

EVALUATION OF COMMUNITY-BASED GASTRONOMIC TOURISM IN SATUN PROVINCE, THAILAND, REGARDING MANAGEMENT FOR ZERO FOOD WASTE

Melissa YODKHAYAN^{ID}

Faculty of Environmental Management, Prince of Songkla University, Hat Yai, Thailand, e-mail: mymelizz@gmail.com

Umaporn MUNEEANAM^{*ID}

Faculty of Environmental Management, Prince of Songkla University, Hat Yai, Thailand, e-mail: umaporn.m@psu.ac.th

Citation: Yodkhayan, M., & Muneenam, U. (2023). EVALUATION OF COMMUNITY-BASED GASTRONOMIC TOURISM IN SATUN PROVINCE, THAILAND, REGARDING MANAGEMENT FOR ZERO FOOD WASTE. *GeoJournal of Tourism and Geosites*, 50(4), 1260–1267. <https://doi.org/10.30892/gtg.50406-1124>

Abstract: This study aimed to evaluate community-based gastronomic tourism in Satun province, Thailand, regarding the management for zero food waste, both by the entrepreneurs' and by the tourists' evaluations. Face-to-face interviews were done with 12 representative respondents from six community-based gastronomic tourism sites, and self-administered or on-line questionnaires were used by quota sampling with 402 representative tourists visiting these six community-based gastronomic tourism areas. 11 quantitative indicators of zero food waste management were analyzed, and it was found that 'Tonpanan-Bornamron' received high scores both from self-evaluation (mean = 4.50) and from the tourists (mean = 4.21, total mean = 4.36).

Key words: Evaluation, Zero Food Waste, Community-Based Gastronomic Tourism, Satun Province, Thailand

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INTRODUCTION

Food or gastronomic tourism is getting popular in many places around the world, such as Australia, Egypt, Finland, India, Indonesia, Italy, Latvia, Portugal, Romania, Taiwan, and Vietnam (Kumar, 2019; Rivza et al., 2022; Kar et al., 2023; Sutiadiningsih et al., 2023). Thailand, whose economy is strongly dependent on tourism, also promotes gastronomic tourism as an alternative attraction complementing the more traditional ones (Prasongthan and Silpsrikul, 2023). For example, Phuket and Phetchaburi provinces in Thailand have been honored by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) naming them creative sites for gastronomy since 2015 and 2021, respectively (Bangkok Post, 10. 11. 2021). The CNN Travel Staff (27. 2. 2021) reported that *Massaman* curry, *Tom Yum Goong*, and *Som Tam* Thai foods ranked 1st, 8th, and 48th among the world's best foods. This attracts tourists who want to experience tastes that are novel and exotic to them. In addition, spending on food is one-third to one-fourth of the expenditures while travelling, the rests consisting of accommodation, souvenirs, etc. (Kumar, 2019).

Undeniably the food experiences are essential while travelling. At present, gastronomic tourism or food tourism is not limited to only eating the local servings, but also includes experiences with production, harvesting, processing, cooking, and tasting, for both entertainment and learning. For example, Mora et al. (2021) reported that professional chefs from famous restaurants take gastronomic tours to seek new culinary techniques, products, flavors, and textures. In addition, there are many types of tour providers for gastronomic tourism, including hotels, restaurants, local chefs, or tour guides. This study focuses on community-based gastronomic tourism (CBGT) in the Satun province of Thailand.

Gastronomic tourism is a creative form of tourism that Thailand and many other countries promote as an attraction that can contribute unforgettable experiences and memories, while providing revenue to the locals (Tan et al., 2014). Satun province of Thailand has high potential for further expanding tourism due to being rich in culture (Thai and Malay cultures; Buddhist and Islamic religions) as well as its rich natural and geographical resources (Satun UNESCO Global Geopark), while supporting unique tasting foods for gastronomic tourism and welcoming all types of tourists, both domestic and international (Yodkhayan, 2023). For example, statistics before COVID-19 in 2019 (Satun Province, 2022) showed that the Thai tourists (88%) dominated over foreign tourists (12%), the latter mainly from Malaysia, UK, Singapore, Japan, and Germany.

