

Land use in the Seychelles – Rethinking the Sustainability of Tourism

USYS TdLab Transdisciplinary Case Study 2023

Report

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Pius Krütli, Florian Marcussen, Elizabeth Tilley, Amin Khiali-Miab, Bianca Vienni, Paul Kangethe, Daniel Etongo & Michael Stauffacher (Eds.)



Photo: Anton Yang

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Contents

Acronyms and abbreviations	2
Preface	3
Acknowledgements	4
Executive summary	8
General introduction	11
1 Navigating the Socio-Cultural and Environmental Sustainability of Beach Tourism in Seychelles	16
2 Cultural Tourism in the Seychelles	36
3 Agri-Tourism in the Seychelles	54
4 Terrestrial adventure tourism in the Seychelles – An opportunity	66
5 Local identity and the societal impact of tourism	81
6 Coordination of food demand and supply between farms, hotels and restaurants	96
7 Performance Assessment Tool for Tourism Establishments	108
General discussion and conclusions	121

Acronyms and abbreviations

ADF	Agricultural Development Fund
AR	Anse Royale
ATTA	Adventure Travel Trade Association
BO	Belombre
BTR	Business Tax Receipt
CBS	Central Bank of Seychelles
CBT	Aquagenx Compartment Bag Tests
DoT	Department of Tourism
DoE	Department of Employment
DoF	Department of Finance
ETH	Swiss Federal Institute of Technology
FAO	Food and Agricultural Organisation
GoS	Government of Seychelles
LD	La Digue and inner islands
LM	Les Mamelles
MACCE	Ministry of Agriculture, Climate Change and Environment
MB	Mont Buxton
MLH	Ministry of Lands and Housing
MPN	Most Probable Number (E. coli per 100mL)
NBS	National Bureau of Statistics
PG	Port Glaud
PL	Point Larue
PUC	Public Utilities Corporation
SCR	Seychelles Rupee
SDGs	Sustainable Development Goals
SIAH	Seychelles Institute of Agriculture and Horticulture
SIDS	Small Island Developing States
SLA	Seychelles Licensing Authority
SRC	Seychelles Revenue Commission
SSTL	Seychelles Sustainable Tourism Label
STC	Seychelles Trading Company
TD	Tourism Department
tdCS	Transdisciplinary Case Study
TdLab	Transdisciplinarity Lab
TIN	Tax Identification Number
UniSey	University of Seychelles
VAPA	Vanuatu Agritourism Plan of Action
VAT	Value Added Tax

Preface

In 2016, when we began with the first transdisciplinary case study (tdCS) in the Seychelles, our motivation was to expose ETH master's students to a real-world problem in the Global South. Equipped with solid knowledge and methodological skills, highly motivated and eager to demonstrate their abilities in a field completely new to most of them, students wanted to learn how to tackle a wicked and complex problem. Also, they wanted to contribute to the solution of a real problem: in 2016, solid waste management and later as well, transport and tourism.

The Seychelles are an interesting 'case' for such an endeavour: With a landmass of some 450km² and a population of 100,000 it is small; access to people and stakeholders is easy; there are sustainability related problems that can be found elsewhere, but they can be studied here at a small scale; there are limited resources and technical expertise so that students can make a difference with their work. In short, it is an ideal place for a transdisciplinary case study. The term transdisciplinarity stands for a scientific approach that starts from a real world (sustainability) problem. It involves knowledge from various sectors, academia (scientific) and practice. TdCSs are problem-oriented and science-based teaching courses, aiming at understanding a real problem in its various facets, to scientifically analyse it and find possible solutions. A particular concern and great challenge is to balance the learning objectives of students with gaining practical results for the local partners.

In this tdCS, the Tourism Department of the Ministry of Foreign Affairs and Tourism was our major practice partner: Young bright students close to graduating may inject the tourism authorities with new inspiring ideas. Not being in the business, they look at tourism from a different, an outsider, perspective. They are not tourism experts, and they are not consultants either. This gives them the freedom they need. But they are not working in a vacuum. Their work must serve the Seychelles; and the Tourism Department as a partner is the best guarantee to keep them on track. Their work must meet scientific standards, as well. This is what ETH requires and what a team of seven lecturers and researchers ensures.

The tdCS 2023 focused on tourism. Tourism is a major pillar of the Seychellois economy. In the last 10 years, tourism arrivals grew 10 percent per annum and peaked at 380,000 arrivals in 2019. The steep growth bears risks and creates path dependencies: More incoming flights bring more tourists; more tourists require more infrastructure; more infrastructure needs more resources;

more resources need more revenues and so forth. The new governmental strategy is to keep arrival numbers stable but to get more revenues from the individual tourist. Diversification of the tourism portfolio is the way the Seychelles want to go. This was the starting point of our study.

This report represents the result of our fourth tdCS in the Seychelles. Based on the Strategic Land Use and Development Plan 2040, along with relevant assessment reports and the latest Tourism Master Plan, and in collaboration with the Tourism Department, the students were tasked to explore themes centred around "Rethinking the Sustainability of Tourism in Seychelles". Within this umbrella theme, seven different topics emerged: One topic relates to beach tourism, the 'standard portfolio' of tourism in Seychelles; three topics refer to diversification options (cultural, agri-, and adventure tourism); another to the impact of tourism on the social system; a sixth topic is about the link between the agriculture and tourism sectors; and the last topic is about a tool that can help the decision makers to assess the sustainability performance of future tourism strategies.

The team consisted of 25 ETH master's students with different scientific backgrounds (environmental, agricultural, engineering, management, technology & economics, and spatial planning & infrastructure sciences). In addition, five bachelor's students from the University of Seychelles (UniSey) specialising mainly in environmental sciences, joined the field phase in the Seychelles. – They have done a great job together. They compiled a solid data base and provided a broad spectrum of ideas to improve the tourism sector. During the three-week fieldwork in July 2023, the students conducted more than 900 interviews and surveys. In total, they spent more than 5,000 working hours. The students learned how to proceed from a vague idea to a concrete research question; they acquired and created new knowledge, improved their methodological competences. They applied a variety of new methods; learned to work in teams, especially intercultural ones; engaged intensively with stakeholders; and learned to organise and execute a project independently and take responsibility. In short, the students experienced work practice and did so outside their disciplinary and mental comfort zones.

We hope you enjoy reading the outcome of this work.

*Pius Krüttli, Elizabeth Tilley, Bianca Vienni,
Amin Khiali-Miab & Michael Stauffacher
Lecturer team of the tdCS at ETH Zurich, Switzerland*

Acknowledgements

Many people were involved in this study: from the Tourism Department of the Ministry of Foreign Affairs and Tourism of Seychelles, the local University of Seychelles, the public and private sector, civil society in Seychelles as well as experts from ETH Zurich and other institutions. We would like to thank all the people in the following list! They all took the time to share their expertise, opinions and time with our students. Our thanks also go to the 850 respondents (tourists and residents) who took the time to complete the questionnaires.

Special thanks go to our most important partner institution in this study: the Tourism Department. The team of Principal Secretary Ms Sherin Francis and Director General Mr Paul Lebon deserve our deepest gratitude for their commitment to this study, for their time, their advice, and their logistical and financial contributions. Our thanks also go to Ms Sheril Crea of the Tourism Department, who supported the entire project work with efficiency and great commitment. We would also like to thank our colleagues from the University of Seychelles, in particular Mr Paul Kangethe (senior lecturer), Dr Daniel Etongo (senior lecturer), Dr Michael Hall, Dean of the Business and Sustainable Development Faculty, and the Vice Chancellor Ms Joelle Perreau, who provided us generous workspace and logistical support throughout the field phase in Seychelles. Special thanks go to Mr Patrick Andre, Principle Secretary of the Department Land Transport who initiated the collaboration with the Tourism Department.

Many thanks are due to the local advisory board (see list below for members) who accompanied the students through the field phase in the Seychelles, gave them access to people, provided their expertise and contributed feedback to the draft reports.

We also include in our thanks the National Bureau of Statistics, in particular Mrs Helena Butler-Payette and Chief Executive Laura Ahime and their team, who provided us with their great data support and a representative sample for the perception study.

Special thanks also go to Mr Geffy Zialor, Chief Operations Officer of the Seychelles Public Transport Corporation, for providing the transport service, Mr Marc Houareau, Chairman of the VCS Group, for providing a car for the ETH team during the fieldwork, Mr Patrick Labrosse, Patrick Labrosse, owner of La Villa Therese in Anse Royale, for providing accommodation at a very favourable price for the ETH students. Big thank you also goes to PhD student Ariane Wenger from TdLab for supporting the students in the preparation of the ethics proposal, the survey design and the online tool, and the Department of Environmental Systems Science at ETH Zurich for providing the necessary resources to conduct this study.

Finally, we would like to thank our lecturer colleagues at ETH Zurich, Dr Bianca Vienni, Prof Elizabeth Tilley, Dr Amin Khiali-Miab for their great commitment, as well as Ms Maria Rey for the great support of the study teams with the logistics and Mr Sandro Bösch for the wonderful layout of this report – a great team!

And if we have forgotten to mention anyone by name here, we ask for your indulgence.

Pius Krütli and Michael Stauffacher
Responsible lecturers of the tdCS, ETH Zurich, Switzerland

Table A.1

List of interviewees and workshop participants for the Chapters of the tdCS 2023

Title	Name	Function	Institution	Chapter
Mr	Terry Accouche	Cultural Entrepreneur	–	2
Mr	Colin Albest	Chairperson	Cooperative des Artisans	2
Mr	Israel Alcindor	Statistician	Ministry of Employment	7
Ms	Victoria Alis	Project Manager	Seychelles Sustainable Tourism Foundation	2
Ms	Charlotte Anderson	Policy Analyst	Tourism Department	4, 7
Mr	Patrick Andre	Principal secretary	Land Transport Department	Advisory Board
	Zenaff Appoo	–	Restaurant	6
Ms	Kirsten Arnephy	Senior Statistician	National Bureau of Statistics	7
Mr	Sony Banane	Farmer	Seychelles Farmers Association	6
Mr	Marc Jean Baptiste	Site Manager	Seychelles Island Foundation	4
Ms	Sammia Bastienne	Student	Seychelles Institute of Agriculture and Horticulture	3
Ms	Beverly Bijoux	Economist	Seychelles Ministry of Finance, Trade, Investment and Economic Planning	7
Mr	Christophe Boniface	Farmer	–	3
Mr	Darrel Bouchereau	Farmer	–	6
Mr	Gwenael Briat	Cluster Executive Chef	Story Hotel	6
Ms	Samia Brioché	–	University of Seychelles Student Union	7
Ms	Janice Bristol	Product Planning & Development Officer	Tourism Department	2, 3, 7
Mr	Jude Brown	Farmer	–	6
Mr	Ivan Capricieuse	Cultural Entrepreneur	–	2
Mr	Allen Cedras	Chief Executive Officer	Seychelles Park and Garden Authority	4
Mr	Jose Chang King	Head Procurement and Imports	Seychelles Trading Company	6
Ms	Pricilla Changtime	Farmer	–	6
Ms	Diane Charlot	Director International Relations	Tourism Department	7
Mrs	Penda Choppy	Director	Creole Language and Culture Research Institute, University of Seychelles	2
Ms	Monik Choppy	Student	University of Seychelles	5
Ms	Annarose Clarisse	–	UN Youth Seychelles organisation	5
Mr	Ed Constance	Assistant Urban Planner	Seychelles Planning Authority	Advisory Board
Ms	Sheryl Crea	Policy Analyst	Tourism Department	2, 3, 4, 7 and Validation Workshop
Ms	Elgin Crea	Student	University of Seychelles	5
Mr	Emmanuel D'Offay	Executive Director	Creative Seychelles Agency	2
Mr	Norman Dogley	Farmer	–	3
Ms	Sophia Duval	Employee	Mize Koko	2
Mr	Malbrook Elvis	–	Restaurant	6
Ms	Rose Marie Emond	Entrepreneur	–	3
Mr	Alix Esparon	Farmer	–	6
Mr	Steve Esther	Cultural Entrepreneur	Praslin Museum	2
Ms	Sara Calderin	Senior Economist	Agriculture Department	3
Mr	Ronnley Franquete	Entrepreneur	–	3
Mr	Donatien Furminot	Cultural Entrepreneur	–	2
Mr	Lenny Gabriel	Deputy CEO	Seychelles Investment Board	4

Table A.1
continued

Title	Name	Function	Institution	Chapter
Mr	Jean-Paul Geoffrey	Farmer	–	3
Mr	Roland Georges	–	Seychelles Hospitality and Tourism Association	Advisory Board
Ms	Micheline Georges	Entrepreneur	–	3
Mr	Marc Gonthier	Cultural Entrepreneur	–	2
Dr	Michael Hall	Dean Faculty of Business and Sustainable Development	University of Seychelles	Advisory Board
Mr	Henrik Hermeni	Farmer	–	3
Mr	Vic Hoarau	Farmer	–	6
Ms	Virginie Hoareau	Statistician	National Bureau of Statistics	7
Ms	Philomena Hollanda	Director Risk Management	Tourism Department	4
Ms	Merline Ismael	Private Secretary	Enterprise Seychelles Agency	2
Ms	Rosabelle Japhet	Farmer	–	6
Ms	Linetta Joubert	Chief Officer	Seychelles Agricultural Agency	
Mr	Shadrach Joubert	Student	Seychelles Institute of Agriculture and Horticulture	3
Ms	Gina Julia	–	Hotel	6
Ms	Cecille Kalebi	Principal Secretary	Seychelles National Institute for Culture, Heritage, and the Arts	2
	Taren Kumar	–	Le Relax Hotel	6
Ms	Medina Laboudallon	Cultural Entrepreneur	–	2
Mr	Manfred Lapale	Online Platform Developer	–	6
Mr	Jean Marc Larue	Sales and Marketing Officer	Seychelles Island Foundation	4
Ms	Lisa Lautoy	Chief Executive Officer	Enterprise Seychelles Agency	2
Ms	Isabel Lavigne	–	Restaurant	6
Mr	Paul Lebon	Director General Destination Planning and Development	Tourism Department	5 and Advisory Board
Mrs	Sinha Levkovic	Director Product Planning and Development	Tourism Department	2, 3, 5 and Validation Workshop
Ms	Natasha Lucas	Quality and Standard Officer	Environment Department	Advisory Board
	Gilly Mallurcu	Farmer	–	6
Ms	Bequitta Manaenne	–	Restaurant	6
Mr	Chris Matombe	Director Strategic Planning	Tourism Department	7
Ms	Mariette McKelvey	Chairperson	Cooperation des Artisans	2
	Genais Micha	–	Restaurant	6
Ms	Cindy Moka	Research Officer	Creole Language and Culture Research Institute, University of Seychelles	2
Mr	Pat Monthy	–	Hotel	6
Ms	Susan Morel	Chief Policy Analyst	Ministry of Employment	7
Mr	Guy Morrel	Consultant	–	3
Mr	James Mougat	General Manager	Forestry and National Parks	4
Mr	Kevin Moumou	Senior Conservation Officer	Environment Department	3, 4
	Muberi Mousjack	Farmer	–	6
Mr	Hubert Moustache	Farmer	–	3
Mr	Kenneth Nalletamby	Chairman	People Experience Growth	2
Mr	Kevin Nancy	Principal Secretary	Agriculture Department	Advisory Board
Mr	Barry Neurick	Farmer	–	6

Table A.1
continued

Title	Name	Function	Institution	Chapter
Mr	Christian Ng Ping Cheun	CNDS/ATSEP Manager	Seychelles Civil Aviation Authority, Rotaract Club Of Mahe	5
Ms	Ena Nicole	–	Restaurant	6
Mr	Barry Nourice	Agricultural consultant and farmer	–	3
Mr	Jean Paulgelly	Farmer	–	6
Mr	Burny Payet	Statistician	National Bureau of Statistics	7
Mr	Terence Payet	Senior Statistician	Central Bank of Seychelles	7
Ms	Hannah Pearson	APAC Regional Director	Adventure Travel Trade Association	4
Ms	Najoie Philoe	Senior International Liaison Officer	Creative Seychelles Agency	2
Ms	Christina Pothin	Farmer	–	3
Ms	Florette Punse	Cultural Entrepreneur	–	2
Dr	Marie-Therese Purvis	General Member	Citizen Engagement Platform Seychelles (CEPS) and Sustainability for Seychelles (S4S)	Advisory Board
Mr	Rodney Quatre	Director General Biodiversity Conservation	Ministry of Environment, Energy and Climate Change	3
Ms	Diana Quatre	Director Tourism Human Resource Development	Tourism Department	7
Mr	Romeo Radegonde	Farmer	–	3
Ms	Tessa Rassool	Cultural Entrepreneur	–	2, 3
Ms	Audrey Rath	Economist	Central Bank of Seychelles	7
Ms	Kimora Rever	Employee	Mize Koko	2
Ms	Linda Robert	–	Hotel	6
Ms	Emanuella Robert	–	Seychelles Revenue Commission	7
	Benjamine Rose	Executive Director	Seychelles National Heritage Resource Council	2
Ms	Josianna Rose	Cultural Entrepreneur	–	2
Ms	Marie Alise Rosette	–	Environment Department	3
Ms	Sara Scaldarin	–	Agriculture Department	6
Ms	Bernice Senaratne	Director Industry Planning and Policy Development	Tourism Department	2, 3, 4, 7
	Efwar Shashi	–	Restaurant	6
Ms	Robyn Shield	Group Branding & Project Manager	Mason's Travel	2
Ms	Franca Sicobo	Senior Economist	Seychelles Ministry of Finance, Trade, Investment and Economic Planning	7
Ms	Judy Sinon	Principal Licensing Officer	Seychelles Licensing Authority	7
Ms	Myra Solin	Farmer	–	3
Ms	Nisha Ann Solomon	Human Resources Coordinator	Restaurant	6
Mr	Sebastian Suarez	–	Hotel	6
Mr	Michael Thomas	Cultural Entrepreneur	–	2
Ms	Margaret Vel	Cultural Entrepreneur	–	2
Mrs	Bernadette Willemin	Director General Destination Marketing	Tourism Department	Advisory Board and Validation Workshop
Ms	Seychelle Worth	Cultural Entrepreneur	Bikini Bottom	2
Mr	Bernard Zialor	Cultural Entrepreneur	–	2

Executive summary

Travel and tourism are fast-growing economic sectors worldwide that make a significant contribution to global gross domestic product and job creation. Tourism is also associated with negative environmental and social impacts, such as the consumption of land, water and energy, the associated release of CO₂, etc. The enormous importance of the tourism sector for the global economy and the associated impacts raises questions about its sustainability.

The Seychelles are highly dependent on tourism: Tourism is the largest contributor to GDP, provides numerous jobs, and generates a large proportion of the country's foreign exchange. The number of tourist arrivals has increased significantly with annual growth rates of 10% and peaked in 2019 with 380,000 visitor arrivals.

From its beginnings until the early 2000s, the Seychelles were characterised by and known for the luxury and high-price segment of tourism. Later, the sector diversified and now offers packages for different groups, from backpacking to high-end luxury tourism.

Tourism in the Seychelles is being put to the test, not least due to the SARS-CoV-2 pandemic. While visitor numbers are rising, per capita income is falling. This is leading to a new kind of strategy of the sector. The aim is no longer to increase visitor numbers at all costs, but to diversify the tourism offering and supplement traditional beach tourism with niche segments such as agro-tourism, cultural tourism and adventure tourism in order to increase per capita expenditure.

The aim of this study is therefore to rethink the sustainability of tourism in the Seychelles. More specifically, the aim is to understand how the current tourism portfolio can be diversified to generate more revenue per capita while limiting the (local) environmental and social footprint. The overarching question is as follows:

What opportunities and challenges does a small island nation like the Seychelles have to face in order to make international tourism more socially responsible, economically viable and environmentally friendly?

This question has been tackled via seven modules (working groups), representing chapters 1–7. Chapter 1 focuses on beach tourism, which represent the major mode of tourism in the Seychelles. Sections 2–4 are focusing on potential diversification of the touristic portfolio: cultural, agro, and terrestrial adventure tourism. Chapter 5 analyses the impact of tourism on the social system. Chapter 6 investigates the link between agricultural and tourism, and section 7, finally provides a tool to assess the three sustainability pillars of tourism in the Seychelles. Diverse research methods such as surveys, modelling, expert interviews, workshops, drone footage, etc. were employed during the study, depending on the group's purpose. A large number of stakeholders from the public and private sectors and civil society were involved in most of the data collection and analysis processes.

(1) Effective management of beaches in the Seychelles is crucial for preserving their natural beauty and enhancing the overall beach user experience, which in turn contributes to the sustainability of tourism and the local economy. Surveys, drone footage, and manual counting, were performed to assess Beau Vallon and Anse Source d'Argent in terms of perception, environmental quality, and crowdedness. It was found that while both beaches are appreciated for their natural beauty, they face challenges such as littering, conflicts between locals and tourists, and potential water contamination. Suggestions for improvement include a better waste management, enhancing security to address conflicts, and promoting nature conservation through education and eco-friendly initiatives. Considering the diverse needs of beach users and implementing sustainable management practices, are essential to preserve the natural beauty of these beaches while enhancing visitor experiences in the Seychelles. By addressing the identified issues, the Seychelles can maintain its reputation as a premier tourist destination known for its pristine beaches and vibrant natural ecosystems.

(2) Cultural tourism not only showcases the Seychelles' rich heritage but also fosters inclusive economic growth, making it imperative to utilise its potential for sustainable development and community empowerment. Interviews and a stakeholder workshop revealed significant insights, highlighting the need for enhanced coordination and stakeholder engagement. Despite enthusiasm for cultural tourism, a lack of shared vision and awareness of

the Creole Rendezvous brand hampers its potential. Cultural entrepreneurs face challenges such as financing and competition, which highlights the demand for collaborative solutions from governmental bodies and the private sector. Proposed interventions include marketing cultural tourism, empowering entrepreneurs, and improving regulations. Fostering collaborative efforts between stakeholders is essential for unlocking the full potential of cultural tourism in the Seychelles. These findings offer a roadmap for Seychelles' cultural tourism development, emphasizing its vital role in driving economic prosperity and preserving cultural heritage.

(3) Uncovering the potential of agri-tourism in the Seychelles is crucial as it offers an opportunity for economic diversification beyond traditional tourism while preserving the nation's rich cultural heritage. The research highlights that despite existing challenges, like limited official offerings and financing constraints, there is interest among farmers to engage in agri-tourism. By bridging the agricultural and tourism sectors, the Seychelles can enhance its tourism offerings while empowering local communities. Policy alignment, enhanced communication, and targeted educational programs are needed to realise the full potential. Fostering collaboration between governmental bodies and local entrepreneurs will be needed to overcome the financial hurdles and regulatory obstacles identified. Collaboration between key stakeholders, especially the Agricultural and Tourism Departments, is necessary to maximise the transformative power of agri-tourism.

(4) Terrestrial adventure tourism in the Seychelles has the potential to contribute to economic growth while preserving the nation's natural environment. While currently the Seychelles offers hiking, biking, horseback riding, and zip-lining, more terrestrial adventure activities, such as wildlife tours and canopy trails, were identified as both environmentally friendly and appealing to tourists. Enhancing existing infrastructure and incorporating educational and cultural elements can further elevate visitor experiences. Collaboration between hotels and local entrepreneurs can prove beneficial, leading to economic development and job creation. Addressing safety concerns and insurance, and offering incentives for local entrepreneurship are crucial for the sustainable growth of the sector. By prioritizing stakeholder collaboration and implementing targeted initiatives, the Seychelles can capitalize

on adventure tourism to achieve sustainable development goals while safeguarding its pristine environment. Additionally, the sector can be aligned with conservation efforts and local community engagement.

(5) Understanding local perceptions of tourism and preserving Seychellois Creole identity within the evolving landscape of tourism growth are important aspects of sustainable development in the Seychelles. Balancing economic growth and tourism development with cultural preservation ensures long-term viability, and is only possible when the locals' perception of tourism is understood. A survey was conducted to grasp residents' attitudes towards the tourism industry and its impacts. The findings highlight the multifaceted relationship between tourism development, cultural heritage, and societal well-being. The research revealed a nuanced understanding of residents' perceptions towards tourism in Seychelles, highlighting both the recognition of its economic significance as well as concerns regarding potential negative impacts on the environment and cultural heritage. The research stresses the importance of fostering a deep understanding of local sentiments to inform sustainable tourism strategies, to ensure resilience and cultural authenticity in the face of expansion of the tourism sector.

(6) With the Seychelles being heavily reliant on food imports, addressing seasonal overproduction in local agriculture is a crucial step towards enhancing food security and fostering economic resilience in the island nation. As a net food importer, the Seychelles face challenges in achieving self-sufficiency due to limited agricultural opportunities and/or coordination, and reliance on imports. Overproduction exacerbates these challenges by leading to food waste and hindering market access for local farmers. Therefore, the factors contributing to overproduction, as well as solutions to strengthen the linkage between farmers and the hospitality sector, were investigated. Initiatives such as an online platform and a labelling system offer promising opportunities for improving collaboration and balancing supply and demand. Nevertheless, implementation barriers such as unpredictable yields and financial constraints will require government support and investment. By addressing overproduction effectively, the Seychelles can enhance food security, support local farmers, and promote environmentally sustainable tourism.

(7) With a growing tourism sector comes a heavier reliance on water and electricity resources, which usage has surged in recent years. Addressing inefficiencies in resource utilization is crucial for mitigating ecological strain, ensuring long-term resilience, and fostering sustainable growth in the tourism sector. This research developed a tool to examine the relationship between tourism and resource consumption, to help gain a systemic overview of the environmental, social and economic impact of accommodation establishments. It was found that low occupancy rates present a dilemma, emphasizing the need for quality over quantity in accommodation development. Additionally, the results reveal variations in water and electricity consumption among different accommodation categories, highlighting the need for targeted interventions to promote sustainability. The research methodology also identified a need for improved and streamlined data practices between stakeholders. By prioritizing higher occupancy rates, renewable energy adoption, and efficient water management, the Seychelles can navigate towards a more sustainable tourism industry.

In conclusion: the tourism in the Seychelles is perceived rather positively by both tourists and locals. The tourists appreciate the beaches, but also criticise the lack of adequate beach-related facilities; the locals primarily see the economic benefits, but also associate tourism with some negative aspects such as access to the beaches in the hotels or the price effects. This harbours potential for conflict, and it is advisable to keep an eye on the interplay between tourism and local sensitivities. The problem of inadequate communication and coordination between different administrations, sectors and interest groups is a recurring theme throughout the chapters. We propose improving communication and cooperation between stakeholders and making cross-

toral cooperation the standard. In order to create synergies between beach tourism and new market segments such as cultural, agricultural or adventure tourism, active management seems to be necessary, which requires cooperation between the players involved. The players in these niche offers would have to coordinate their offers, harmonise them and, if necessary, offer them jointly in order to fully exploit their potential. To address the imbalance between the seasonal food supply (farmers) and the demand for food (hotels, restaurants), a round table at association level to reach a common understanding of the potential between the two sectors would be a first concrete measure to better utilise the synergies. Language, cuisine, dance, music and peacefulness are characteristics of the Seychelles' Creole culture; they create identity and strengthen the cohesion of local society. However, this Creole element is in danger of becoming blurred and even lost due to the constant influence from outside. Still, we propose to preserve and strengthen the cultural identity, because that is what distinguishes the Seychelles from other competing destinations, not the sand and the sea.

The rapid growth of tourism raises the question of sustainability. We therefore propose a comprehensive review of tourism. This would be based on the key question: What is the future of tourism in the Seychelles, what is good for the people, for the environment, for the economy? This question should be addressed in a broad public discourse. The aim is to anticipate and assess the possible consequences of different tourism development options. This goes hand in hand with planning, as tourism development cannot be viewed in isolation from other developments and must be planned for the long term in order to avoid uncontrolled developments.

General introduction

Authors:

Pius Krütli, Florian Marcussen and Michael Stauffacher

Travel and tourism, which are closely linked, are fast growing economic sectors worldwide (Figure i.1), making a significant contribution to global gross domestic product (GDP, 10.3% in 2019) and job creation (10% of global employment) (WTTC, 2022). While there was a sharp collapse due to the SARS-CoV-2 pandemic in 2020, which hit both tourism and travel, the sectors are recovering and are expected to be back at 2019 levels in 2024 (WTTC, 2024). Further annual growth of 5.8% (GDP) is forecast for these sectors over the next ten years (WTTC, 2022).

The number of tourist arrivals has increased steadily in recent years, with annual growth rates of 3-7% and a peak of 1.46 billion in 2019 (UNWTO, 2023), and is expected to increase by 23% to 1.8 billion by 2030 (UNWTO, 2011). Forecasts for the transport sector, particularly for air traffic, also predict an increase of 40% between 2019 and 2033 (Weston et al., 2023). Tourism almost came to a standstill during the SARS-CoV-2 pandemic but has since recovered and the number of tourist arrivals has almost reached 2019 levels again (UNWTO, 2023).

