของคุณหรือไม่ (เช่น การแยกขยะในห้องพัก, การทำความสะอาดชายหาด)?

### Collaborative Actions and Regional Cooperation / การมีส่วนร่วมและความร่วมมือระดับภูมิภาค

### <u>Collective Initiatives / โครงการร่วมมือ</u>

Are there any regional or collective initiatives you are part of that aim to reduce SUP usage or improve waste management?

How do you collaborate with other hotels, local authorities, or NGOs to address SUP issues?

📲มีโครงการริเริ่มระดับภูมิภาคหรือร่วมมือใดๆ

ที่คุณเป็นส่วนหนึ่งที่มุ่งเป้าไปที่การลดการใช้พลาสติกแบบใช้ครั้งเดียวหรือการปรับปรุง การจัดการขยะหรือไม่?

ผู้คุณร่วมมือกับโรงแรมอื่นๆ, หน่วยงานท้องถิ่น, หรือองค์กรไม่แสวงผลกำไรอย่างไรเพื่อจัดการกับปัญหา SUP?

# Challenges and Opportunities / ความท้าทายและโอกาส

### <u>Barriers to SUP Reduction / อุปสรรคต่อการลดการใช้ SUP</u>

- What are the main obstacles you face in reducing SUP usage in your operations?
- How do guest expectations influence your ability to implement SUP reduction measures?
- อุปสรรคหลักที่คุณเผชิญในการลดการใช้พลาสติกแบบใช้ครั้งเดียวในการดำเนินงานขอ งคุณคืออะไร?
- ความคาดหวังของแขกมีอิทธิพลต่อความสามารถของคุณในการดำเนินมาตรการลดกา รใช้ SUP อย่างไร?

# Future Directions and Needs / ทิศทางและความต้องการในอนาคต

- Looking forward, what strategies or innovations are you considering to further reduce SUP usage?
- What kind of support or resources would assist you in achieving your sustainability goals?

# ∔ในอนาคตข้างหน้า

คุณกำลังพิจารณากลยุทธ์หรือนวัตกรรมใดบ้างเพื่อลดการใช้พลาสติกแบบใช้ครั้งเดียวเ พิ่มเติม? คุณต้องการการสนับสนุนหรือทรัพยากรประเภทใดที่จะช่วยให้คุณบรรลุเป้าหมายด้าน
ความยั่งยืนของคุณ?

# Conclusion / ข้อสรุป

Invite additional comments or suggestions on enhancing SUP reduction efforts.

+Thank the interviewee for their time and valuable insights.

ขอเชิญแสดงความคิดเห็นหรือข้อเสนอแนะเพิ่มเติมเกี่ยวกับการเพิ่มความพยายามในก ารลดการใช้พลาสติกแบบใช้ครั้งเดียว

📣ขอขอบคุณผู้ให้สัมภาษณ์สำหรับเวลาและข้อมูลที่มีค่าของท่าน

Interview Guidelines for other Tourism-related Operations

# Interview Guidelines for other Tourismrelated Operations

คู่มือการสัมภาษณ์สำหรับการดำเนินงานอื่น ๆ ที่เกี่ยวข้องกับการท่องเที่ยว

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This guide is tailored to extract in-depth information from hotel operators about their current practices, challenges faced in reducing SUP usage, and the strategies employed to engage both staff and guests in sustainability efforts. It also aims to uncover collaborative initiatives and the support needed to overcome barriers, driving toward a more sustainable and environmentally responsible tourism sector. The objective is to address the current practices, challenges, and potential strategies for reducing single-use plastic usage within the hospitality sector, keeping in mind the unique environmental, regulatory, and cultural contexts of the project sites:

คู่มือนี้จัดทำขึ้น เพื่อเข้าถึงข้อมูลเชิงลึกจากผู้ประกอบการโรงแรม เกี่ยวกับแนวทางปฏิบัติในปัจจุบัน, ความท้าทายที่ต้องเผชิญในการลดการใช้พลาสติกแบบใช้ครั้งเดียว (SUP), และกลยุทธ์ที่ใช้ในการดึงดูดพนักงาน และแขกผู้เข้าพัก เพื่อเข้าร่วมในความพยายามด้านความยั่งยืน นอกจากนี้ยังมีจุดมุ่งหมายเพื่อเปิดเผยโครงการร่วมมือ และการสนับสนุนที่จำเป็นในการเอาชนะอุปสรรคเพื่อขับเคลื่อนไปสู่ภาคการท่องเที่ยวที่ยั่งยืน และรับผิดชอบต่อสิ่งแวดล้อมมากขึ้น วัตถุประสงค์คือ การจัดการกับปฏิบัติการปัจจุบัน, ความท้าทาย, และกลยุทธ์ที่เป็นไปได้สำหรับการลดการใช้พลาสติกแบบใช้ครั้งเดียว ในภาคการบริการโรงแรม โดยคำนึงถึงบริบทด้านสิ่งแวดล้อม, กฏหมาย, และบริบททางวัฒนธรรมของพื้นที่โครงการ

## Introduction

- Brief introduction of the project, its objectives, and the importance of the interviewee's insights.
- Assure confidentiality and the intent to use insights to develop practical solutions.
- name of the operation, size, function, certification, clientele
- แนะนำโครงการอย่างย่อ, วัตถุประสงค์, และความสำคัญของข้อมูลเชิงลึกของผู้ให้สัมภาษณ์
- ยืนยันการรักษาความลับ และจุดประสงค์ในการใช้ข้อมูลที่ได้ เพื่อพัฒนาแนวทางแก้ไขที่ใช้งานได้จริง
- ≻ ชื่อของโครงการ (การดำเนินงาน, ธุรกิจ), ขนาด, การทำงาน, ใบรับรอง , ลูกค้า

# Monitoring and Documentation of SUP Usage / การติดตาม และบันทึกการใช้งาน SUP

### Inventory Practices/ แนวทางปฏิบัติด้านสินค้าคงคลัง

- How do you monitor and document the usage of SUP products and packaging within your operation?
- What tools or systems are in place to track SUP waste generation?
- 🕌 คุณติดตาม และบันทึกการใช้งานผลิตภัณฑ์ และบรรจุภัณฑ์ SUP ภายโครงการของคุณอย่างไร?
- 4 มีเครื่องมือ หรือระบบใดบ้างที่ใช้ในการติดตามการสร้างขยะ SUP?

### <u>Waste Separation and Recycling/ การแยกขยะ และการรีไซเคิล</u>

- Describe the waste separation and recycling practices. How are these facilitated and encouraged among both guests and staff?
- อธิบายปฏิบัติการแยกขยะ และวิธีการรีไซเคิล ว่าปฏิบัติการเหล่านี้ได้รับการส่งเสริม และสนับสนุน จากผู้เข้าร่วมงาน และพนักงานอย่างไร?

### <u>Challenges and Solutions/ ความท้าทาย และวิธีแก้ไข</u>

- What are the specific challenges faced in reducing SUP in these areas, and what innovative solutions have been found?
- ความท้าทายอะไรบ้างที่คุณพบ ในการลดการใช้พลาสติกแบบใช้ครั้งเดียวในการดำเนินงานในพื้นที่ของคุณ และพบวิธีการแก้ปัญหาที่เป็นนวัตกรรมใดบ้าง

# SUP Reduction Strategies/ กลยุทธ์การลดการใช้พลาสติกแบบใช้ครั้งเดียว

### Elimination and Alternatives/ การกำจัด และทางเลือก

- For Restaurants: Kitchen
  - How do you manage the use of single-use plastics in serving and packaging food for dine-in and takeout customers?
  - Sustainable Packaging for Deliveries: Describe any initiatives to work with suppliers to reduce packaging waste in deliveries, especially for fresh produce.
  - Alternatives to Single-Use Items: What alternatives to single-use items (e.g., condiment packets, plastic wrap) are used in the kitchen?
  - What initiatives have you taken to replace single-use plastic items with other alternatives in your restaurant?
  - Can you describe any challenges faced in sourcing alternatives to single-use plastics for food service and packaging?
  - Drinking water: Do you avoid PET bottles and offer refill stations instead?
  - Bulk Purchasing: Do you incorporate bulk purchasing to reduce SUP in kitchen operations?
  - Have you considered to purchase non-perishable food unpackaged or not individually shrink-wrapped?
  - Ho you use reusable gloves?
  - Have you eliminated plastic straws, stirrers and coasters?
  - Are snacks and ice cream offered in reusable container?
  - Do you offer condiments (ketchup, mayonnaise, mustard, jams, vinaigrette, butter) in dispensers instead of in plastic or foil packaging?
  - Does your business provide sugar, salt and pepper in dispensers, shakers or paper sachets instead of plastic ones?

Do you take any measures to eliminate plastic bags?

สำหรับผู้ประกอบการร้านอาหาร: ครัว

4	คุณจะจัดการการใช้พลาสติกแบบใช้ครั้งเดียวในการเสิร์ฟและบรรจุอาหารสำหรับ
	ลูกค้าที่รับประทานที่ร้านและซื้อกลับบ้านอย่างไร <b>?</b>
4	บรรจุภัณฑ์ที่ยั่งยืนสำหรับการส่งมอบ: อธิบายโครงการใดๆ
	ในการทำงานร่วมกับซัพพลายเออร์ เพื่อลดขยะบรรจุภัณฑ์ในการส่งมอบ
	โดยเฉพาะอย่างยิ่งสินค้าที่ต้องอาศัยความสดใหม่
	ทางเลือกอื่นสำหรับรายการแบบใช้ครั้งเดียว: มีทางเลือกใดบ้าง
	สำหรับสินค้าใช้ครั้งเดียว (เช่น ซองเครื่องปรุง, พลาสติกที่ใช้ห่อหุ้ม) ที่ใช้ในครัว?
	คุณได้ริเริ่มอะไรบ้างเพื่อทดแทนการใช้พลาสติกแบบใช้ครั้งเดียว
	ด้วยทางเลือกอื่นๆ ในร้านอาหารของคุณ
	คุณช่วยอธิบายความท้าทายที่ต้องเผชิญในการจัดหาทางเลือกอื่นแทนพลาสติกแบ
	บใช้ครั้งเดียวสำหรับบริการอาหารและบรรจุภัณฑ์ได้ไหม
	น้ำดื่ม: คุณหลีกเลี่ยงการใช้ขวดน้ำดื่ม PET หรือไม่?
	และมีตู้กดเติมน้ำให้บริการแทนหรือไม่?
	การซื้อสินค้าในปริมาณมาก: คุณรวบรวมการซื้อสินค้าในปริมาณที่มาก
	เพื่อลดการใช้พลาสติกแบบใช้ครั้งเดียวในงานครัวอย่างไร?
	คุณเคยพิจารณาซื้ออาหาร ที่ไม่เน่าเสียง่าย
	โดยไม่ใช้วัสดุห่อหุ้มหรือไม่มีการหุ้มด้วยพลาสติกแยกชิ้นหรือไม่?
4	คุณใช้ถุงมือที่สามารถนำมาใช้ซ้ำได้หรือไม่?
	คุณจำกัดใช้หลอด, แท่งคนพลาสติก และที่รองแก้วหรือไม่?
4	คุณให้บริการอาหารจำพวกขนม และ ไอศกรีม
	ในบรรจุภัณฑ์ที่นำกลับมาใช้ใหม่ได้หรือไม่?
4	เครื่องปรุงรส (ซอสมะเขือเทศ, มายองเนส, มัสตาร์ด, แยม, น้ำสลัด และ เนย)
	มีการใช้เครื่องจ่ายแทนการใช้เครื่องปรุงที่มีบรรจุภัณฑ์พลาสติกหรือฟอยล์หรือไม่?
	ธุรกิจของคุณใช้ น้ำตาล เกลือ และพริกไทย
	ในขวดหรือแบบที่บันจุในซองกระดาษแทนอันที่บรรจุโดยห่อพลาสติกหรือไม่?
4	คุณมีมาตรการ วิธีการกำจัดถุงพลาสติกอย่างไร?