At the same time, gastronomic tourism may also create solid waste and wastewater. However, recent research studies (Papargyropoulou et al., 2019; Dhir et al., 2020; and Kattiyapornpong et al., 2023) focused on the hospitality and food service sector (the HaFS) including restaurants, hotels, health care, food industries, education and staff catering; but none studied CBGT. This research study assesses how well the community-based gastronomic tourism in Satun performs in food waste management by applying two indicators; food service standard for tourism and Thailand's community-based tourism indicators, based on the entrepreneurs' self-assessments and evaluations by tourists. The sampled community-based gastronomic tourism sites in Satun province of Thailand are ranked in this regard, and recommendations for improvement are given. Consequently, the results from this research extend the prior studies from their context of hospitality and food service sector (HaFS), and contribute proposed indicators to food waste management hierarchy theory.

* Corresponding author

LITERATURE REVIEW

Food Waste

Food waste means the residual food, initially intended for human consumption, remaining at the end of the food chain providing edible products to people (after retail and final consumption), and it relates to retailers’ and consumers’ behaviors (Parfitt et al., 2010; Food and Agriculture Organization of the United Nations, 2011, 2). This definition is also similar to that of Beretta et al. (2017), and does not include the inedible parts of food such as bones, shells, or peels. However, in reality the waste related to food may also include inedible parts of food, as well as non-food items such as tissue paper, chopsticks, and wood sticks from a restaurant, a food market, or a household kitchen (Tuphoon, 2015) and these are contaminants in the food waste. Food waste is different from the food losses that take place in production, in the post-harvest and processing stages of the food supply chain, as shown in Figure 1 (Food and Agriculture Organization of the United Nations, 2011, 2). However, the work of Parfitt et al. (2010) included food losses as food waste. About one-third of food is wasted in food loss and food waste stages (Puangkeaw et al., 2018; Srijuntrapun et al., 2022). Consequently, food waste management is as important as other types of waste management. Dr Dan Mongtaangdan (2014) mentioned that the European Union (EU) countries are trying to reduce by half the food waste of about 40%, by 2025. This is similar to the information from Srijuntrapun et al. (2022) and Delgado et al. (2023) who reported that the stakeholders in SDG 12.3 committed to food losses and waste reduction by 2030, this being included in the national agenda of Thailand.

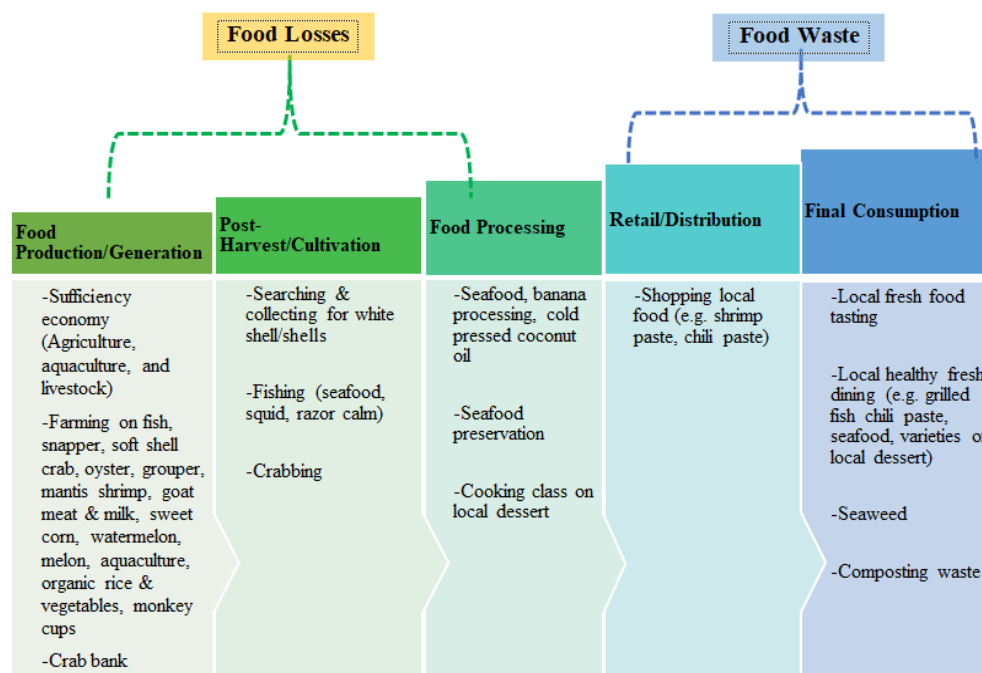


Figure 1. Example of CBGT in Satun province, Thailand, divided to *food losses* and *food waste* in the supply chain (Source: Applied from Food and Agriculture Organization of the United Nations, 2011; and summarized from Satun Province 2022, 118-127)