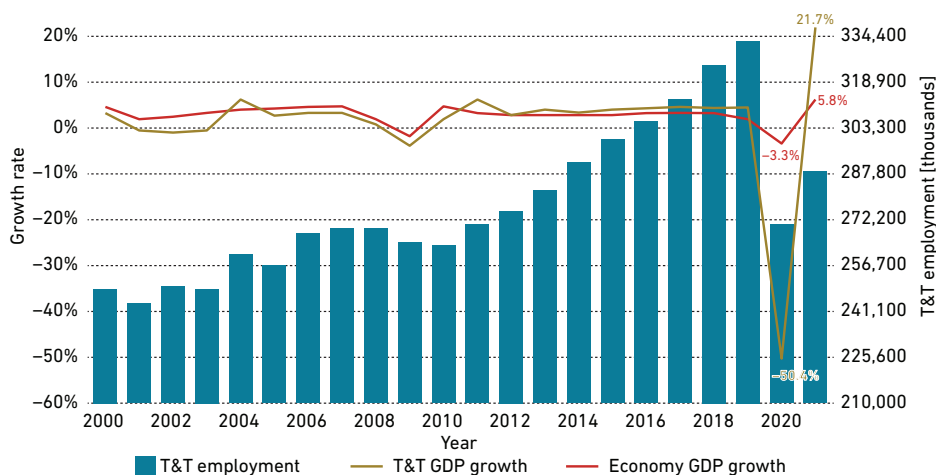


Figure i.1

Economic impact timeline of global Travel & Tourism (T&T) (Source: adapted from WTTC, 2022, p. 5). The blue bars show Travel & Tourism employment. We can observe a steep increase in jobs globally peaking in 2019 followed by a sharp collapse in 2020 caused by SARS-CoV-2 pandemic. The red line shows the economic growth (GDP); the green line refers to the GDP growth of the Travel & Tourism sectors. While the growth rates follow similar patterns over the year, the collapse of the latter is about 15 times as much as the global economy.

Apart from the economic importance and the wealth it creates for tourism destinations such as Fiji or Mauritius (contribution to GDP: 12.6% and 9.1%, respectively, in 2018) (UNWTO, 2023), tourism is also associated with negative environmental and social impacts, such as the consumption of land, water and fossil fuels, the related CO₂ release, waste production, or the disturbance of ecosystems and local communities (e.g. Belsoy et al., 2012; Buckley, 2012; Chong, 2020; Gössling & Peeters, 2015; WTTC, 2023). Aviation accounts for 2–3% of global CO₂ emissions (IEA, 2023), but the impact on climate change could be significantly greater than the CO₂ share suggests, as recent studies show (Lee et al., 2021; Brazzola et al., 2022). Parts of it can be related to tour-

ism. However, tourism may also be associated with positive impact on the local environment as it provides e.g. ecological functions or services for the host country or is used as an instrument for nature protection (e.g. Balsalobre-Lorente et al., 2020).

The massive importance of the tourism sector and the related impacts raise questions on the sector's sustainability. Indeed, sustainable tourism has been studied by scholars and policy developers for more than two decades, however, there is little evidence that the mainstream sector is on a sustainable trajectory (Sharp-ley, 2021; Buckley, 2012). The SARS-CoV-2 pandemic has given us an unprecedented reminder of how vulnerable destinations are to global disruption, which could prompt the sector to reorient itself towards more sustainable pathways (Ioannides & Gyimóthy, 2020).

Forms of tourism like cultural-, eco-, agro-tourism or similar activities are considered sustainable (Sharp-ley, 2021) as they have less impact on local environment and culture, while at the same time leading to more local jobs and income (for a systematic review on sustainable tourism see Streimikiene et al., 2021). Even though these touristic forms are seen as niches, potentially targeting a particular group of tourists, their economic potential on a global scale is limited. Still, less invasive forms of tourism could be of particular importance for Small Island Developing States (SIDS) as they are small in size and often have vulnerable ecosystems with limited carrying capacity for tourism (Ghina, 2003).

Tourism in the Seychelles

The Seychelles are highly dependent on two economic pillars: Tourism and Fishery. At 21%, tourism makes the largest contribution to GDP, provides 27% of employment and generates a large proportion of the country's foreign exchange (IMF, 2022). In the last decade prior to the SARS-CoV-2 pandemic, tourism arrivals have increased significantly with annual growth rates of 10% (Government of Seychelles, 2018b).

The Seychelles were dominated by and well known for its luxury and high price segment tourism in its early days until the early 2000s. In the 2000s the sector diversified (liberalized) and now offers packages for various groups, from backpacking to high end luxury tourism. Meanwhile, bed availability is dominated by self-catering, guesthouses and small hotels (55%), while large hotels, which are mostly in the higher price segment, account for 45%. All-inclusive packages are increasing while extra spending is decreasing (Government of Seychelles, 2018a). On the other hand, self-catering guesthouses, and small hotels are often locally owned and the money coming in stays in the local system, while on the other side of the spectrum, medium and large hotels are often in the hands of foreign investors and operated by large hotel chains and the revenue very often does not come into the country or does not stay in the system (Pratt, 2015).

Following a general trend in tourism, Seychelles' strategy is to diversify its tourism offerings to increase per capita spending in the country while slowing the increase of arrivals (Government of Seychelles, 2018b). Ecotourism, agrotourism, cultural tourism, adventure tourism – all of these categories are expected to lead to an expansion of tourism activities and higher per capita spending while minimising environmental and social impacts.

Like fishery, the other economic pillar, the sector relies on intact ecosystems, i.e. the country's environmental capital. The Seychelles are rich in natural beauty on land and sea, which forms the basis of the Seychelles' tourism sector. Accordingly, the country placed about 50% of its land area and more than 30% of its large extended economic zone (EEZ) at sea under a certain protected status (Government of Seychelles, 2013). Despite their short settlement history of 250 years, the islands also have a lot to offer culturally, but this is only gradually penetrating the national consciousness and has so far been only marginally exploited economically, in comparison to beach and sea related activities. In fact, most touristic facilities are located along the coastline. This also means that most environmental impacts such as habitat loss are concentrated in this area. Other, more remote mountain areas are only indirectly affected by tourism because, for example, the coastal areas are no longer available for housing construction, which consequently migrates to the mountain regions as can be observed. However, tourism is only one of several reasons for this development. Furthermore, the dramatic growth of the sector translated into increased water usage, energy consumption and imports of goods that are probably disproportionate compared to the local population's consumption (IRENA, 2023; UNEP, 2017).

Framework land use and tourism

Tourism, especially in the four- and five-star segment, is land use intensive (e.g. Gössling and Peeters, 2015; Gössling et al., 2002) and competes with the availability of land for other purposes such as housing, infrastructure, industry, agriculture or nature protection. This is particularly the case when land is a very scarce resource, as in the Seychelles (Government of Seychelles, 2015).

The importance of tourism and its relation to land use can best be understood by linking tourism to a land use classification system. The classification of land use is based on land cover and the function (e.g. potential for a certain activity like agriculture) assigned to the land. Land cover (naturally or man-made) and land use (linked to women's activity) is dynamic and can change over time (Anderson et al., 1976).

Seychelles distinguishes 12 main and 56 sub-categories of land use based on their characteristics and functions (Government of Seychelles, 2015). Tourism is one of the main categories; accommodation and tourism sites are sub-categories. Tourism is linked

to other categories such as residential (for touristic use), commercial (e.g. shops, food facilities), agriculture (not yet, but possible be in the future, e.g. agrotourism), forestry (e.g. trails, tourist sites), protected areas (e.g. recreational activities), social infrastructure (e.g. sports, cultural), physical infrastructure (e.g. airport, roads), public utilities (not specific to tourism but still relevant) (Figure i.2).

In other word, land use is directly influenced by tourism and vice versa (highlighted by bidirectional arrows in Figure i.2), as land cover also influences tourism infrastructure and activities. For their part, tourism forms and activities are determined by behavioural and cultural changes, increasing prosperity, technological improvements, policy changes and changing supply (Williams & Shaw, 2009), as shown in Figure i.2. Those drivers are sometimes influenced by external disruptions such as climate change, piracy, economic dislocation in the countries of origin, pandemics, etc.

Objectives and work packages

As we have already seen, tourism is a major pillar of the Seychelles' economy. However, the country faces stiff competition from other destinations with similar tourism offerings. Furthermore, as a Small Island Developing State (SIDS), it has some important characteristics, such as remoteness, small size of economy, limited resources, vulnerability against climate change (Briguglio, 1995; Pratt, 2015; Wolf et al., 2021); as a tourism destination it is vulnerable to external disruptions, such as global economy failures, political instability in countries where tourism comes from, piracy, or pandemics. Given that the country was long focussed on 3S "mainstream" tourism (Sea, Sand, Sun), the aim of this study is to rethink the sustainability of tourism in the Seychelles. More specifically, the aim is to understand how the current tourism portfolio can be diversified to generate more revenue per capita while limiting the (local) environmental and social footprint. The focus is on the main island Mahé. The gener-

al research question can be formulated as follows:

What opportunities and challenges does a small island nation like the Seychelles have to face in order to make international tourism more socially responsible, economically viable and environmentally friendly?

This question has been tackled via seven modules (working groups), representing chapters 1-7. Chapter 1 focuses on beach tourism, which represent the major mode of tourism in the Seychelles. Sections 2-4 are focusing on potential diversification of the touristic portfolio: cultural, agro, and terrestrial adventure tourism. Chapter 5 analyses the impact of tourism on the social system. Chapter 6 investigates the link between agricultural and tourism, and section 7, finally provides a tool to assess the three pillars of sustainability of tourism in the Seychelles.

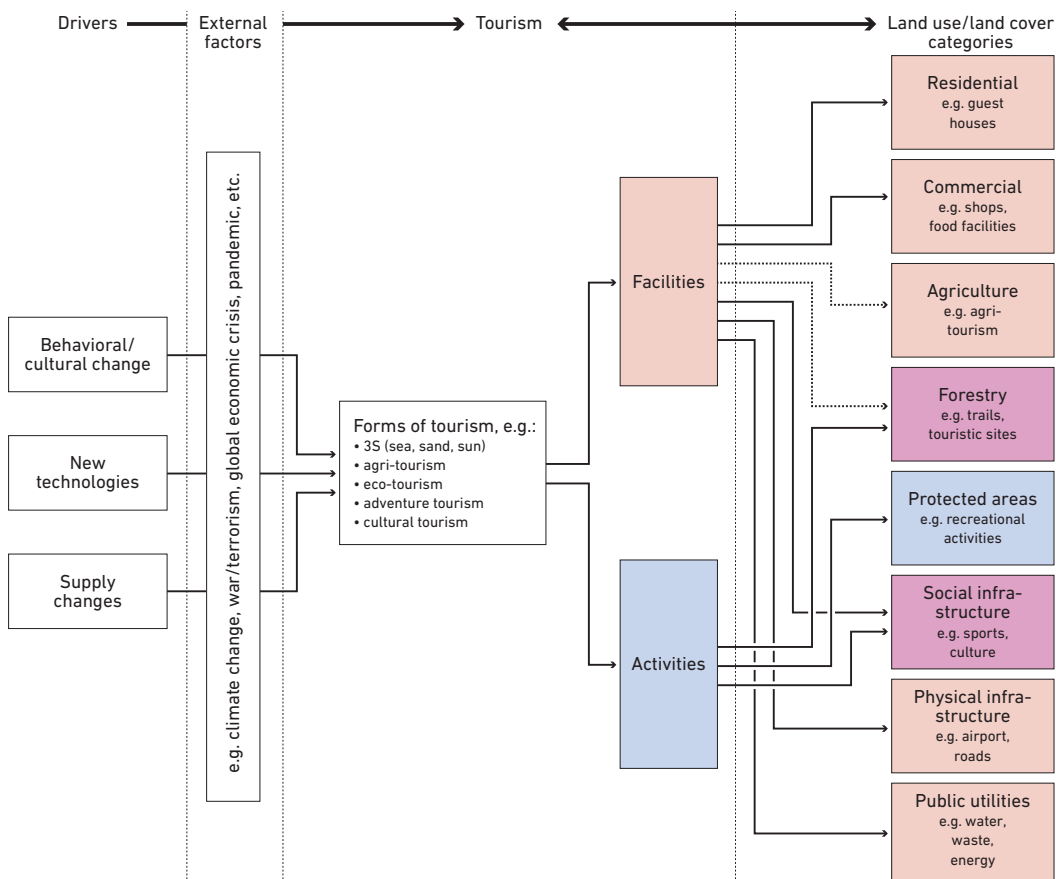


Figure i.2

Driver-tourism-land use nexus framework (Source: adapted from Williams and Shaw, 2009). The framework shows the factors that drive tourism (left side) and the related effects on land use (right side). Drivers such as behavioural/cultural change in source countries, new technologies or supply changes influence the touristic portfolio which translates in facilities and activities, both directly related to the use of different land categories. Land use itself may have a reverse effect on tourism. The boxes in blue are related to touristic activities; the boxes in light red refer to touristic facilities; the boxes in purple relate to both activities and facilities.

1. The **Beach Tourism** group analysed the environmental quality (water, littering) and the perception of beach users in terms of satisfaction, crowdedness, and potential conflicts, focusing on two major beaches on Mahé and La Digue.
2. A second group investigated the potential and the challenges of **Cultural Tourism** with a particular focus on the Creole Rendezvous brand, which was recently launched.
3. Another group focused on **Agro-Tourism**, i.e. its status (achievement and challenges), its potential and the way forward to promote its implementation in the Seychelles.
4. A third group worked on diversification of the tourism portfolio, by investigating the pros and cons of **Adventure Tourism** through the lens of tourists, locals, and authorities.
5. Another group wanted to understand the **Social Impact of Tourism**. They surveyed residents' perception of tourism, their recognition of the role of Seychelles' Creole history and culture in tourism development.
6. One more group worked on the **Link between Agriculture and Tourism** focusing on the status and the potential of coordination of local food demand and supply.
7. Finally, the last group developed an **Assessment Tool** to analyse the performance of future tourism strategies in terms of the three dimensions of sustainability.

This study was executed by three partners: ETH Zurich, the Tourism Department of the Ministry of Foreign Affairs and Tourism, and the University of Seychelles (UniSey). 25 master's students from ETH Zurich, with various disciplinary background such as environmental sciences, agricultural science, environmental engineering, spatial planning & infrastructure, and management, technology & economics, and five undergraduate students from the University of Seychelles (mostly environmental sciences background) were involved, guided by a team of about 15 lecturers, researchers, and advisors.

The team conducted the case study in two phases from February to July 2023. During the semester from February through June 2023, the ETH students engaged in literature review, background research, research plan development and field phase preparation. About halfway, local experts from the Tourism Department joined a two-day workshop in Zurich to validate preliminary research plans. A three-week field research in the Seychelles, a collaborative effort by both UniSey and ETH students, followed this preparatory work.

This report is the result of the preliminary scientific reports of July 2023 and a six-month follow up review and revision process.

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1 Navigating the Socio-Cultural and Environmental Sustainability of Beach Tourism in Seychelles

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Photo: Johanna Mattenklodt

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1.1 Introduction

“Mass tourism”, an excessive number of tourists at a specific destination, can result in negative impacts both culturally and on the environment, including overcrowding (Dodds and Butler, 2019). This overcrowding, in turn, could lead to environmental degradation. This research delves into the phenomenon of overcrowding on beaches and the repercussions it has on the environment and the tourist experience in the Seychelles.

A study by Garcia and Servera (2003), for example, showed that almost 80% of the beaches investigated in Mallorca, Spain, revealed overcrowding resulting in degradation that was visible in the form of a rapidly retreating coastline. Similarly, already in 1989, Romanian beaches experienced visible environmental degradation. Beach users expressed concerns about the lack of cleanliness, including poor sewage treatment and the presence of litter, inadequate facilities, and general environmental degradation (Coman, Morgan and Williams, 1999).

The United Nations defines environmental degradation as the deterioration of the environment through resource depletion, ecosystem destruction, and undesirable changes (United Nations Environment Programme, n.d.). While environmental degradation also occurs naturally, humans are currently the major driver of environmental degradation (Maurya et al, 2020). Increasing tourist numbers accelerate impacts on the destination provoked by humans (Taiminen, 2018). When it comes to coastal areas, these impacts often take the form of degradation through littering and decreased water quality (Taiminen, 2018).

Water quality is compromised by pollutants introduced by human activities, such as agricultural runoff, improper sewage treatment, and industrial practices (Maurya et al., 2020). Microbial contamination poses a serious threat, as contact with unsafe water can impose risks on human health (Kumar et al., 2019). Litter, which is primarily left behind by beach users themselves (Dadon, 2018), detracts from the beach experience and can even deter tourists from visiting (Tudor and Williams, 2003; Brouwer et al, 2017). Not only are litter levels tied to the quantity of people, they are often accompanied by a lack of garbage infrastructure (Taiminen, 2018), and linked to beach users' behaviour.

Moreover, the quality perception of a beach experience, as well as a beach users' treatment of the area, varies depending on the values, interests, and origin of beach users (Roca et al, 2009). Two types of beach users can be distinguished. The first being anthropocentric which is associated with consumptive recreation; the second being ecocentric attitudes in which beach users have a preference towards unspoilt beaches (Wolch and Zhang, 2004). The proportions of such groups on beaches influence the quality of people's beach experience, as destructive behaviours from consumptive groups, such as littering, can impact the environmental quality as well as other beachgoer's enjoyment of the beach (Pendleton, Martin & Webster, 2001). Overcrowding, driven by over tourism, tends to increase the proportion of anthropogenic beach users, which can escalate destructive behaviours, lead to

user conflicts, and impact the preservation of the beach, causing degradation (Pendleton, Martin & Webster, 2001). Furthermore, overcrowding leads to overuse of beach environments and contributes to factors that further degrade these areas, including the development of facilities, littering, and water pollution (Sánchez-Quiles and Tovar-Sánchez, 2015). This environmental degradation can deter tourists from destinations (Maurya et al, 2020), leading to economic losses, especially in regions heavily dependent on coastal tourism (Lucrezi, 2022).

The Seychelles welcomed over 384,000 visitors in 2019, and experienced a yearly visitor arrivals increase of approximately 10% from 2009 to 2017 (Government of Seychelles, 2018a).

Visitors to the Seychelles highly value its natural environment, expressing concerns about issues like litter on beaches and in the sea (Government of Seychelles, 2018b). The expressed concerns for litter (Taiminen, 2018), as well as previously identified seawater contamination at Beau Vallon (Grandcourt, 1995) are indications of coastal degradation that should be taken seriously (Brouwer et al, 2017). The potential degradation of beaches could threaten the tourism reputation of the Seychelles which could in turn result in economic losses (Ballancea, Ryanb and Turpie, 2000).

The direct contribution of tourism to Seychelles' GDP was 28.6% in 2018 and is forecasted to increase by 2.9% per year from 2018 to 2028 (Government of Seychelles, 2018a).

In this study we investigate two beaches suggested by the Tourism Department: Beau Vallon on Mahé and Anse Source d'Argent on La Digue. The Tourism Department identified these two as popular beaches, most likely to be affected by the consequences of overcrowding in the Seychelles.

In order to answer the overarching research question: “*What is the quality of the beach experience at Beau Vallon and Anse Source d'Argent, and how could it be improved?*”, each of the three components described above is linked to a sub-research question:

- RQ1 *What is the quality of Beau Vallon and Anse Source d'Argent as perceived by beach users?*
- RQ2 *What is the existing environmental quality of Beau Vallon and Anse Source d'Argent, considering water quality and litter level as parameters?*
- RQ3 *How crowded are the beaches and how do beach users perceive the crowdedness?*

Our research consists of three main components with the aim of establishing valuable insights for effective beach management and mitigating the adverse effects of overcrowding, in order to ensure that the Seychelles remains an attractive and sustainable tourist destination. The three components are as follows: surveying of beach users on their perception of the beach experience; assessing the existing environmental quality, which includes water quality testing and a litter assessment; and crowdedness assessment.

1.2 Methods

We consulted a wide range of literature, to assess the existing social and environmental challenges within beach tourism. To provide a holistic approach, we used qualitative and quantitative data collection methods.

1.2.1 Survey

The survey was designed to investigate the preferences and perceptions of beach users about the quality of their beach stay, as well as their demographics and visiting behaviour.

Questionnaire

The survey consisted of 20 questions of which half were rating questions. The survey used is attached in Appendix 1.1.

We made a distinction between local residents, local tourists and foreign tourists to be able to analyse the different perceptions of these groups.

There were two questions that presented 23 parameters (items) relating to beach quality to the respondents, with a distinction between satisfaction versus importance of the parameter, to be rated on a five-point Likert scale. The parameters were related to each other. For example, the first parameter regarding satisfaction was “sand texture” and was rated as (1 = very dissatisfied, 3 = neither satisfied nor dissatisfied, 5 = very satisfied), and the first parameter regarding importance was “comfortable sand texture” and rated as (1 = not important at all, 3 = of average importance, 5 = essential). To investigate the participants' priorities in more detail, another question required a choice of five aspects (out of the 23 items presented in the questionnaire) perceived as most important to them.

Furthermore, participants were asked to grade the crowdedness of the beach (1 = almost no people, 3 = some people, 5 = a lot of people), and express whether they experienced discomfort due to overcrowding. This coupling of the perception and the associated feeling is helpful to understand what role crowdedness plays in the overall beach experience. Moreover, we included both questions as we anticipated that there are both people who dislike crowds and those who enjoy crowds.

As a general rule, a “No opinion / Not applicable” answer option was added to those survey questions, for which the survey participants have to state their personal opinion.

Data collection

Beach users were asked in person, and via QR code to maximise the outreach of the survey. We selected people randomly walking up and down along the beach. The surveys were written in English and verbally translated into Créole or German for participants where needed.

At Beau Vallon, four QR codes were distributed in public places, with the consent of the owner of the establishment to increase the response rate. Access to the online survey, via the platform Google Forms, was opened on 4 July and closed on 15 July 2023.

Beau Vallon

We split the beach into five zones (Figure 1.1), categorised based on the land-use of that area (see Table 1.1 in Appendix 1.2). Along Beau Vallon beach, these five different uses include water-based activities (A), kiosk and restaurants (B), tourist activities and the promenade (C), hotels and restaurants with beach access (D), and luxury restaurants with access from Bel Ombre road (E). Our hypothesis is that the form of beach-use and the available activities and facilities may impact the perception of beach quality. Surveys were collected on 4, 5, 7, and 8 July 2023 between approximately 10am and 6pm. The average completion time for the survey was between 15 and 20 minutes.

Anse Source d'Argent

Anse Source d'Argent was not split into zones as very few beach regions have diversified land use. Surveys were collected between approximately 3pm and 6pm on 13 July, 10am and 6pm on 14 July and 10am and 1pm on 15 July 2023.

Sample

Beau Vallon

In total 203 surveys were collected at Beau Vallon. Two third of participants were tourists. The minimum age for participating in the survey was 18 years old. Within the tourist segment of the sample, about 18% of the sample reported Germany as their country of residency, followed by Russia (7%) and France (6%). Overall, around 75% of countries mentioned in the category 'other' by foreign tourists are European countries (including non-EU-countries, excludes Russia).

Anse Source d'Argent

At Anse Source d'Argent, a total of 89 responses were collected. Within this sample, 75 respondents were foreign tourists. The sample also included 4 local tourists and 10 local residents. The local residents were predominantly people who worked at the beach. The age of participants ranged between 18 and 72 years. Out of the foreign tourists, 15% indicated Germany as their country of residency. This was followed by Italy (11%) and Switzerland (9%). Russia accounted for 4% of tourists. Another 8% indicated La Réunion as their country of residency. A total of 69% of tourists were from Europe (includes non-EU-countries, excludes Russia).

Data analysis

Since we used Google Forms for our questionnaire, the survey results could be directly exported as a Google Sheet file.

Most of our analysis was descriptive, i.e., what are the reasons that beach users chose to visit Beau Vallon. We mostly used stacked bar/column charts as our chart type to visualise the survey data. For the satisfaction and perceived importance of beach users, we also calculated the average score based on the Likert scale of the survey questions.

We also performed qualitative analysis to evaluate the answers to our open-ended questions, which were mainly about conflicts and suggestions for improvement. In this case, we would categorise similar answers into one group and rank these different groups based on their frequency of occurrence.

1.2.2 Water quality testing

An older study on the water quality at Beau Vallon showed that the water quality was not safe, referring to the period between 1972 and 1993 (Grandcourt, 1995). We performed water quality testing to reassess the situation.

The Aquagenx Compartment Bag Tests

The water quality testing equipment we used were Aquagenx Compartment Bag Tests (CBT)¹. These bags test for *E. coli* via a compartmentalised plastic bag, a faecal indicator, and a chromogenic culture medium. The test kits can be used for both salt and freshwater and allows for the testing of total coliforms in the same bags. These bags have five compartments with different sizes to simulate different environments under which bacteria can grow; 1ml, 3ml, 10ml, 30ml and 56ml respectively. Evaluation of colour changes in the different compartments indicates whether water is contaminated, or not, and at what concentrations in term of most probable number of bacteria per ml.

Data collection

We collected 100ml of seawater per testing site at a 45° angle at water surface level to minimise influx of other ocean materials. These samples were then stored in collection bottles. For each sample a new (sealed) bottle was used. The evening of the day that the samples were collected, the chromogenic culture medium was added and left to dissolve for 15 minutes, before the samples were added to the CBT bags and left to incubate in ambient temperatures (approximately 25°C) for 48 hours. The samples from La Digue were only incubated for 24 hours, as they already showed results within that time frame.

Beau Vallon

We identified two water quality testing sites at Beau Vallon (shown in Figure 1.1). Site one was at the mouth of the river Mare Anglaise (zone A) and site two at the centre of the bay (zone D, see Figure 1.1). These sites were selected because we hypothesised that the water quality at the mouth of the river, which is less influenced by infrastructure, would be of better quality than the water near the restaurant facility. Samples were predominantly taken in the morning (approximately 10am) and late afternoon (approximately 5pm), to monitor changes that may occur between these two different tidal periods. Weather conditions were not taken into account, as there was no large rainfall during the sampling period². We collected seven samples in the river flow zone and six in front of the restaurant. Samples were collected on 4, 5, 7, and 8 July 2023.

Anse Source d'Argent

Given that there is a landfill and sewage treatment plant behind the beach, thus close to the study site, the water quality may have been affected. The land use at this location is rather uniform. Therefore, samples were taken at varying randomly selected sites, and at differing times. We collected five samples in total from this location, on 13, 14, and 15 July 2023.

Reference test site: Petite Police Beach

As reference to the two study sites Beau Vallon and Anse Source d'Argent we took four water samples at Petit Police (Figure 1.1). Two samples were taken on the northwestern side, and two on the southeastern side. We hypothesised that this site is uncontaminated by human activities as it is almost unpopulated and far away from residential and touristic areas. Samples were collected on 20 July 2023.

Data analysis

In the presence of *E. coli*, a compartment will colour blue/green, while in the absence it will colour yellow. The combinations of differently coloured compartments per volume allow for interpretation of results using Table 1.2 in the Appendix 1.2. This table shows the different possible colour combinations per compartment volume and the corresponding Most Probable Number (MPN) of *E. coli* per 100ml, and the Health Risk Category. The Health Risk Category is based on the MPN and the confidence interval and ranges from low risk/safe to unsafe.

Lastly, the same bags were tested for total coliforms using fluorescence in a dark room with UV light. If the bag was fluorescent, it was positive for total coliforms. This was a binary result; there was no quantification for the level of total coliforms.

1.2.3 Littering assessment

This section will feed into RQ2 on existing environmental quality. Litter was assessed using a transect method, meaning that objects were counted along a standardized path, and was categorised as specified below.

Data collection

Beau Vallon

Litter evaluation occurred along the entire stretch of the beach. The litter was categorised according to the previously outlined zones (Figure 1.1) and based on size: small (0–5cm), medium (5–30cm), and large (> 30cm), and whether it originated from the sea or shore. This classification of origin was made based on proximity to the shoreline, as well as visual signs that the litter has been in the water, such as seaweed. This data collection took place on 4 and 5 July 2023. The samples were taken between 9am and 5pm.

Anse Source d'Argent

Litter was assessed on part of the beach (Figure 1.1), using the same transect method as specified above. It was categorised into glass and general waste, since other types of waste were negligible at this beach during our sampling time. Glass was categorised into the sizes small (0–5cm) and medium (5–10cm). No glass was found to be larger than 10cm. Data collection occurred on 14 and 15 July 2023 at around 11am.

Data analysis

At Beau Vallon we analysed which types of litter were present, as well as at what time of the day there was the most litter (morning/afternoon), and the distribution of litter in the different beach zones. At Anse Source d'Argent, we analysed the most dominant type of litter, which was glass-based on its size.