# Diving operators

In what ways do you minimize the use of single-use plastics in your diving operations and excursions?

How do you educate and involve divers and clients in efforts to reduce plastic pollution in marine environments?

What sustainable practices have you implemented for equipment cleaning and maintenance to reduce reliance on single-use plastics?

# ภาคธุรกิจดำน้ำ

คุณมีวิธีการใดบ้างในการลดการใช้พลาสติกแบบใช้ครั้งเดียว ในการดำน้ำและการท่องเที่ยวของคุณ?

คุณมีวิธีการให้ความรู้ความเข้าใจ และขอความร่วมมือจากนักดำน้ำและลูกค้า ในการลดขยะพลาสติกลงสู่สภาพแวดล้อมทางทะเลอย่างไรบ้าง?

คุณมีแนวทางปฏิบัติที่ยั่งยืนอะไรบ้างในการทำความสะอาดและบำรุงรักษาอุปกร ณ์เพื่อลดการพึ่งพาพลาสติกแบบใช้ครั้งเดียว?

National Park

How are single-use plastics managed within the park, especially in visitor centers, concessions, and during park activities?

What measures are in place to encourage visitors to reduce plastic waste while in the park?

Can you share examples of successful initiatives or programs aimed at reducing single-use plastics within the park boundaries?

### ภาคอุทยานแห่งชาติ

ภายในอุทยานมีการจัดการกับพลาสติกแบบใช้ครั้งเดียว โดยเฉพาะอย่างยิ่งในศูนย์นักท่องเที่ยว,

พื้นที่สัมปทานและระหว่างกิจกรรมของอุทยานอย่างไร?

- ¥ มาตราการใดที่ผลักดันให้นักท่องเที่ยวลดการใช้พลาสติกในขณะอยู่ในพื้นที่อุทยา น?
- 4 คุณช่วยบอกเล่าประสบการณ์

หรือโครงการใดที่ประสบผลสำเร็จในการลดพลาสติกแบบใช้ครั้งเดียวในอุทยานขอ งคุณได้หรือไม่? Retail shops

What steps have you taken to reduce or eliminate single-use plastic packaging in your product offerings and checkout processes?

- What are the barriers to reduce the use of single-use plastics like e.g. plastic bags?
- How do you communicate the importance of reducing single-use plastics to your customers?
- Are there any specific challenges you face in transitioning to sustainable packaging solutions?
- ภาคร้านค้า
  - คุณได้ดำเนินการขั้นตอนใดบ้างเพื่อลดหรือกำจัดบรรจุภัณฑ์พลาสติกแบบใช้ครั้งเ ดียวในการวางขายและในกระบวนการชำระเงินของคุณ?
  - 4 มีปัญหาใดบ้าง ที่คุณเผชิญจากการเปลี่ยนไปใช้บรรจุภัณฑ์แบบยั่งยืน?

### Ferry and Boat Operators

- How do you address the use of single-use plastics on your vessels, particularly for food and beverage service?
- What practices have you implemented to manage waste effectively on board, especially plastic waste?
- Can you discuss any initiatives aimed at educating passengers about the impact of plastic pollution and how they can contribute to its reduction?
- ≻ ภาคธุรกิจเรือโดยสารและเรือข้ามฟาก
  - คุณจะจัดการใช้พลาสติกแบบใช้ครั้งเดียวบนเรือของคุณ โดยเฉพาะอย่างยิ่งสำหรับการบริการอาหารและเครื่องดื่มอย่างไร?
  - คุณใช้แนวทางปฏิบัติอะไรบ้างในการจัดการขยะอย่างมีประสิทธิภาพบนเรือ โดยเฉพาะขยะพลาสติก?

คุณสามารคให้ข้อมูลเกี่ยวกับโครงการริเริ่มใดๆ ที่มุ่งให้ความรู้แก่ผู้โดยสารเกี่ยวกับผลกระทบของมลพิษจากพลาสติก และวิธีที่พวกเขาสามารถมีส่วนร่วมในการลดมลพิษได้หรือไม่?

### Boat Piers

- What measures have been implemented at the pier to reduce the generation of plastic waste by operators and passengers?
- How do you ensure proper disposal and recycling of plastic waste generated at the facility?
- Are there any collaborative efforts with boat operators, vendors, and local authorities to collectively reduce the use of single-use plastics at the pier?
- ภาคธุระกินและการดำเนินงานบริเวณท่าเรือ
  - 🕌 ที่ท่าเรือมีมาตรการอะไรบ้างเพื่อลดการสร้างขยะพลาสติกโดยผู้ประกอบการและผู้ โดยสาร**?**
  - คุณจะมั่นใจได้อย่างไรว่าจะมีการจัดการและรีไซเคิลขยะพลาสติกที่ท่าเรืออย่างเห มาะสม?
  - มีความร่วมมือใดๆ กับผู้ประกอบการเดินเรือ, ผู้ขาย และหน่วยงานท้องถิ่นเพื่อลดการใช้พลาสติกแบบใช้ครั้งเดียวที่ท่าเรืออย่างมีประสิ ทธิภาพหรือไม่?

### Purchasing and Procurement/ การซื้อและการจัดหา

- How does your procurement process support the reduction of SUP usage? Are there challenges in sourcing alternatives?
- Discuss any collaborations with suppliers to reduce packaging or to procure in bulk.
- กระบวนการจัดซื้อของคุณช่วยสนับสนุนการลดการใช้พลาสติกแบบใช้ครั้งเดียวได้อย่า งไร? มีความท้าทายอะไรในการหาทางเลือกหรือไม่?
- พูดคุยเกี่ยวกับการทำงานร่วมกับซัพพลายเออร์เพื่อลดบรรจุภัณฑ์หรือเพื่อซื้อสินค้าเป็น จำนวนมาก.

# Staff Training and Engagement/

## การฝึกอบรมและการมีส่วนร่วมของพนักงาน

### <u>Training Programs/ โปรแกรมการฝึกอบรม</u>

- Can you describe your staff training programs related to environmental sustainability and SUP reduction?
- How do you handle challenges such as changing routines or increasing awareness among your staff?
- คุณสามารถอธิบายโปรแกรมการฝึกอบรมของพนักงานที่เกี่ยวข้องกับความยั่งยืนทางสิ่ งแวดล้อมและการลดการใช้พลาสติกแบบใช้ครั้งเดียวได้หรือไม่?
- คุณจัดการกับความท้าทายเช่นการเปลี่ยนแปลงกิจวัตรประจำวันหรือการเพิ่มความตระ หนักรู้ในหมู่พนักงานของคุณอย่างไร?

## Guest Integration and Communication/ การรวมและการสื่อสารกับแขก

### Engaging Guests/ การดึงดูดแขก

- How do you communicate your environmental efforts, particularly regarding SUP reduction, to guests?
- Have you implemented any initiatives to involve guests in your sustainability practices?
- คุณสื่อสารความพยายามทางสิ่งแวดล้อมของคุณ
   โดยเฉพาะเกี่ยวกับการลดการใช้พลาสติกแบบใช้ครั้งเดียว ต่อแขกได้อย่างไร?
   คุณได้ดำเนินโครงการใดๆ เพื่อให้แขกมีส่วนร่วมในปฏิบัติการที่ยั่งยืนของคุณหรือไม่ (เช่น การแยกขยะในห้องพัก, การทำความสะอาดชายหาด)?

# Collaborative Actions and Regional Cooperation/ การมีส่วนร่วมและความร่วมมือระดับภูมิภาค

### <u>Collective Initiatives/ โครงการร่วมมือ</u>

- Are there any regional or collective initiatives you are part of that aim to reduce SUP usage or improve waste management?
- How do you collaborate with other hotels, local authorities, or NGOs to address SUP issues?
- 4 มีโครงการริเริ่มระดับภูมิภาคหรือร่วมมือใดๆ
  - ที่คุณเป็นส่วนหนึ่งที่มุ่งเป้าไปที่การลดการใช้พลาสติกแบบใช้ครั้งเดียวหรือการปรับปรุง การจัดการขยะหรือไม่?

คุณร่วมมือกับโรงแรมอื่นๆ, หน่วยงานท้องถิ่นหรือองค์กรไม่แสวงผลกำไรอย่างไรเพื่อจัดการกับปัญหา SUP?

# Challenges and Opportunities/ ความท้าทายและโอกาส

### <u>Barriers to SUP Reduction/ อุปสรรคต่อการลดการใช้ SUP</u>

- What are the main obstacles you face in reducing SUP usage in your operations?
- How do guest expectations influence your ability to implement SUP reduction measures?
- อุปสรรคหลักที่คุณเผชิญในการลดการใช้พลาสติกแบบใช้ครั้งเดียวในการดำเนินงานขอ งคุณคืออะไร?

ความคาดหวังของแขกมีอิทธิพลต่อความสามารถของคุณในการดำเนินมาตรการลดกา รใช้ SUP อย่างไร?

# Future Directions and Needs/ ทิศทางและความต้องการในอนาคต

Looking forward, what strategies or innovations are you considering to further reduce SUP usage?

What kind of support or resources would assist you in achieving your sustainability goals?

∔ในอนาคตข้างหน้า

คุณกำลังพิจารณากลยุทธ์หรือนวัตกรรมใดบ้างเพื่อลดการใช้พลาสติกแบบใช้ครั้งเดียวเ พิ่มเติม?

คุณต้องการการสนับสนุนหรือทรัพยากรประเภทใดที่จะช่วยให้คุณบรรลุเป้าหมายด้าน ความยั่งยืนของคุณ?

# Conclusion/ ข้อสรุป

Invite additional comments or suggestions on enhancing SUP reduction efforts.

HThank the interviewee for their time and valuable insights.

ขอเชิญแสดงความคิดเห็นหรือข้อเสนอแนะเพิ่มเติมเกี่ยวกับการเพิ่มความพยายามในก ารลดการใช้พลาสติกแบบใช้ครั้งเดียว

4 ขอขอบคุณผู้ให้สัมภาษณ์สำหรับเวลาและข้อมูลที่มีค่าของท่าน

Feedback and Comments from participants of the Stakeholder Workshop – Koh Tao

# Feedback and Comments from participants of the Stakeholder Workshop – Koh Tao

### 4. June 2024, Koh Tao Regal Resort

# Action Priority - Scenarios A to C – Koh Tao/ ลำดับความสำคัญของการดำเนินการ - สถานการณ์ A ถึง C

What level of priority would you assign to the following actions grouped in Scenario A, "Pioneering the Plastic Footprint Reduction"? / คุณกำหนดลำดับความสำคัญระดับใดให้กับการดำเนินการต่อไปนี้ซึ่งจัดกลุ่มในสถานการณ์ A "ผู้บุกเบิกการลดรอยเท้าพลาสติก"



Which priority level do you assign to the following Actions grouped in Scenario B "Progressive Plastic Minimization Pathway"? / คุณกำหนดลำดับความสำคัญระดับใดให้กับการดำเนินการต่อไปนี้ซึ่งจัดกลุ่มไว้ในสถานการณ์ B "เส้นทางการลดการใช้พลาสติกแบบก้าวหน้า"



Which priority level do you assign to the following Actions grouped in Scenario C "Comprehensive Circular Success"?