Methods for Zero Food Waste

The goal of zero food waste can be pursued as follows (Filimonau and Coteau, 2019; Charoennaiwongpao, 2020; Thai Health Promotion Foundation, 2019, cited in Charoennaiwongpao, 2020):

- [1] Food waste prevention means attitudes, choices and practices that stakeholders adopt before food is produced, bought, or prepared (Moraes et al., 2021). For example, cooking plan (Schott and Cánovas, 2015) and raw food preparation planning in terms of shopping list and expiry date (Dolnicar et al., 2020).
- [2] Food waste reduction or minimization means attitudes, choices and practices that stakeholders adopt after food has been produced, bought, or prepared (Moraes et al., 2021), such as reduction of food decoration, preparing food in smaller portions, charging fee for uneaten food on the plate or plate waste (Dolnicar et al., 2020) and the consumer taking only as much food as one will eat (Eriksson et al., 2019).
- [3] Food sharing and donation (Eriksson et al., 2018). This also includes food use as animal feed (Schott and Cánovas, 2015; Beretta and Hellweg, 2019).
- [4] Food recycling by composting, as biogas, and as RDF or refuse derived fuel from solid waste and liquid waste (Tuphoon, 2015; Eriksson et al., 2018; Puangkeaw et al., 2018).
- [5] Sewage and waste disposal such as wastewater treatment and landfill (Schott and Cánovas, 2015; Eriksson et al., 2018; Beretta and Hellweg, 2019). The above management topics are similar to what Shumal et al. (2020) suggested about waste management hierarchy from reduce, reuse, recycle, recover, and dispose.

In addition, recent information in 2022 from Satun Province (2022) showed that there have been totally two sanitary landfills, one controlled dumping landfill, one incineration facility of waste on an island, as well as waste separation, waste recycling and recycling shop, waste and wastewater composting, and waste recycling bank; but no wastewater treatment is available due to the low population density (115.70 persons/square kilometer) in Satun province.

Gastronomic Tourism and Food Waste

Gastronomic tourism is also known as food tourism, wine tourism, culinary tourism, gourmet tourism, and gastro-tourism (Pavlidis and Markantonatou, 2020). However, ‘gastronomic tourism’ is used in this research article to mean a leisure trip in pursuit of unique experiences in eating and drinking (Pavlidis and Markantonatou, 2020, 2) — and it is not limited to only wine. This is also applied from ‘gastronomy’ that means knowledge of what to eat, and how to eat it, from generating, cultivating, processing, distributing, and consuming food and drinks that affect human physical, mental, and social well-being (Navarro-Dols and González-Pernía 2020, 2). Hence, gastronomic tourism can be practiced in a cottage, on farms and related agri-food markets, in gastronomy processing, in accommodation related to gastronomy, by means of gastronomy, cooking schools and seminars, and dining areas as examples (Pavlidis and Markantonatou, 2020). Examples of community-based gastronomic tourism in Satun province, Thailand, divided by the supply chain, are presented in Figure 1. There is a continuous spectrum of gastronomic tourists by intensity from very light to very deep: from no emphasis on what to eat, to considering food as the main purpose of the trip (Guzel and Apaydin, 2016).

Gastronomic tourism may produce waste as both food losses and food waste, or from food production to human food consumption (Food and Agriculture Organization of the United Nations, 2011). When focusing on zero food waste from gastronomic tourism, as Parfitt et al. (2010) defined, this study considered both food losses and food waste in the supply chain of gastronomic tourism, as the gastronomic tourism activities are found from food production to human food consumption. Besides, food losses can be targeted by food waste management if they are related to gastronomic tour providers’ and tourists’ behaviors; hence, food waste at food loss stage is comparable to food waste from consumption stage, and the same guidelines of food waste management can be applied.