¹ <https://www.aquagenx.com/cbt-ectc/>

² <https://www.timeanddate.com/weather/@241428/historic>

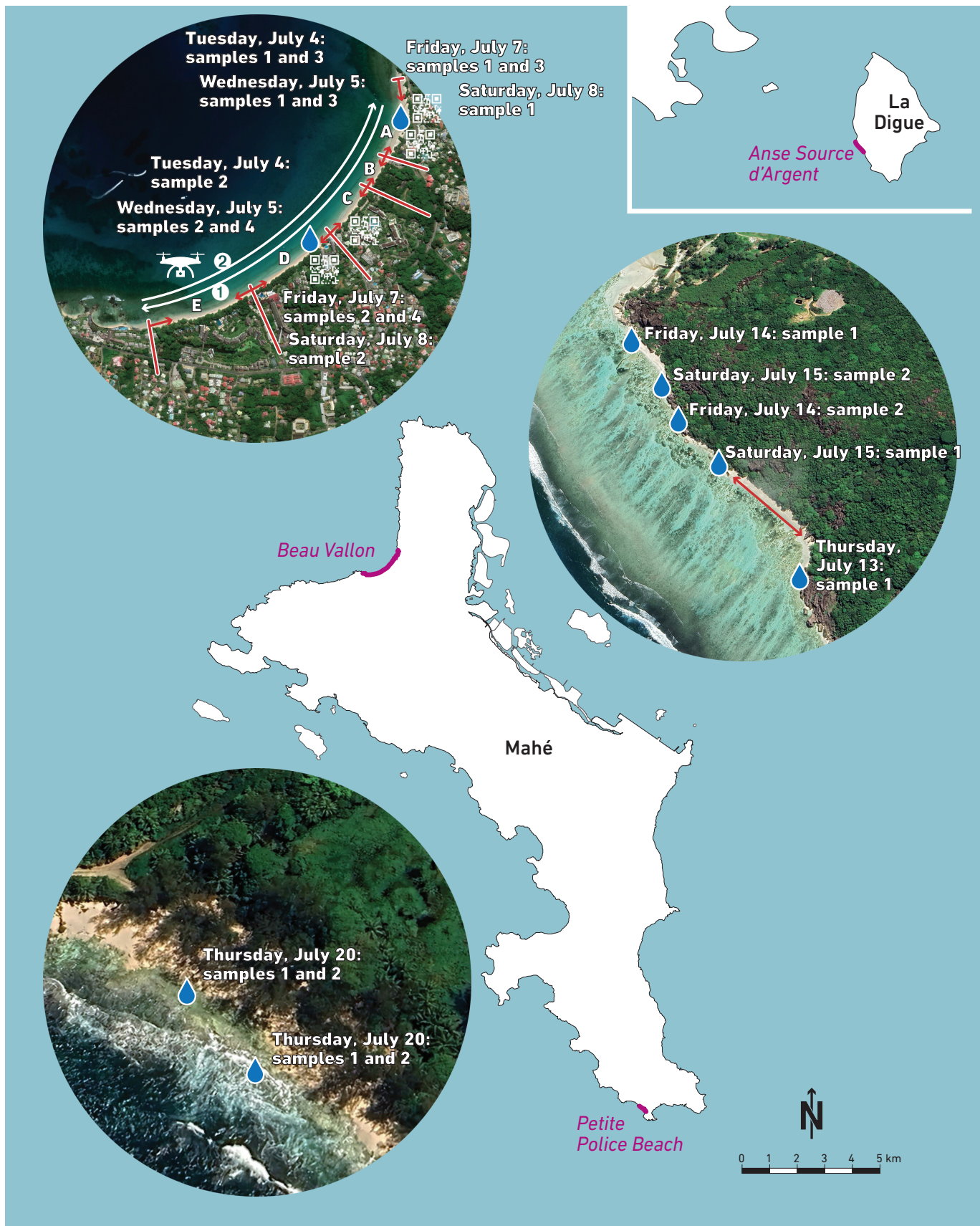


Figure 1.1

The data collection zones at Beau Vallon, Anse Source d'Argent, and Petite Police Beach. The top left image shows Beau Vallon; the five different zones are water-based activities (A), kiosk and restaurants (B), tourist activities and the promenade (C), hotels and restaurants with beach access (D), and luxury restaurants with access from Bel Ombre road (E). The arrows indicate at which side of the red lines, or along which stretch of the beach, the data was collected. The white arrows along the beach with numbers 1 and 2 refer to the drone flights to measure crowdedness. The drops indicate the locations where water quality samples were collected, including the number of samples at each location.

1.2.3 Crowdedness assessment

In order to assess crowdedness, we asked survey participants how crowded they perceived the beach to be, based on a five-point Likert scale, and whether the crowdedness made them feel uncomfortable, according to three answer options; 'yes', 'no', 'no opinion/not applicable'. Additionally, we counted the actual number of beach visitors to reference perceived crowdedness to actual counted numbers. This count was performed in order to obtain a more concrete idea of an acceptable visitor threshold. This section aims to answer RQ3.

Data collection

Beau Vallon

At Beau Vallon, we used a DJI Air 2S drone to take videos and panoramic pictures (Figure 1.1). We had three scheduled drone flights each survey day, except only two flights on 8 July 2023, to capture the crowds at different times. The first flight was between 11 and 12am, the second between 2.30 and 3.30pm and the last one between 5 and 6pm. The drone was flown at such a distance and angle to be able to count people whilst maintaining their anonymity and safety. At Beau Vallon, such crowd counts were performed on 4, 5, 7, and 8 July 2023.

Anse Source d'Argent

Due to the diverse and complex topography of Anse Source d'Argent, it was impracticable to capture the beach users with a drone. Instead, we used a counter app on a phone to manually identify the number of people at the beach and in the water. We did not have a fixed schedule for counting people; instead, we did so whenever we perceived a relevant change in visitor numbers. This resulted in counts being carried out on 13 July 2023 between 4 and 5pm, in multiple hour blocks between 11am and 5pm on 14 July and between 10am and noon and 15 July 2023 (Table 1.3 in Appendix 1.2).

Data analysis

To analyse the drone footage, videos and panoramic pictures were first split into individual frames. These frames were then imported into Microsoft Paint, in which clusters of people were circled and manually counted (example images are shown in Appendix 1.2, Figure 1.1). These numbers were then added up and categorised based on the day and time of data collection, the zones of the study site, which are the same zones as used for survey, and whether the people were at the beach or in the water. Since we counted the number of people at Anse Source d'Argent manually on site, these numbers were directly translated from the counter app to an Excel file (Appendix 1.6, Tables 1.8 and 1.9).

For perceived crowdedness three figures were plotted for each beach: perceived crowdedness of all beach users, of local residents, and of foreign tourists. We divided the plots based on beach user groups because we assumed locals and tourists would perceive crowdedness differently.

For actual crowdedness, different plots were created based on different survey days and time slots. Within a figure, the numbers were divided based on different beach zones. For example, the number of people counted with the drone flight carried out at Beau Vallon on Tuesday 4 July 2023 between 11am and noon were assigned to the survey results from Tuesday morning, whereby morning correlates to before noon. This was done because we hypothesised that there are more people at the beach during weekends than on weekdays. Additionally, we used different time slots since we anticipated there to be more people at the beach during the evening. Furthermore, we thought there would be a spatial pattern of the beach users i.e., people would concentrate around certain points of interests such as hotels or restaurants.

1.3 Results

The main objectives of our study are to assess beach users' perception of the quality of their experiences at Beau Vallon and Anse Source d'Argent, as well as the existing environmental quality of these two beaches. While the former was assessed via a survey of both tourists and residents, the latter was achieved via the assessment of three parameters, namely water quality, litter quantities and crowdedness. In section 1.3.1 and 1.3.2, we present the profiles of beach users and their perceptions of the two beaches according to the survey results. In section 1.3.3, we outline the existing environmental quality of the two beaches with regard to water quality and litter quantities. In section 1.3.4, we assess the actual and perceived crowdedness at the aforementioned two beaches.

1.3.1 Profiles of beach users

The profiles of beach users contain information related to, among other things, their travel time, activities they plan to do at the beach, reasons for choosing the beach, and how often they visit the beach. In the following we present the latter three aspects while we refer to Appendix 1.3 for further information.

Activities of beach users

Beau Vallon

Figure 1.2 shows the activities that the beach users did or planned to do at Beau Vallon. The beach users consisted of 134 foreign tourists, 67 local residents and 2 local tourists (N=203). Each beach user could mention multiple activities which resulted in 525 activities that were mentioned. These activities were broken down into 35 different categories. "Swimming" was the activity mentioned most by both local residents and foreign tourists. It was mentioned 158 times in total. This was followed by "reading", which was mentioned 70 times in total. It was mostly mentioned by tourists (6 mentions by local residents and 64 mentions by foreign tourists). "Relaxing" with 59 mentions was the third most popular activity overall and was distributed about equally between local residents and foreign tourists (26 mentions by local residents and 33 mentions by foreign tourists).

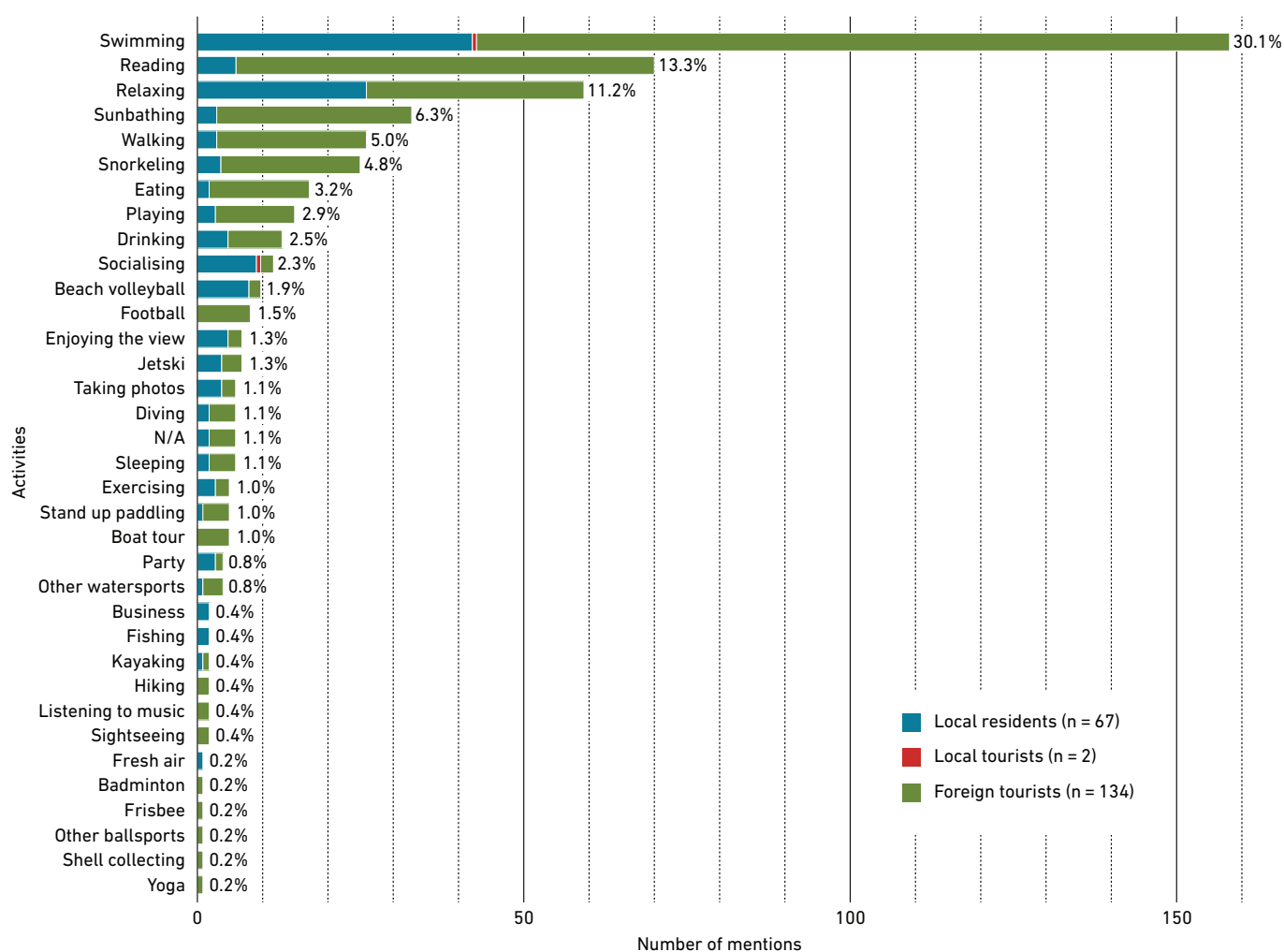


Figure 1.2

Activities that the beach users did or planned to do at Beau Vallon. The percentages on the right end of the bars indicate the relation between the total number of each mentioned category and the total number of mentioned activities.

The most popular activities for foreign tourists were therefore (in descending order) “swimming”, “reading”, “relaxing” and “sunbathing”. For local residents, the most popular activities were “swimming”, “relaxing”, “socialising” and “beach volleyball”.

Anse Source d'Argent

We collected data from 75 foreign tourists, 10 local residents and 4 local tourists (N = 89). In total, 208 activities were mentioned. These activities were broken down into 22 different categories as shown in Figure 1.3. Similarly, at Anse Source d'Argent, “swimming” was the most popular activity for all beach users (ca. 30%),

followed by “reading” (ca. 13%). However, in contrast to Beau Vallon, “snorkelling” was more popular than “relaxing” (ca. 10% vs. ca. 8%). “Taking photos” was more frequently mentioned (ca. 7%), than at Beau Vallon (ca. 1%).

More than half of the local residents were at the beach for business reasons (vendors or providing information for tourists). For local tourists, the most popular activities were “swimming” (ca. 38%), “reading” (ca. 13%), “relaxing” (ca. 13%) and “sunbathing” (ca. 13%). But due to the small sample size of local tourists (n = 4), these data have only limited representativeness.

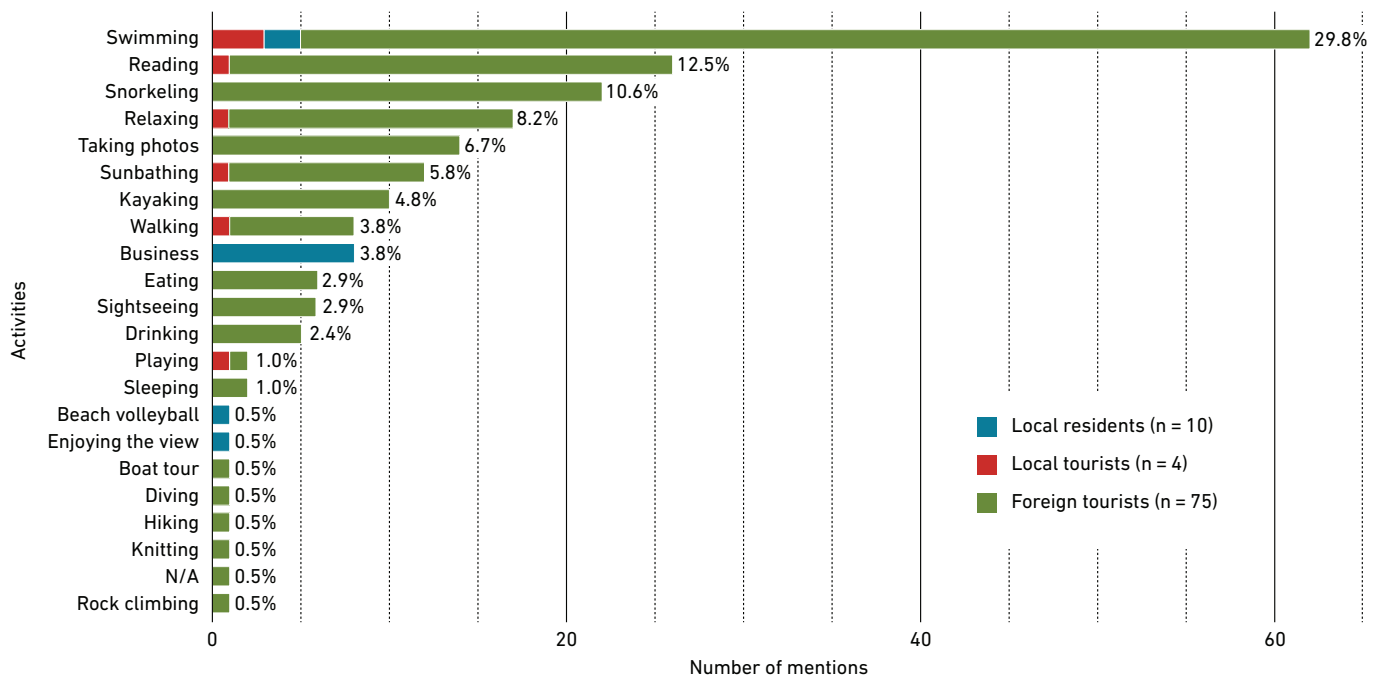


Figure 1.3
Activities that the beach users did or planned to do at Anse Source d'Argent. The percentages on the right end of the bars indicate the relation between the total number of each mentioned category and the total number of mentioned activities.

Reasons for selecting the beach

Beau Vallon

As part of the survey, we also asked beach users about their reasons for choosing Beau Vallon besides the activities they did/wanted to do at the beach. Overall, beach users mainly chose Beau Vallon due to its close proximity to their residence/accommodation (mentioned by 16 local residents and 58 foreign tourists). The natural beauty of the beach was also a major factor for beach users to choose Beau Vallon (mentioned by 22 local residents and 43 foreign tourists). The third most mentioned reason was that Beau Vallon offers various facilities and amenities that are not available elsewhere (mentioned by 11 local residents and 17 foreign tourists). Please refer to Appendix 1.3 Figure 1.2 for further details.

Anse Source d'Argent

The top three reasons foreign tourists chose Anse Source d'Argent are the natural beauty, good reputation and unique granite rocks of the beach (mentioned 47, 20 and 7 times respectively). While the local residents shared the first reason, their following three top reasons, good reputation, close proximity and sentiment (knowing the beach for a long time), were mentioned twice each.

Natural beauty was mentioned by all four local tourists and one also mentioned various facilities and amenities. The lack of accommodations as well as big facilities and amenities near Anse Source d'Argent is reflected in the answers of beach users; "close proximity" and "various facilities and amenities" were only mentioned a few times (Appendix 1.3 Figure 1.3).

Frequency of the visits

Beau Vallon

Overall, almost half of the beach users at Beau Vallon visited almost every day (42%). They are followed by beach users who visited the beach more than once a week (21%) and those who visited the beach for the first time (17%). It is important to note that these frequencies are dominated by foreign tourists (Appendix 1.3 Figure 1.4). If we only consider local residents, they tend to visit the beach from more than once a week to more than once a month.

Anse Source d'Argent

More than 60% of the beach users visited Anse Source d'Argent for the first time, this is linked to the high number of foreign tourists in comparison to local residents. Most of the few local residents visited the beach on a daily basis (Appendix 1.3 Figure 1.5).

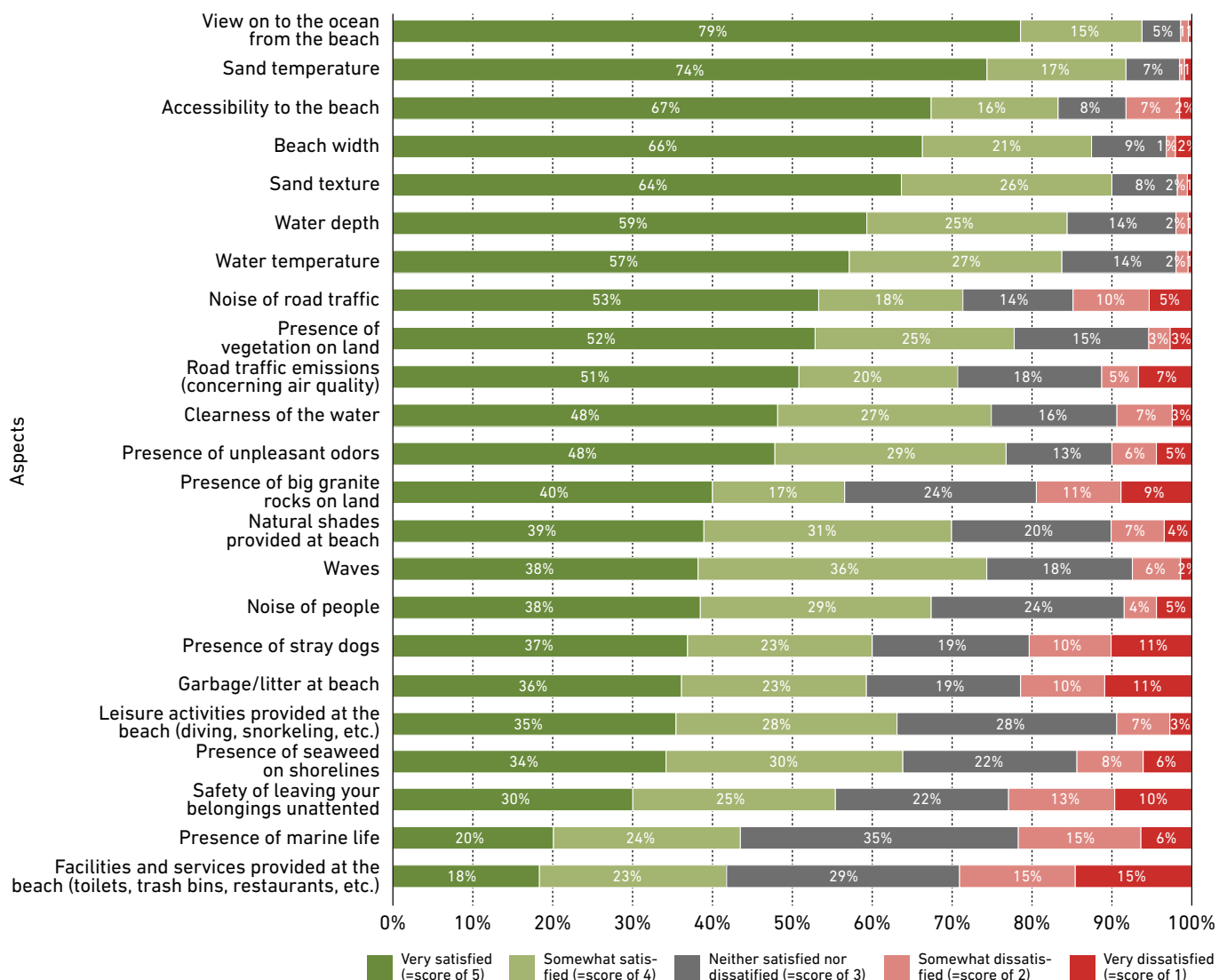


Figure 1.4
All beach users' satisfaction of different aspects at Beau Vallon (N=203).

1.3.2 Beach users' perceptions

Beach users' perceptions consist of their satisfaction with certain parameters as well as their perceived importance of certain aspects of the beaches. Furthermore, conflicts and suggestions described by beach users also contribute to their perceptions.

Satisfaction with certain aspects of the beaches

Beau Vallon

The levels of satisfaction at Beau Vallon of all beach users regarding the different proposed parameters can be seen in Figure 1.4. The satisfaction levels for locals and foreign tourists only can be found in Appendix 1.3 Figures 1.6 and 1.7 respectively.

Physical aspects like "ocean view" were top rated by a majority of beach users while social and infrastructure related factors like "facilities and services provided at the beach" received the lowest 'satisfaction' values.

On average, beach users expressed the highest satisfaction with "view on the ocean from the beach" ($M=4.7$). This was followed by "sand temperature" ($M=4.6$). The lowest mean and therefore level of satisfaction was for "facilities and services provided at the beach" ($M=3.2$), followed by "presence of marine life" ($M=3.4$). All means can be found in Appendix 1.3 Table 1.4.

Anse Source d'Argent

The satisfaction levels of all beach users can be seen in Figure 1.5, and those for local residents and foreign tourists in Appendix 1.3 Figures 1.8 and 1.9 respectively.

Overall, beach users expressed general satisfaction with "presence of big granite rocks on land" and "sand temperature" ($M=4.9$ each). They were generally least satisfied with "presence of marine life" and "facilities and services provided at the beach" ($M=3.6$ each). Again, there is no separate figure for local tourists due to the small sample size of this category. All means can be found in Appendix 1.3 Table 1.5.

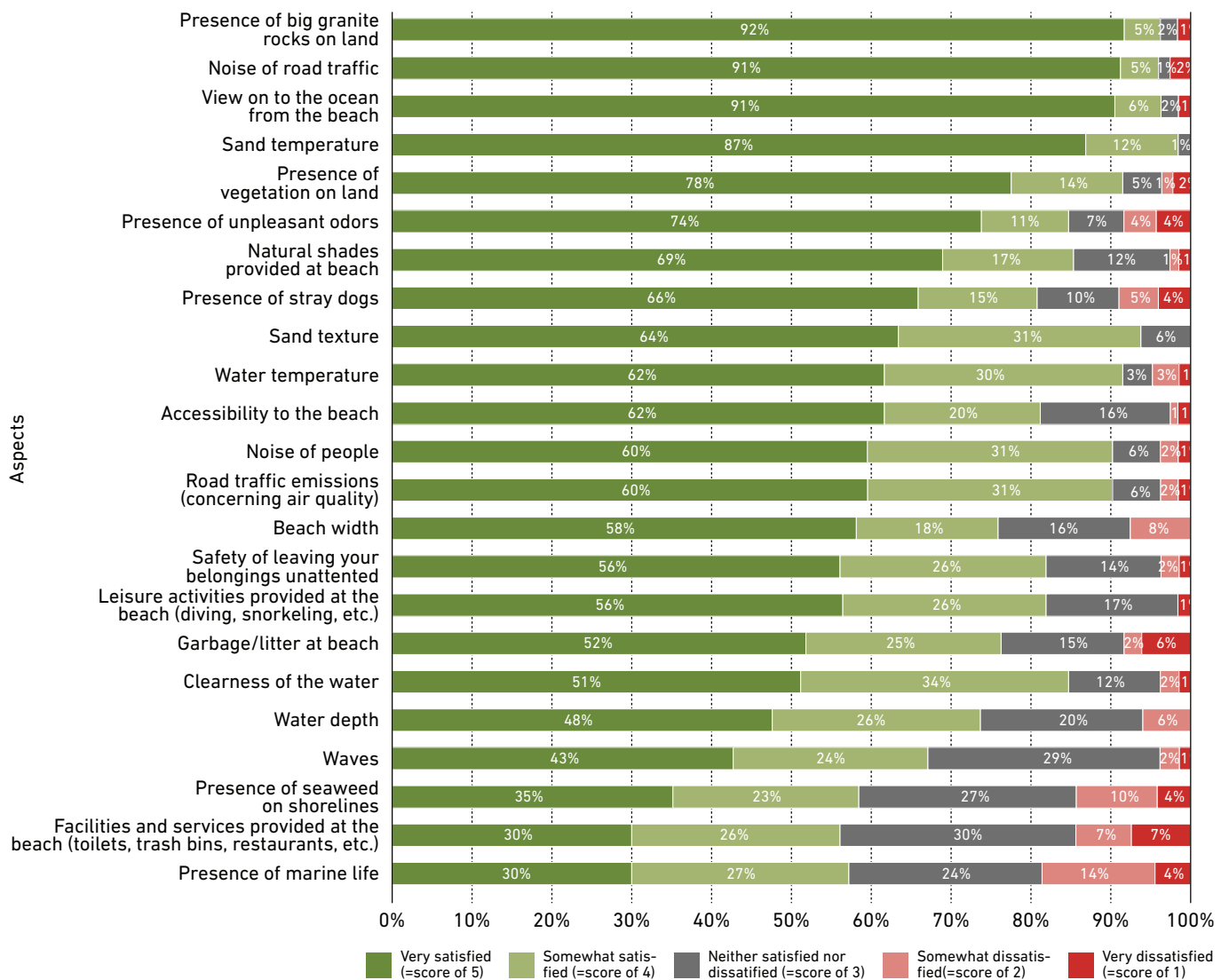


Figure 1.5
All beach users' satisfaction of certain aspects at Anse Source d'Argent (N=89).

Most important aspects

Beau Vallon

The survey asked which aspects beach users valued the most for beaches in general. The results from Beau Vallon showed that locals valued "clear water" (52%), a "clear view onto the ocean" (49%), and "calm waves" (33%) the most (Appendix 1.3 Figure 1.10).

Tourists also valued "clear water" (61%), but then prioritised 'no garbage/litter at the beach' (51%) and "feeling safe to leave belongings unattended" (44%) the most (Appendix 1.3 Figure 1.11). The five aspects that are most important for all beach users at Beau Vallon are shown in Figure 1.6.