# Please, write here your suggestions about the priority of actions to reduce SUP waste in Koh Tao.

/ กรุณาเงียนข้อเสนอแนะของคุณเกี่ยวกับลำดับความสำคัญของการดำเนินการเพื่อลดขยะ SUP ในเกาะเต่าที่นี่

### 9 responses

- 1. Lots of clean up activities already underway by private sector, urgently need to improve infrastructure for preventing waste entering the environment and for managing waste removed!
- 2. Have more bin in public and add more corrector as well.
- อยากที่จะ เพิ่มจุดทิ้งขยะสาธารณะเพิ่ม ปัจจุบันมีการจัดทิ้งขยะแบบไม่เป็นระเบียบเท่าที่ควร มีขยะตามพื้นและหาดทราย หากมีจุดทิ้งขยะ อาจจะลดการกระจายของขยะได้ (translated: Want to add more public garbage disposal points. At present, garbage is disposed of in an unorganized manner as it should be. There is garbage on the floor and on the beach. If there is a garbage disposal point It may reduce the distribution of waste.)
- 4. Need clearly defined alternatives to replace the most harmful plastics, these should be known by all e.g hemp bags to replace plastic bags or a new type if less harmful container to keep food in to be used across the island and nation. These must be introduced top down and this way effective waste management is easier too. Most importantly there needs to be clear waste management schemes that are efficient. The hard work of people separating their trash should NOT and NEVER be wasted by throwing it all in the same common waste bin. There MUST be effective wags of recycling the waste and preciventing the buildup of the dump which only leaches more plastic into the sea. This is the main point of waste management and currently it simply doesn't work. Most of the responsibility is on the government to effectively segment waste and recycle it. potentially creating a whole waste market where small companies can reuse and create with the waste.
- 5. นอกจากสร้างความเข้าใจกับคนในชุมชน และผู้ประกอบการแล้ว ต้องมีการจัดการ ดูแลต่อเนื่องเป็นวิถึ สร้างความตระหนักให้ตนในชุมชน และนักท่องเที่ยว / In addition to creating understanding with people in the community and entrepreneurs Must be managed Continuous care is the way Create awareness for yourself in the community and tourists
- 6. Prioritize what can be done the fastest, the first this we should do is have people desperate their trash and the waste collectors keep it separate and do not mix the recyclable trash with non recyclable trash

 จัดให้มีถังขยะแยกประเภทตามจุดต่างๆ ให้ความรู้กับชาวบ้านที่ยังแยกขยะไม่เป็น และแจ้งถึงความสำคัญ และผลกระทบของขยะ และสถานการณ์เรื่องขยะล้นเกาะ ควรทำเรื่องแยกขยะอย่างจริงจังและทำให้ยั่งยืน /

Provide separate trash cans at various points. Educate villagers who still don't know how to separate garbage. and notify of the importance and the impact of garbage and the situation of overflowing garbage on the island Waste separation should be taken seriously and made sustainable.

8. ควรทำความเข้าใจกับผู้ประกอบผู้ประกอบการควรมีการจัดอบรมให้ความรู้กับเจ้าหน้าที่ในองค์กร สุดท้าย อยู่ที่การบริหารจัดการปลายทางสำคัญที่

อชู่ที่การบริหารจัดการปลายทางสำคัญที่สุดคือเทศบาลจะบริหารจัดการอย่างไร / You should understand the entrepreneurs. There should be training to provide knowledge to the staff in the organization. Finally, it is about the management of important destinations. The most important issue is how the municipality will manage it.

9. Reducing the use of unsustainable plastics will in turn reduce the amount of plastics entering the ocean - the key is to focus on the source, rather than the later stages at this point

# Action Effectiveness - Scenarios A to C Koh Tao/ ประสิทธิผลของการดำเนินการ - สถานการณ์ A ถึง C

How effective is in your opinion each Action grouped in Scenario A "Plastic Footprint Reduction Pioneer"? / ความคิดเห็นของคุณแต่ละการดำเนินการจัดกลุ่มในสถานการณ์ A "ผู้บุกเบิกการลดรอยเท้าพลาสติก" มีประสิทธิภาพเพียงใด



How effective is in your opinion each Action grouped in Scenario B "Progressive Plastic Minimization Pathway"?



How effective is in your opinion each Action grouped in Scenario C "Comprehensive Circular Success"?



Please, write here your suggestions for how actions to reduce SUP waste in Koh Tao can be implemented in a way that helps to really achieve the intended outcomes.

/ โปรดเขียนข้อเสนอแนะของคุณที่นี่ว่าการดำเนินการเพื่อลดขยะ SUP

ในเกาะเต่าสามารถนำไปใช้ในลักษณะที่ช่วยให้บรรลุผลตามที่ตั้งใจไว้ได้อย่างไร4 responses

- 1. Also need to target beanbags used by beach bars lots of beans spilled everyday
- 2. Make everyone organise their bins for general and recycling waste. Have the waste collectors keep this separate, rather than they collect and mix together. Collected recycling material could be sold in bulk or traded online. An online store for anyone in the world to buy in bulk recyclable material for their projects. If we had recycling storage centres and a single online store. Company's and businesses could order the materials they need for their business, this could have a massive world impact.
- 3. Limit/ban the import/use of certain plastics, create a fine for the import/use of said plastics, and re-invest fined money into funding more sustainable materials. Stricter bans and better promotion towards both purchasing sustainable materials and lowering the cost of those materials in the process to make them the more affordable option for local businesses.
- 4. ขนออกจากเกาะ / Transport off the island

# SUP Waste Scenarios for Koh Tao / SUP สถานการณ์ขยะเพื่อการท่องเที่ยวเกาะเต่า

This is about the expected timeframe for the different Scenarios. / นี่เป็นเรื่องเกี่ยวกับกรอบเวลาที่คาดหวังสำหรับสถานการณ์ต่างๆ



# Here is additional space for adding comments and missing actions related to the SUP Waste Scenarios of the Tourism Sector.

/ นี่เป็นพื้นที่เพิ่มเติมสำหรับการเพิ่มความคิดเห็นและการดำเนินการที่งาดหายไปที่เกี่ยวข้องกับสถานก ารณ์ขยะ SUP ของภาคการท่องเที่ยว3 responses

- 1. Negotiate with 7-Eleven to help. They would have a big impact as they are all over Thailand and are one of the reasons for so much plastic being out there.
- 2. Dedicate the necessary funds towards the highest priority target, once that has been completed, work towards the next priority. However, if the necessary initial funds are not spent, or only a half-effort is made, it will inevitably lead to a fail and financial loss, therefore discouraging further future action.
- ส่วนมากสถานประกอบการสามารถดำเนินการได้ส่วนมากสถานประกอบการสามารถดำเนินการได้เลยที่ไม่สามารถทำได้คือเกี่ยวกับเรายังไม่มี บรรจุภัณ หรือวัสดุทดแทน / Most establishments can do the work. Most establishments can do the work. What cannot be done is that we do not yet have packaging or substitute materials.

# Feedback and Comments from participants of the Stakeholder Workshop –Trang

## Feedback and Comments from participants of the Stakeholder Workshop –Trang

### 6. June 2024, Thumrin Thana Hotel

Please, mark for the geographic region you mainly express your perspective here. / โปรดทำเครื่องหมายภูมิภาคที่คุณแสดงมุมมองของคุณเป็นหลักที่นี่ <sup>24 responses</sup>



Action Priority - Scenarios A to C – Trang/ ลำดับความสำคัญของการดำเนินการ - สถานการณ์ A ถึง C What level of priority would you assign to the following actions grouped in Scenario A, "Pioneering the Plastic Footprint Reduction"? / คุณกำหนดลำดับความสำคัญระดับใดให้กับการดำเนินการต่อไปนี้ซึ่งจัดกลุ่มในสถานการณ์ A "ผู้บุกเบิกการลดรอยเท้าพลาสติก"



Which priority level do you assign to the following Actions grouped in Scenario B 『Progressive Plastic Minimization Pathway"? / คุณกำหนดลำดับความสำคัญระดับใดให้กับการดำเนินการต่อไปนี้ซึ่งจัดกลุ่มไว้ในสถานการณ์ B "เส้นทางการลดการใช้พลาสติกแบบก้าวหน้า"



Which priority level do you assign to the following Actions grouped in Scenario C "Comprehensive Circular Success"?



# Please, write here your suggestions about the priority of actions to reduce SUP waste in Trang.

/ กรุณาเขียนข้อเสนอแนะของคุณเกี่ยวกับลำดับความสำคัญของการดำเนินการเพื่อลดขยะ SUP ในเกาะเต่าที่นี่

2 responses

- 10. ติดตั้งถังบยะ ในทุกๆ 5เมตร เพื่อลดบยะ / Install trash cans every 5 meters to reduce waste.
- 11. จัดตั้งถังขยะให้สะดวก สำหรับนักท่องเที่ยว รนรงณ์ห้ประชาชนทั่วไปไม่ใช้ไฟนและพลาสติก / Set up trash cans
  - conveniently. for tourists Promote the general public not to use phones and plastic.

## Action Effectiveness - Scenarios A to C Trang/ ประสิทธิผลของการดำเนินการ - สถานการณ์ A ถึง C

Please, mark for the geographic region you mainly express your perspective here. / โปรดทำเครื่องหมายภูมิภาคที่คุณแสดงมุมมองของคุณเป็นหลักที่นี่

21 responses



How effective is in your opinion each Action grouped in Scenario A "Plastic Footprint Reduction Pioneer"? / ความคิดเห็นของคุณแต่ละการดำเนินการจัดกลุ่มในสถานการณ์ A "ผู้บุกเปิกการลดรอยเท้าพลาสดิก" มีประสิทธิภาพเพียงใด





How effective is in your opinion each Action grouped in Scenario B "Progressive Plastic Minimization Pathway"?

How effective is in your opinion each Action grouped in Scenario C "Comprehensive Circular Success"?



Please, write here your suggestions for how actions to reduce SUP waste in Trang can be implemented in a way that helps to really achieve the intended outcomes.

/ โปรดเขียนข้อเสนอแนะของคุณที่นี่ว่าการดำเนินการเพื่อลดขยะ SUP

ในเกาะเต่าสามารถนำไปใช้ในลักษณะที่ช่วยให้บรรลุผลตามที่ตั้งใจไว้ได้อย่างไร 2 responses

- It will make the place much cleaner and more attractive to tourists. / จะทำให้สถานที่นั้นสะอาดขึ้นมากน่าท่องเที่ยว
- 2. Install trash cans every 5 meters. / ติดตั้งถังขยะ ในทุกๆ5เมตร

# SUP Waste Scenarios for Trang / SUP สถานการณ์ขยะเพื่อการท่องเที่ยวเกาะเต่า

Please, mark for the geographic region you mainly express your perspective here. / โปรดทำเครื่องหมายภูมิภาคที่คุณแสดงมุมมองของคุณเป็นหลักที่นี่ <sup>18 responses</sup>



This is about the expected timeframe for the different Scenarios. / นี่เป็นเรื่องเกี่ยวกับกรอบเวลาที่คาดหวังสำหรับสถานการณ์ต่างๆ



# Here is additional space for adding comments and missing actions related to the SUP Waste Scenarios of the Tourism Sector.