WRAP (2013 cited in Charoennaiwongpao, 2020); and Beretta and Hellweg (2019) stated that food waste is generated because of several reasons; for example, recent studies from Filimonau and Coteau (2019); Papargyropoulou et al. (2019); and Dhir et al. (2020) divided causes of food waste as similar to food losses and food waste stages, namely: 1) pre-kitchen (lack of technology for food production, too early harvesting due to lack of food product and farmers’ lack of cash, but such food is poor nutrition, poorly stored and transported, with substandard food products in markets, or too much food products in the markets), 2) kitchen (food safety reasons, food preparation in the food industry, overproduction, deteriorated food), and 3) post-kitchen (leftovers from food decoration, leftovers from food consumption such as buffet and plate waste, overconsumption, and not satisfying preferences).

Assessment of Food Waste Management in Community-Based Gastronomic Tourism

Gastronomic tourism is an alternative sustainable tourism form that relates to economic benefits, as well as local and regional development (Pavlidis and Markantonatou, 2020). It attracts tourists who pursue culture and education.

This study applied two major indicators of community-based gastronomic tourism, especially to food waste management, firstly from food service standard for tourism (Ministry of Tourism and Sports, 2013), and secondly from Thailand’s community-based tourism indicators (National Tourism Policy Committee, 2016). Twelve questions were asked of two targeted samples, as shown in Table 1.

Table 1. Indicators of food waste management surveyed in this study

Source	Methods for Zero Waste Management
Thailand’s community-based tourism indicators (National Tourism Policy Committee, 2019)	Food waste prevention
	1) Community has rules for food waste management
	2) There is a carrying capacity of tourist count in terms of food waste
	3) There are rules between community and tourists on waste management in gastronomic tourism
	4) Gastronomic tourism activities are designed to not release waste to environment
	5) Food ingredients are mainly locally sourced, such as local plants or animals, for reducing food waste from spoilage during transport, and also to support local food conservation
	Food waste reduction
6) Local food is utilized at highest value	
7) Food is processed in environmentally friendly way to preserved food (Face-to-face interviews with representatives of CBGT only)	
Food service standard for tourism (Ministry of Tourism and Sports, 2013)	Food sharing and donation
	--Not Applicable--
	Food waste recycling
	8) Waste separation, such as organic food waste versus others
	9) Food waste recycling by composting, and by biogas generation
	Sewage and food waste disposal
10) Cleaning water goes directly to sewage pipeline, and there is oil & grease collection	
11) The food waste residues are treated as sanitation, such as with sanitary landfill	
12) Food wastewater is treated as sanitary sewage	

MATERIALS AND METHODS

Research Design and Sampling

This was a survey-based study designed to have two main samples. Firstly, purposive sampling was applied in the districts that had only one site of community-based gastronomic tourism (Khuankalong, Manang, and Khuandon districts), and after that simple random sampling was used in districts with more than one site for community-based gastronomic tourism (Muang Satun, Langu, Thungwa, and Thapae districts). After selecting the sampling of community-based

gastronomic tourism, names of the sites were concealed and coded (Table 2) totally for six communities, except for the representatives from Thapae district who were excluded during the study as all of them were permanently terminated during COVID-19. Two representatives (CBGT, and chef) of each community-based gastronomic tourism site (for totally 12 participants) were then selected by purposive sampling, and 67 Thai tourist representatives of each community-based gastronomic tourism (totally 402 participants) were selected by quota sampling. The count of 402 tourists was targeted based on previous statistics on tourists (475,101 tourists) entering Satun province in 2021 (Satun Province, 2022, 129) with 95% confidence level and a ± 5 confidence interval (Table 3 and Figure 2).