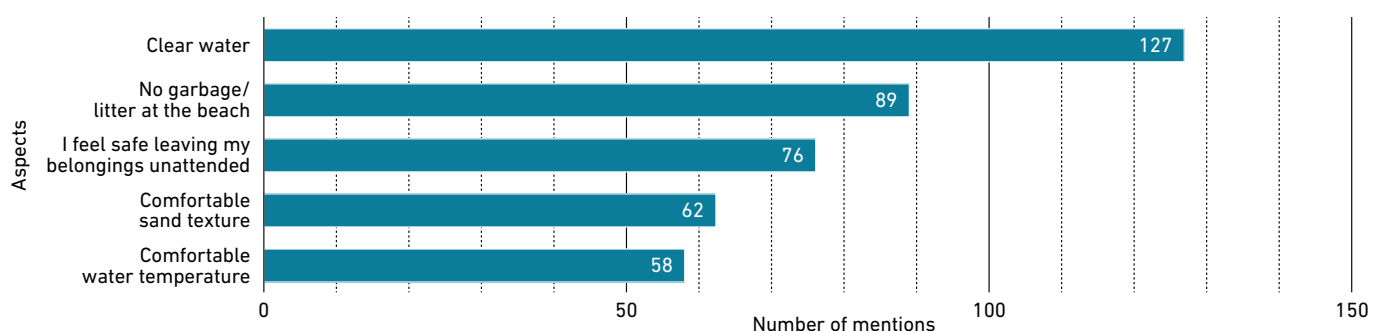


Figure 1.6
Generally, the most important beach aspects for all beach users at Beau Vallon (N=203, N/A values not included).

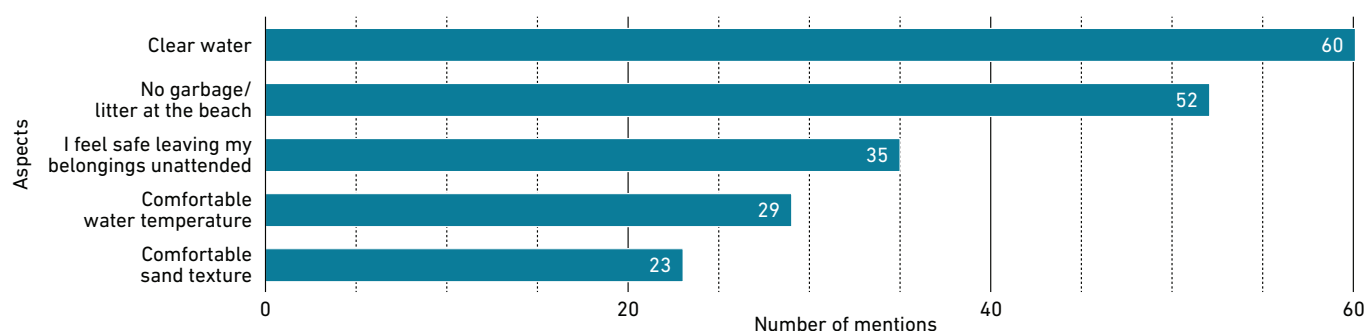


Figure 1.7

Generally, most important beach aspects for all beach users at Anse Source d'Argent (N=89, N/A values not included).

Additionally, respondents were asked to rate the importance of the various predefined parameters. The results of this are shown in Appendix 1.3 Figure 1.12. The breakdown per beach user group is shown in Appendix 1.3 Figures 1.13 and 1.14.

The parameter with the highest mean for importance is "clear water" (mean=4.7). The overall lowest importance was given to "leisure activities provided at the beach" (mean=3.1). All means can be found in Appendix 1.3 Table 1.6.

Anse Source d'Argent

Generally, locals named "presence of marine life" (40%), no garbage/litter at the beach" (40%) and "feeling safe leaving belongings unattended" (40%) as most important factors when visiting any beach (Appendix 1.3 Figure 1.15). This shows that locals at Anse Source d'Argent generally value different aspects than locals at Beau Vallon. Tourists indicated they value clear water most (72%), followed by a clean beach (61%), and feeling safe leaving belongings unattended (41%), which is similar to the answers recorded at Beau Vallon (Appendix 1.3 Figure 1.16). The five aspects that are most important for all beach users at Anse Source d'Argent are shown in Figure 1.7.

Here as well, the respondents were additionally asked to rate the importance of the various predefined parameters. The results of this are shown in Appendix 1.3 Figure 1.17. The breakdown per beach user group is shown in Appendix 1.3 Figures 1.18 and 1.19. The results show that "clear water" (M=4.7) is most important to beach users at Anse Source d'Argent. Considered the least important is "presence of big granite rocks on land" (M=3.2). All means can be found in Appendix 1.3 Table 1.7.

Conflicts

Beau Vallon

19 out of the 203 (9%) beach users at Beau Vallon (about half locals and half tourists) provided input to the optional open ended survey question, whether the beach users experienced or witnessed any conflicts at the beach. Among these answers, the conflict that was mentioned the most is that there are unlicensed fruit sellers at the beach who sell coconuts etc. at an overcharged price. Some of these fruit sellers would also use the excuse of not having the money for change with them to simply disappear and steal the money of their customers.

Another conflict that was mentioned regularly is that tourists often felt uncomfortable when being approached by local vendors (for boat trips and other kinds of leisure activities) because of their aggressive sales tactics. In a similar context, there were tourists who felt uneasy around locals who were under the influence of drugs. Additionally, it was also mentioned by the tourists that there was occasionally an unpleasant smell due to cooking by locals at the beach. Some tourists were disturbed by the construction site between the "La Plage Restaurant" and the jungle gym, mainly due to noise pollution. Another point of contention between the tourists and the locals at the beach is the playing of loud music.

Moreover, in discussions with locals we were told that noise is an issue at Beau Vallon. We observed people listening to music in the vicinity of beach beds owned by a hotel, who were then asked by hotel staff to leave. Additionally, safety of leaving belongings unattended seems to be a concern at Beau Vallon. We were hence wondering, how often these conflicts happen, and asked the police station for data.

The police station was kind enough to forward us statistics on beach thefts. To find out which objects are at risk, we compiled an overview of which objects are stolen most; the police statistics from January to August 2023 report 45 items stolen (Figure 1.8). As expected, cash is the most common. Phone thefts are the second most common. Only one incident of watch theft has been reported.

Most incidents reported in the period January–August 2023 are in the months April, July, and January (Appendix 1.3 Figure 1.20). Over the period observed, the most popular weekdays for theft are Tuesdays and Thursdays (Appendix 1.3 Figure 1.21).

Anse Source d'Argent

At Anse Source d'Argent, 8 out of the 89 (9%) beach users (six locals and two tourists) experienced some sort of conflict. The main conflicts mentioned by locals were theft and drug usage at the beach, followed by harassment of customers and unpleasant odour coming from the nearby landfill. Both locals and tourists mentioned conflicts regarding environmental concerns like shell

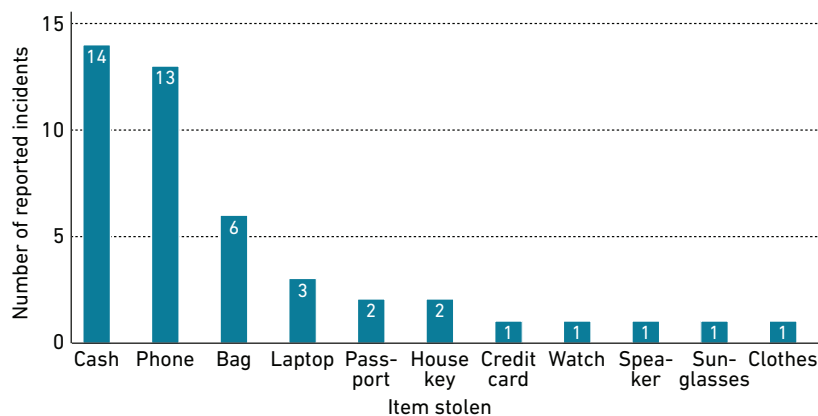


Figure 1.8
Number of reported incidents per item, January to August 2023 (Source: Police statistics for Beau Vallon).

extraction and littering by beach users. One tourist specifically mentioned that s/he did not like how the tourists could touch and play with the tortoises during the glass kayak tour due to tortoise welfare reasons. Additionally, one tourist mentioned line skipping at beach bars as a conflict.

Suggestions for improvement

Beau Vallon

Finally, regarding the open-ended question on suggestions to improve the beach experience, 110 out of 203 (54%) beach users chose to provide additional suggestions. The most mentioned suggestion to improve Beau Vallon by all beach users was to install more toilets (34%), followed by more trash bins (23%) and more leisure activities (18%). Generally, tourists had more suggestions for improvement than locals (73 vs 37 suggestions).

The top three suggestions by tourists were more toilets (31%), more drink options (21%) and more trash bins (19%). The most popular suggestions of locals were more toilets (38%), more trash bins (30%) and more leisure activities (30%).

Anse Source d'Argent

48 out of 89 (54%) beach users (39 tourists and 9 locals) have provided suggestions by improve the beach experience at Anse Source d'Argent. The most popular suggestions to improve Anse Source d'Argent overall was the installation of toilets and preservation of nature (both were mentioned 13 times).

For locals, the most popular suggestions were preserving nature (67%), followed by the installation of toilets (44%) and the prevention of erosion (33%). Tourists most frequently suggested the installation of toilets (23%), followed by the installation of trash bins (18%) and the preservation of nature (18%).

1.3.3 Environmental quality

Water quality testing

Our results indicate that water quality at Beau Vallon, Anse Source d'Argent and Petite Police Beach is largely in the range between "intermediate risk/possibly safe and high risk/possibly unsafe" according to WHO standards (Aquagenx, 2022). This is indicative of the potential contamination of the water sources by *E. coli* and total coliform in the aforementioned locations (see Figure 1.1).

Beau Vallon

At Beau Vallon, 10 out of 13 samples collected can be labelled as intermediate risk/possibly safe, tending towards possibly unsafe, meaning that the Most Probable Number (MPN) of *E. coli* per 100ml in these samples exceeded 10 in all the compartments of the CBT kits (Table 1.1). These numbers and safety regulations are based on the guideline of our water testing kits which are in turn using the World Health Organisation Health Risk Category³. The remaining 23% of samples were "possibly safe" meaning that the MPN of *E. coli* in these samples was approximately 4.8/100ml.

³ https://www.aquagenx.com/wp-content/uploads/2021/06/Basis-of-Aquagenx-MPN-Table_June2021-.pdf

Table 1.1
Results of water quality tests at Beau Vallon. For zones and sites of sample see Figure 1.1.

Location	Sample number	MPN/100ml (estimate)	Sampling date/time
River inflow zone A	1	4.83	4 July, 11:00
In front of Indian restaurant zone D	2	4.83	4 July, 17:00
River inflow zone A	3	>10	4 July, 17:15
River inflow zone A	1	>10	5 July, 11:30
In front of Indian restaurant zone D	2	4.83	5 July, 11:45
River inflow zone A	3	>10	5 July, 16:30
In front of Indian restaurant zone D	4	>10	5 July, 17:15
River inflow zone A	1	>10	7 July, 11:45
In front of Indian restaurant zone D	2	>10	7 July, 11:45
River inflow zone A	3	>10	7 July, 17:30
In front of Indian restaurant zone D	4	>10	7 July, 17:45
River inflow zone A	1	>10	8 July, 17:15
In front of Indian restaurant zone D	2	>10	8 July, 17:30

Furthermore, all samples from Beau Vallon were tested positive for total coliforms (Appendix 1.4 Figures 1.22 and 1.23).

Anse Source d'Argent

Across all the testing days and sites at Source d'Argent (see Figure 1.1 in section 1.2 Methods), all kits were tested positive for the presence of *E. coli* as well as total coliforms in all compartments of the CBT bags (Appendix 1.4 Figures 1.24 and 1.25). Hence, these samples can be categorised as intermediate risk/possibly safe, tending towards possibly unsafe (MPN/100ml >10) as shown in Table 1.2. Possible sources of contamination could be the nearby landfill, sewage, or feces by beach users. But without further investigations, this assumption cannot be verified.

Table 1.2
Results of water quality tests at Anse Source d'Argent.

Sample number	MPN/100ml (estimate)	Sampling date/time
1	>10	13 July, 16:45
1	>10	14 July, 10:15
2	>10	14 July, 17:15
1	>10	15 July, 12:15
2	>10	15 July, 12:30

Petite Police Beach (control samples)

We also took control samples at Petite Police Beach with the assumption that the water there is not or at least less contaminated, because there is basically no tourism infrastructure and relatively few tourism activities happening in the near vicinity of the beach. We took two samples at each testing site; one site was closer to the shore while the other site was more into the open ocean water (see Figure 1.1 in section 1.2 Methods).

All control samples were tested positive for the presence of *E. coli* similar to the other two test sites (Table 1.3). Hence, the water at Petite Police Beach would also be categorised as intermediate risk/possibly safe, tending towards possibly unsafe (MPN/100ml >10).

Table 1.3
Table of results of water quality tests at Petite Police Beach.

Location	Sample number	MPN/100ml (estimate)	Sampling date
South East side	1	>10	20 July
	2	>10	20 July
North West side	1	>10	20 July
	2	>10	20 July

Litter assessment

Beau Vallon

On average our data indicated that the majority of litter originates from the shore (e.g. from beach users). This was in particular in the afternoons, when our data showed that the shore on average has more litter than in the morning. In the morning, however, the majority of litter originated from the sea (Figure 1.9). It should be noted that the onshore coast is cleaned every day in the morning. Small litter (0 to 5cm) was reported to be in the highest quantities in both the morning and afternoon, with large litter (> 30cm) being the smallest category across both time periods. Figure 1.26 in Appendix 1.5 shows the overall average size of litter at Beau Vallon.

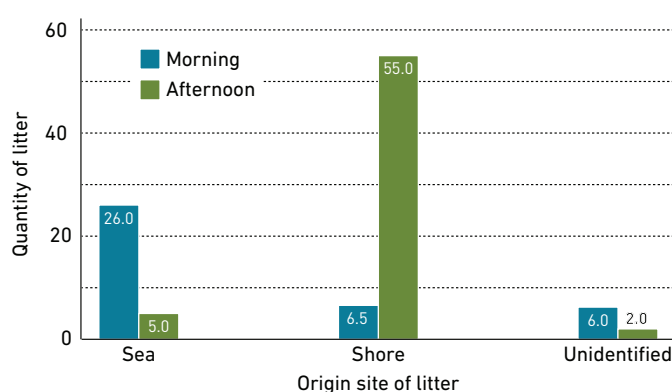


Figure 1.9
Origins as well as the daily average quantity of litter sighted at Beau Vallon. The daily average quantity of litter is calculated based on the total quantity of litter on Tuesday 4th July and Wednesday 5th July.

Figure 1.10 shows the distribution of litter in the different beach zones (see Figure 1.1 in section 1.2 Methods). We can observe that there is the highest level of litter in the mornings in zone A, whereas in all other zones, the litter levels are the highest in the afternoons.

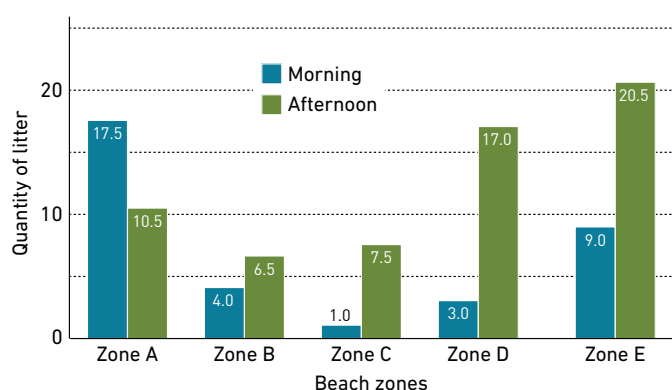


Figure 1.10
Graph showing the daily average quantity of litter per beach zone at Beau Vallon. The daily average quantity of litter is calculated based on the total quantity of litter on Tuesday 4th July and Wednesday 5th July.

Anse Source d'Argent

At Anse Source d'Argent, we observed lower levels of litter than at Beau Vallon. However, the presence of glass was more notable along the seashore and could present a safety hazard as all pieces noted were sharp. Overall, glass sized 0 to 5cm made up for 67%, and glass size 5 to 10cm made up for 25% of the collected litter sample. The remaining 8% of the glass litter could not be categorised precisely. Other types of litter were negligible during our litter assessment time and were not considered further for analysis.

Our results indicate that litter is present in higher quantities at Beau Vallon than Source d'Argent, and it is generally not welcomed by all beach users at both beaches.

1.3.4 Crowdedness assessment

Perceived crowdedness and discomfort due to overcrowding

Beau Vallon

Overall, about 55% of the beach users stated that they perceived some people at the beach, meaning a crowdedness score of 3. The lowest crowdedness score of 1 was given by 4% of the beach users, meaning they perceived almost no people, and the highest score by 10% of the beach users, meaning they perceived a lot of people (Figure 1.11, horizontal axis).

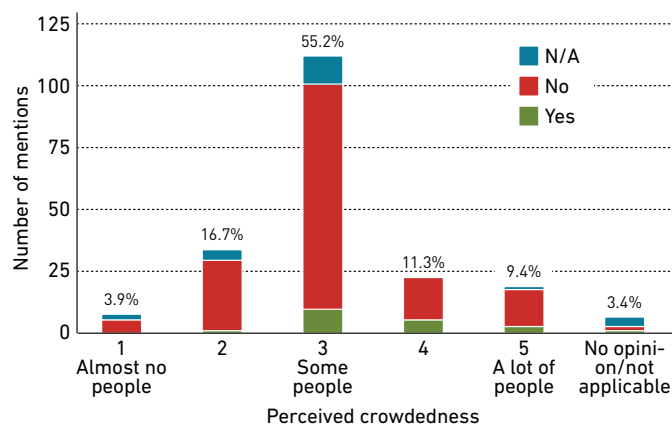


Figure 1.11
Distribution of perceived crowdedness by all beach users (N=203) over all four survey days at Beau Vallon.

Additionally, people were asked whether they experienced discomfort due to overcrowding. 80% of the beach users indicated that they did not experience discomfort due to overcrowding at Beau Vallon (Figure 1.11, color legend). Nevertheless, the data show that beach users can experience discomfort due to overcrowding, even though they perceive there to be “only” some people.

If we separate the survey respondents into local residents (n=67) and foreign tourists (n=134), we can see that about 20% of the local residents and about 4% of the foreign tourists stated that

they perceived a lot of people (Appendix 1.6 Figures 1.27 and 1.28). In contrast, while less than 10% of the local residents stated that they perceived less than some people (crowdedness score < 3), almost 30% of foreign tourists had the same perception. At the same time, about 70% of the local residents and about 80% of the foreign tourists stated that they did not experience discomfort due to overcrowding. Almost 20% of the local residents and about 6% of the foreign tourists stated the opposite.

In general, local residents have a more sensitive perception of crowdedness and are more likely to experience discomfort due to overcrowding than foreign tourists.

Anse Source d'Argent

About 54% of the beach users stated that they perceived some people at Anse Source d'Argent. About 2% stated that they perceived almost no people and about 6% stated that they perceived a lot of people. At the same time, about 85% of the respondents stated that they did not experience discomfort due to overcrowding and about 6% of respondents stated the opposite (Figure 1.12).

The results shown in Figure 1.12 mostly match those of Beau Vallon, which implies that in general, the perception of crowdedness does not vary significantly between the two case study sites. The only noticeable difference is that at Anse Source d'Argent, none of the survey respondents who provided a crowdedness score of 3 said that they experienced discomfort due to overcrowding.

If we separate the survey respondents into local residents (n=10) and foreign tourists (n=75), we see that none of the local residents stated that they perceived almost no people (crowdedness score = 1). Half of the local residents stated that they perceived some people. The only local resident who experienced discomfort due to overcrowding stated that he/she has no opinion on perceived crowdedness (Appendix 1.6 Figure 1.29). Regarding foreign tourists, their perception of crowdedness at Anse Source

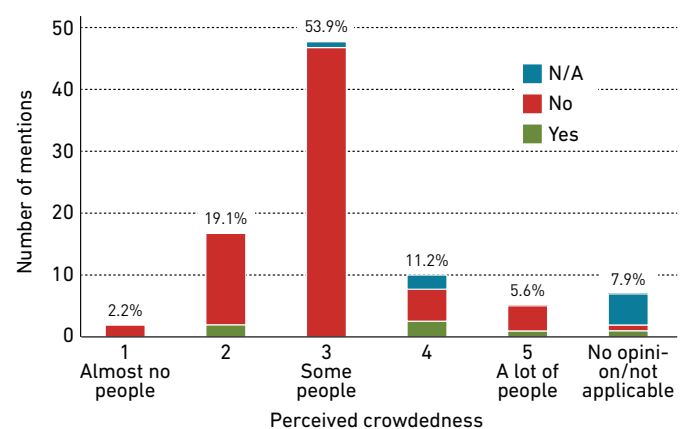


Figure 1.12
Distribution of perceived crowdedness by all beach users (N=89) over all three survey days at Anse Source d'Argent.

d'Argent almost matches with that at Beau Vallon (Appendix 1.6 Figure 1.30). Due to the marginal sample size of local tourists ($n=4$), we do not include them in this and further analysis.

While we found at Beau Vallon that the local residents have a more sensitive perception of crowdedness and are more likely to experience discomfort due to overcrowding than foreign tourists, this was not found at Anse source d'Argent.

Actual crowdedness (drone footage)

Beau Vallon

Besides the perceived crowdedness, we also analysed the actual crowdedness based on our drone. Figure 1.13 shows the number of counted beach users at Beau Vallon (both on land and in water) on Tuesday 4 July 2023 divided into different time slots and beach zones (see section 1.2 Methods for the delimitation of the beach zones and the definition of the time slots). Figure 1.14 shows the same for Saturday 8 July 2023. The Excel data can be found in Appendix 1.6 Table 1.8, and the plots for the other two survey days in Appendix 1.6 Figures 1.31 and 1.32.

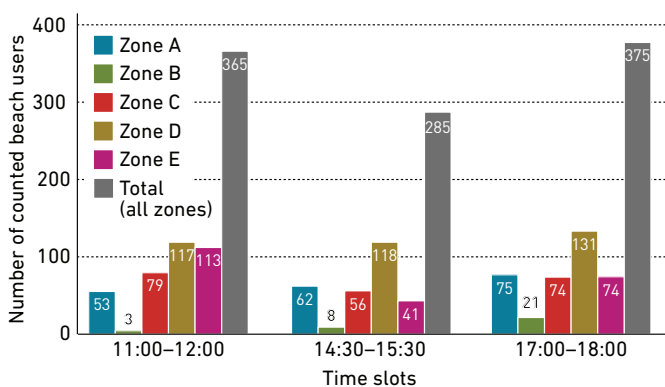


Figure 1.13
Actual crowdedness at Beau Vallon on 4 July 2023.

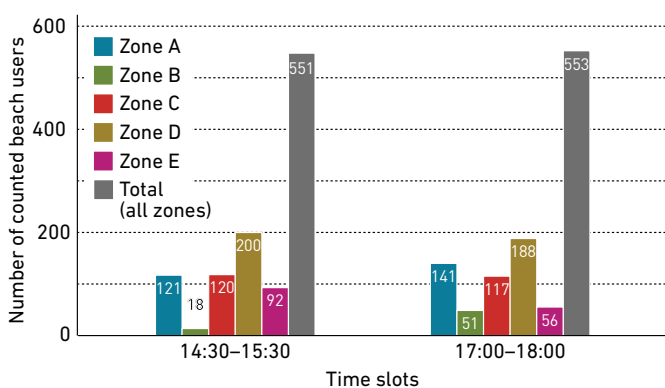


Figure 1.14
Actual crowdedness at Beau Vallon on 8 July 2023.

We observe that, in general, there are more beach users on Friday and Saturday than on other days, which was expected. Furthermore, the most beach users were in beach zone D and its surroundings near the hotel accommodations and facilities. Beach zone B was the area with the fewest beach users, this could be explained by the construction site that was in beach zone B. A clear temporal pattern during the day was not observed, e.g. there are always more people at the beach during evening hours. It should be mentioned that weather conditions also play an important role for crowdedness, which was not taken into account in our study.

Anse Source d'Argent

Due to limited data collection at Anse Source d'Argent only a comparatively simple crowdedness analysis was possible (Figure 1.15). The Excel data can be found in Appendix 1.6 Table 1.9.

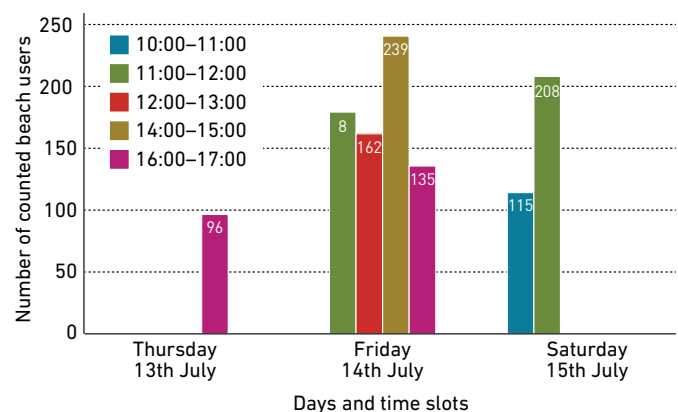


Figure 1.15
Actual crowdedness at Anse Source d'Argent over all three survey days.

If we assume that we can extrapolate the data of Thursday and Saturday based on the data of Friday, we can observe that there are more beach users at Anse Source d'Argent on Friday and Saturday than on Thursday, which would match our observation at Beau Vallon. Because we did not divide Anse Source d'Argent into different zones, it is difficult to say where the most or least beach users are located. But one point that should be addressed is the density of beach users. Even though there are less beach users at Anse Source d'Argent compared to Beau Vallon, considering the surface area and specific geographical features of both beaches, Anse Source d'Argent probably has a higher density of beach users, especially at certain bottleneck places (for example a narrow walkway between granite rocks which occurs fairly frequently at Anse Source d'Argent).

1.4 Discussion

In this chapter we discuss the implications of our results as well as proposals for future management strategies. Each research question is addressed in subsections one, two, and three respectively, whilst limitations of our methodology are discussed in the fourth subsection.

1.4.1 Beach users' perceptions of popular beaches in the Seychelles

Beau Vallon

For locals, their visit to Beau Vallon was generally due to its proximity to their homes, as well as the beauty of the beach. Locals argue that a clear view onto the ocean, and calm waves add to the quality of their beach experience. Yet, they requested more leisure activities at Beau Vallon. Concrete suggestions ranged from beach volleyball tournaments for children's entertainment, to more expensive activities such as jet skiing. Currently, locals normally "swim", "relax" and "socialise" at the beach. However, they also identified that there are some conflicts associated with this. Our surveys concluded that some locals were told to leave hotel areas (namely Sables d'Or) as they were reportedly disturbing hotel guests by "listening to music" or "taking pictures" in the vicinity of these sunbeds. While this may be an instance on its own or specific to this establishment, preventing locals from public spaces is illegal (Seychelles Legal Information Institute, 2012) and indicates that conflict arises as a result of having designated tourist areas that minimise local people's social activities.

Further conflicts that arose were "vendors keeping change". This refers to coconut sellers and other vendors leaving tourists to "get change", and then never returning. Tourists reported losses of up to 500 rupees. We were informed that there are tourist police officers on the beach. Should this not ameliorate the situation, perhaps security could be increased in numbers to minimise this in the future. Additionally, some locals mentioned the introduction of licensing to be a vendor, with unlicensed vendors being suspended from selling at the beach.

From the police station data, it seems that the most expensive items, or those easiest to make cash out of, are targeted for theft. Our data suggest that the months of most theft coincide with the most popular months to visit the country. Hence, theft may be related to visitor numbers; the more people there are, the more incidents that occur. It could be further investigated whether this would be because one person steals more, or more people steal. Moreover, the day of the week with most theft does not coincide with the days the beach is most crowded. This is surprising, as we expected there to be more thefts on a more crowded beach day such as Saturday. A possible explanation would be that if it is too crowded, it is not appealing for thieves, as there are too many witnesses. It would be interesting to examine data on the time of theft to learn more about these dynamics.

Another notable suggestion was to clearly outline specific swimming areas, to prevent collisions of swimmers with boats. This could also be used to divert visitors and boats away from coral reef areas.

Our results conclude that tourists mainly reside in close proximity to Beau Vallon, indicating that the beach is generally occupied by tourists from the neighbouring accommodations. This suggests that tourists seem to utilise the beach due to the convenience of its location. Since this would make it challenging to divert people to different beaches, a change in management would be the remaining option to minimise overcrowding in this region. Our results recorded a generally higher density of people in the central hotel zones (zone D and E), and less at the start of zone A and the end of zone E.

Tourists frequently refer to an absence of litter being the main parameter to maximise beach quality, which is reflected by the high frequency of requests for more trash bins. Although these are already present on the pathways behind the beachfront, there is a noticeable absence of bins in zone E. This correlates with our results that suggest that litter is an issue at Beau Vallon. Additional facilities that tourists requested included more drink options, affordable restaurants, showers and toilet blocks. In accordance with the survey results, tourists particularly liked having a large selection of restaurants and bars, yet wished for more (budget-friendly) options.