/ นี่เป็นพื้นที่เพิ่มเติมสำหรับการเพิ่มความคิดเห็นและการคำเนินการที่ขาดหายไปที่เกี่ยวข้องกับสถานก ารณ์ขยะ SUP ของภาคการท่องเที่ยว 2 responses

- 1. ชายหาด ต.หาดสำราญ / Beach, Hat Samran Subdistrict
- ต้องมีผู้ใหญ่สอนเด็กทิ้งขยะ ในถังแบบที่ถูกต้อง / There must be an adult teaching children how to dispose of garbage. in the correct tank

# The WWF Plastic Waste Monitoring Tool for Tourism Businesses

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### 1. Introduction

### Purpose of the Tool

### Objective

As part of the "Marine Litter Prevention through Reduction, Sustainable Design, and Recycling of Plastic Packaging (MA-RE-DESIGN)" project with a baseline assessment in the destinations Koh Tao and Trang, a tool should be provided that allows businesses to monitor the plastic waste generated. The tool shall enable owners or managers to assess changes in generated plastic waste that can be attributed to changes in business practices, particularly those targeted towards avoiding and reducing plastic packaging material.

### Background Information

This tool is based on about 40 individual conversations with business owners and managers about their practices of single-use plastic in their business operations. It also sits on the experience of measuring the plastic waste of a sample of 20 small- to medium-sized business operations.

It has been developed to monitor the plastic waste that can be found in all the trash bins of the business operation. Hence, it was decided to apply an output approach rather than an input approach. An input approach would require the businesses to provide records of any plastic packaging material which is purchased or acquired and their current stock to arrive at the 'consumption' of plastic waste for a particular period. The output approach incorporates some ambiguities: customers bring plastic packaging material from outside (e.g. products from retail shops, other food and beverage vendors) to dispose of them in your premises. On the other hand, some plastic packaging material might leave the premises (e.g. takeaway products).

Plastic waste material of value (e.g. PET, HDPE) is segregated in many businesses. And yet, smaller operations sometimes do not see a benefit in separating PET or HDPE from the general waste. Segregating all the other plastic waste from general waste requires a change in business processes in most cases. Hence, it is recommended to discuss and prepare clear instructions for the assigned staff to organize: a) how to segregate PET, HDPE and other plastic waste from general waste, b) where to keep during the day, c) where and when to collect centrally, d) how to weigh the plastic waste and e) how to note the readings.

### 2. Getting Started

### System Requirements

The tool has been developed under Microsoft Office 2021. It can be used by any version of Excel that can open and edit these types of files. The tool does not work with any macros or VBA code. Despite this simplification, it is not recommended to operate the content under Google Sheets or similar online tools.

### Installation Guide

There is no special requirement for the storage location of the file. It can be on a hard drive, on an external storage device or on a cloud space.

### Initial Setup

The tool is shared in an empty state without any data. No user accounts are necessary to access the content. The first steps of handling include filling the "Profile" with a few descriptors for the own business operation.

### 3. User Interface

### Overview of the Interface

The Tool (Excel file) is organized in different sheets or pages. It starts with a sheet/page with general "Instructions" about how to use the tool. This is followed by the "Profile" page that carries data about the business and business structure. In the lower section, there is space for a kind of log-book of events which are deemed to be relevant for variations in the generated plastic waste.

The most important output and information for analytical and decision-making purposes are automatically generated in the following two pages: "Monitor" and "Total Plastic Waste". The "Monitor" tables the change in the total waste for each month (in kg) for which plastic waste records are available compared to the initial "Baseline" measurement. Right to the total waste for each month, the user can see changes expressed as an average volume of plastic waste per customer served (in gram).

The remaining pages show a similar structure. First, the "Baseline" page is prepared for taking the records of plastic waste and customers served for an initial observation period. The "Baseline" recording will be done once commonly before any major changes in business practices are implemented. After this step, the business can use the monthly pages (prepared for January to December) entering the recordings in the same way like it has been done for the "Baseline" period.

#### Language Selection

Right at the beginning, on top of the "Instruction" page, the user shall choose the preferred language (English or Thai) for the interface. Once, data have been input in one of the consecutive pages, the language setting should not be changed. If this is necessary, the user has to delete the selected names for the service departments and the selected unit for the capacity description and re-enter those in the other language.

### 4. Features and Functions

### Data Entry

The following data entry description is split into the 3 pages for which data entry is required: "Profile", "Baseline" and "January" to "December".

### The "Profile" page

You start entering a few details on your business operation in the "Profile" sheet. You can select from 8 service areas.

- 1. Accommodation
- 2. Restaurant
- 3. Pool Bar
- 4. Bar
- 5. Coffee Shop
- 6. Spa / Massage
- 7. Beauty Salon
- 8. Diving/Boat tours
- 9. Staff housing

If you want to choose more than 1 service area, please only consider those which are at the same location and those for which you have a record / good estimate of daily customers. If you separate the plastic waste of different service areas and intend to weigh and measure separately, it is recommended to use one Excel file for each of these service areas. Since it is common practice for many businesses to bring together the trash bins and containers from all service departments and prepare them for collection centrally, this tool is prepared to be used for businesses with more than one service department.

The same logic applies to those businesses which operate staff accommodations. If the trash and plastic waste is collected together with the other commercial service areas, the "Profile" page should include the selection "Staff housing" and the waste records later on should include the number of employees staying overnight on the premises.

For trainers or external assistants supporting you with this tool, it is recommended to give a brief description of the capacities of each service department. You choose the appropriate unit form the list:

- 1. Rooms
- 2. Beds
- 3. Bungalows/Huts
- 4. Tables
- 5. Seats
- 6. Massage beds/chairs
- 7. Treatment places

### 8. Diving/tour customers

And add an appropriate number in the column to the left. These entries are not mandatory and not relevant for any consecutive calculations.

If you weigh and record plastic waste for more than one service area, you can enter a number that expresses the relative plastic waste volume the other service area(s) generate per customer relative to your main service area. E.g. if you believe that your restaurant (= main business area) generates 4 times the plastic waste per customer compared to the diving operation, you enter "1" for the restaurant and "0.25" for the diving department. If you are okay with the values in the "Default" column, you do not need to enter anything. This step is a necessary technical workaround that enables later on a comparison of waste data from different days with a different occupancy rate and customer frequency in the different service departments. If we would not allow this differentiated calculation the tool would either always divide the total plastic waste by the number of customers in the main service area (e.g. number of overnight guests) or the business would have to measure and record the plastic waste for each service department separately.

Later during the monitoring year, you enter on the "Profile" page a brief description on any changes you implement or that occur inside or outside the business which might impact the volume of plastic packaging material used in your business operation. We strongly recommend highlighting even particular items (e.g. ban on plastic straws, ban on plastic containers for takeaway food) for which you decided to make changes.

### The "Baseline" page

The "Baseline" page is reserved for the initial plastic waste records. It is recommended to do the recording for 1 to 2 weeks. Choose days that do not represent extraordinary events: e.g. no supplies of plastic bottles. For the later Benchmark operation, the data collected for the Baseline period will be adjusted for a full month. Enter the month and year of the Baseline period at the beginning of the page.

A pre-requisite for this type of waste monitoring is the separating and measuring (weight) of the plastic waste from the general waste. In most cases, this will not change the current routines of collecting PET and harder plastic containers (e.g. laundry detergents, fabric softener, cooking oil, cosmetics, shower gel; category 2 or HDPE plastic). Yet, you would need to separate all other plastic package material (found in the trash bins of guest rooms, of kitchen and any food & beverage facility, spa etc.) into a separate bin.

The waste volume for plastic waste which is collected every day needs to be weighed and recorded every day. PET and HDPE plastic can be weighed and recorded in this tool for 1, 3, 5 or more days, depending on your quantity and routine. If PET waste e.g. is routinely collected every day, this type of plastic has to weighed and recorded on a daily basis as well. The same applies for HDPE plastic. Important to notice is that you enter customer numbers for those days for which you weigh and record SUP waste volumes. Of course, the objective is to keep

a complete record of all operating days of the monitoring period to arrive at a meaningful figure for the total waste generated and calculated per month.

For businesses with one or more than one service area (e.g. accommodation and restaurant), enter actual customer numbers (e.g. not rooms or tables sold) or realistic estimates in the absence of exact records for each service area. Remember: only if the plastic waste for all these service areas is weighed and recorded together. This applies in the same way if the plastic waste from staff accommodation comes together with that of customers.

### The monthly recordings page

After this Baseline record, you may start with regular monitoring and data collection in any month thereafter. The data entry is the same as for the "Baseline" page. These data should be entered in the appropriate page prepared for every month of the monitoring year.

### Reports and Dashboards

This monitoring tool provides two dashboard pages: the "Monitor" and the "Total Plastic Waste" page.

The reporting will be done automatically: On the page "Total Plastic Waste" you will receive two tables, one with the figures for the total plastic waste per month (in kg), and a second for the average plastic waste per customer (in gram). For businesses reporting for more than one service area, this tool converts the customer (and eventually staff) numbers of the different service areas into one combined, weighted customer figure. This statistic is only relevant and meaningful for your internal benchmarking.

The ultimate goal of this tool is the monitoring of changes. You can observe changes for each month and each plastic waste category on the page "Monitor". On this page, absolute changes in plastic waste volumes (in kg for each month) will be exhibited and relative changes expressed in grams per weighted customer (for each month). Changes are calculated as the difference compared with the "Baseline" plastic waste generation corrected by variations of customer numbers served for the different periods.

### Sharing Data:

At the given time intervals, you can send the entire Excel file to the supporting agency. However, it is not necessary to share/send the entire Excel file with all detailed and daily records. There are three options how for doing this:

A) Printing the relevant areas of the 3 sheets "Profile", "Monitor" and "Total Plastic Waste" or

B) Take pictures with your mobile phone of the content of these 3 sheets or

C) Saving only these 3 sheets into a new Excel file under the name using your assigned ID.

### 5. Illustration Cases for Demonstration

We will show two use-cases with screenshots and a brief description in this chapter.

### Restaurant operation

After having selected the appropriate language, we can go on to fill in the minimum descriptive information about the restaurant business on the "Profile" page:

- The year of the reporting
- The ID for the business assigned by the WWF office
- The name of the business
- The location of the business
- The name of the contact person for using this tool
- The email address for this contact person
- The main service department: Restaurant in our case
- And optional: the capacity of the restaurant: either using # of seats or # of tables.