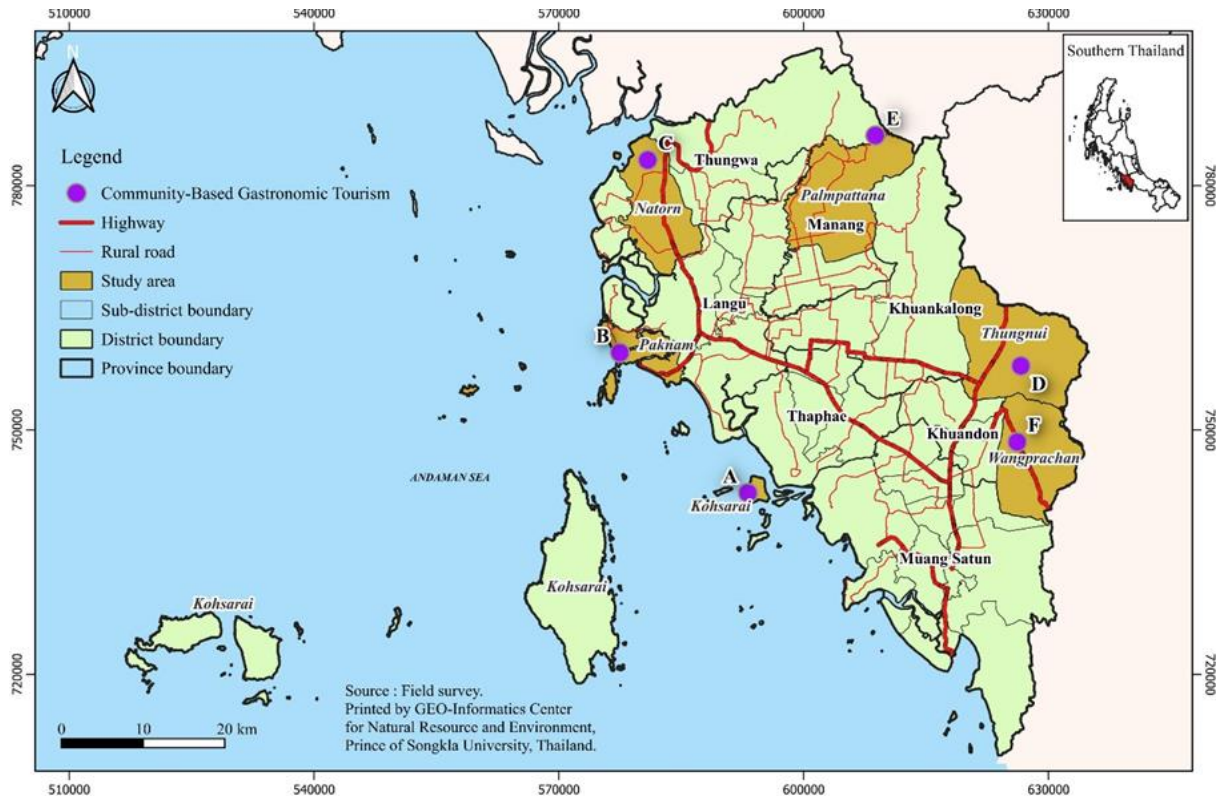


Figure 2. Locations of the sampled six Community-Based Gastronomic Tourism sites (Source: GEO-Informatics Research Center for Natural Resource and Environment, Cartographer Tongyoi, R., 2023; this figure was produced purposely for only this research article)

Research Tools and Data Collection Procedures

Semi-structured questionnaires and structured questionnaires were developed for use with the representatives from community-based gastronomic tourism, and for Thai tourists visiting the six community-based gastronomic tourism sites. The two questionnaires were investigated for validity by three experts, and for reliability with 30 pilot samples, with final revision before conducting the surveys. There were two main sections in the questionnaires: basic information about the respondent, and rating scores from the least to the highest (on five-point Likert scale) regarding food waste management. Face-to-face interviews were used to collect data from 12 representatives of community-based gastronomic tourism, and self-administered questionnaires or on-line questionnaires were applied to collect data from the 402 Thai tourists (Table 3).

Data Analysis

Frequencies, percentages, averages, and multiple response data analysis were conducted with the Statistical Package for the Social Sciences (SPSS) Version 16. In addition, qualitative data from semi-structured face-to-face interviews were narration analyzed. The community-based gastronomic tourism site that received the highest scores on zero food waste management was considered a successful model for community-based gastronomic tourism.