Anse Source d'Argent

At Anse Source d'Argent, "swimming" was also the most popular activity, followed by "reading". However, in contrast to Beau Vallon, "snorkelling" was more popular than "relaxing", which is possibly more indicative of a nature-based user profile. Many local and foreign tourists also said they came to take pictures, due to the famous status of the beach and its rare granitic rock formations.

Based on respondents' ranking of importance of parameters and additional comments, both tourists and locals seemed to be more aware and engaged in nature conservation than at Beau Vallon. In terms of the awareness of locals, this could be due to the large proportion of locals surveyed being kayak operators, who rely on the reef's beauty and intactness for business. The expressed value of nature for Anse Source d'Argent's visitors should provide further motivation for this unique landscape to be protected, preserved, and prioritised. Locals stress that there is a general lack of education of tourists, on the topics of "extraction of shells" from the beach, being allowed to moor boats in seagrass and coral areas, or a lack of promoting the use of reef-friendly sunscreen. A lack of regulation on boat paths may degrade, disturb, and ultimately be destroying these coastal ecosystems. Many locals suggested the implementation of a marine protected area at Anse Source d'Argent, which we strongly urge authorities to consider as a possible solution to the degradation of this area. Overall, the majority of locals and tourists suggest that nature conservation, as well as the authenticity or 'naturalness' of the beach, need to be of top priority.

Such prioritisation could lead to higher customer satisfaction for kayaking and snorkelling operators, which will ultimately increase local revenue and be beneficial for the world-known reputation of Anse Source d'Argent. Furthermore, educational tours (e.g. marine wildlife observations, or how to restore corals) could provide an additional stream of income, and additionally cater to the recently developing wish of tourists to engage in sustainable tourism activities and learn about the unique nature and ecosystems of their destination (Cathrine et al., 2022; Hederer, 2022). Therefore, we see much opportunity in positioning the beach as a sustainable attraction that will be preserved long into the future.

Additionally, survey participants in our research generally emphasise that their wish for more facilities should not come at the cost of the natural environment. This implies that there is a trade-off between the wish for facilities and the wish for pristine nature, which should be further investigated and considered in the future when it comes to beach management.

1.4.2 Existing environmental quality of case study beaches **Water quality testing**

Our results indicate that the majority of water quality samples at both Beau Vallon and Anse Source d'Argent can be labelled "intermediate risk/possibly safe, tending towards possibly unsafe" due to some contamination with *E. coli* and total coliforms, while some samples can be labelled as being "possible safe" (AquaGenx, n.d.). This means that our findings are not alarming, but we cannot say conclusively in which range the water quality lies. Insofar, we cannot confirm the study results of Grandcourt in 1995, a study which emphasised that Beau Vallon's water quality was a "cause for national concern". Their study identified total coliforms counts of 900 units/100ml at the mouth of Mare Anglaise River, which is similarly reflected by the majority of CBT test kits being positive for total coliforms >10 units/100ml in our study. However, we must bear in mind that the Grandcourt study is outdated and things may have changed since then. Nevertheless, the results of our study indicate that there might be a water quality problem. This needs to be investigated further. For the limitations of our study, see section 1.4.4.

Litter assessment

Through our results, we identified that litter quantity is an issue on both beaches. At Beau Vallon we identified that the litter on the shore increases throughout the day, which is likely resulting from beach user littering. Moreover, we identified an increased amount of litter from sea-based origin in the morning, which is likely due to the fact that it is low-tide at this time, hence more sand is exposed and litter is more visible. Noticeably, this litter is particularly prominent near the banks at the back of the beach, where possibly there is a lack of trash bins. Similar to this observation, respondents to the survey mentioned that they would like to see more trash bins and expressed complaints about the quantity of litter on Beau Vallon. Similarly, at Source d'Argent respondents expressed a need for more bins and rated litter levels to be unsatisfactory. Previous studies also identified that litter degrades

the quality of beach users' experience (Brouwer et al, 2017), which supports the large amount of interest generated around this topic through the survey responses. Moreover, no garbage/litter at beach" was ranked as the most important parameter for beach users at Anse Source d'Argent. These results therefore indicate that management needs to be adapted to decrease the amount of litter on both beaches, in order to increase the quality of beach experiences at these locations.

More regular beach clean-ups should go hand in hand with a change in management to reduce the allowance of glass products and increase waste disposal at beaches. Beach clean-ups alone cannot permanently solve the problem since they do not reduce the quantities of litter at the source (Simmons and Williams, 1993). Nevertheless, beach clean-ups hold value in addressing the issue in the short term, in raising public awareness, and can be used as an educational tool (Williams et al., 2012). Regulations and education on litter prevention rather than clean-up will be the foundation to build towards a longer term and sustainable solution to the litter problem (Williams et al. 2012).

1.4.3 Crowdedness of case study beaches

At Beau Vallon our research was able to conclude that the local residents tend to be more sensitive than foreign tourists in regard to perceived crowdedness. This suggests that different types of beach users perceive crowdedness differently, meaning that future beach carrying capacity studies or changes to beach management should consider the different perceptions of different beach user groups. This trend is not reflected in the results for Anse Source d'Argent.

One reason for this discrepancy could be that the perception of beach users at these two beaches are different. This difference in perception is possibly due to the higher number of foreign tourists than local residents/tourists at Anse Source d'Argent, resulting in a bias towards foreign tourist's perception of crowdedness. Additionally, the difference in perception could be explained by a difference in beach use between locals and foreign tourists. Especially during the weekends, many locals use the beach for social gatherings with family and friends, which requires space. A cultural aspect could thus further explain the differences in crowdedness perception. However, further investigations would be necessary to shed more light on this matter.

1.4.4 Limitations and future research

In general, our study provides some insightful results, for example, on locals' and tourists' perception of the two beaches. However, there are also some limitations we would like to address here. An overall limitation of the research lies in the limited time frame during which the research was conducted. This resulted in limited time windows for sampling, limited sample sizes (in particular locals), and a seasonal and day-of-the-week based bias. Therefore, further research should include a longer time frame, allowing for longer sampling windows and bigger sampling sizes to get a more nuanced picture.

Beach users' perception of popular beaches in the Seychelles

We anticipate that if this research were to be conducted during peak season, more conflicts of use may have been identified due to further crowding. Related to that, since we sampled during the day, certain conflicts at Beau Vallon may not have been captured by our survey; for instance, the Tourism Department warned us about loud music being an issue in the evenings. Future research could take into account complaints directly to the police and hotels, and a longer time frame would allow for analyses of potential variations resulting from seasonality. This longer time frame will be needed to better support beach carrying capacity studies and management plans.

Existing environmental quality

Given the ambiguity of results and taking into account the small sample size and the narrow sampling window, the results should only be considered as an indication to further analyse the water quality in more comprehensive study. A future study would also include sampling over different seasons and longer periods of time, as different wind regimes in the Seychelles impact the water circulation. Furthermore it is known that rainfall increases bacteria populations (USF, 2023). It is thus worth conducting further tests at multiple sites at each individual beach – and other beaches as well – and during various months of the year.

Crowdedness and carrying capacity of popular beaches in the Seychelles

We categorised beach users into local residents, local tourists, and foreign tourists. However, there are additional dynamics in reality. Previous studies identified that beach quality perception varies depending on the interests, values and origin of the beach users (Roca et al, 2009), and this also relates to perception of over crowdedness. Future research could use this information to further investigate different perceptions of various beach users.

Crowd density (the number of beach users per beach surface area) was not investigated in our study due to a lack of supplementary spatial data as well as the fact that identifying crowd density hotspots (such as around restaurants or hotels) across a temporal scale would go beyond the scope of this study. Further research could investigate the density as we anticipate this could have an impact on perceived crowdedness.

Lastly, future research could dive further into the socio-cultural use of the beach by locals, and how this has evolved over time. Camp fires and Mucha dance used to be common at Beau Vallon beach, proving an opportunity for tourists and locals to interact. Currently, locals often use the beach for social gatherings with family and friend. The change in socio-cultural use could impact the perceived crowdedness by either tourists or locals.

Despite these limitations we think that our data provides valuable insights for future beach management and forms a solid foundation for future research.

1.5 Conclusion

Although our study demonstrates that beach user satisfaction at Beau Vallon and Anse Source d'Argent is generally high, our research findings have illuminated crucial areas that require attention and strategic management to preserve the natural beauty of these beaches while enhancing the beach users' experience.

Understanding the needs and desires of beach users is fundamental to creating an environment that caters to both locals and tourists. The future management of Beau Vallon should involve a careful balance between preserving the natural environment and providing additional entertainment options. Moreover, addressing conflicts is vital for maintaining an inclusive and harmonious beach environment. This calls for legal compliance by all stakeholders, ensuring that locals and tourists can continue to enjoy public spaces. Preventing issues like “vendors keeping change” and theft requires improved security measures and potentially the introduction of vendor licensing. By enhancing security, beachgoers can feel safer, and the beaches can maintain their reputation as a secure destination.

In view of the uncertainty of the water quality results, it is recommended that the water quality be analysed over a longer period of time to determine the magnitude, variation, and source of contamination. A future study would ideally be done over the whole year and over the entire island (monitoring). The litter assessment results highlight the need for better waste management on the beaches. The implementation of more trash bins is a straightforward yet effective solution. However, future management should consider a comprehensive approach that combines regular beach clean-ups, public awareness campaigns, and proactive prevention strategies, in order to keep the beaches clean and to enhance the beach user experience.

Understanding how different types of beach users perceive crowdedness is a valuable insight for future management strategies, since the results have shown that locals and foreign tourists at Beau Vallon perceive crowdedness differently. This indicates that strategies should be tailored to accommodate these varying perspectives. While this trend was less pronounced at Anse Source d'Argent, the principle of considering different user groups remains relevant to further investigate.

To prevent the overcrowding of the beaches, the Tourism Department can identify equally suitable beaches by using the most popular physical aspects as identified by our survey to market to tourists and spread beach users over a larger region. Our results imply that many respondents utilise the Beau Vallon beach due to its convenient location or close proximity. Keeping in mind the carrying capacity of the Seychelles and the already high number of accommodations in the beach area, it would be important to keep accessibility and travel time in mind if trying to divert beach users to different beaches in the future. Furthermore, beach users at

Beau Vallon could be more evenly distributed across the beach. To achieve this and simultaneously accommodate a wish for more facilities, the introduction of facilities or amenities such as a sunbed hire in low density areas could be further investigated.

Anse Source d'Argent is highly valued for its natural beauty, and has received many suggestions for improvement and conservation from the respondents to our survey. Therefore, future research could focus on educating both tourists and locals about responsible beach behaviour and the importance of preserving these unique environments. Such initiatives can include marine wildlife observation tours, coral restoration programs, and eco-friendly sunscreen promotions. Engaging beachgoers in sustainable tourism activities and nature conservation will not only protect the environment but also contribute to the local economy.

In conclusion, our research offers a pathway to a more sustainable and vibrant future for the Seychelles' popular beaches. Our research has shown that beach user perceptions vary per demographics and per location, and that each beach therefore requires a tailored approach. By considering the needs and perceptions of beach users, addressing environmental concerns, and fine-tuning management strategies, the beaches can continue to be a source of natural beauty and economic prosperity.

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2 Cultural Tourism in the Seychelles

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2.1 Introduction

The Tourism Department in the Seychelles recognises the potential of cultural tourism as a complementary aspect to beach and sun tourism, aiming to foster a high-value, low-impact sector. By promoting cultural experiences, the department seeks to open doors for local businesses, providing economic opportunities to the community. Cultural tourism is considered a pivotal component of the department's product diversification strategy, as it showcases and commercialises the country's rich culture and heritage and has the potential to revitalise and preserve it for future generations (Government of Seychelles, 2015). In the context of this study, cultural tourism is defined as tourist attractions based on products which are related to the country's authentic culture and heritage.

Seychelles is one of many Small Island Developing States (SIDS) that share the vision of a more inclusive tourism sector, which aim to include marginalized groups in the production and consumption of tourism to expand its benefits and to reduce poverty and inequality (Giampiccoli et al., 2021). Besides their scenic natural beauty, the unique living and historical culture often stands out as a significant asset in developing countries (Engelhardt, 2008). African island economies have been witnessing a rise in the number of visitors seeking authentic cultural tourism experiences (Ramkissoon, 2015). To achieve authenticity that is genuine and unique it needs to be perceived as such not only by visitors but also by locals (Atayi, 2021). Thus, the tourism industry must set a focus on local people and their diversity, rather than resorting to staged experiences (Atayi, 2021). Considering the local perception in cultural tourism development is consequently fundamental to manage the trade-offs between marketing cultural experiences and preserving the authenticity. Additionally, to achieve long-term community sustainability, community-based tourism can play an important role (Mtapuri & Giampiccoli, 2013).

Involving local community members in the planning and implementation of tourism activities helps steer appropriate tourist behaviour, reduce negative social impacts, and enrich cultural offerings for visitors and locals (Engelhardt, 2008; Leal Filho et al., 2018). Evidence suggests that community involvement in tourism can lead to measurable reductions in poverty and empowerment, especially for women and youth (Kayat, 2014). However, communities often lack the marketing expertise, resources, and networks to access the tourism market, necessitating support from facilitators such as government, NGOs, or private entities (Kontogeorgopoulos et al., 2014).

Seychelles Tourism Department has introduced the umbrella brand "Creole Rendezvous" to promote local cultural events and activities. While around 70 potential cultural entrepreneurs have already been identified through audits in nine districts, the Tourism Department acknowledged that not all these small local businesses may become tourism products due to various challenges. Examples of these are limited access to funding, lack of coordination between stakeholders and activities, a market easily

saturated, and entrepreneurs lack of know-how for commercialization. Moreover, challenges related to stakeholder engagement and commitment of entrepreneurs, as well as collaboration with other governmental actors in the cultural sector, further contribute to the complexities faced by the department in fully realising the potential of cultural tourism in Seychelles (Seychelles Tourism Department, 2023. Personal communication).

To increase community participation in cultural tourism and overcome the above-mentioned challenges, current motivators and challenges of cultural entrepreneurs need to be assessed.

This study aims to achieve several objectives. Firstly, it seeks to understand how different stakeholders perceive cultural tourism and the Creole Rendezvous brand to assess its role, potential, and authenticity. Secondly, the study intends to identify motivators and challenges faced by cultural entrepreneurs in participating in cultural tourism initiatives to increase the community engagement. Thirdly, it aims to map the stakeholder landscape around cultural tourism in Seychelles to improve support and coordination for its development. Finally, the study seeks to involve various stakeholders in co-creating potential interventions to further develop cultural tourism in the country. By gaining comprehensive insights into these aspects, the study aims to contribute to the long-term success and preservation of Seychelles' cultural heritage while promoting its authentic cultural tourism offerings. The research question and operational questions (RQ) are as follows:

How can cultural tourism be economically viable and socially beneficial for the Seychelles?

1. *What is the current state and perception of cultural tourism, and the Créole Rendezvous brand?*
2. *What are the motivators and challenges for the cultural entrepreneurs and other key stakeholders to participate in cultural tourism?*
3. *What does the current stakeholder landscape look like and how can stakeholders coordinate to support cultural tourism?*

2.2 Methods

The methods used in this study include literature reviews, semi-structured interviews, and a workshop, deployed in different steps to collect the data needed to meet our objectives. These methods were chosen in order to gain an understanding of the context in which cultural tourism takes place in the Seychelles, to hear directly from cultural entrepreneurs about their experiences, and finally to establish a joint understanding amongst stakeholders.

2.2.1 Data Collection

Literature review

A literature review was carried out to understand the current state of the tourism sector in the Seychelles and how it is expected to develop in the next few years. Attention was brought to the product diversification strategy of the Tourism Department, where cultural tourism emerged as a potential new tourism product currently lacking. In addition, the Tourism Department was

consulted to benefit from their knowledge, expertise, and perspectives, specifically, to gather information on cultural tourism and on the Creole Rendezvous. An in-depth look was then directed to the sustainability and community opportunity cultural tourism offers and to examples in other SIDS.

Stakeholder interviews

Semi-structured interviews were conducted with small business cultural entrepreneurs (N=14) and other stakeholders related to the cultural tourism landscape (N=8). The general purpose of the interviews included: a) assess stakeholder's perception of cultural tourism and the Creole Rendezvous brand, b) assess stakeholders' attitude in participating in cultural tourism and their possible role, c) identify challenges to participating in and providing cultural tourism offers, and d) identify current support mechanisms and interactions between relevant stakeholders.

In this study, the cultural entrepreneur is defined as a Seychellois resident who intends to operate a small business offering tourist products linked to the Seychellois Creole culture. Examples are traditional dancers, Moutya musicians, artisans, craftspeople, cultural tour guides, etc.

Cultural entrepreneurs contacted and interviewed were previously identified by several "cultural audits" conducted by the Tourism Department between 2022 and 2023 to recognise cultural activities and businesses that could be further developed and promoted to offer experiences to tourists under the Creole Rendezvous brand. By May 2023, 9 districts out of 27 were audited identifying 70 potential activities. To select cultural entrepreneurs to interview, the tourism product proposed was considered to account for a different range of offers, such as music classes and cultural tours, and propose a wider perspective in our research.

The interviews accounted for 19 questions ranging from the business description to the perception and knowledge about cultural tourism and the Creole Rendezvous, and to the different motivators and challenges cultural entrepreneurs face. The total of 14 interviews with cultural entrepreneurs were held in person to increase the perception of their reality and bond with culture.

Other key stakeholders interviewed are part of governmental departments, academic institutes, destination management companies, and NGOs. The selection was meant to include the most variety of key stakeholders' part of the cultural tourism network to increase the number of perspectives and balance the contributions of tourism stakeholders and cultural stakeholders.

In this frame, interviews accounted for 10 questions ranging from the perception and knowledge about cultural tourism and the Creole Rendezvous, to their roles and perspectives in the cultural tourism landscape. The total of 8 interviews with these stakeholders were conducted with different formats: five in person, one online, and two on paper.

Interviews were held in Mahé between 4 and 9 July 2023, in Praslin on 10 July, and in La Digue on 11 July, by two team members, one person leading the conversation in English and the other one taking notes. All interviews were recorded. The interview guidelines for cultural entrepreneurs are available in Appendix 2.1 Figure 2.1 and for the other key stakeholders in Appendix 2.1 Figure 2.2.

Stakeholder Workshop

The aim of the workshop was to establish a joint understanding and vision for cultural tourism in the Seychelles, specifically goals included: a) present and discuss identified challenges of the stakeholders already engaged, b) understand the role of key players in the development of cultural tourism, c) co-create creative potential interventions for supporting the development of cultural tourism. A total of 13 people participated in the 3.5-hour workshop which took place on 14th of July 2023; including three cultural entrepreneurs and three other stakeholders related to culture in the Seychelles, representatives from the Tourism Department and other government agencies, and one NGOs. During the workshop, participants were divided into three sub-groups for discussion and brainstorming. Each group consisted of participants with heterogeneous backgrounds and was moderated by one researcher.

Theory of Change (ToC)

The method as applied in this study consists of four steps:

Step 1. A drafted impact statement with a vision for cultural tourism in Seychelles in 2033 was presented to the participants. Participants were asked to review the statement and make adjustments to reach consensus on it.

Step 2. Within each sub-group, participants were asked to brainstorm short-term (1–2 years), mid-term (3–5 years), and long-term (6–10 years) outcomes to overcome the challenges currently faced by cultural entrepreneurs and get to the vision of the impact statement with a backcasting method (i.e., from the long to the short-term).

Step 3. Participants brainstormed potential interventions, and who might implement them, related to the short-, mid-, and long-term outcomes. Outcomes are defined as the desired goals participants wished to see, while interventions are the actions needed to achieve the desired outcome.

Step 4. Each sub-group presented their outcomes and interventions for further discussions and were asked to point out which intervention should be a priority.

In Step 2–3, each sub-group received a blank flip chart and sticky notes. Participants wrote down potential outcomes and interventions on the sticky notes and placed them on the flip chart with a timeline.

(Source: Claus & Belcher, 2020)

The workshop began with a small-group discussion of the preliminary research findings regarding the challenges faced by cultural entrepreneurs to engage in cultural tourism. Workshop participants were instructed to discuss which results they found unexpected. Subsequently, they were carried through steps similar to the Theory of Change (ToC, see box) method (Claus & Belcher, 2020). ToC attempts to draw causal connections between interventions and outcomes (desired future goals). The process of creating a ToC diagram encourages workshop participants to discuss desired outcomes, discover areas of disagreement, and assumptions related to the causal connections. The diagram created by the participants serves as a guide to design and evaluate interventions, especially for those who might be able to undertake them (Barbrook-Johnson & Penn, 2022). The ToC model was adapted to ensure participants could brainstorm multiple outcomes and intervention ideas within the 3.5-hour workshop.

During the workshop, data was collected in different formats. Notes of the main points of discussion in each sub-group focused mainly on serious disagreement among participants and further details of the outcomes and interventions proposed. An audio record of the presentation of the final flip chart for each sub-group was taken to preserve the reasoning for proposing each outcome or intervention. Photos of the flip charts at the end of the workshop were taken to further process each outcome or intervention.

2.2.2 Data analysis

Stakeholder Interviews

All the interviews were partially paraphrased or transcribed according to notes that were taken during the interviews and recordings of the interviews. The interviews were analysed according to the thematic analysis method outlined by SAGE (SAGE Publications, 2018). An analysis guideline was created before interviewing commenced, which allowed relevant information to be gathered systematically.

Preliminary analysis of each interview was conducted soon after each interview was held. Interview notes and recordings were referenced during the analysis process, while a few content-rich interviews were transcribed before being analysed. Comments were categorised based on the following topics: perception of cultural tourism (Section 2.3.1) and of the Creole Rendezvous brand (Section 2.3.1), motivation and challenges of small-business entrepreneurs to engage in cultural tourism (Section 2.3.2), stakeholder network and the type of relationship that existed (Section 2.3.3).

The identified challenges and motivators were visualised in a heatmap where the coloured squares represent the contribution of each interviewee to a topic.

Themes that emerged within each of these topics were recorded in tables, along with supporting quotes and examples mentioned by interviewees. The themes were continually synthesised and clustered as interviews were held. Secondary analysis began once all interviews were completed and continued following input from the workshop.

In a power-interest matrix, a stakeholder's position along the x-axis reflects its interest in cultural tourism, while its position along the y-axis represents its power or influence to support cultural tourism. The power-interest matrix was referenced during the workshop. The heatmap was validated during the workshop and was used along with the power-interest matrix to inform participants' discussion on how to support cultural tourism in the future.

Stakeholder Workshop

The results of the workshop were evaluated by afterwards sorting our notes, clustering the data into umbrella themes and sorting them according to the participants' prioritisation. Based on these results and those from the interviews, concrete actions and responsibilities were formulated.

The workshop outputs were firstly used to validate and modify preliminary findings on the perception of cultural tourism and the Creole Rendezvous brand, the challenges faced by cultural entrepreneurs, and the stakeholder landscape. A sociogram was created after the interviews and workshop, drawing from frequency and nature of comments by participants on the relationships between various partners. The sociogram thus highlights relationships that would benefit from improved collaboration and communication.

Secondly and most importantly, the workshop outputs were synthesised into a roadmap of ideas and potential interventions to improve collaboration between stakeholders in culture, tourism, and small-business entrepreneurship. The outcomes and corresponding interventions proposed by workshop participants were sorted by theme and time-scale, and visually depicted in a diagram (Section 2.3.4).

To organise the workshop and interview outputs, 69 outcomes and interventions were initially gathered and then reduced to 61 distinct ideas (See Appendix 2.6 Table 2.6). These were then clustered based on their relevance to overcome a set of related challenges faced by cultural entrepreneurs. One or more stakeholders were assigned to each intervention based on the relevance of their role to implement it. The power-interest matrix helped in converting some interventions to actual outcomes, since it was assumed that stakeholders with less power (e.g. cultural entrepreneurs) cannot implement interventions by themselves and consequently need support by other stakeholders to influence their capacity to perform an intervention, which is then the desired goal.

An iterative process was used to place and link outcomes and interventions on a diagram with short-, mid-, and long-term time axis. The final diagram provides an overview of who can be involved, and in what ways, to support the sustainable development of cultural tourism in the Seychelles.

2.3 Results

Results of this study are divided into four sections, each focusing on a specific aspect of cultural tourism in Seychelles. This succeeding first section (2.3.1) presents how different stakeholders perceive cultural tourism and the Creole Rendezvous brand. Cultural entrepreneurs, government representatives, NGOs, and private companies share their perspectives on the role of cultural tourism. Section 2.3.2 identifies the motivators and challenges faced by cultural entrepreneurs in their efforts to participate in cultural tourism initiatives. Section 2.3.3 explores the landscape of stakeholders involved in cultural tourism while the last section (2.3.4) outlines interventions co-created by various stakeholders to further develop cultural tourism.

2.3.1 Stakeholders' perception

This section gives an overview of the encountered stakeholders' perceptions of cultural tourism and the Creole Rendezvous brand.

Cultural Tourism

All cultural entrepreneurs share the opinion that cultural tourism has an important role to play in the Seychelles. Many of them believe it reflects Seychellois identity and heritage, allowing them to preserve and pass on their traditions to future generations. One cultural entrepreneur nicely emphasised the relationship between its identity and its culture: *"To stand without culture is not good... that's who you are. Every tree stands by its roots."*

Recalling the 1980's, another entrepreneur noted that cultural tourism was once more prevalent, with locals and tourists enjoying cultural entertainment together in hotels. According to our interviews, today, tourists express a demand for cultural experiences, but they are often not adequately exposed to Seychellois culture during their visit. Many cultural entrepreneurs see cultural tourism as a way to bridge this gap and keep their cultural heritage alive, but also voice concerns about its current state. They describe the existing offers as limited, not well-promoted, or staged, leading to dissatisfaction among visitors who seek more immersive and authentic experiences. The perspectives of other key stakeholders largely align with those of cultural entrepreneurs regarding the potential benefits of cultural tourism. They acknowledge its ability to enhance the Seychelles experience for visitors, offering insights into the country's history, lifestyle, and unique vitality. Figure 2.1 illustrates the main perceived benefits of cultural tourism and how many times they were mentioned by the stakeholders interviewed. One stakeholder emphasises the importance of immersing clients in Seychellois culture, folklore,

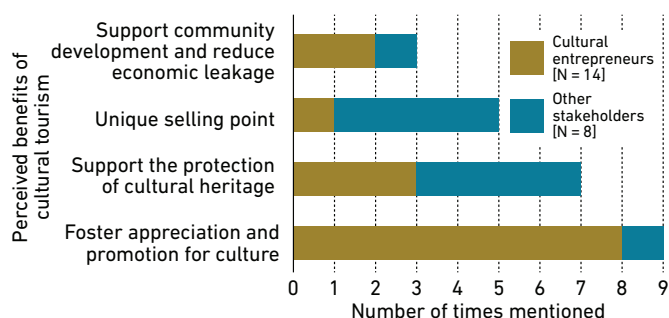


Figure 2.1
Perceived benefits of cultural tourism and number of times they were mentioned in the interviews with 14 cultural entrepreneurs and 8 other key stakeholders.

and music, creating a more meaningful engagement with the local community and a more enriching experience for the client. Further explanations of the benefits of cultural tourism can be found in Appendix 2.2 Table 2.1.

While recognizing the positive aspects, stakeholders and cultural entrepreneurs also highlight the need for careful development of cultural tourism to avoid potential risks. They express concerns about preserving cultural heritage under certain conditions and ensuring that tourists genuinely interact with local communities to foster social and economic sustainability in the tourism sector. As illustrated in Figure 2.2, cultural entrepreneurs see the biggest risk in *"Losing authenticity"*. Other stakeholders agree and specifically point out the risk of overcommercialisation of culture. Developing a brand around cultural heritage demands caution. A list of explanations for the perceived risks can be found in Appendix 2.2 Table 2.2.

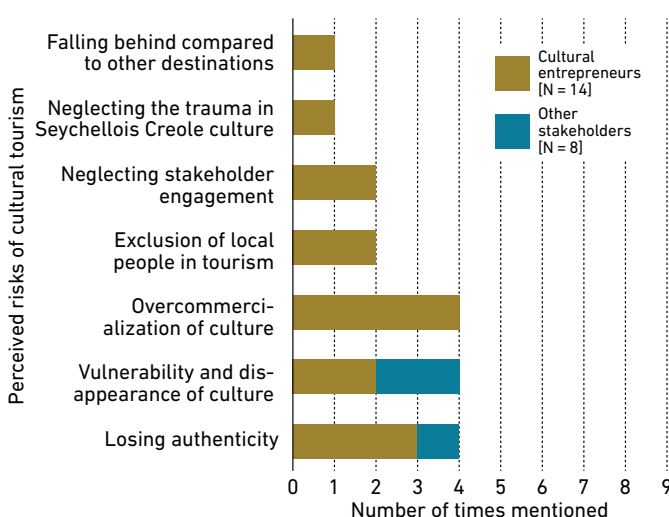


Figure 2.2
Perceived risks of cultural tourism and number of times they were mentioned in the interviews with 14 cultural entrepreneurs and 8 other key stakeholders.