#### Packaging Plastic Waste Monitoring Tool for Tourism Businesses

Reporting year	2567	÷	Year of monitoring
Business ID KT-007		÷	Use the ID assigned by WWF Office
Business Name	Beach Restaurant		
Location	Mae Haad		
Contact person	Ms. Thai	email:	xxxxx@gmail.com
Baseline/Benchmarking		June Month	2567 <b>Year</b>

	Select here the main service departments of your business for which the plastic waste is measured together	Describe here the capacity for each department with a number	Select the appropriate unit	Default proportions of plastic waste volume per customer	Your estimate for these proportions starting with "1" for your main service
Main service	Restaurant	100	Seats	1.0	
Other service 1					
Other service 2					
Other service 3					
Other service 4					
Other service 5					
Staff accommodation					

Please list the specific actions your business is taking to reduce single-use plastic waste. Include details on the types of plastic items you are replacing or eliminating, such as straws, cups, utensils, bags, food packaging, and toiletries. Describe any changes to your operations that will impact the volume of plastic waste generated and collected from your business. Providing this information will help us better understand and track the plastic waste reduction efforts across the tourism sector. The next step is already dedicated to the first measurements deemed to be the Baseline or Reference period. In our case, we start in June, beginning with 10 and continuing until 16. On top of the table, we enter the month and the year for this Baseline period.

If you want to provide a printout of the table for entering the daily records of PET, HDPE and other plastic waste, simply mark that area of the table and print it as large as possible to ease the manual data entry.

Later, the daily plastic waste volumes can be manually entered into this spreadsheet adding the appropriate number of customers in the free, white column to the right.

The Tool automatically calculates the sum of the total plastic waste and divides this volume by the number of customers. In the table header area, the Tool automatically calculates the sum of the recorded plastic waste volumes for each type of plastic, divides this volume by the number of customers recorded in this spreadsheet and projects these figures into a monthly waste volume assuming the waste generation for a complete month (30 days each).

Assume that the business introduces some plastic waste reduction actions: 1) before the beginning of July and 2 before the second half of August. The business owner decides to run two measurement periods to check whether there is a significant change. See here the recorded data for the two periods after SUP reduction actions have been taken.

#### Packaging Plastic Waste Monitoring Tool for Tourism Businesses

	Please, ente	er in columns	f the period	Please enter in columns below # of customers for the reported day(s)											
	РЕТ	HDPE	All other plastic	Total Plastic Waste	Customer number	Plastic Waste / Customer	Accom modati on	Restaura nt	Pool Bar	Bar	Coffee Shop	Spa / Massag e	Beauty Salon	Diving/ Boat tours	Staff housing
	in gram							(Insert cu	istomer	number	s only for	the whit	e cells)		(staff #)
Sum	2180	519	1540	4239	1155										
Average Sum /	2	0	1	4	1	4									
complete	9343	2224	6600	18167	4950										
month															
Day															
1	350	45	150	545	160	3		160							
2	270	67	220	557	120	5		120							
3	380	89	250	719	170	4		170							
4	400	98	300	798	220	4		220							
5	200	54	120	374	140	3		140							
6	260	77	200	537	170	3		170							
7	320	89	300	709	175	4		175							
8				0	0	na									
9				0	0	na									
10				0	0	na									
11				0	0	na									
12				0	0	na									
13				0	0	na									
14				0	0	na									
15				0	0	na									
16				0	0	na									
17				0	0	na									
18				0	0	na									
19				0	0	na									
20				0	0	na									
21				0	0	na									
22				0	0	na									
23				0	0	na									
24				0	0	na									
25				0	0	na									
26				0	0	na									
20				0	0	na									
2/				0	0	na									
20				0	0	na									
29				0	0	na									
30				0	0										
31	1			0	0	114					1				
Packaging Plastic Waste Monitoring Tool for Tourism Businesses

	Please, ente	er in columns		Please enter in columns below # of customers for the reported day(s)											
	PET	HDPE	All other plastic	Total Plastic Waste	Customer number	Plastic Waste / Customer	Accom modati on	Restaura nt	Pool Bar	Bar	Coffee Shop	Spa / Massag e	Beauty Salon	Diving/ Boat tours	Staff housing
	in gram						(Insert customer numbers only for the white cells)							(staff #)	
Sum	2180	519	1200	3899	1197	2									
Sum /	2	U	1	3	1	3									
complete	9343	2224	5143	16710	5130										
month															
Day				0	0	na									
1				0	0	na									
3				0	0	na									
4				0	0	na									
5				0	0	na									
6				0	0	na									
7				0	0	na									
				0	0	na									
9				0	0	na									
10				0	0	na									
11				0	0	na									
12				0	0	na									
13				0	0	na									
14				0	0	na									
15				0	0	na									
16				0	0	na									
17				0	0	na									
18				0	0	na									
19				0	0	na									
20				0	0	na									
21				0	0	na									
22	350	45	120	515	145	4		145							
23	270	67	190	527	140	4		140							
24	380	89	220	689	192	4		192							
25	400	98	250	748	240	3		240							
26	200	54	80	334	139	2		139							
27	260	77	150	487	157	3		157							
28	320	89	190	599	184	3		184							
29				0	0	na									
30				0	0	na									
31				0	0	na									

The Tools provides two Dashboards for reporting: A) "Total Plastic Waste" and B) "Monitor". The Total Plastic Waste gives a monthly overview of the total plastic waste taking the average of plastic waste generation for the recorded period (in our example 7 days) and projecting these numbers for a complete month. This step makes the Total Plastic Waste figures at least comparable across different months. In most cases, different months will have a different number of customers which influences to a large extent the volume of plastic waste generated. Hence, the second half of the table converts the Total Plastic Waste figures into an average per customer. Be aware that the Total Plastic Waste is expressed in kg whereas the Plastic Waste per customer is expressed in grams.

Reporting year	2567										
Business ID	KT-007										
		Total for busin	ess per month	i l	Average per customer #						
	PET	HDPE	All other plastic	Total Plastic Waste	PET	HDPE	All other plastic	Total Plastic Waste			
		in kilo	ogram		in gram						
Month											
January											
February											
March											
April											
May											
June											
July	9	2	7	18	2	0	1	4			
August	9	2	5	17	2	0	1	3			
September											
October											
November											
December											
Year Total	19	4	12	35							

In the "Monitor" Dashboard, the business operator can see whether changes happened compared to the baseline measurement. The color code shall help correctly read the results: red marked cells mean an increase compared to the Baseline measurement (Plastic Waste volume) and green marked cells a decrease or reduction.

In our example, the overall volume of plastic waste increased in July and also in August. However, this can be attributed to the increase of business volume. Only the second half of the table can tell us whether the operation could lower the plastic waste generation per customer. In our example, all three plastic types show green cells and a slight improvement for PET and HDPE, but a significant reduction in other plastic waste.

If the business took some particular action towards reducing e.g. LPDE or PP (e.g. plastic cups and bowls), it is strongly recommended to mention such measures briefly in the "Profile" page, giving a brief description of the action taken and which plastic types are expected to be less in the overall plastic waste volume.





#### Multi-department resort operation

After having selected the appropriate language, we can go on to fill in the minimum descriptive information about the restaurant business on the "Profile" page:

- The year of the reporting
- The ID for the business assigned by the WWF office
- The name of the business
- The location of the business
- The name of the contact person for using this tool
- The email address for this contact person
- The main service department: accommodation in our case; and restaurant and spa/massage as other service areas. In addition, the resort provides some housing for staff. For all four areas/departments, the waste and plastic waste is collected centrally. Therefore, we need to provide records of the pax numbers for the customers of each department later on.
- And optional: the capacity of the accommodation, restaurant and spa: either using # of beds/rooms, # of seats or # of tables and 3 of massage chairs/beds.
- By default, the Tool provides different weights for the customer # of the different service areas (including the staff housing). These ratios should reflect the volume of plastic waste each customer causes in which department. These ratios can be based on your best experience and judgement. If you do not want to follow the default settings, please enter your estimates in the column to the right. Important: Please, use

your main service department as your reference with a ratio of "1" for one customer. In our example, we set this weight or ratio at 0.25 for the restaurant operation. This means that 4 restaurant customers cause a similar amount of plastic waste compared to one customer in the rooms department. Similar, we set the ratio for the spa/massage department to 0.2. This means: 5 spa customers generate a similar amount of plastic waste compared to one customer on the rooms department. Finally, a ratio for the plastic waste generated by the employees living in the resort. We set this ratio to 0.8 which means, that that the plastic waste of employees living in the resort is about 80% of the volume one customers in the rooms department generates.

Reporting year	2567	÷	Year of monitoring
Business ID	KT-007	÷	Use the ID assigned by WWF Office
Business Name	Dream Bay Resort		
Location	Shark Bay		
Contact person	Mr. Thai	email:	xxxxx@gmail.com
Baseline/Benchmarking		June Month	2567 <b>Year</b>

#### Packaging Plastic Waste Monitoring Tool for Tourism Businesses

	Select here the main service departments of your business for which the plastic waste is measured together	Describe here the capacity for each department with a number	Select the appropriate unit	Default proportions of plastic waste volume per customer	Your estimate for these proportions starting with "1" for your main service
Main service	Accommodation	50	Rooms	1.0	1
Other service 1	Restaurant	75	Seats	0.2	0.25
Other service 2	Spa / Massage	12	Massage beds/cha	0.4	0.2
Other service 3					
Other service 4					
Other service 5					
Staff accommodation	Staff housing			0.3	0.8

Please list the specific actions your business is taking to reduce single-use plastic waste. Include details on the types of plastic items you are replacing or eliminating, such as straws, cups, utensils, bags, food packaging, and toiletries. Describe any changes to your operations that will impact the volume of plastic waste generated and collected from your business. Providing this information will help us better understand and track the plastic waste reduction efforts across the tourism sector.

The next step is dedicated to the first measurements deemed to be the Baseline or Reference period. In our case, we start in June, beginning with 10 and continuing until 16. On top of the table, we enter the month and the year for this Baseline period.

If you want to provide a printout of the table for entering the daily records of PET, HDPE and other plastic waste, simply mark that area of the table and print it as large as possible to ease the manual data entry.

Later, the daily plastic waste volumes can be manually entered into this spreadsheet adding the appropriate number of customers in the free, white column to the right.

The Tool automatically calculates the sum of the total plastic waste and divides this volume by the number of customers. In the table header area, the Tool automatically calculates the sum of the recorded plastic waste volumes for each type of plastic, divides this volume by the number of customers recorded in this spreadsheet and projects these figures into a monthly waste volume assuming the waste generation for a complete month (30 days each).

Baseline	/ Benchmark Period

June Month 2567 Year

	Please, enter in columns below the plastic waste of the period Please enter in columns below # of customers for the reported day(s)									y(s)						
	РЕТ	HDPE	All other plastic	Total Plastic Waste	Customer number	Plastic Waste / Customer	Accom modati on	Restaurant	Poo Ba	ol ar	Bar	Coffee Shop	Spa / Massage	Beauty Salon	Diving/ Boat tours	Staff housing
		in g	ram					(Insert cu	istom	ner r	numbers	only for	the white	cells)		(staff #)
Sum	11460	1219	29670	42349	593											
Average	19	2	50	71	1	71										
complete	49114	5224	127157	181496	2542											
month		J.L.	127107	101150	2012											
Day																
1				0	0	na										
2				0	0	na										
3				0	0	na										
4				0	0	na										
5				0	0	na										
6				0	0	na										
7				0	0	na										
8				0	0	na										
9				0	0	na										
10	1520	145	3400	5065	63	80	40	50					5			12
11	1610	167	2520	5297	65	80	20	67					10			12
11	1700	100	3520	5257	00	58		07					10			12
12	1/00	105	3000	5309	50	103	05	00					°			12
13	1880	198	3700	57/8	56	103	35	48					6			10
14	1450	154	4350	5954	/9	70	48	68					12			14
15	1570	177	5400	7147	125	57	80	120					18			14
16	1650	189	5700	7539	108	/0	66	110					16			14
17				0	0	na										
18				0	0	na										
19				0	0	na										
20				0	0	na										
21				0	0	na										
22				0	0	na										
23				0	0	na										
24				0	0	na										
25				0	0	na										
26				0	0	na										
27				0	0	na										
28				0	0	na										
20				0	0	na										
20				0	0	na										
30					0	n										
31				0	0	1 10	1					1	8			

Assume that the business introduces some plastic waste reduction actions: 1) before the beginning of July and 2) before the second half of August. The business owner decides to run two measurement periods to check whether there is a significant change. See here the recorded data for the two periods after SUP reduction actions have been taken.