Table 2. Community based gastronomic tourism (CBGT) distributed in Satun Province, TH (Source: Summarized from Satun Provincial Office of Tourism and Sports, 2021)

No.	District	Community-Based Gastronomic Tourism		Sum	Sampling Design	Selected Sub-District	SUM	Code
		Interested	Not Interested					
1	Muang Satun	8	3	11	Simple Random Sampling	Kohsarai	1	A
2	Langu	8	2	10	Simple Random Sampling	Paknam	1	B
3	Thungwa	3	4	7	Simple Random Sampling	Natorn	1	C
4	Khuankalong	1	1	2	Purposive Sampling	Thungnui	1	D
5	Manang	1	1	1	Purposive Sampling	Palmpattana	1	E
6	Khuandon	1	-	1	Purposive Sampling	Wangprachan	1	F
7	Thapae	2	-	2	Exclusion due to all closing during COVID-19	Sakorn	N.A.	N.A.
Sum		24	11	35	6			

Table 3. Survey participants (n = 402) and face-to-face interviews (n = 12) of CBGT in Satun (Source: The authors' elaboration)

Code	District	Sub-District	Quota Sampling Survey			Face-to Face Interviews		
			Self-Administered	On-Line	SUM	Participants' ID	Position	Date of interviews in 2022
A	Muang Satun	Kohsarai	52	15	67	C1	Head of CBGT	19 March
			(77.61%)	(22.39%)	(16.67%)	C2	Chef	19 March
B	Langu	Paknam	47	20	67	C3	Head of CBGT	15 May
			(70.15%)	(29.85%)	(16.67%)	C4	Chef	15 May
C	Thungwa	Natorn	32	35	67	C5	Head of CBGT	13 March
			(47.76%)	(52.24%)	(16.67%)	C6	Chef	13 March
D	Khuankalong	Thungnui	43	24	67	C7	Chef	8 July
			(64.18%)	(35.82%)	(16.67%)	C8	CBGT Committee	19 September
E	Manang	Palmpattana	39	28	67	C9	Head of CBGT	15 July
			(58.21%)	(41.79%)	(16.67%)	C10	Chef	15 July
F	Khuandon	Wangprachan	50	17	67	C11	Head of CBGT	6 March
			(74.53%)	(25.37%)	(16.67%)	C12	Chef	6 March
SUM = 6			263 (65.42%)	139 (34.58%)	402 (100.00%)	12 (Participants)		

RESULTS

Basic information of the six community-based gastronomic tourism sites

Table 4 summarizes basic information on the six community-based gastronomic tourism sites in Satun province, Thailand, from the perspective of the communities themselves.

Table 4. Information on six CBGTs in Satun province from face-to-face interviews (n = 12) (Source: The authors' elaboration)

Community-Based Gastronomic Tourism Information	Community					
	A	B	C	D	E	F
Community's Main Religion	Islamic	Islamic	Islamic	Islamic	Buddhism	Islamic
Food Alternatives						
Halal	√	√	√	√	×	√
Vegetarian	×	√	×	√	×	√
Healthy	×	√	√	√	×	√
Others such as local food and fruits	×	×	×	×	√	√
Food Style Service						
Main Course	√	√	√	√	√	√
Break	√	√	√	√	√	√
Dessert	×	√	√	√	√	√
Drink	×	√	√	√	√	√
Gastronomic Tourism Service						
Seeing	√	√	√	√	√	√
Tasting	×	√	√	√	×	√
Cooking	×	√	√	√	×	√
Dining	√	√	√	√	×	√
Carrying Capacity (Persons)	40-50	30-50	100-150	100	100	200
Minimum Average of Food Expenditures (Thai Baht)	300	350	150	180	150	300
Community Accommodation (Beds)	30	60	×	15-20	30	Not Specified
Transportation Service	Motor Tricycle	Van	Car	Motorcycle, Taxi	Car	Not Specified
Processed Food Products (Qualitative data of food waste reduction; No.7)	1) Sea leech preserved in honey syrup 2) Honey 3) Shrimp paste	1) Dried seafood 2) Shrimp paste 3) Pumpkin cracker	1) Dried fish and shrimp 2) Fermented shrimp 3) Curry puff	1) Local grinded coffee 2) Coffee flower tea	×	1) Lemongrass and moringa teas 2) Raw banana powder 3) Banana in honey syrup

Food Waste Management Assessment

Figure 3 shows the self-assessment results on food waste management from 12 representatives of six CBGTs in Satun province. The representatives from CBGT C assessed themselves to the highest rank (mean = 4.77); while the representatives from CBGT A assessed themselves to the lowest rank (mean = 2.82). Comparing the results in Figure 4 with Table 5 showing the tourists' assessment indicates that tourists visiting CBGT D assessed this community's food waste management to the highest rank (mean = 4.21); while the tourists visiting CBGT E assessed this community's food waste management to the lowest rank (mean = 3.42).