The culture sector has been put under a lot of pressure by the tourism sector, particularly since the SARS-CoV-2 pandemic, to offer more products and experiences for tourists. While there is a need to meet the demands of the tourism industry, our interviewees expressed concern that the commercialization of culture may erode its true essence. In fact, one stakeholder raised the concern that the tourism industry is in general unaware about Seychellois Creole culture, often portrayed as vibrant and care-free, and neglects its traumas rooted in slavery which demands sensitive handling. Cultural tourism needs to support fostering pride and empathy by addressing the historical roots and complexities of the rich Seychellois heritage and identity.

The Creole Rendezvous Brand

The Creole Rendezvous emerged from the product diversification strategy of the Tourism Department. The diversification strategy is guided by the vision of a high-value, low-impact tourism sector which highlights flagship brands and market niches, and increases the number of visitors, occupancy rate, and per capita expenditure. Additionally, the vision proposes greater local and community participation and ownership in tourism businesses (Government of Seychelles, 2015).

According to the Tourism Department (Personal communication, 2023), the Creole Rendezvous is meant to promote and market cultural activities offered by small local private businesses (artists' showcases, dance performances and classes, music, cultural tours, etc.) and cultural events (for example bazaars) in Mahé, Praslin, and La Digue. The aim is to increase the offers of cultural tourism products while also increasing economic opportunities for Seychellois in the tourism industry.

At first, the Tourism Department identified the potential of community-based experiences but difficulties emerged in finding support for their development. Consequently, it took over the identification of potential products with processes such as "*cultural audits*", meant to identify cultural experiences which could be promoted under the Creole Rendezvous brand. Basic criteria and standards were then applied to assess the readiness and suitability of a product on the market (booking and payment system, consistency of the offer, hygiene, and safety regulations, etc.). For the future, the Tourism Department plans to offer inhouse training to meet the criteria previously mentioned, facilitate entry into the market and to then have these experiences run independently.

Currently, the process of developing high-quality activities has been challenging and the launch of the brand in July 2023 had fewer activities than anticipated, falling short of meeting the department's expectations.

Interviews with various stakeholders highlighted that communication and collaboration on Creole Rendezvous existence, role, and purpose is lacking. Less than half of the cultural entrepreneurs interviewed, which were also audited by the Tourism Department,

express a certain understanding of the role of the brand, while all other entrepreneurs were not aware of it. Some cultural entrepreneurs also voiced some confusion between different initiatives to support culture and cultural tourism coming from different stakeholders like the Tourism Department and others, hindering the offer of a clear and strong support system.

Regarding other key stakeholders related to cultural tourism, only about half of the interviewees were aware of Creole Rendezvous and its role. Some stakeholders mentioned to not have been involved in the creation process from the Tourism Department, even if they feel to be key players in the successful development of cultural tourism.

Disagreements were raised in the workshop, when participants were confronted with a vision for the future of cultural tourism in the Seychelles in which cultural experiences are promoted under the Creole Rendezvous brand. Most of the stakeholders present were not familiar with the brand and its purpose, raising serious concerns and different degrees of acceptance about the role of the brand. Especially stakeholders from the cultural sector were sceptical about the brand and criticised the lack of involvement of people with expertise in the authentic Seychellois Creole culture. Some concern was also raised that the name of the brand does not emphasise the Seychellois aspect of Seychellois Creole culture.

2.3.2 Entrepreneurs' Motivators and Challenges

During the interviews, 17 different motivators were identified (Table 2.1). The most mentioned are the following: Love and pride for culture, keeping culture alive and preserving heritage, and existing demand from tourists.

Regarding, *Love and pride for culture*, most stakeholders agree that it is the Seychellois love for their unique culture and the pride to share this love with visitors that motivates entrepreneurs in cultural tourism.

Another motivator is the wish to *preserve heritage* for future generations as well as visitors. Both should be given the opportunity to learn about the rich history of the islands. Cultural entrepreneurs additionally wish to teach their practices to other locals and contribute to *keeping these cultural practices alive*.

Mainly other stakeholders but also some cultural entrepreneurs see the *demand from tourists* as another important motivator. Cultural entrepreneurs received positive feedback from visitors. The stakeholders mentioned that they noticed an expressed wish by tourists to experience more of the Seychellois culture which motivated them to pursue a business in cultural tourism. Other stakeholders share this opinion and agree that there is economic opportunity for locals in cultural tourism. They see a strong demand from tourists for authentic cultural experiences, local products like food, drinks, and crafts.

Table 2.1

Heatmap of motivators faced by cultural entrepreneurs from Mahé (blue), Praslin (green), La Digue (red) and other stakeholder (grey). Each row represents a motivator. Each column 1–22 represents one participant. The coloured squares show the participants' contribution to the motivators in the respective row and the participants group.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Σ
Love and pride for culture and art	■	■			■	■	■	■	■			■				■	■			■	■		12
Keeping culture alive, Preserving heritage		■				■	■			■		■		■		■	■			■	■		10
Existing demand from tourists				■								■	■	■		■	■	■	■		■		9
Competitive advantage through authenticity																■	■		■			■	4
Creating experiences	■			■	■							■											4
Self-realisation			■				■						■	■									4
The new government	■					■				■				■									4
Love for nature	■						■	■	■														3
Sustainability															■		■			■			3
Feeling of appreciation															■				■				2
Financial support													■	■									2
First mover advantage												■		■									2
Generating income							■				■												2
Competition		■																					1
Contribute to local society													■										1
Encouraging feedback from authorities														■									1
Networking														■									1

Other motivators that were mentioned by at least four stakeholders were: *Competitive advantage through authenticity, creating experiences, self-realisation, and the new government*. A short description of all 17 motivators can be found in Appendix 2.3 Table 2.3.

Across all stakeholders 30 challenges were identified (Table 2.2). The five most mentioned challenges over all stakeholders were: *Financing, rules and regulations, disinterest from established tourism industry, insufficient and unideal space designated for culture, and foreign competition*.

Over 60% of stakeholders mentioned *Financing* as a challenge for entrepreneurs. Cultural entrepreneurs struggle to finance their businesses. They are searching for investors and trying to apply

for grants. Most stakeholders agree that it is difficult to take up a loan. Another challenge that was mentioned in connection with *Financing* is *Creating a Business Plan*. Cultural entrepreneurs describe that they need a very good business plan to receive funding. Writing this business plan was either only possible with the help of friends, required a lot of effort or is still not accomplished by the cultural entrepreneur.

Almost as many stakeholders agree that *Rules and regulations* are a challenge for entrepreneurs. Cultural entrepreneurs struggle to create authentic experiences for visitors because of the strict regulations that are in place. The regulations hinder cultural entrepreneurs from innovating in new directions. The entrepreneurs feel that there is no room for compromise.

Table 2.2

Heatmap of challenges faced by cultural entrepreneurs from Mahé (blue), Praslin (green), La Digue (red) and other stakeholder (grey). Each row represents a challenge. Each column 1–22 represents one participant. The coloured squares show the participants' contribution to the challenge in the respective row and the participants group.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Σ
Financing			■		■		■	■	■	■		■		■	■	■	■	■	■	■			14
Rules and Regulations					■		■	■	■		■	■	■	■	■	■	■		■		■		13
Disinterest from established tourism industry		■		■	■	■		■	■	■					■		■				■		10
Insufficient, unideal space for culture	■	■		■		■		■	■	■				■						■			9
Foreign competition		■						■	■	■							■				■	■	7
Uncertainty			■		■	■		■	■	■				■									6
Access materials, infrastructure and land															■		■	■	■	■	■	■	6
Building a local network			■			■				■		■	■	■									5
Various stakeholders lack knowledge on Seychellois Creole culture															■		■				■	■	5
Fear of being copied		■								■			■	■									4
Time		■		■						■	■												4
Under-pricing						■		■	■														3
Access to training and support																■	■				■		3
Contradicting authorities								■	■					■									3
Creating a business plan							■					■		■									3
High level decision making			■										■	■									3
Lacking support from DoT				■				■	■														3
Pricing			■							■						■							3

Table 2.2
continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Σ
Transport costs																							2
False concepts of culture in tourism																							2
Innovation, diversification, coordination																							2
Reaching customers																							2
Training participation																							2
Receiving information on grants																							1
Discrimination																							1
Keeping culture alive																							1
Non existing training on culture																							1
Language barrier of tourists																							1
Cultural entrepreneur health																							1
Lacking support policy																							1

Under rules and regulations six entrepreneurs mentioned that they struggled for a long time or were not able yet to receive the required licence from the responsible authorities. According to the entrepreneurs, other licence holders try to prevent authorities from giving out a licence to the cultural entrepreneur because they fear competition.

Health regulations were mentioned by five entrepreneurs. The public health authority blocks the realisation of new business ideas because some aspects do not comply with the strict health regulations in place. In the context of cultural tourism health regulations are often brought up in relation to the traditional Creole kitchen. It is, according to many stakeholders, not possible to serve authentic Seychellois Creole food that was cooked in a

traditional Creole kitchen. The entrepreneurs that encountered this issue share the opinion that the traditional kitchen would add a unique, authentic element to the experience of their visitors and that the use of a modern kitchen would break the authenticity of it.

Another challenge is the *Disinterest from the established tourism industry*. According to half of the stakeholders interviewed, locals are still excluded from a big part of the industry. Established actors have a competitive advantage because of their already existing network and international support system. Major actors in the tourism industry still market the Seychelles without marketing its rich history, people, and culture. Tourists are often not encouraged by the established tourism industry to experience the local culture or community.

Over 40% of the stakeholders name *Insufficient and unideal space designated for culture* as a challenge for cultural entrepreneurs. According to these stakeholders, there are not enough spaces designated to culture and not enough opportunities for cultural entrepreneurs to showcase their art to visitors. The spaces that exist are unideal in their location and not visible enough.

Foreign competition is mentioned by four entrepreneurs and five other stakeholders as a key challenge. They identify a lack of protection for authentic Seychellois products. Many imported artefacts are labelled as “made in Seychelles”. Since the prices of imported goods are undercutting the prices of local products, this lack of protection leads to a competitive disadvantage of Seychellois products. A short description of all challenges can be found in Appendix 2.3 Table 2.4.

2.3.3 Stakeholder Mapping

The stakeholder landscape was mapped using a power-interest matrix and a sociogram. These maps depict which stakeholders are most relevant to cultural tourism entrepreneurship, and also highlight which relationships would benefit from improved collaboration.

Power-Interest Matrix

The stakeholder power-interest matrix, created based on interviews and literature research, reveals (qualitatively) several patterns among stakeholders and informs the direction of future interventions (Figure 2.3). Appendix 2.4 Table 2.5 provides descriptions for each of the stakeholder identified and included in the power-interest matrix.

The upper-right quadrant signifies stakeholders with high power and high interest. This is the core group of actors who can make the greatest efforts to actively support cultural tourism, and include the Tourism Department (TD), the Enterprise Seychelles Agency (ESA), and the National Institute for Culture, Heritage and the Arts (SNICHA) and its sub-bodies.

Stakeholders with high power but low interest in cultural tourism are in the upper-left quadrant. These stakeholders should be, at a minimum, kept informed on developments in cultural tourism and engaged as necessary. The risks of not involving these stakeholders include the persistence of challenges faced by the sector such as the lack of access to funding, operational restrictions due to regulations, and a disengaged potential market. Various government entities, such as the Public Health Authority (PHA) and the Licensing Authorities (SLA), as well as luxury hotels and banks, fall into this category and could offer valuable support within the sector if their interest levels increase.

The lower-right quadrant shows low-power but highly interested stakeholders. While these stakeholders have important experiences, information or perspectives on cultural tourism, they often lack the influence to make their voices heard. The core group should prioritise communication and engagement with stakeholders in this quadrant as valuable contributors to interventions in

cultural tourism. Civil society actors such as the Co-operative des Artisans (CdA), non-governmental organisations (such as PEG), and cultural entrepreneurs themselves fall within this category of stakeholders to strengthen and engage.

Finally, stakeholders in the lower-left quadrant have low power and low interest. These stakeholders do not need to be actively engaged but should be monitored in case their level of interest rises. Few stakeholders in this quadrant, such as the Fisherman Association (FA) and the International Tour Guide Network (TGN), were identified due to their general lack of relevance currently in cultural tourism.

Generally, government bodies are high on the power scale due to their political influence, human resources capacities, or budgets. Civil society, non-governmental organisations and small businesses often have less influence due to a lack of contact with decision-makers, training, funding, or personnel. For the most part, groups with a general mandate or vision involving culture, tourism or entrepreneurship are located high on the interest scale.

The sociogram in Figure 2.4 represents current relationships between key stakeholders and indicates relationships which would benefit from future strengthening, as identified by research participants. Dashed lines graphically show where increased collaboration and communication should take place so that the intersection of culture and tourism may flourish. The following section (2.3.4 Potential Interventions by Stakeholders) then explains what actions were suggested during interviews and the workshop to strengthen these relationships.

Stakeholders in the lower-left quadrant of the power-interest matrix were excluded from the sociogram due to their relatively low relevance in supporting cultural tourism. Priority stakeholders, indicated by large dark green ovals, were those located high on either the power or interest scales of the power-interest matrix. The five core stakeholders are ESA, the Tourism Department, the SNICHA, the Creole Language and Culture Research Institute (CLCRI), and cultural entrepreneurs themselves. Interviewees commonly referenced these partners during discussions on the types of support currently available (such as entrepreneurship grants offered by ESA) and the improvements they wish to see in the future (such as training events for government staff on the authentic Creole cultural heritage).

2.3.4 Potential interventions by stakeholders

Based on interviews and workshops, 36 interventions and 25 outcomes were categorised in the following themes: a) Educate youth talents on cultural tourism, b) Awareness of Seychellois Creole culture, c) Market cultural tourism, d) Access to resources and cultural spaces, e) Capacity building for entrepreneurs, and f) Improve rules and regulations. Each theme is a potential impact pathway to partially overcome the challenges faced by cultural entrepreneurs mentioned in section 2.3.2 and to increase the community participation. It should be noted that a stronger cross-departmental collaboration from early on may contribute

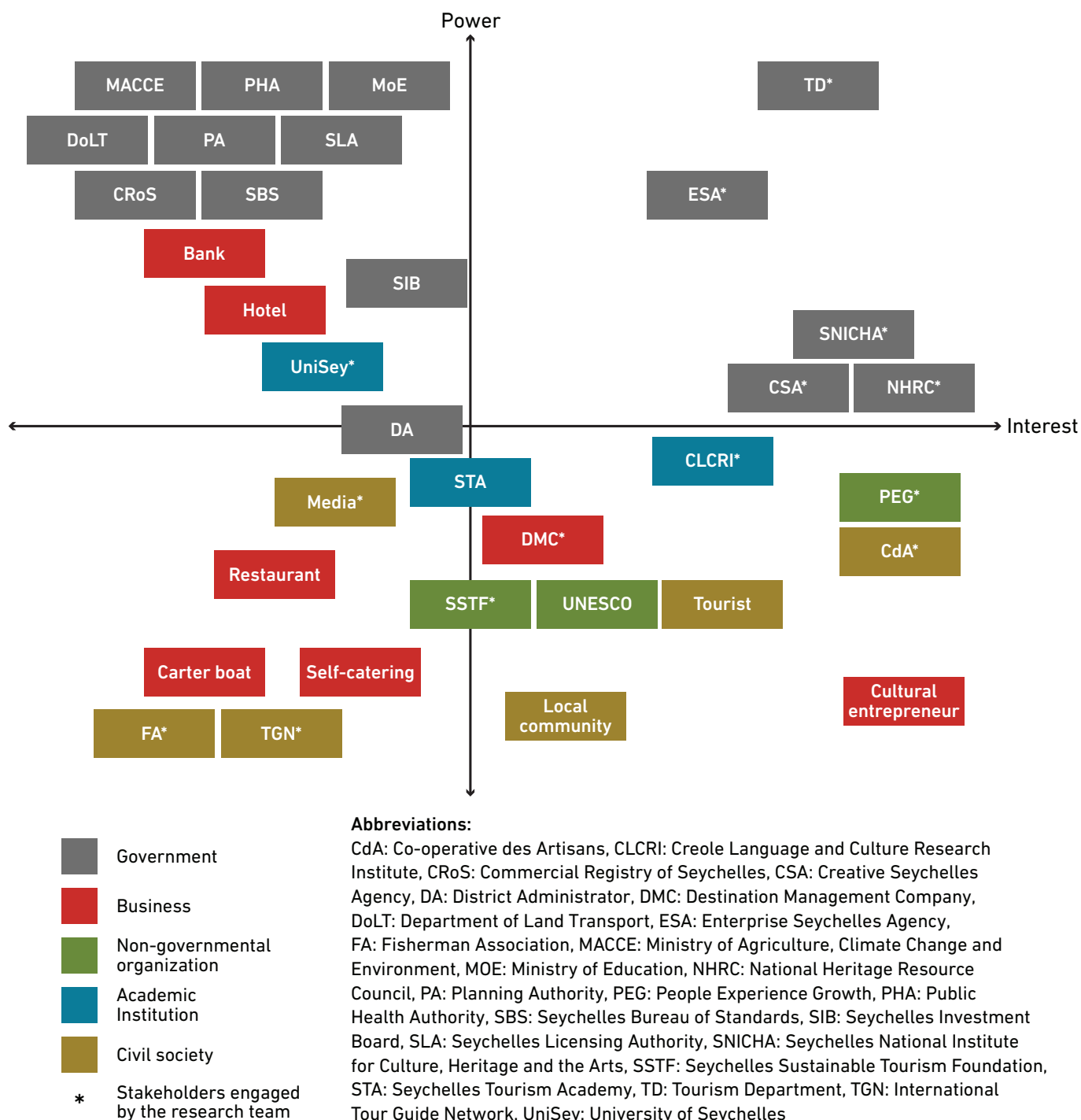


Figure 2.3
Stakeholders mapped in the Power-Interest Matrix.

to the progression of each impact pathway. Cross-departmental collaboration is thus considered as a starting point (see Figures 2.5 and 2.6), and it is outlined below followed by the other six themes. An extract of the full diagram, available in Appendix 2.5 Figure 2.3, is shown on the bottom. Figure 2.5 illustrates the potential pathways for theme a), b), and c), while figure 2.6 for theme d), e), and f).

Cross-departmental collaboration

The diversity of governmental departments who can implement interventions to support cultural tourism highlights the need to strengthen cross-departmental collaboration. Interviewees and workshop participants mentioned these have different responsibilities and conflicting priorities in addition to an often-lacking communication, preventing cultural tourism unfold its full potential. Cultural entrepreneurs interviewed mentioned the difficulties

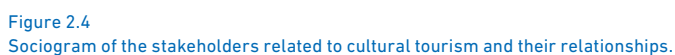


Figure 2.4
Sociogram of the stakeholders related to cultural tourism and their relationships.

of starting a business when it comes to collaborate with multiple different departments. Moreover, workshop participants mentioned the example of artisans prohibited from using an endemic plant as raw material to make typical bags and drums because the Ministry of Agriculture, Climate Change and Environment (MACCE) implemented stringent regulations to protect it. In their opinion, regulations to protect plant species should let room for the continuity of traditional arts and crafts.

As a result, two possible major interventions for cross-departmental collaboration in the short-term are 1) creating a cross-department programme on cultural management and 2) creating a delegation for cultural tourism-related issues with the consultation of tourism, culture, and other sectors. The first suggestion aims to facilitate cultural experts to transmit know-how to across governmental departments, whereas the second suggestion is focused on cross-department engagement, leading to a cultural tourism policy, jointly developed by the Tourism Department and SNICHA, which intends to harmonise regulations and leverage support across departments to support cultural entrepreneurs. The connections related to these two interventions can be found in the full diagram in Appendix 2.6 Table 2.6.

Educate youth talents on cultural tourism

Workshop participants highlighted that the future of cultural tourism will require educating youth so that in 20–30 years they will be available for generational succession of cultural entrepreneurs (Figure 2.5). Workshop participants highlighted that Tourism Club at primary and secondary schools were already created to get young people and children interested in working in the tourism sector. Some suggested that it could emphasise more on promoting culture. Some other suggestions emerged from the workshop included organising extracurricular activities and overseas exchange programmes related to culture. These ideas could be done under the umbrella of a student training programme. In the mid- and long-term, participants suggested that UniSey can play a role by becoming a world-class faculty offering university courses and degree on Seychellois Creole culture, so that students can study further, pursue a career in cultural tourism, and develop cultural products.

Awareness of Seychellois Creole culture

Raising the awareness of Seychellois Creole culture was deemed the most important aspect to support cultural tourism by workshop participants. Combined with responses from the interviews, our findings reveal that the target group of awareness raising does not only limit to the public or youth. Staff of relevant governmental departments can regularly attend training to stay up to date with knowledge about Seychellois Creole culture in which culture group stakeholders, such as CLCRI, might be able to offer.

One of the major discussions during workshop was whether stakeholders from the culture and tourism sectors agree on the definition of Seychellois culture and cultural entrepreneur, which might directly affect the Tourism Department branding criteria for promoting cultural tourism. Before establishing branding criteria,

government agencies can enhance collaboration consultation and engagement of stakeholders related to cultural tourism. A possible concrete step to achieve this outcome is by creating platforms and forums for discussion related to culture in the short-term, which facilitates the creation of a shared definition of cultural entrepreneurs. These platforms might be organised in every district since interviewees and workshop participants both highlighted that decentralisation of management of cultural activities might be beneficial to involve communities and other stakeholders. One workshop sub-group emphasised that when talking about culture, it is *"important not [to] equate the ideas of authentic or tradition as being old-fashioned"*. Another workshop participant described that despite culture is an evolving concept, cultural heritage in Seychelles determines whether a culture offer is authentic or not, and how it might affect cultural tourism branding: *"You know, we also put in the word Creole [in Creole Rendezvous], but Creole doesn't speak about the Seychelles. It speaks about the Creole culture of the world, the different mixture of the people and it doesn't speak of us. Yes, we are under that umbrella of Creolisation or "Creoleality", but we are not speaking about the Seychelles [...]"*.

From the workshop emerged that in the mid-term, the decentralised management of cultural activities might support the identification of cultural assets in each district. Partnered with civil society and professionals from the culture sector, the Tourism Department can jointly conduct surveys to identify cultural entrepreneurs, leading to the creation of a *"cultural map"* – a database of cultural activities and heritage sites – which can be used for future cultural heritage education and market cultural tourism.

Market cultural tourism.

As mentioned earlier, branding criteria can be refined after stakeholder discussions related to culture and agreeing on the joint definition of cultural entrepreneurs. Culture sector stakeholders, especially SNICHA, can preliminarily determine the branding criteria based on a jointly developed cultural tourism policy. Branding criteria might be useful for the Tourism Department to promote not only cultural events and offers around the islands, but also to encourage hotel managers to diversify their cultural programmes and support eligible cultural entrepreneurs to promote their arts and products at small-scale and large-scale hotels. Some interviewees thought hotels were not willing to introduce new cultural activities and did not allow cultural entrepreneurs to promote their offers directly to hotel guests despite some hotel guests expressing interest in trying out cultural experiences. The Tourism Department might need to take the first step to communicate with hotels, including small-scale hotels and guest houses.

Access to resources and cultural spaces

Workshop participants and interviewees stressed that there should be cultural spaces both within and outside of hotel establishments as some of the cultural entrepreneurs had performed or promoted their products at hotels, both small-scale and large-scale.

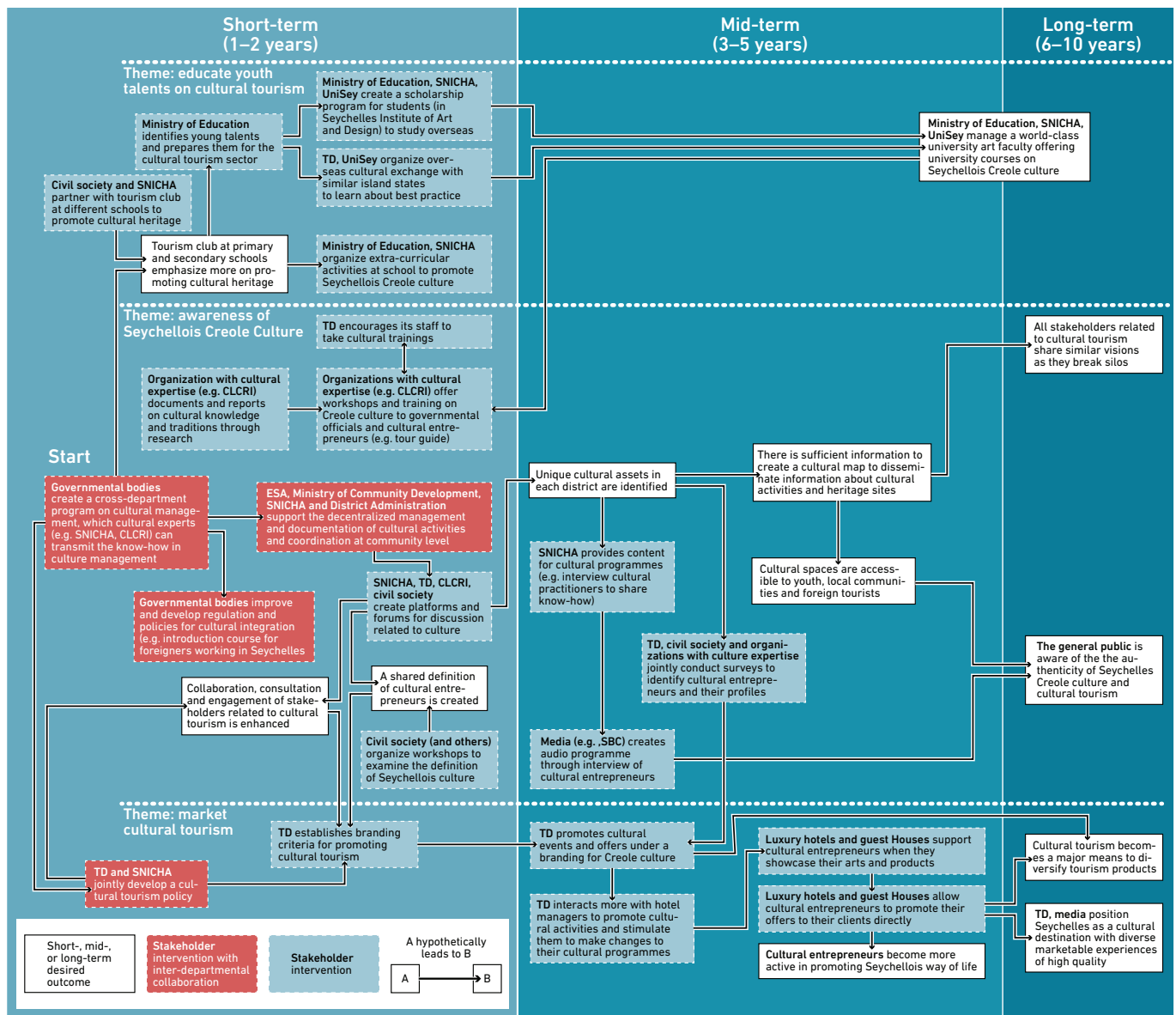


Figure 2.5

"Theory of Change" Diagram with three impact pathways: Educate Youth Talents on Cultural Tourism, Awareness of Seychellois Creole Culture, and Market Cultural Tourism. The proposed diagram is based on interventions suggested by workshop participants and interviewees. Dashed boxes represent interventions implemented by specific stakeholders, in blue, and by an inter-departmental collaboration, in red. Boxes with white background represent final goals (outcomes) reached through the interventions. Arrows represent the link between interventions and outcomes.

It was suggested by workshop participants that one-stop places should be created for cultural entrepreneurs to promote their offers. This outcome might require an intervention from the Planning Authority, District Administration and Ministry of Agriculture, Climate Change and Environment to allocate suitable spaces for these one-stop places. Cultural entrepreneurs might also need better access to basic infrastructures, as well as good suppliers, designers, and materials to promote their offer. Cultural entrepreneurs might need to rely on capacity-building activities to meet their needs (Figure 2.6).

Culture-related institutions are expected to be responsible for organising cultural events and venues. Workshop participants suggested an increase of the budget of culture-related organisations, such as Creative Seychelles Agency (CSA) and SNICHA, as an intervention to ensure the success of other interventions and desired outcomes. A cultural stakeholder explained budget constraint as a problem which could be alleviated by developing cultural tourism: "For us, cultural tourism is important as well because it also allows us to generate some much-needed revenue. As you know, culture is always the 'poor daughter of the government'. We are always fighting to get that last little cent".