	Please, ente	er in columns		Please enter in columns below # of customers for the reported day(s)											
	РЕТ	HDPE	All other plastic	Total Plastic Waste	Customer number	Plastic Waste / Customer	Accom modati on	Restaura nt	Pool Bar	Bar	Coffee Shop	Spa / Massag e	Beauty Salon	Diving/ Boat tours	Staff housing
		in g	ram					(Insert cu	ustomer	numbers	only for	the whit	e cells)		(staff #)
Sum	12750	1219	29060	43029	637										
Average Sum /	20	2	46	68	1	68									
complete	54643	5224	124543	184410	2729										
month															
Day															
1	1670	145	3570	5385	71	76	44	60				10			12
2	1780	167	1680	3627	73	50	42	77				12			12
3	1960	189	3780	5929	103	58	70	85				10			12
4	2070	198	3800	6068	62	99	38	56				8			10
5	1720	154	4570	6444	85	76	52	74				14			14
6	1730	177	5670	7577	129	59	80	134				21			14
7	1820	189	5990	7999	115	70	70	120				19			14
8				0	0	na									
9				0	0	na									
10				0	0	na									
11				0	0	na									
12				0	0	na									
13				0	0	na									
14				0	0	na									
15				0	0	na									
16				0	0	na									
17				0	0	na									
19				0	0	na									
10				0	0	na									
19				0	0										
20				0	0										
21				0	0										
22				0	0										
23				0	0	na			-						
24				0	0	na									
25				0	0	na									
26				0	0	na									
27				0	0	na									
28				0	0	na									
29				0	0	na									
30				0	0	na									
31				0	0	na									

	Please, ente	er in columns		Please enter in columns below # of customers for the reported day(s)											
	PET	HDPE	All other plastic	Total Plastic Waste	Customer number	Plastic Waste / Customer	Accom modati on	Restaura nt	Pool Bar	Bar	Coffee Shop	Spa / Massag e	Beauty Salon	Diving/ Boat tours	Staff housing
		in g	ram					(Insert customer numbers only for the white cells)							(staff #)
Sum	14662.5	1401.85	33419	49483.35	781	62									
Sum /	19	2	45	05	1	03									
complete	62839	6008	143224	212072	3348										
month															
Day															
1				0	0	iid na									
2				0	0	na									
3				0	0	- 114									
4				0	0										
5				0	0										
6				0	0	114									
/				0	0	na									
8				0	0	na									
9				0	0	na									
10				0	0	na									
11				0	0	na									
12				0	0	na									
13				0	0	na									
14				0	0	na									
15				0	0	na									
16				0	0	na									
17				0	0	na									
18				0	0	na					ļ				
19				0	0	na									
20				0	0	na									
21				0	0	na									
22	1921	167	4106	6192.75	67	92	42	57				8			12
23	2047	192	1932	4171.05	70	60	40	73				11			12
24	2254	217	4347	6818.35	98	70	66	82				8			12
25	2381	228	4370	6978.2	57	123	34	53				7			10
26	1978	177	5256	7410.6	255	29	49	771				12			14
27	1990	204	6521	8713.55	123	71	76	128				20			14
28	2093	217	6889	9198.85	111	83	67	117				17			14
29				0	0	na									
30				0	0	na									
31				0	0	na									

The Tool provides two Dashboards for reporting: A) "Total Plastic Waste" and B) "Monitor". The Total Plastic Waste gives a monthly overview of the total plastic waste taking the average of plastic waste generation for the recorded period (in our example 7 days) and projecting these numbers for a complete month. This step makes the Total Plastic Waste figures at least comparable across different months. In most cases, different months will have a different number of customers which influences to a large extent the volume of plastic waste generated. Hence, the second half of the table converts the Total Plastic Waste figures into an average per customer. Be aware that the Total Plastic Waste is expressed in kg whereas the Plastic Waste per customer is expressed in grams.

Reporting year	2567										
Business ID	KT-007										
		Total for busin	ess per month	i l		Average p	er customer #				
	PET	HDPE	All other plastic	Total Plastic Waste	PET	HDPE	All other plastic	Total Plastic Waste			
		in kilo	ogram		in gram						
Month											
January											
February											
March											
April											
May											
June											
July	55	5	125	184	20	2	46	68			
August	63	6	143	212	19	2	43	63			
September											
October											
November											
December											
Year Total	117	11	268	396							

In the "Monitor" Dashboard, the business operator can see whether changes happened compared to the baseline measurement. The color code shall help correctly read the results: red marked cells mean an increase compared to the Baseline measurement (Plastic Waste volume) and green marked cells a decrease or reduction.

In our example, the overall volume of plastic waste increased in July and also in August. However, this can be attributed to the increase of business volume. Only the second half of the table can tell us whether the operation could lower the plastic waste generation per customer. In our example, all three plastic types show green cells except for PET in July. Yet, in August, the average PET waste generation went down compared to the Baseline period of June. Important to mention that particularly the "Other plastic" waste could be reduced significantly in both months.

If the business took some particular action towards reducing e.g. LPDE or PP (e.g. plastic cups and bowls), it is strongly recommended to mention such measures briefly in the "Profile" page, giving a brief description of the action taken and which plastic types are expected to be less in the overall plastic waste volume.





### 6. Troubleshooting

#### Common Issues and Solutions

- The different pages/sheets of this tool are password-protected. This limits and protects the data entry to the cells which are prepared for data entry.
- Once, the preferred language setting is chosen on the "Instructions" page the interface changes to that language. The user can change it back to another language. However, once some entries on the "Profile" page have been made using one chosen language, the Tool should not be changed back to another language. This would distort the consecutive formula generation and Dashboard calculations. Yet, if a swap of languages is necessary, the user has to delete the chosen service department names and reselect them in the other language version. No other changes to data entry are necessary.
- •

#### Support Contact

Provide contact information for technical support or further assistance.

### 7. FAQs

- Do need training to use this Plastic Waste Monitoring Tool? Т No, the essential information about the purpose, the functions and data entry can be found on the first page of the Excel file called "Instructions". More explanations can be found in the Tool Manual. However, it is strongly recommended to receive the assistance of a trainer explaining the functionality in about 60 to 90 minutes.
- Do I need to register before using this Tool? It is recommended to register with the agency supporting the use of this Tool. This will enable us to grant support if needed.
- What shall Ι do if Т do not know my customer numbers? Without the realistic daily customer numbers, this Tool will not serve its purpose. Reporting the total volume of Plastic Waste collected in your business premises is, of course, relevant. However, without reference to your operation and occupancy level, nobody will be able to determine whether attempts to reduce plastic waste have been successful or not. Hence, good estimates from the department head or station manager are better than no records at all.
- the When do T need to weigh plastic waste? Every business has its proper routines and contingencies. Important is that the plastic waste is weighed before it leaves the premises of the business (e.g. through waste collection). E.g. if the general waste is picked up during night time or early in the morning, the 'other plastic' waste which is commonly picked up with the general waste, should be compiled and weighed the evening before. If PET or HDPE is not leaving the business every day, it could be measured every 2 or 3 days under the condition that a) it is kept somewhere for weighing and b) the recording mentions explicitly for which days this plastic waste has been accumulated.
- Do my employees need to access this Excel Tool? No, it is recommended to prepare a simple printout of the table for recording the daily volumes of plastic waste (PET, HDPE, other plastic) for the staff in charge of weighing. The handwritten entries are collected at the end of the month or end of the observation period and entered into the Tool.
- How can I weigh the plastic waste properly? Regularly, the plastic waste is collected in some baskets or larger bin bags. If the containers are heavy, please, weigh them separately and deduct the tara weight from the total plastic weight measured. Either use a scale that can accommodate larger bins or baskets to put on or use a device that reads the weight of a bag or basket which is attached by a hook or rope hanging downwards without touching the floor.

### 8. Appendices

• Pictorial guide for sorting plastic types





- Empty printouts of the "Baseline" and monthly recording tables can be found digitally or in hardcopy as part of this Manual.
- The Excel Tool is available digitally in the 'empty' version and for training purposes in two versions explained in the case examples in Section 5.
- Additional Resources: The Ratings Charts. Guidance for tourism businesses by Futouris/SUSTOUR explains in short which alternative packaging material is more or less impactful/harmful to the environment.

### 9. Feedback from the Pilot Testing Phase

### Minutes

**Review Pilot Testing Phase SUP Waste Monitoring Tool – Tourism Businesses** 

Date: July 18, 3.00 to 4.00 pm (BKK time), online

Participants: Eknarin, Aim-on, Tika (WWF Thailand), Marianne, Martina (WWF Germany), Dagmar, Andreas (ITS Vienna)

Report by K. Tika (Trang):

- 7 businesses have been invited
  - o 3 in Pak Meng
  - o 2 in Koh Libong
  - 2 in Koh Mook (1 hotel, 1 restaurant)
- Handling the recording of plastic waste using the hardcopy printout of the recording table did not cause any problems
- Some businesses expressed their wish to also record the volume of glass and aluminium trash; so they simply extended the recordings on the printout
- All chosen tourism businesses are committed to adopting the tool for further use and monitoring

Report by K. Aim-on (Koh Tao):

- 5 businesses have been invited
  - 2 resorts (one of which has been recording the volume of all different types of waste for several years)
  - 2 restaurants
  - o 1 diving school
- All pilot test participants can be considered pioneers who are very open and eager to continue with the monitoring

- The question arose whether it would be better to record by object categories rather than by resin type. Recommendation: follow the established practice to sort out PET and HDPE because these plastic categories can be and are indeed sold by many operators.
- To support the separation, the workers should be supported by pictorial, printed guides including the internationally standardized classification symbol for the different plastic types.
- Another problem arose from operators with minimal plastic waste that can barely be measured. Recommendation: either a) keep and collect this type of plastic waste for a few days (including the record of customer numbers for these days) and weigh a slightly larger volume or b) simply enter "1 gram" as a proxy measure for that day.
- Another question arose: currently the SUP Monitoring Tool does not include retail operations. Some resorts do have mini-marts in their portfolio. Hence, it would be good to be able to include the retail department.
- On the other hand, there are independent retailers which also generate plastic waste selling to tourists and residents. Andreas mentioned that the bulk of plastic packaging material those retailers bring into circulation does not end up in their proper trash bin while the other bulk packaging material represents only a minor fraction of the total SUP waste generated. K. Eknarin clarified that 7-11 is currently not a partner of WWF Thailand. Anyway, K. Aim-on stated that a number of retail operators are willing to support plastic reduction measures and therefore they should be supported.
- Andreas confirmed that he will add the retail operation as one of the business department options to choose from to the tool.