Suggested appropriate approach to gastronomic tourism in Satun province, Thailand

Table 5 shows a ranking based on the results in the previous section, regarding food waste management in community-based gastronomic tourism sites in Satun province, Thailand. The community with the highest score can serve as a model for successful community-based gastronomic tourism approach.

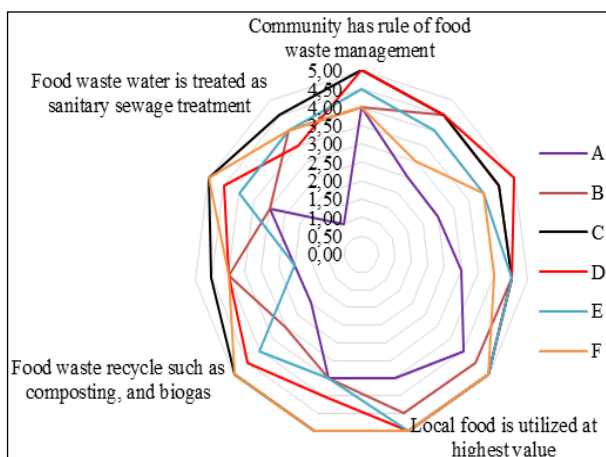


Figure 3. Self-assessment survey on food waste management in CBGTs (n = 12) (Source: The authors' elaboration)

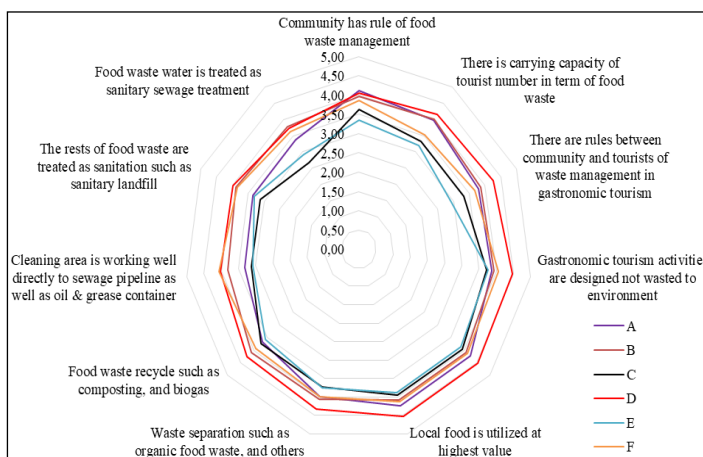


Figure 4. Tourists' results in survey on food waste management of CBGTs (n = 402) (Source: The authors' elaboration)

Table 5. Ranking of CBGTs in Satun province, Thailand Source: The authors' elaboration

Rank	Community	Self-Assessment (n = 12)	Tourists' Assessment (n =402)	Total Average Score
1	D	4.50	4.21	4.36
2	C	4.77	3.48	4.13
3	F	4.36	3.90	4.13
4	B	4.00	3.97	3.99
5	E	4.05	3.42	3.74
6	A	2.82	3.81	3.32



Figure 5. Examples of foods at 'Tonpanan-Bornamron' CBGT in Satun province, Thailand (Source: The authors' elaboration)

Basic Information of CBGT D

The community-based gastronomic tourism site D is called “Tonpanan-Bornamron” and it is situated at Village No. 5, Thungnui sub-district, Khuankalong district, Satun province, Thailand. By religion it is purely Islamic, and it is surrounded by mountains and forests. Local organic food has been served to tourists for the main course, dessert, in the morning and in the afternoon breaks, as well as with a variety of drinks. The food cultures represented are Muslim (Halal), vegetarian, and health foods. The way of cooking is a mix of Thai-southern and Malay, with banana pickle and blossom, home grown chicken meat, spicy curry, coconut milk, and coconut meat. Typical examples of foods are home chicken curry with banana pickle (1), local vegetable fern salad (2), deep-fried banana blossom (3), roasted minced coconut chili paste (4), and deep-fried bananas with local coffee (5) (Figure 5). Local seasonal fruits are durian, santol, chempedak, rambutan, and longkong. Community-based gastronomic tourism here has been managed as learning stations or from food generation to food consumption having at Station 1 cooking steam rice in bamboo tube, at Station 2 seeing, harvesting, and tasting local vegetable fern growing in the forest near a river, at Station 3 brewing and tasting local coffee; and at Station 4 cooking a local dessert.