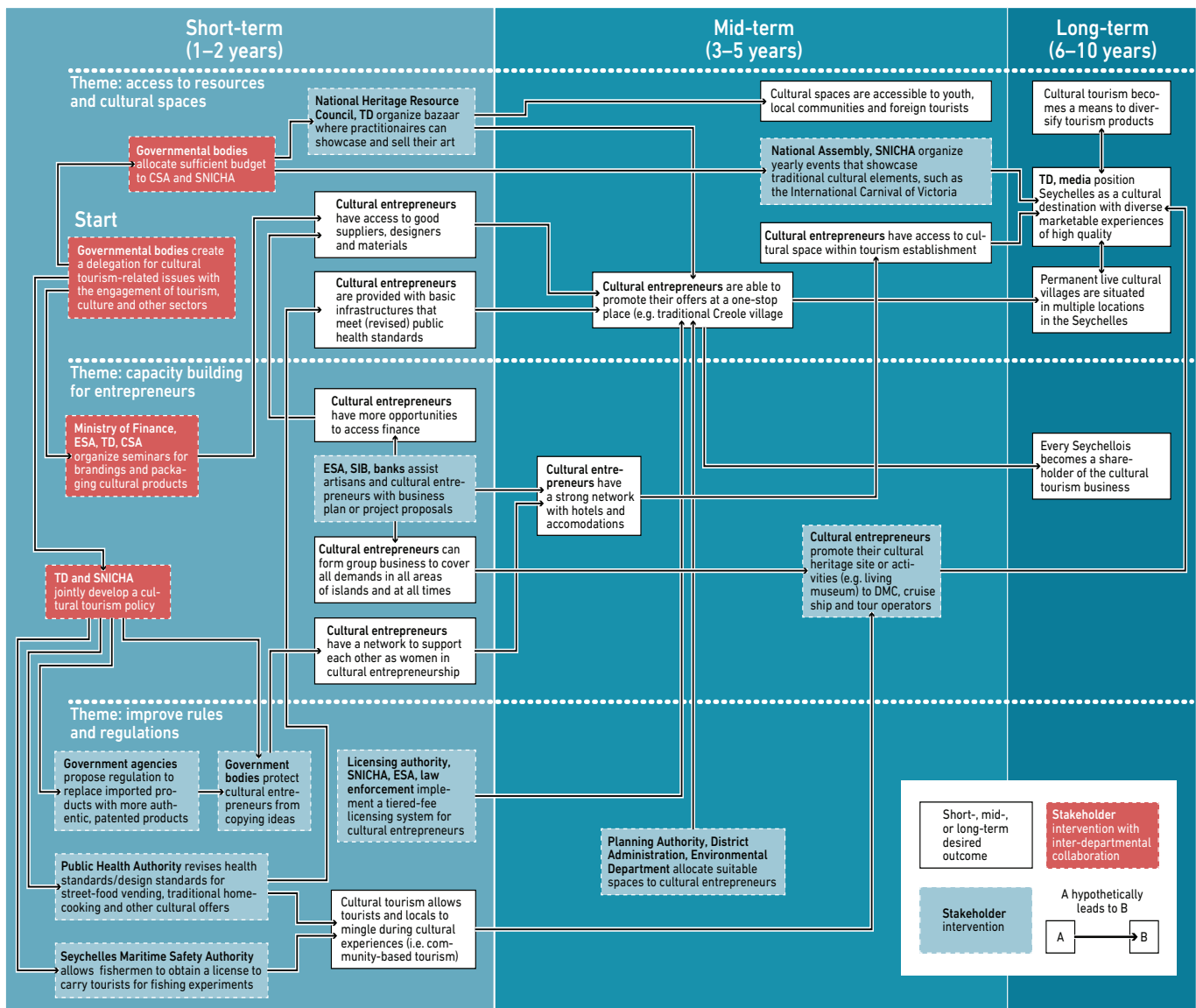


Figure 2.6

"Theory of Change" Diagram with three impact pathways: Access to resources and Cultural Spaces, Capacity-building for Entrepreneurs, and Improve Rules and Regulations. The proposed diagram is based on interventions suggested by workshop participants and interviewees. Dashed boxes represent interventions implemented by specific stakeholders, in blue, and by an inter-departmental collaboration, in red. Boxes with white background represent final goals (outcomes) reached through the interventions. Arrows represent the link between interventions and outcomes.

Capacity building for entrepreneurs

In section 2.3.2, it was mentioned that cultural entrepreneurs need a good business plan to gain access to finance. ESA, Seychelles Investment Bureau, and banks were mentioned by workshop participants as potential stakeholders who can contribute to this outcome by assisting cultural entrepreneurs in creating business plans and proposals.

Capacity building efforts can also aim at the following two short-term outcomes mentioned by interviewees: 1) have a strong network of (women) entrepreneurs to support each other and 2) form group business to cover all demands in different locations of Mahé. These outcomes might strengthen their visibility and connections with hotels and accommodations and ability to promote their offers to Destination Management Companies (DMC), cruise ship and tour operators.

Improve rules and regulations

It is hypothesised that a cultural tourism policy will likely provide the delegation with the mandate to harmonise regulations made by multiple governmental agencies.

Workshop participants and interviewees mentioned the need to engage with Seychelles Maritime Safety Authority and Public Health Authority in the short-term so that they are more likely to revise health and safety standards and give out licences to cultural entrepreneurs. These interventions might allow tourists and locals to mingle during cultural experiences without violating regulations, making cultural entrepreneurs less reluctant to promote their offers to DMC, cruise ship and tour operators.

The lack of copyright regulation mentioned in section 2.3.2 might be supported by licensing and regulations that replace imported products with more authentic, patented products.

2.4 Discussion

According to the Seychelles News Agency (2021, 2022), cultural tourism is extremely valued by the Tourism Department to diversify the tourism offer and to expand its benefit to the local community, and an attempt to bring some of the key stakeholder together to develop and support cultural tourism was already done in 2021. Nevertheless, it is not clear where this initiative led since it was never mentioned by our interviewees and not reflected in our findings.

Our research outcomes emphasise the pressing need for coordination to tackle the conflicts and complexities surrounding the development of cultural tourism and the significance of stakeholder engagement becomes evident concerning the perception of the brand Creole Rendezvous. While interviewees revealed a general enthusiasm towards cultural tourism and the development of an inclusive and ethic sector, the lack of a shared vision based on different stakeholders' perspective and the lack of awareness and understanding of the brand currently developed by the Tourism Department, are hindering the development of cultural tourism to its full potential.

Results suggest that a solid stakeholder network, including the local community, is essential to the success of a tourist destination, and the network and support currently offered to the Seychellois cultural entrepreneurs to facilitate their entrance in the cultural tourism sector need to be revised and strengthened (Bornhorst et al., 2010; Kontogeorgopoulos et al., 2014). Additionally, various stakeholders raised concerns that the current approach is not effectively addressing the risks associated with cultural tourism. A holistic approach is suggested to balance the wish to appeal to tourist expectations with the preservation of authenticity, safeguarding disappearing Seychellois culture, and avoiding over-commercialisation.

Stakeholders expressed concerns about the Creole Rendezvous brand's development and its potential impact on cultural authenticity. Meant by this, is that some stakeholders expressed to be worried by the commercialisation of culture. For example, mentioned was that traditional weddings are sold as a product in the Seychelles, but with the use of Caribbean dresses, since they are perceived more spectacular than the traditional Seychelles wedding dresses. Another mention was conflict between monetizing versus living the culture. To address these issues, a collective effort is needed to create a shared vision and a brand that receives broad support from relevant stakeholders. This may involve starting fresh with a common vision, redefining the brand, and potentially even adopting a new name that better reflects the Seychellois aspect of Creole culture. The study also revealed a large number of stakeholders' ideas for the development of cultural tourism. These ideas span across six themes: Educate youth talents on cultural tourism; Awareness of Seychellois Creole cul-

ture; Market cultural tourism; Access to resources and cultural spaces; Capacity building for entrepreneurs; and Improve rules and regulations, all overarched by the need to strength cross-departmental collaboration.

During the interviews, it emerged that cultural entrepreneurs could also have an important role to play in the marketing of cultural tourism under a common brand. They need to fully grasp the brand's significance and be trained to use it effectively in their own marketing activities to deliver the brand promises and ensure its success. Building trust and confidence in the brand among all key stakeholders appears consequently essential to its success (Bornhorst et al., 2010; Cox et al., 2014). It will also be crucial to empower individual entrepreneurs in different districts of the islands in order to improve the relationships with the tourism industry on a community level and tackle more specific challenges (Strydom & Mangope, 2018). From the interviews and workshop, it emerged the potential of decentralise cultural tourism at the district level to highlight the special features of each of them and engage more with the community. Community members from the respective district including cultural entrepreneurs can co-develop new innovative ideas for community-based cultural tourism offers that reflect their idea of authenticity and avoid external dominance (Atayi, 2021; Mtapuri & Giampiccoli, 2013).

2.4.1 An intergovernmental coordination unit

Since strengthening cross-departmental collaboration and addressing conflicting priorities is vital to realising the pathways developed under the six themes, the establishment of an intergovernmental coordinating body for cultural tourism is suggested. The Tourism Department should take over only the promotion of cultural tourism products to visitors and has consequently expressed the desire for another stakeholder to take over the coordination of cultural tourism activities due to their own human resources limitations. The creation of a new position as a joint venture between the Tourism Department and SNICHA is therefore suggested. As a cross-departmental officer, this person will have a mandate to act in the interest of both sides of cultural tourism: the culture side, which is concerned with persevering authentic Seychellois heritage, and the tourism side, which is concerned with promoting high-quality activities that are accessible to visitors. The cultural tourism officer will be given the authority to take leadership in coordinating efforts and manage trade-offs between cultural, tourism, and entrepreneurship bodies, and would have three primary responsibilities: support stakeholder engagement, support and empower cultural entrepreneurs, and marketing.

The first responsibility is Stakeholder engagement. The cultural tourism officer would facilitate regular networking and training opportunities for key stakeholders so that a vision for cultural tourism can be agreed upon and sustainably supported by all relevant partners. Stakeholders and their relationships presented in the power-interest matrix and in the sociogram (section 2.3.3) could serve as a starting point to organize networking meetings. Networking meetings should provide space for stakeholders to give each other feedback, request assistance or advice from oth-

ers, and adapt the direction of cultural tourism efforts. As the results show, raising the awareness of Seychellois Creole culture is a central aspect. The cultural tourism officer will thus collaborate with stakeholders like the CLCRI to develop training on Seychellois Creole culture and provide them to all relevant stakeholders.

The second responsibility is the Support and Empowerment of Cultural Entrepreneurs. The cultural tourism officer should support individual cultural entrepreneurs and connect them to the resources they need to be successful in the long term. The cultural tourism officer should ensure motivated entrepreneurs continue to receive the support they need, facilitating their interactions with the other key stakeholders. Additionally, it is suggested that the officer networks with community-based tourism experts also from other destinations and builds up a collection of resources like, for example, the “Community-Based Tourism Social Innovation Playbook” from the UNDP Accelerator Lab Thailand (UNDP Accelerator Lab Thailand, 2022) to support the districts with creating their own initiatives.

The third responsibility is Marketing. The cultural tourism officer will coordinate the marketing of the activities offered under the cultural tourism brand. This will be helpful for entrepreneurs who lack the expertise to market their activities and to reach hotels and restaurants already well established, and to create a cohesive image for the brand. The marketing methods and content should be reviewed by stakeholders such as the entrepreneurs and SNICHA, to ensure it reflects the shared vision for authentic cultural tourism in Seychelles.

In summary, the cultural tourism officer will take the lead to coordinate and communicate with all key stakeholders in cultural tourism, including cultural institutions, tourism bodies, and the cultural entrepreneurs offering activities. The potential interventions described in the results section will be a helpful resource for this individual. Finally, the officer must establish indicators, such as those described in Jelinčić (2021), to measure progress in each of the three areas of responsibility.

2.4.2 Limitations

While the study provides some valuable insights to the potential and the barriers of cultural tourism in the Seychelles, it also faces several limitations. One limitation is the selection of interview partners. Cultural entrepreneurs chosen have already been audited by the Tourism Department. While this approach ensured a focus on entrepreneurs already engaged with the Tourism Department, it might have excluded others who faced different challenges in cultural tourism participation. This may have led to overlooking important perspectives and reducing the comprehensiveness of findings. To address this, future research could consider using the networks of key stakeholders like SNICHA to reach a broader representation of local entrepreneurs in the cultural sector. Additionally, the interviews with other key stakeholders predominantly included governmental bodies, excluding district administrations and private sector actors. Future research efforts can involve a more diverse range of stakeholders, especially private actors like hotels and restaurants, to gain comprehensive insights into cultural tourism challenges and potential solutions. Furthermore, district administrations were not included, leaving

a gap in capturing insights from local authorities and possibility to pursue a decentralised approach of managing cultural and cultural tourism activities. Another limitation is the absence of key stakeholders from Finance, Public Health, Planning Authority, and district administrations in the workshop. These stakeholders are directly related to the most mentioned challenges faced by cultural entrepreneurs, including financing, health regulations and licensing issues, which may have hindered the development of well-rounded interventions. Finally, the Power-Interest matrix and sociogram presented in section 2.3.3, and the Theory of Change Diagrams in section 2.3.4 might also be validated, refined, and discussed by relevant stakeholders in the future.

2.5 Conclusion

The development of cultural tourism in Seychelles presents a unique opportunity to showcase the rich and diverse heritage of the islands, while also contributing to economic growth and sustainable community development. This research aimed to explore the perspectives and challenges of key stakeholders, particularly cultural entrepreneurs, in the cultural tourism sector. Through interviews and a stakeholder workshop, valuable insights were gathered, leading to a deeper understanding of the current state of cultural tourism in Seychelles and the potential pathways for its sustainable development.

The results of the research revealed several key findings. First, there is a need for better stakeholder engagement and coordination to ensure the successful development of cultural tourism. The lack of awareness and understanding of the brand Creole Rendez-vous among stakeholders highlights the importance of creating a collective vision, an effective communication strategy, and a brand that receives broad support from all relevant parties. Cultural entrepreneurs play a vital role in the marketing of cultural tourism under a common brand, and they need to be empowered and trained to effectively promote their activities.

Second, the challenges faced by cultural entrepreneurs, such as financing, regulations, and competition from foreign products, require a concerted effort from various governmental bodies and private sector actors. Strengthening cross-departmental collaboration and addressing conflicting priorities will be crucial to implement the proposed interventions for the sustainable development of cultural tourism.

Third, the research identified potential impact pathways and interventions for the development of cultural tourism in Seychelles. These pathways include marketing cultural tourism, improving access to resources and cultural spaces, capacity building for entrepreneurs, improving regulations, raising awareness of Seychellois Creole culture, and educating youth talents. The proposed interventions highlight the importance of involving all key stakeholders, including cultural institutions, private actors in the tourism sector, and individuals offering cultural activities.

The success of cultural tourism in Seychelles relies on effective stakeholder engagement, coordination, and collaboration. The proposed establishment of a cross-departmental coordinating unit for cultural tourism, led by a cultural tourism officer, can play

a pivotal role in facilitating networking, providing support and empowerment for cultural entrepreneurs, and marketing cultural tourism activities.

However, the research also faced limitations, including the selection of interview partners and the absence of key stakeholders in the workshop. Future research efforts should aim to include a broader representation of stakeholders and district administrations to gain comprehensive insights into cultural tourism challenges and potential solutions.

In summary, the findings and proposed interventions of this research serve as a roadmap for the responsible and authentic development of cultural tourism in Seychelles. By fostering stakeholder engagement and addressing the identified challenges, Seychelles can position itself as a leading cultural tourism destination, offering enriching and immersive experiences that celebrate its vibrant heritage while driving social and economic progress for the nation. Through the collaborative efforts of all stakeholders, cultural tourism in Seychelles can continue to thrive, creating lasting benefits for cultural entrepreneurs, local communities, and visitors alike.

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3 Agri-Tourism in the Seychelles

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Photo: Aline Föcker

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3.1 Introduction

Tourism has significantly contributed to economic advancement in island states (Badrie, 2009; Thomas et al., 2018). However, according to Rogerson (2012) linkages between tourism and agriculture are a way to maximise the economic impact of tourism in developing countries. In other islands states such as the Caribbean agri-tourism has been proposed as a means to link the tourism and the agricultural sector as well as to diversify the economy (Addinsall et al., 2017; Badrie, 2009; Thomas et al., 2018). Agri-tourism is a term that is often used interchangeably with other terms such as agrotourism, farm tourism, farm-based tourism or rural tourism (Ammirato et al., 2020). A broad range of definitions of agri-tourism exist. Ammirato et al. (2020) for example introduce agri-tourism as an authentic form of rural tourism which allows tourists to experience activities on a working farm (e.g. harvesting, feeding, preserves preparation), and to be in contact with nature and animals while enjoying locally produced products. This will serve as a working definition for this study. In this report we consider any place where food is produced for commercial purposes as a working farm.

Apart from building a linkage between agriculture and tourism, agri-tourism is seen to have opportunities for social development and mitigating negative impacts on the environment (Ammirato et al., 2020). Additional opportunities highlighted in literature include: economic benefits, food security (Thomas et al., 2018), community well-being (Naidoo & Sharpley, 2016), empowerment of farmers (Thomas et al., 2018), connection between farmers and consumers (Yu & Spencer, 2020) and socio-cultural enrichment (Ammirato et al., 2020). On the other hand, the literature reveals hurdles that farmers face when venturing into agri-tourism. These challenges encompass limited resources and high production costs, uncertainty in terms of insurance and security, and financial constraints (Esguerra, 2020), competition with other tourist activities, lack of training and knowledge amongst farm workers, a disconnection between consumers and farmers, social and equity constraints and a lack of effective promotion strategies (Naidoo & Pearce, 2018; Yu & Spencer, 2021).

In the Seychelles agri-tourism has emerged as a promising niche market that complements traditional beach and marine activities and contributes to the diversification of the agriculture and tourism sector (Government of Seychelles, 2015; Seychelles Planning Authority, 2015; Government of Seychelles, 2018). The previously mentioned definition of agri-tourism aligns perfectly with the definition of agri-tourism that has been proposed in the Seychelles Strategic Land Use and Development Plan (Seychelles Planning Authority, 2015). In this plan, agri-tourism is defined as “any practice developed on a working farm with the purpose of attracting visitors, incorporating both a working farm environment and a commercial tourism component” (ibid., p.68). Agri-tourism is seen as an option to provide additional revenue streams for farmers and to encourage their engagement in the sector. However, like in

any other Small Island Development State (SIDS), land is a scarce resource in the Seychelles and should be used efficiently in order to ensure food security. According to the Ministry of Fisheries & Agriculture (2015) the main challenges of agricultural production in the Seychelles are the declining production and productivity of major locally grown crops and livestock.

Despite the recognition of the potential of agri-tourism to contribute to the diversification of the agriculture and tourism sector in the Seychelles by national strategic plans and scientific research, the possibilities of agri-tourism in the country are not sufficiently studied. There is a significant knowledge gap regarding the potential agri-tourism activities, further actions for its implementation and the contribution of agri-tourism to sustainable tourism development. To shed light on these aspects, this study aims to answer the following research questions:

- RQ1 What is the current state of agri-tourism, including achievements and challenges of agri-tourism in the Seychelles?*
- RQ2 What is the potential of agri-tourism in the Seychelles according to different involved actors?*
- RQ3 What is needed to promote the implementation of agri-tourism in the Seychelles?*

To address these research questions, literature review, expert interviews, farmer interviews, tourist surveys and a workshop were performed.

3.2 Methods

To address our research questions, a combination of methods was chosen. These methods included a literature review, expert interviews, farmer interviews, tourist surveys and a workshop. Literature review was used to identify potential agri-tourism practices from other countries and policy frameworks for agri-tourism. In addition, we interviewed experts and farmers to gain insights on the current state of agri-tourism in the Seychelles, as well as their perspectives on its potential for future development. The interviews were conducted during the month of July 2023. The tourist survey provided data on tourists' level of interest in agri-tourism activities. Additionally, the workshop was included in order to bring various stakeholders together for an interactive session.

3.2.1 Data Collection

Literature review

As a basis, we conducted a comprehensive literature review on agri-tourism to gain a better understanding of the topic and identify the current state of research. Our review aimed to explore the opportunities and challenges associated with agri-tourism, with a main focus on other SIDS where agri-tourism is already established. For this, we examined general literature on agri-tourism on SIDS or other tropical islands, but we also looked at specific examples from SIDS. This for instance included an example in Vanuatu (Vanuatu Agritourism: Plan of action, 2016).

In a next step the state of the art of agri-tourism in the Seychelles has been analysed through literature. Given the absence of scientific literature on agri-tourism in the Seychelles, we assessed several national documents.

Expert interviews

We conducted five expert interviews with one representative from the Tourism Department, one from the Agricultural Department, one from the Environmental Department, one agricultural consultant who is also a member of a farmers' association and a national consultant. The aim of the interviews was to gain an in-depth understanding on the current state of agri-tourism in the Seychelles as we could not fully explore this solely with the literature review. Further, the interviews were conducted to gain an insight on different perceptions related to the agri-tourism development in the Seychelles, the challenges for the implementation of agri-tourism and to figure out what potential different stakeholders see in the implementation of agri-tourism in the Seychelles. These interviewees were selected based on their variety in expertise and perspectives.

The interviews were semi-structured and followed a guideline that was developed based on our research questions and the previously conducted literature review. According to the different expertise of our interview participants the guidelines were adapted. Given the semi-structured nature of the interviews, they varied in length and time. The interviews were recorded, and notes have been taken (the interview guideline can be found in Appendix 3.1).

Farmer interviews

In addition to the expert interviews, we also conducted 11 semi-structured interviews with farmers on Mahé and La Digue to capture different views across the whole country of the Seychelles. The selection of these farmers was based on contacts that were provided to us by the Tourism Department and through snowballing technique. These contacts were mentioned to be involved in agri-tourism. The interviews aimed to gain in-depth insights from farmers on the implementation of agri-tourism on a farm-level but we also wanted to gain an understanding of how they perceive the agri-tourism development in the Seychelles as a country. The goal was to find out what offers of agri-tourism work for the Seychelles, to see how far their projects are developed, what opportunities they see in doing agri-tourism and what challenges they face (the interview guideline can be found in Appendix 3.2).

Survey with tourists

To find out whether tourists are interested in agri-tourism activities, a survey was conducted in cooperation with the Adventure Tourism Group (see chapter 4 of this report). Tourists were asked to rate their interest in certain agri-tourism activities on a 1–5 point Likert scale (1 = not interested at all, 2 = somewhat not interested, 3 = neutral, 4 = somewhat interested, 5 = very much interested, 6 = prefer not to answer). The tourists were asked how much they are interested in doing the following activities on a farm:

Direct-to-consumer sales, agricultural education, recreation, accommodation, hands-on experiences, culinary experiences and events. Specific examples were given for each of these groups for better understanding. The survey took place on Mahé in the first two weeks of July 2023 and a total of 204 valid responses were collected. See Appendix 3.3 for the questionnaire.

Stakeholder workshop

After having gained an overview of the current state of agri-tourism in the Seychelles including the views, ideas, challenges and opportunities that different stakeholders perceive in the implementation of agri-tourism in the Seychelles, we conducted a workshop with 13 key stakeholders. Present at the workshop were four representatives from the Tourism Department, one representative from the Agricultural Department, two representatives from the Environmental Department, one consultant and three farmers and two students from Seychelles Institute of Agriculture and Horticulture (SIAH). The main aim of the workshop was to identify challenges that agri-tourism in the Seychelles is facing and to come up with clear actions and responsibilities for its further development. Additionally, the workshop also had the goal to build a platform for exchange between different stakeholders. The workshop took place in the Botanical House mid-July 2023 in Victoria and lasted 2.5 hours. Data was collected by extensive note taking during the workshop. Key themes as well as interesting quotes were noted. Further details are listed in the Appendix 3.5.

3.2.2 Data analysis

Expert and farmer interviews

All the interviews were partially paraphrased or transcribed according to notes that were taken during the interviews and recordings of the interviews. The 18 interviews were analysed through a qualitative thematic analysis (SAGE Publications, 2018). Many of the themes were already identified during the development of the interview guidelines, some were included additionally during the interview phase because they turned out to be relevant. For example, the struggling of the agricultural sector with ageing was hardly noticed and therefore we decided to include the topic of youth involvement in the analysis. The identified challenges and opportunities were visualised in a heatmap where the coloured squares represent the contribution of each interviewee to a topic.

Survey with tourists

The quantitative data from the tourist survey was analysed using R. In a descriptive analysis, the mean values of tourists' interest in different activities were determined to see trends which activities they prefer and which they do not (see Appendix 3.4 for the detailed analysis).

Stakeholder workshop

The workshop was evaluated by sorting our notes, clustering the data into umbrella themes and sorting them according to the participants prioritisation. Based on these results and those from the interviews, concrete actions and responsibilities were formulated.

3.3 Results

In this chapter, we will present our findings from the literature review, the semi-structured interviews and the workshop. The chapter is structured into current state of agri-tourism in the Seychelles, potential of agri-tourism and actions and responsibilities which are structured according to the main categories that emerged from the data analysis.

3.3.1 Current state of agri-tourism in the Seychelles

This chapter summarises the main findings about the current state of agri-tourism in the Seychelles. Also, results of the current legal/ policy framework around agri-tourism, the different definitions of agri-tourism, existing agri-tourism offers, and perceived challenges of agri-tourism are shown. The current offer is rather limited, but a high level of interest in expansion is expressed. The challenges range from financial constraints and workforce issues to gaps in education, youth engagement, and the need for cohesive policy and regulations. The following data are based on qualitative interviews and the workshop.

Definition of agri-tourism in the Seychelles context

Defining agri-tourism in the Seychelles is crucial due to varying definitions amongst stakeholders. The interviews revealed a shared understanding of agri-tourism amongst farmers, namely tourists visiting farms as a major component. This aligns with our working definition "agri-tourism" as an authentic form of rural tourism which allows tourists to experience activities on a working farm (e.g. harvesting, feeding, preserves preparation), and to be in contact with nature and animals while enjoying locally produced products which emphasises authentic rural experiences. In contrast to that, several experts had a broader view, linking farmers with hotels which aligns much more with the definition of agri-tourism that is being used in the agri-tourism policy (see introduction). One of the expert interviewees highlighted the significance of farmer-hotel linkages in the context of SIDS, whereas in Europe, agri-tourism is predominantly viewed as "leisure activity". Moreover, it was noted in the interview that there exists a fine line between the concepts of agri-tourism and eco-tourism, and they often accompany each other (Van Rooyen, 2007).

Underlying these statements, it was also emphasised that in the Seychelles agri-tourism also has the aspect of linking the agricultural and the tourism sector and that there needs to be a balance found between these two interests, so they can coexist in the same space and can profit from each other, without impeding the functions of the different sectors. Some concerns about tourism taking over agricultural land were brought up by stakeholders.

Legal framework related issues

In June 2021 a draft for an agri-tourism policy was released which was developed based on a previously executed study on the agri-tourism potential of the Seychelles (FAO, 2018). The whole process was led by a private consultant with the major involvement of the Agricultural Department, but also other stakeholders such as the Tourism Department and farmers were involved. It appears that the document did not reach all important stakeholders.

Now, five years later, Seychelles is still lacking an official policy or strategy for agri-tourism as the drafted policy has not yet been approved by the Cabinet of Ministers as it was highlighted in one interview.

Draft of agri-tourism policy

The Seychelles' agri-tourism policy framework integrates agriculture with tourism to give tourists better destination experiences while also generating revenue for farmers and the community. The agri-tourism policy's main goal is to offer a transparent and well-thought-out decision-making tool to direct the growth of the Seychelles' agri-tourism sector. It is not meant to distract the farming industry from its primary goals of ensuring the production and security of food. Instead, it tries to complement the hotel industry by providing a better organised, dependable supply and value chain system for locally produced agricultural goods. To support the national ambition to offer tourists more locally produced agricultural goods, expanded and enhanced destination experiences, higher foreign exchange retention, and economic inclusivity, the strategy aims to create stronger inter-sectoral links (Ministry of Agriculture, Climate Change and Environment, 2021).

Agricultural Development Fund

As a response to the Food and Agriculture Organisation (FAO)-funded study on agri-tourism (FAO, 2018), where financing was identified as a major hurdle, the Development Bank of Seychelles developed the Agricultural Development Fund (ADF) in collaboration with the Agricultural Department. There, farmers can get loans ranging from 25,000 to 5 million SCR for projects related to agriculture. The ADF loan has a low interest rate of 2.5% up to an amount of 3 million SCR and 5% for loans above 3 million SCR. An addendum was made to include agri-tourism and agro-processing projects. This addendum is not yet in force, so projects submitted in this regard will be held back until the addendum is signed (FAO, 2018).

Leased or private land

Legally, the situation to initiate an agri-tourism offer differs depending on whether the land on which farmers/ other initiators want to develop agri-tourism is agricultural land or whether it is private land. Agricultural land is normally leased from the government with the main aim to use it for agricultural production which is why accommodation is currently not allowed on leased agricultural land (Seychelles Planning Authority, 2015). This also means that the building of stationary buildings is not allowed as mentioned by several interviewees. In contrast, agri-tourism development was pointed out to be generally less restricted on private land if it complies with other regulations.