Dagmar mentioned briefly the experiences of a similar tool developed and applied by Futouris:

- The monitoring works by monitoring the throughput: purchases → consumption of products using plastic or packaged in plastic.
- The adoption by rather larger hotel operators was very good.
- The recording of items bought/used is automatically translated into a weight estimate for plastic on an annual basis.
- Only the number of overnight guests is used to break the SUP consumption down to a per capita figure.
- Most important to the successful adoptions was the offered incentive: accompanying consulting for matters of plastic waste avoidance and handling.

### Documentation – 2<sup>nd</sup> Stakeholder Workshops in November 2024

Duration	Agenda item	Facilitator/
		presenter
9:00-9:30	Welcome & introductions	<u>WWF</u>
9:30-10:15	Where we are today: Presentation of current waste	ITS, PITH
	flows from Koh Tao municipality and the tourism sector	
	A baseline assessment of current municipal solid waste flows and their management in Koh Tao municipality	
	A baseline assessment of plastic usage and waste	
	management in the tourism sector on Koh Tao	
	Questions & answers, discussion	
10:15 - 11:00	What the future could hold: Presentation of scenarios /	ITS, PITH
	recommendations for the municipality and the tourism sector	
	Recommendations for municipal solid waste management	
	Recommendations for plastic (waste) management in	
	the tourism sector	
	Questions & answers, discussion	
11:00-11:15	Break	
11:15-12:15	Group work in mixed groups	Facilitation:
	Discussions in smaller groups on specific issues, e.g.:	<u>WWF project</u>
	• Financing improvements in municipal waste	consultants
	<ul> <li>Behaviour change and communication</li> </ul>	
	<ul> <li>Reducing (single-use) plastics use across sectors</li> </ul>	
	Increasing waste collection coverage	
	<ul> <li>Increasing recovery and recycling</li> </ul>	
12:15-12:20	Transition back to plenary	
12:20-12:30	Reporting back from the working groups	All <u>WWF</u>
	Representatives from working groups briefly	
	summarise their discussion outcomes	
12:30-13:15	Lunch break	

MARE Design – 2<sup>nd</sup> Stakeholder workshops, 7<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> Nov 2024- Agenda Koh Tao: Municipality and tourism sector jointly

13:15-14:30	Parallel working groups:	Facilitation:
	a) Municipality stakeholders	a) <u>WWF</u> (with
	Plastic Smart City Action Plans in a nutshell: What do	PITH)
	they look like? How to develop and use them? What do	(room: Small)
	examples from other cities look like?	
	b) Tourism stakeholders	b) <u>WWF</u> , ITS
	Presentation of Good Practice examples from the	(room: Main)
	tourism sector	
	Presentation of the commitments (flyer) and project's support offer	
	Introduction to the monitoring tool: Presentation, experience-sharing from pilot businesses, short trial; questions & discussion, invitation to join roll-out	
14:30-14:50	Plenary: Outlook and next steps	WWF
	Outlook on the project and agreement on next steps in the collaboration	
14:50-14:55	Wrap-up, thanks and farewell	WWF

### Trang: Tourism sector (Dugong Village, Hat Pak Meng; 11th Nov)

Duration	Agenda item	Facilitator/ presenter
9:30 - 10:00	Registration	
10:00-10:20	Welcome, introductions	WWF
	Welcome, agenda, round of introductions, recap on project, process to date and short outlook	
10:20-10:50	Where we are today: Presentation of current waste flows from the tourism sector in Pak Meng, Koh Libong, Koh Mook	ITS
	A baseline assessment of plastic usage and waste management in the tourism sector on Koh Tao	
	Questions & answers, discussion	
10:50-11:30	What the future could hold: Presentation of scenarios / recommendations for the tourism sector in the three destinations	ITS
	Recommendations for plastic (waste) management in the tourism sector	
	Questions & answers, discussion	
11:30-11:45	Break	
11:45-12:15	Introduction to the monitoring tool	ITS, WWF
	Overview and introduction, hands-on trial	
	Questions & answers	
12:15-13:00	Lunch break	
13:00-14:15	Improving our businesses' plastic footprint	WWF
	Presentation of Good Practices/examples from the tourism sector internationally (10-15 min)	
	Discussion on commitments (presentation of the commitment flyer- 10 min, Q&A - 5-10 min),	
	World Café (35-40 min):	
	<ul> <li>What is our role in tackling plastic waste locally?</li> <li>Which measures have we taken already - what were the successes and challenges?</li> <li>Which measures do we think we can take? Which support will we need?</li> </ul>	
14:15 - 14:20	Transition time back to the plenary	

14:20 - 14:50	Reporting back from the tables	WWF
	Hosts briefly summarise the key take-aways from the discussions at their tables	
14:50-15:20	Outlook and next steps	WWF
	Short input on WWF's support offer and suggested next steps	
	Consulting businesses on their availability (scheduling of trainings) and needs and any local occasions/opportunities for awareness-raising or announcement of commitments	
15:20-15:30	Wrap-up, thanks and farewell	WWF
15:30-16:00	Afternoon tea & networking	

### Trang: Municipality (Tamarind Hotel, Trang; Tue, 12th Nov)

Duration	Agenda item	Facilitator/ presenter
8:30 - 9:00	Registration	
9:00-9:30	Welcome, agenda, round of introductions, recap	WWF
9:30-10:00	Where we are today: Presentation of current waste flows from Trang municipality	PITH
	A baseline assessment of current municipal solid waste flows and their management in Trang municipality	
	Questions & answers, discussion	
10:00-10:15	Break	
10:15-10:45	What the future could hold: Presentation of scenarios / recommendations for the municipality	PITH
	Recommendations for municipal solid waste management	
	Questions & answers, discussion	
10:45-11:45	Group work in mixed groups	WWF
	Discussions in smaller groups on specific issues, e.g.:	
	<ul> <li>Financing improvements in municipal waste management</li> </ul>	
	Behaviour change and communication	
	<ul> <li>Increasing recovery and recycling</li> <li>Reducing (single-use) plastics use</li> </ul>	

	Increasing waste collection coverage	
11:45 - 12:00	Reporting back from the working groups Representatives from working groups briefly summarise their discussion outcomes Questions & answers, discussion	WWF
12:00-13:00	Lunch	
13:00-13:30	PSC Action Plans in a Nutshell Presentation: What do they look like? How to develop	WWF
	and use them? Snapshot of real examples	
13:30-14:15	Plenary: Outlook and next steps Outlook on the project and agreement on next steps in the collaboration	WWF
14:15-14:30	Wrap-up, thanks and farewell	WWF

Presentation Slides prepared by ITS

Plastic Waste in Tourism Koh Tao 2024



# Plastic Waste in Tourism Koh Tao 2024 – Where are we today?

Prof. Dr. Andreas H. Zins Nicola Koschel, MSc Prof. Dr. Dagmar Lund-Durlacher

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# Key Structural Data 2023 – Koh Tao



## Tourism and SUP Waste 2023 – Koh Tao



### Importance of different travel segments – Koh Tao 2023

Main travel motive/activity by arrivals



Main travel motive/activity by overnights



Tourism Plastic Waste in Koh Tao: from Generation to Disposal 150 gram per tourist and day / shares in %



The demand-side approach of Plastic Waste in Koh Tao: in t/year (2023)







Sources: Waste Sampling March 2024, Modelling Tourist Structure of Koh Tao, Baseline Estimation of Single-use Plastic Generated by Tourists by ITS

### Implications



- Very fragmented business landscape with many small enterprises: 700+
- Tourism demand patterns go much beyond hotels and restaurants
- Bars, street vendors and retail shops
- PET & HDPE: 50%+ of PW: collection!
- PP & PS: not a major concern by volume, yet the waste management needs improvement!
- LDPE: 33% the problem child!



# Plastic Waste in Tourism Koh Tao 2024 – **Future Perspective**

Prof. Dr. Andreas H. Zins Nicola Koschel, MSc

Prof. Dr. Dagmar Lund-Durlacher





# Scenario Description

#### Scenario A: "Plastic Footprint Reduction Pioneer" - 2025

 This Scenario captures the essence of starting the journey towards significant SUP reduction, highlighting the pioneering actions taken to initiate change.

#### Scenario B: "Progressive Plastic Minimization Pathway" - 2028

 This Scenario emphasizes the advanced steps taken beyond the foundational actions of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. Yet, it is assumed that Scenario 2025 actions are more effective due to higher commitment levels.

#### Scenario C: "Comprehensive Circular Success" - 2030

 This Scenario reflects the highest level of commitment and action, aligning closely with Thailand's Roadmap on Plastic Waste Management 2018 – 2030. It conveys the achievement of a fully integrated and sustainable waste management system. It is assumed that Scenario 2025 actions are more effective than in Scenario 2028 and the additional Scenario 2028 actions are also more effective due to higher commitment levels.

### Scenario Outcome

#### Scenario A: "Plastic Footprint Reduction Pioneer" - 2025

- Reducing SUP generation by 14%
- Resulting in between 162 and 190 kg plastic waste less per day
- Highest reduction effect for PET (between 84 and 98 kg) and LDPE (between 52 and 61 kg)
- Increase in collection rate from 94% to 94.5%

#### Scenario B: "Progressive Plastic Minimization Pathway" - 2028

- Reducing SUP generation by 24%
- Resulting in between 277 and 324 kg plastic waste less per day
- Highest reduction effect for PET (between 134 to 157 kg), followed by LDPE (104 to 122 kg)
- Increase in collection rate from 94% to 96%
- Waste collection: cigarette butts and e-cigarettes

#### Scenario C: "Comprehensive Circular Success" - 2030

- Reducing SUP generation by 38%
- Resulting in between 460 and 538 kg plastic waste less per day
- Highest reduction effect for PET (195 to 228 kg), followed by LDPE (176 to 206 kg)
- Increase in collection rate from 94% to 96.7%
- Waste collection: cigarette butts and e-cigarettes

# Tourism Plastic Waste Actions/Measures 2025 – 2030

Index	Action/measure successfully implemented	Outcome	Importance Score	Pri- vate	Public	NGO	2025	2028	2030
A4	Avoid grocery shopping bags	Reduce LDPE plastic	83	Hi	Hi	Low	-7%	-10%	-30%
A6	Avoid PS food trays and cutlery	Reduce PS plastics in general waste	79	Hi	Low		-20%	-25%	-30%
A7	Regular SUP waste monitoring	Reduce PET, HDPE, LDPE, PP SUP waste	66	Hi	Low	Med	-5%	-7%	-10%
B4	Further reduce plastic straws (PP), and stirrers	Reduce PP SUP in general waste	62	Hi	Med		-2%	-3%	-4%
A2	Re-usable drinking bottles	Reduction of PET consumption	48	Hi	Low	Med	-5%	-7%	-10%
B2	Avoid food plastic bags (PP) for ready-to- eat food and beverages	Reduce PP plastic bags	48	Hi	Hi	Med		-5%	-10%
A3	Single-use packages of Toiletries	Reduction of HDPE packaging	47	Hi			-20%	-25%	-30%
B5	Establish a collection system for used, clean shopping bags	Increase collection of LDPE plastic	45	Hi	Hi			+2%	+3%
C4	Completely ban foam boxes for food transportation	Reducing PS in general waste, leakage and landfill	45	Hi	Hi	Low			-50%

Importance scores (product of effectiveness x priority) derived from 1<sup>st</sup> Stakeholder Workshop: June 2024 Private, public and NGO involvement: initial expert assessment for effective implementation