DISCUSSION

This study applied two major indicators from food service standards for tourism, and Thailand's community-based tourism indicators, for assessing food waste management via both self-assessment and a tourists' assessment. The weak scores reflected issues on food waste management to improve, from both self-assessment as well as from the tourists' point of view. The good scores indicated good management of food waste as well as reminded the community-based gastronomic tourism to keep up the good practices. Ranking of community-based gastronomic tourism sites in Satun province was topped by “Tonpanan-Bornamron” community, situated at Thungnui sub-district, Khuankalong district, in Satun province of Thailand. The CBGT route design for visitors could suggest trips of one or more days among CBGTs in Satun province, possibly also with plans mixing community-based gastronomic tourism with geo-tourism, health and wellness tourism, and sea-sand-sun tourism.

Twelve indicators of food waste management reflected the status of CBGTs in Satun province, Thailand, and the survey results of course depend on the choice of these indicators. The results on the suggested CBGT approach from this study are concordant with results of Yodkhayan (2023) who assessed four main indicators, namely on resources and environmental management; food standard and food safety; tourist services; and CBGT activities. However, only a select subset of CBGTs in Satun province were studied, while in a separate study all the CBGTs could be reinvestigated for comprehensive ranking and improvement suggestions. Comparing gastronomic tourism activities in supply chain and food waste management indicates that some management activities overlap between food losses and food waste, so that food waste management can apply to the food losses as well, and this influenced the definition of food waste management used in this study. For example, in an activity of visiting or seeing the local vegetable fern at food production stage the tourists may taste the fern directly at the farm, witness harvesting local vegetable fern (post-harvest stage), as well as participate in a cooking class (food processing stage) and food tasting; they might also dine together after the class. It appears that food waste management should naturally target the whole supply chain incurring food losses and food wastes. Food waste management survey in this study provides some guidelines and suggestions for tourism organisation, for community-based gastronomic tourism in Satun province, Thailand, and is of interest outside this limited context. The information from Satun Province (2022) showed some shortcomings in the management as there is no wastewater treatment available. Whether they can build their own sewage system — such as using a septic tank (Miller and Spoolman, 2015) — at touristic places, or use food waste prevention, reduction, sharing, and recycling, the food waste management can still be improved.

CONCLUSION

This study applied two indicators, firstly of food service standard for tourism; and secondly, Thailand's community-based tourism indicators, for assessing zero food waste management in community-based gastronomic tourism of Satun province. Ranking and appropriate approach to community-based gastronomic tourism in Satun province are presented for the benefit of gastronomic tourism entrepreneurs as well as for use by relevant organizations.

Author Contributions: Conceptualization, M.Y. and U.M.; methodology, M.Y. and U.M.; software, M.Y.; validation, M.Y. and U.M.; formal analysis, M.Y. and U.M.; investigation, M.Y. and U.M.; data curation, M.Y. and U.M.; writing - original draft preparation, M.Y. and U.M.; writing - review and editing, M.Y. and U.M.; visualization, M.Y. and U.M.; supervision, U.M.; project administration, M.Y. and U.M. All authors have read and agreed to the published version of the manuscript.

Funding: The Faculty of Environmental Management, Prince of Songkla University in the fiscal year 2021–2022, and the Graduate School, Prince of Songkla University, in the fiscal year 2022.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study may be obtained on request from the corresponding author.

Acknowledgments: The authors wish to thank graduate studies grant from the Faculty of Environmental Management, Prince of Songkla University in the fiscal year 2021–2022, and research grant from the Graduate School, Prince of Songkla University, in the fiscal year 2022, as well as all representative survey respondents.

Conflicts of Interest: The authors declare no conflict of interest.

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