### Tourism Plastic Waste Actions/Measures 2025 - 2030

Index	Action/measure successfully implemented	Outcome	Importance Score	Pri- vate	Public	NGO	2025	2028	2030	
B3	Avoid food cups, bowls and trays (PP)	Reduce PP SUP in general waste	39	Hi	Hi	Med		-10%	-15%	
A5	Reduce food-wrapping films (LDPE)	Reduce LDPE plastic	38	Hi	Low		-1%	-2%	-4%	
A9	Staff training and population campaigns about HDPE	Increase collection rate for HDPE	34	Med	Hi		-15% (HDPE)	-20% (HDPE)	-25% (HDPE)	
C1	Avoid and/or reduce shrink wrap (PVC)	Reducing the amount of PVC in general waste	30	Hi		Low			-20%	
A1	Water re-fill station	Reduction of PET consumption	27	Hi		Med	-5%	-10%	-15%	
C3	Avoid food suppliers using PS for wrapping	Reducing PS in general waste	26	Hi		Low			-1%	
B9	Organize international cleaning events/camps in the off-season	Collect garbage (SUP waste) which would stay in the environment otherwise	21	Med	Med	Hi		+5%	+7%	
B1	Avoid trash bags used for internal waste collection	Reduce the volume of LDPE plastic (in the general waste)	9	Hi	Low			-7%	-10%	
C2	Avoid the usage of larger trash bags (LDPE) by using alternative collection systems	Reduce the volume of LDPE plastic (in the general waste)	9	Med	Hi				-5%	
Import	mportance scores (product of effectiveness x priority) derived from 1 <sup>st</sup> Stakeholder Workshop: June 2024									

Importance scores (product of effectiveness x priority) derived from 1<sup>st</sup> Stakeholder Workshop: June 2024 Private, public and NGO involvement: initial expert assessment for effective implementation

# Recommendations for the Tourism Sector

## **Private Sector**

- Continue with the good work so far: water re-fill stations, avoid PP material for food packaging, straws, lids
- Learn from other good practice examples worldwide
- Adapt and implement solutions already tested
- Encourage your staff/teams to come up with your own solutions: set realistic targets

- Monitor changes: use the Plastic Waste Monitoring Tool
- Collaborate with businesses in a similar situation:
  - To spot alternative materials: joint procurement
  - To reduce SUP: "BYO-Bag"
  - Start joint trainings and workshops and ESG circles

# Joint Initiatives

- Resume the campaigning towards 'no free plastic shopping bags' supporting reusable bag alternatives
- Support existing community-led trash initiatives
- Develop a concept of branded reusable cups and food containers for takeaway businesses with a deposit system
- Compile programs, events and actions of different stakeholders, NGOs and initiatives
- Development of criteria and a signet for plastic-conscious businesses

- Implement an officially recognized platform coordinating campaigns for reducing SUP waste and better plastic waste management for each destination
- Develop campaigns, information videos and pieces of training for the population, business operators and their staff and tourists about SUP waste
- Extending the 'Tourist Tax' (introduced under the BIOFIN project in Dec. 2022) for tourists which is dedicated to improving sustainable practices in the area of waste management

### What is our aspiration?



https://www.undp.org/bosnia-herzegovina/blog/single-use-plastic-free-workspaces-it-possible



https://www.optimagutterprotection.com/plastics-pollute-the-ocean/



https://ecogreenlove.com/tag/choose-to-refuse/

Poster: How to assess Plastic Waste from Tourism and the Potential for Reduction Koh Tao 2024



Plastic Waste in Tourism Trang (coastal areas) 2024



# Plastic Waste in Tourism Trang 2024 – Current Plastic Waste and Future Perspectives?

Prof. Dr. Andreas H. Zins Nicola Koschel, MSc Prof. Dr. Dagmar Lund-Durlacher Institute for TOURISM SUSTAINABILITY

# Key Structural Data – Trang Province 2019

Sub-region	# hotels/ resorts	Total rooms	Share of total visitors	Overnights	Daytrippers
Pak Meng	30	750	16%	328564	52247
Koh Libong	18	360	8%	157711	25079
Koh Mook	53	795	17%	348277	55382
Koh Kradang	9	180	4%	78855	12539
Trang City	50	2000	43%	876169	139326
Koh Ngai	12	240	5%	105140	16719
Koh Sukorn	17	340	7%	148949	23685
Total	189	4665	100%	2043665	324978

Total number of overnights and day trip tourists from PTA: only 2019 available: allocation to subregions based on accommodation capacities



### Implications



- Very fragmented business landscape with many small enterprises
- Tourism demand patterns go much beyond hotels and restaurants
- Bars, street vendors and retail shops
- PET & HDPE: 61%+ of PW: collection!
- PP & PS: is a concern, not so much by volume and weight, yet waste management needs improvement!
- LDPE: 25% the problem child!

# Scenario Description

#### Scenario A: "Plastic Footprint Reduction Pioneer" - 2025

 This Scenario captures the essence of starting the journey towards significant SUP reduction, highlighting the pioneering actions taken to initiate change.

#### Scenario B: "Progressive Plastic Minimization Pathway" - 2028

 This Scenario emphasizes the advanced steps taken beyond the foundational actions of Scenario A, showcasing an escalated commitment to tackling plastic waste through more robust measures. Yet, it is assumed that Scenario A actions are more effective due to higher commitment levels.

#### Scenario C: "Comprehensive Circular Success" - 2030

This Scenario reflects the . highest level of commitment and action, aligning closely with Thailand's Roadmap on Plastic Waste Management 2018 -2030. It conveys the achievement of a fully integrated and sustainable waste management system. It is assumed that Scenario A actions are more effective than in Scenario B and the additional Scenario B actions are also more effective due to higher commitment levels.

### Tourism Plastic Waste Measures 2025 – 2030

Index	Measure successfully implemented	Outcome	Importance Score	Pri- vate	Public	NGO	2025	2028	2030
B2	Avoid food plastic bags (PP) for ready-to- eat food and beverages	Reduce PP plastic bags	53	Hi	Hi	Med		-5%	-10%
A2	Re-usable drinking bottles	Reduction of PET consumption	48	Hi	Low	Med	-5%	-7%	-10%
C4	Completely ban foam boxes for food transportation	Reducing PS in general waste, leakage and landfill	48	Hi	Hi	Low			-50%
A6	Reduce PS food trays and cutlery with other materials	Reduce PS plastics in general waste	45	Hi	Low		-20%	-25%	-30%
A5	Avoid food-wrapping films (LDPE)	Reduce LDPE plastic	45	Hi	Low		-1%	-2%	-4%
B1	Reduce trash bags used for internal waste collection	Reduce the volume of LDPE plastic (in the general waste)	43	Hi	Low			-7%	-10%
B4	Further reduce plastic straws (PP), and stirrers	Reduce PP SUP in general waste	43	Hi	Med		-15% (HDPE)	-20% (HDPE)	-25% (HDPE)
Α7	Regular SUP waste monitoring	Reduce PET, HDPE, LDPE, PP SUP waste	40	Hi	Low	Med	-2%	-3%	-4%
B9	Organize international cleaning events/camps in the off-season, particularly for Koh Mook	Collect garbage (SUP waste) which would stay in the environment otherwise	40	Med	Med	Hi		+5%	+7%
B10	Establish a Trash Hero Working Group	Reducing the generation of PET waste, increasing collection rates of SUP waste	39	Med	Low	Ні		+3%	+5%

Importance scores (product of effectiveness x priority) derived from 1<sup>st</sup> Stakeholder Workshop: June 2024 Private, public and NGO involvement: initial expert assessment for effective implementation

# Tourism Plastic Waste Measures 2025 – 2030

Index	Measure successfully implemented	Outcome	Importance Score	Pri	Pub	NGO	2025	2028	2030
A4	Avoid grocery shopping bags	Reduce LDPE plastic	39	Hi	Hi	Low	-5%	-7%	-10%
В3	Reduce food cups, bowls and trays (PP)	Reduce PP SUP in general waste	37	Hi	Hi	Med	-7%	-10%	-30%
C3	Avoid food suppliers using PS for wrapping	Reducing PS in general waste	37	Hi		Low		-10%	-15%
C2	Reduce the usage of larger trash bags (LDPE) by alternative collection systems	Reduce the volume of LDPE plastic (in the general waste)	34	Med	Hi				-1%
A9	Staff training and population campaigns about HDPE	Increase collection rate for HDPE	32	Med	Hi				-5%
В5	Establish a collection system for used, clean shopping bags	Increase collection of LDPE plastic	29	Hi	Hi			+2%	+3%
A1	Water re-fill station	Reduction of PET consumption	27	Hi		Med	-20%	-25%	-30%
A3	Toiletries	Reduction of LDPE packaging	27	Hi			-5%	-10%	-15%
C1	Avoid and/or reduce shrink wrap (PVC)	Reducing the amount of PVC in general waste	20	Hi		Low			-20%

Importance scores (product of effectiveness x priority) derived from 1<sup>st</sup> Stakeholder Workshop: June 2024 Private, public and NGO involvement: initial expert assessment for effective implementation

# Synopsis of Scenario Outcomes - Trang

	Pak Meng	Koh Libong	Koh Mook	Koh Kradang	Total
Per year in mt					
SUP Volume: Mixture Low	33	16	34	6	89
SUP Volume: Mixture Medium	39	19	41	8	107
SUP Volume: Mixture High	45	21	47	10	123

# Synopsis of Scenario Outcomes – Trang (ctn'd)

	Pak Meng	Koh Libong	Koh Mook	Koh Kradang	Total
Reducing SUP waste	16% to 39%	16% to 39%	16% to 39%	16% to 39%	16% to 39%
SUP Waste Reduction per day in kg					
Scenario State 2025	20	10	19	4	54
Scenario State 2028	33	16	30	7	85
Scenario State 2030	48	23	44	10	125
Highest reduction	PET	PET	PET	PET	PET
Increase in collection rate in %-points	+2.6% - 10.4%	+2.6% - 10.4%	+3.5% – 11.6%		

# Recommendations for the Tourism Sector

# **Private Sector**

- Continue with the good work so • Monitor changes: use the Plastic far: water re-fill stations, avoid Waste Monitoring Tool PP material for food packaging. Collaborate with businesses in a straws, lids similar situation: Learn from other good practice To spot alternative materials: joint examples worldwide procurement • To reduce SUP: "BYO-Bag" Adapt and implement solutions
  - already tested
- Encourage your staff/teams to come up with your own solutions: set realistic targets
- Start joint trainings and workshops and ESG circles

## Joint Initiatives

- Resume the campaigning towards 'no free plastic shopping bags' supporting reusable bag alternatives
- Support existing community-led trash initiatives: Second Life members in Koh Libong, Environmental Justice Foundation in Koh Mook
- Develop a concept of branded re-usable cups and food containers for takeaway businesses with a deposit system
- Compile programs, events and actions of different stakeholders, NGOs and initiatives
- Implement an officially recognized platform coordinating campaigns for reducing SUP waste and better plastic waste management for each destination
- Develop campaigns, leaflets, information videos and pieces of training for the population, business operators and their staff and tourists about SUP waste
- Introducing a 'Tourist Tax' for tourists which is dedicated to improving sustainable practices in the area of waste management
Poster: How to assess Plastic Waste from Tourism and the Potential for Reduction Trang 2024



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