Existing agri-tourism offers

Agri-tourism offers in the Seychelles are currently limited, with only five identified sites engaged in agri-tourism (FAO, 2018). However, the interviews revealed a significant interest among experts and farmers to expand agri-tourism offers. The development status of the ideas varied greatly, with some sites being almost ready to host tourists, while others have visions that have not been implemented or planned out yet. Additionally, a few interviewees also mentioned that they were already infor-

The people interviewed gave different reasons for entering agri-tourism. Some financial reasons were mentioned, such as diversification of income, the financial attractiveness of the tourism sector or the need for additional income to maintain the farm. Others said they wanted to share their passion for their work and nature or that they were dissatisfied with the move towards 5-star tourism and wanted to create an alternative, more authentic offering.

In the 18 interviews with farmers and experts eleven main categories of challenges have been identified. These were further subdivided into challenges on farm level and on country level. The heatmap of the challenges is shown in Table 3.1. A more detailed heatmap including the 19 subcategories can be found in the Appendix 3.6.

Financing

A majority of the farmers mentioned that the access to finance is challenging. Some stated limited financial resources to be the only challenge to start their agri-tourism businesses. In some cases, ideas and plans for new offers existed but the projects have been dropped due to a lack of funding. The access to funds has also been perceived as a hurdle when it comes to the development of community projects. Among some interviewees the perception has come up that the government is not interested in assisting to finance agri-tourism projects. Two interviewees stated that it is time consuming to find access to finance and one mentioned

Workforce

The majority of the interviewed farmers and some experts raised the concern that agri-tourism leads to an additional workload because the workforce that engages with the visitors on the farm is lacking on the agricultural fields. Some farmers mentioned that they lack sufficient spare time. The expert interviewees additionally pointed out that they see different people being responsible for the agricultural production and the tourism offer. Several interviewees said that they cannot afford the additional workforce which would be needed to keep the agricultural production running whilst engaging with visitors. Several interviewees hire workers from abroad on their farms and some of them stated that they mistrust local workers. Some interviewees assume that for most Seychellois it is more attractive to work in the tourism industry and thus local workforce is missing in the agricultural sector.

Education and trainings

The interviewed students from SIAH confirmed that agri-tourism is currently not included in their curriculum. Therefore, they see a knowledge gap concerning this topic among the farmers. Several farmers, experts and workshop participants pointed out that corresponding training and education for farmers are missing. Another issue raised by some farmers and one expert are language barriers which hinder the farmers from engaging with tourists on their farms. One expert pointed out that being innovative and coming up with a vision should be trained as well.

Table 3.1
Heatmap showing challenges of agri-tourism in the Seychelles as a result of the interviews (Farmer interviews = blue, expert interviews = grey). The categories are listed according to how often they have been mentioned by the interviewees and in the workshop. The challenges are specified on the farm and the country level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Σ
Farm level																			
Financing	■	■	■		■		■	■		■	■	■				■		■	11
Workforce	■	■	■	■			■	■		■	■	■			■		■	■	10
Education and trainings	■				■					■		■	■	■	■		■	■	9
Youth engagement	■			■			■	■			■	■							6
Creating a business plan	■		■	■											■	■		■	6
Insurance and security									■	■	■			■		■	■		6
Access to agricultural land	■					■	■					■							4
Country level																			
Policies and institutional regulations						■	■			■				■	■		■	■	7
Creating the offer						■				■	■	■				■			5
Cooperation and communication		■	■							■				■		■		■	4
Land use conflicts												■					■		3

Youth engagement

Many interviewees observe a lack of young people in the agricultural sector. Two interviewees mentioned that if specialised employees retire it is difficult to find succeeding young people. But having young people on board would be appreciated by many interviewees. Further, several interviewees commented that the interest to work in the agricultural sector is low because the agricultural work does not seem very attractive.

Creating a business plan

For some of the farmers coming up with an adequate concept or business plan is a challenge. This hurdle was also confirmed by experts at the workshop. Several farmers and one expert mentioned that a business plan is necessary to get a loan from the bank.

Insurance and security

Some of the farmers mentioned insurance and safety issues are an uncertainty. Especially, in relation to the provision of locally produced refreshments and food, some farmers and experts raised health and sanitation concerns. Some of the experts shared the opinion that security issues must be addressed and regulated accordingly.

Access to agricultural land

Most agricultural land belongs to the government and can only be leased. According to some interviewees it takes some time to get access to agricultural land, possibly due to the administrative process in securing the lease. Especially for young people who have just finished their agricultural education, it seems to be a hurdle to get agricultural land.

Country level

Policies and institutional regulations

Some farmers and experts mentioned that clear standards, guidelines or a policy for the development of agri-tourism offers are currently lacking. One farmer and one expert stated that projects get rejected due to the lack of a policy. Another concern expressed is that regulations should be inclusive of all farm types and that taxes and regulations in relation to agri-tourism should not impact agricultural production. Stakeholder involvement into the process is currently perceived as missing amongst some interviewees. In the workshop the allocation of the earnings between the agricultural and tourism sector was mentioned to be challenging. One expert pointed out that an agri-tourism policy is being developed but it still has to be approved by the cabinet of ministers. None of the participants of the workshop, except the representative of the Agricultural Department, knew of the policy draft.

Creating the offer

Most interviewees addressed that coming up with a unique idea is essential but also challenging. For some the fear of being copied is central. Although one voice mentioned that there is an intellectual property committee where projects can be registered and protected, so that no one can take your idea. Another issue raised is that the offer must correspond to the demand of the visitors. Concerning the visitor's demand different opinions were observed among the interviewees. Some stated that the offer must

be unique and special to attract visitors, others took a general interest concerning the local practices and the production among visitors as given. The experts outlined that the kind of offered activities must be considered properly and regulated to a certain extent. Several interviewees stated that the agricultural activities should be accompanied and diversified by cultural practices and storytelling as well as educational information is a must for the offer to be successful. As not all agricultural products can be harvested all year round, one expert mentioned that this is an additional challenge that must be included when designing an agri-tourism offer. This expert also commented that animals need adequate living spaces so that tourists are not deterred.

Cooperation and communication

One farmer mentioned that crosstalk between different departments and organisations is needed as agri-tourism is an interdisciplinary topic. This corresponds to two expert opinions that stated that in the policy development process essential actors should be consulted and that the communication among these stakeholders needs improvement. This point has also been confirmed by the participants in the workshop. Some farmers reported a lack of support from the departments and the government. In some farmer interviews it was mentioned that cooperation between the farmers is missing. Some interviewees pointed out that not all farmers are interested in joining the farmers' association or any other type of cooperative.

Land use conflicts

According to some experts the local food production should be maximised which would lead to a decreased dependence on imported goods. They also stated that food security should not be affected by the development of agri-tourism offers in the country. Some of the experts addressed the concern that if tourism is encouraged on agricultural land this land may be lost as productive agricultural land. It was frequently mentioned that the loss of agricultural land to tourism activities should be prevented. The experts seemed to be aware of this issue, but it has also been mentioned in some of the farmers' interviews. The importance of achieving a balance between agriculture and tourism has been pointed out by several participants of the workshop.

3.3.2 Potential of agri-tourism

Although many challenges persist, all the interviewees see a potential for agri-tourism in the Seychelles. One expert stated that the potential depends on the size of the market, business model and investment. A few voices pointed out that the potential was dependent on the demand from tourists, particularly in the high-end tourism sector. Many others, however, held the opinion that tourists are looking for more than 'sun, sand and sea-holidays', and that they want to get to know different aspects of a country.

Visions from different stakeholders

Most of the farmers envision their agri-tourism offers primarily as farm tours, either as educational trails for individuals or guided tours with tour operators. Therefore, the tourists would either pay an entrance fee or package options such as a farm tour with creole food. Storage facilities for food processing, including preservation of juices, making jam or cassava chips, were also

During the workshop, farmers emphasised the importance of inclusive agri-tourism for various farm types and sizes. Additionally, they expressed their doubts about land conversion for

Opportunities for Seychelles

In this section we summarise the opportunities of agri-tourism identified in the interviews and in the workshop. We do this first at the farm level and secondly for Seychelles as a whole. A heatmap showing what was mentioned in which interview shown in Table 3.2.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Σ	
Farm level																				
<i>Economic opportunities</i>																				
Additional income	■	■	■		■			■	■		■	■	■	■	■	■	■	■	14	
Diversify income								■		■		■		■			■		5	
Improve market access for farmers			■			■	■		■			■			■	■	■	■	9	
Earn money all year round																				
Additional workforce		■				■									■			■	3	
<i>Sharing the culture</i>																				
Sharing the culture and passion for work/products	■	■	■	■		■	■	■	■	■	■			■	■		■	■	14	
Exchange with tourists	■		■	■	■		■		■		■						■		8	
Country level																				
<i>Diversification of the tourism sector</i>																				
More offerings for tourists	■	■	■	■		■	■	■	■		■	■		■	■	■	■	■	15	
<i>Education</i>																				
Learning place for tourists and locals	■	■	■	■			■	■	■	■	■	■		■	■		■	■	14	
Education about healthy food										■					■				2	
<i>Strengthen the agricultural sector</i>																				
Strengthen the agricultural sector and raising its appreciation								■					■	■		■			4	
Motivate farmers to produce food all year round								■												1
Motivate young people for agriculture		■		■									■	■					4	
<i>Further opportunities</i>																				
Positive influence on people's wellbeing			■					■									■			3
Preserve nature while doing tourism			■					■												2
Using the inland more							■													1

Farm level

Economic opportunities

Almost all farmers and experts mentioned economic opportunities of agri-tourism. They see it as a possibility of additional income for farmers, as tourism is considered financially lucrative. In particular, the chance to diversify farmers' income was highlighted. As farmers are often dependent on commodity markets, some interviewees and workshop participants indicated that the presence of tourists on the farm is an opportunity for better market access. Furthermore, one interviewee mentioned that because money can be earned with agri-tourism all year round, waiting times before the harvest could be bridged. Three of the respondents said that they see agri-tourism as an opportunity for additional labour force, e.g. when tourists volunteer in exchange for free accommodation.

Sharing the culture

In the interviews with farmers, it was particularly emphasised that for them agri-tourism is about culture. They want to share their passion for their work and their products, but also for the land and nature in general, with the tourists. Most of them find the exchange with the tourists exciting. Also, many experts as well as workshop participants saw the cultural exchange between farmers and visitors as a great opportunity. Relating this to Cultural Tourism (see chapter 2), the cultural aspect of agri-tourism could offer a valuable complementary element which seems to be currently lacking.

Country level

Diversification of the tourism sector

The current offer of activities for tourists is limited, which is why all interviewed experts, and most farmers see great opportunities in the creation of new offers in general and also in the field of agri-tourism. This was especially emphasised by the Tourism Department, for whom the diversification of tourism is a priority topic.

Education

Most interviewees mentioned that agri-tourism additionally has an educational aspect for them. They see agri-tourism sites as places of learning where tourists, but also locals, for example students of the Seychelles Institute of Agriculture and Horticulture, can learn more about the origin of food, traditional farming methods and further processing. Some also see potential for education about healthy and locally produced food.

Strengthening the agricultural sector

One expert and some farmers see agri-tourism as an opportunity to strengthen the agricultural sector. It was mentioned that by bringing consumers and producers closer together, agri-tourism could increase the appreciation of the agricultural sector. Also, one farmer said that it could motivate farmers to be more involved in agriculture, as agri-tourism can only work if a farm is well maintained. And as tourism can be practised year-round, farmers would have an incentive to produce year-round. Also, some interviewees see potential in agri-tourism to motivate young people for the agricultural sector. Especially, because it makes the field more exciting through the additional tourism component.

Other interviewees were not sure whether agri-tourism can be a motivation for young people to go into agriculture, they mentioned the hard physical work as a deterrent factor.

Further opportunities

A few interviewees mentioned that agri-tourism could have a positive effect on people's wellbeing by increasing their physical work and connectivity with nature. Two farmers said that they see agri-tourism as a good way to preserve nature and still do tourism. Also, someone saw potential in using the inland more. According to them, the inland is pleasantly cool even when it is very hot on the coast and tourists would appreciate spending time in the inland during the day.

Tourist perception

From the 204 valid responses of the tourist survey, the mean level of interest for each agri-tourism activity was calculated (see Figure 3.1). The results show that offers in the areas of agricultural education, direct-to-consumer sales and culinary experiences were the most popular among the tourists surveyed. Tourists were least interested in overnight accommodation on a farm and in hands-on experiences. To put the mean values into perspective: 104 people stated that they are "very interested" in an agricultural education activity (scale 5), that is more than every second person in the sample. Overall, the graph shows that tourists are definitely interested in participating in agri-tourism activities ($M = 3.60$, $SD = 0.44$). The comparison of the answers of the same tourist sample regarding agri-tourism (Figure 3.1) and adventure activities (See Chapter 4, Figure 4.2) shows that the mean interest level of tourists in the first-placed agri-tourism offer "agricultural education" is almost identical to the second-placed adventure offer "hiking".

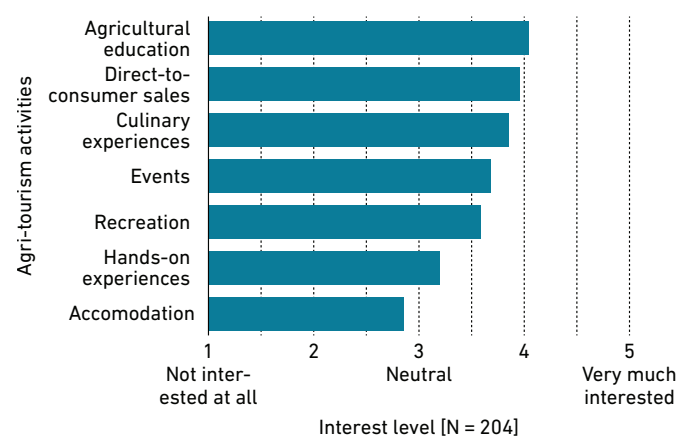


Figure 3.1
Mean interest level in agri-tourism activities. 1 = not interested at all, 2 = somewhat not interested, 3 = neutral, 4 = somewhat interested, 5 = very much interested.

3.3.3 Actions moving forward

Through the workshop and the interviews five fields of actions that are needed for successful agri-tourism implementation in the Seychelles were identified: Agri-tourism policy with the involvement of all important stakeholders, strengthen communication between stakeholders, strengthen education, enable access to

finance, adjustment of regulations. The order of fields of actions was based on a prioritisation task given to the participants during the workshop. Therefore, the first field of action in the list was pointed out to be the most important one.

Agri-tourism policy with the involvement of all important stakeholders

Experts stressed the need for an agri-tourism policy in the Seychelles. Our interviews and the workshop showed a lack of awareness of the existence or content of the policy draft, emphasising the importance of sharing the documents. Further, it was highlighted to include all important stakeholders in policy development. It was proposed to organise a validation workshop for an action plan which should include clear standards and a categorisation of different agri-tourism offers.

Strengthen communication between stakeholders

It was found that enhanced cooperation and communication between different involved stakeholders is needed. Two specific actions that were mentioned were the set-up of a national committee that includes different actors in order to come up with a strategic plan, and the setup of an agri-tourism association within the farmer's association. Furthermore, cooperation between farmers and the implementation of community projects would facilitate the successful implementation of agri-tourism offers.

Education

Education emerged as a critical aspect in promoting agri-tourism, according to eight interviewees and workshop participants.

They stressed the need to guide farmers in how to write a funding proposal, on how to set up an agri-tourism offer and how to market these offers. Additionally, the need for an agri-tourism course at the SIAH was emphasised at the workshop and by SIAH students. The workshop also revealed that farmer to farmer education should be strengthened. Although many people agreed that education is a key aspect in promoting agri-tourism, one voice also mentioned the Agricultural Department already provides guidance to farmers. Generally, it can be seen that education is mostly seen as an important field of action by experts.

Enable access to finances

Access to finance has been mentioned in almost all the interviews and was discussed in the workshop. The majority of the interviewed farmers perceived a need for more financial support for agri-tourism projects. However, some voices mentioned either that they did not want or need any support from the government while others mentioned that they already got support from other international organisations or from the government through the Development Bank of Seychelles. Also, experts disagreed whether financial support for agri-tourism projects was needed. One voice mentioned that there was already a funding option through the ADF in place whereas other expert voices were either not aware of this fund or they did not see that this fund was working for agri-tourism. Similarly, most farmers also seemed to be unaware of the ADF.

Adjustments of regulations

During the workshop some voices mentioned that an amendment of the health policy under the Public Health Authority needs to be conducted since with the current legislation it is really difficult to get agri-tourism projects approved. In alignment with this, a change of the conditions for the lease of agricultural land to allow for tourism development was proposed which would fall under the responsibilities of the Department of Land and the Agricultural Department.

3.4 Discussion

The goal of this study was to explore potential agri-tourism activities, further actions for its implementation and the contribution of agri-tourism to sustainable tourism development. Therefore, this section provides a discussion of the results. Furthermore, a brief overview on limitations of our study will be given.

3.4.1 Current state of agri-tourism – achievements and challenges

Currently, only a few official agri-tourism offers exist in the Seychelles, however interest amongst the interviewed farmers to venture into agri-tourism is high. Most farmers that we interviewed were located in the Val d'Endor area. This contrasts the location of potential agri-tourism areas in Mahé which are proposed to be located on the western side between Port Glaud and Grand Anse towards the inland (Government Seychelles, 2015). Therefore, we suggest taking up the Val d'Endor area as a potential area for agri-tourism in future strategies (Figure 3.2).

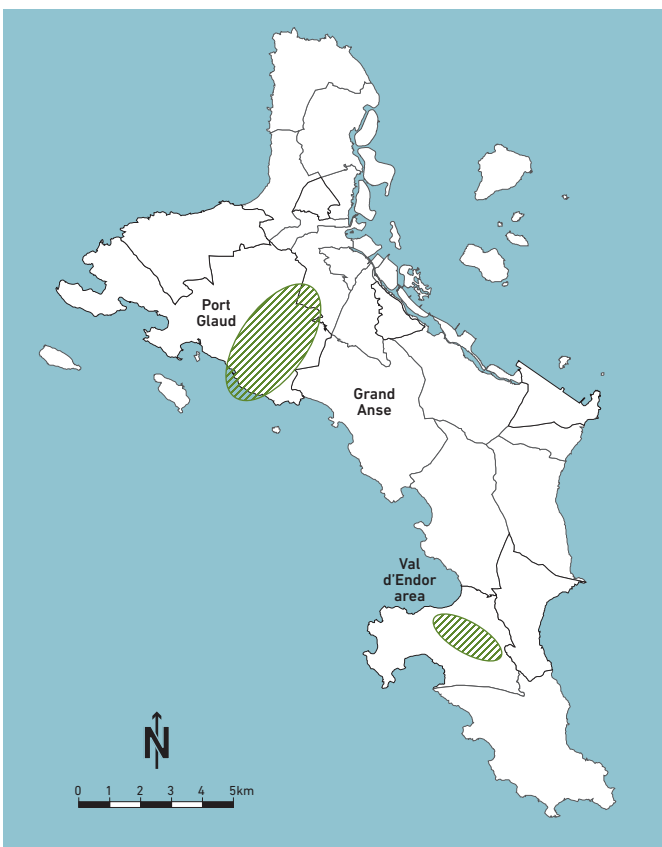


Figure 3.2
Location of potential agri-tourism areas in Mahé.

As our results show, the biggest challenge in implementing agri-tourism is financing. The literature also points out that agri-tourism requires significant investments in agricultural infrastructure, which can lead to financial burdens for small family-owned farms. This can create socio-economic inequities between wealthier and poorer farmers, particularly as tourists tend to seek out high-quality tourist experiences (Thomas et al., 2018). Similarly, small-scale farmers, relying solely on their farms as their primary source of income, often lack the financial capacity to invest in tourist infrastructure, necessitating the need for loans. Apparently, this financial challenge has been recognised by the government and in response, the ADF is to receive an addendum to include agri-tourism projects. Thanks to the ADF and the planned addendum, some experts believed there are now sufficient financing possibilities. However, firstly, this addendum has yet to be signed, and secondly, only one of the farmers interviewed knew about it.

In addition, a lack of education for farmers was identified as a challenge which aligns with findings from Yu & Spencer (2021). Other education related challenges that were pointed out in our findings and in the literature were that farmers do not have practical on-farm knowledge on how to develop an agri-tourism farm and how to market and promote it (Naidoo & Pearce, 2018; Yu & Spencer, 2020). Here, it became apparent too that the opinions of farmers and experts do not always coincide. While some experts considered the support for farmers to be sufficient and mentioned trainings held by the Agricultural Department, this was never mentioned in the farmer interviews and some farmers felt they had too little support.

Communication, on the one hand between the departments, but also with other stakeholders, is insufficient. This was reported by several interviewees, but also corresponds to our experiences on the ground. It was sometimes difficult to get hold of certain documents or contacts, especially the Agricultural Department was hard to reach. This was not only an obstacle for our research, but it is also a major hurdle for the advancement of agri-tourism in Seychelles. As we noted, quite some work has already been done on the topic of agri-tourism. For example, in 2018, the FAO conducted a study on agri-tourism (FAO, 2018) that identified several obstacles, following which various measures were taken. However, neither the report nor the measures were really disseminated, which is probably why we still found similar challenges five years after the report was released. The lack of communication is therefore a major obstacle to the rapid implementation of agri-tourism.

Insufficient communication between departments and stakeholders is also likely to be partly responsible for the fact that agri-tourism is understood and interpreted differently. There seems to be a consensus that agri-tourism is a link between the agricultural and tourism sector. However, what this link should look like seems to be interpreted quite differently. Comparing Seychelles' agri-tourism policy with Vanuatu's (Vanuatu Agritourism: Plan of action, 2016) both include sectoral linkages and market access as key components. On the one hand, this shows that the

two countries have a similar understanding of agri-tourism. But on the other hand, this interpretation of agri-tourism is less in line with our work and farmers perception, which focuses on tourists visiting a farm for leisure purposes. This shows that there is a need for a discussion on the understanding of agri-tourism. Also, it raises the question of which aspect of these different interpretations should be prioritised in an action plan. A balance must be found between the agricultural and tourism interests so that they can coexist and benefit from each other.

3.4.2 The potential of agri-tourism in the Seychelles

Despite the existence of various challenges, our findings demonstrate that stakeholders in the Seychelles recognize significant potential in agri-tourism. Farmers expressed many ideas for implementing agri-tourism on their farm, indicating the many elements that the concept comprises. Interestingly, farmers with better financial opportunities, reflected for example in foreign travel or a higher level of education, displayed greater visions for farm-level implementation of agri-tourism.

At the farm level, we were able to identify two opportunities: economic opportunities and the opportunity of sharing the culture. These economic opportunities align with existing scientific literature which suggests that agri-tourism could contribute to an increased revenue for farmers due to their expanding into the tourism industry (Naidoo & Sharpley, 2016; Thomas et al., 2018; Yu & Spencer, 2021). Regarding knowledge sharing, a clear desire among farmers to share their culture with tourists was noticeable. Encouragingly, we found that tourists' interest in agricultural education is the highest of all the agri-tourism offerings surveyed. This aligns with findings from Ammirato et al. (2020) who emphasised the educational value of farm visits to gain a deeper understanding of agriculture.

At the country level, opportunities for diversifying the tourism sector, promoting education and strengthening the agricultural sector were identified. It is not surprising that diversification emerged as a priority topic by the Tourism Department (Government of Seychelles, 2018). What is interesting, however, is that this perspective was shared by many other interviewees. Moreover, we recognized that the agricultural sector lacks a favourable image, underscoring the potential of agri-tourism to enhance the attractiveness of the agricultural sector. Agriculture is generally seen as an activity with low status and prestige (Government of Seychelles, 2015; Glimmann, 2017). One might expect that agri-tourism would be of lesser interest to Seychelles visitors, given that they are often used to 5-star standards. However, the results of the tourist survey suggest that the opposite seems to be the case and that agri-tourism has potential to offer customers an exclusive and authentic experience that they cannot get in a hotel. Only accommodation was on average met with disinterest by tourists, which supports its exclusion in current strategies (Seychelles Planning Authority, 2015). Excluding accommodation also seems reasonable considering the high number of already existing accommodations in the Seychelles as mentioned in one interview.

3.4.3 Further needs to promote the implementation of agri-tourism

The five fields of actions identified in section 3.3.3 are all at the policy level. Therefore, most of the responsibilities of the suggested actions lie with the different departments and/or the government.

As discovered at the workshop, none of the stakeholders present, besides the Agricultural Department, was aware that the agri-tourism policy was drafted. The development of the draft and the consultation process occurred when the old government was still in place. The draft was only completed under the new government, but there is a possibility that some information may have been lost in the transition. In any case, the unfamiliarity of the policy shows that the cooperation between the different departments does not work as it should and shows the need for support for communication between the different stakeholders.

An action identified at the workshop is to enhance this cooperation through the setup of a national committee or an agri-tourism association within the farmers' association. Similar actions have already proven to be successful in Vanuatu where an "Agritourism Steering Committee" responsible for the coordination of the implementation of the Vanuatu Agritourism Plan of Action (VAPA) was set up (Vanuatu Agritourism: Plan of action, 2016). Such an action plan is also planned to be developed in the Seychelles. However, this requires the prior approval of the agri-tourism policy through the Cabinet of Ministers. The setup of an agri-tourism association on the level of farmers seems to be more difficult to implement, as some interviewees stated that the national farmers' association is not functioning, and that communication does not even work in district farmers' associations.

3.4.4 Limitations

This report was heavily dependent on contacts and communication with various stakeholders in the Seychelles. Upon arrival in the Seychelles, the snowball technique proved to be very effective in finding suitable interview partners. Being physically present in the country allowed us to really get to know the system and the local context. Unfortunately, we only received a copy of the unpublished agri-tourism policy at a late stage when our study was already very progressed, which prevented us from including this information in the development of the interview guidelines for both farmers and experts. Nevertheless, our research findings closely aligned with findings from the agri-tourism policy draft and other existing literature. This consistency between our outcomes and established knowledge underlies the validity of our findings and contributes to the robustness of our findings.

As the interviews were semi-structured, slightly different questions were asked during the interviews, which made data analysis more difficult. If an interviewee was not directly asked something, there is a likelihood that they did not provide insights on that particular aspect. This could have potentially affected the representation of certain aspects in the heatmap.

Another limitation of our study is that we only conducted interviews with the Tourism, Environmental and Agricultural Departments which do not reflect all the stakeholders that are or should be involved in agri-tourism in Seychelles. In addition, only farmers from Mahé and La Digue were interviewed, and farmers from Val d'Endor were overrepresented. Therefore, the perception of farmers on Praslin and in other areas is not represented in this study, although they might show a similar picture.

Despite these limitations, our study has contributed valuable knowledge into the field of agri-tourism in the Seychelles.

3.5 Conclusion

To summarise our findings, it can be said that there is definitely a potential for the implementation of agri-tourism in the Seychelles. This statement is not only based on interviews, but also tourists showed a high interest in agri-tourism experiences, especially agricultural education was rated as very interesting. Moreover, for a sustainable development of agri-tourism young motivated people are needed. As found in the results, farmers are overaged and there is a lack of young farmers. Therefore, agricultural education should be rethought, and a focus should be put on strengthening and improving the image of the agricultural sector. As a basis for a successful implementation of agri-tourism, an intact agricultural sector should be aimed at and additionally, some further actions need to be taken.

Foremost, a comprehensive agri-tourism policy must be approved, incorporating inputs from all key stakeholders. This also means assigning clear responsibilities to all involved actors. Further, communication amongst stakeholders and educational efforts should be enhanced. A key conclusion that can be drawn is that the collaboration between the Agricultural Department and the Tourism Department is vital to be enhanced. Striking an even balance between these two sectors is crucial for the implementation of agri-tourism, with both sectors mutually benefiting from its development. However, the publication of an agri-tourism policy is certainly not enough, grassroot efforts are essential for a successful implementation of agri-tourism in the Seychelles.

There are many fields in the implementation of agri-tourism that could be researched further. Land ownership, i.e., whether agricultural land is in private or state hands, can have an impact on whether or not agri-tourism is adopted or not. There is a special need to dive deeper into studying how agri-tourism can contribute to food security, especially by including the linkages between hotels and farmers, which are highly relevant for agri-tourism. On the other hand, there is a need for research on the evaluation of the agri-tourism policy and how it can be implemented effectively. Another field of interest could be the in-depth analysis of how barriers can be overcome or criteria that make agri-tourism economically viable.

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4 Terrestrial adventure tourism in the Seychelles – An opportunity

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4.1 Introduction

In this report, we investigate ways to enhance adventure tourism in the Seychelles while maintaining a delicate equilibrium between economic prosperity and the preservation of natural beauty of the environment. The Centre for the Promotion of Imports from developing countries (CBI, 2023) and the Adventure Travel Trade Association (ATTA, 2010) define adventure tourism as a tourism trip that includes at least two out of three elements; the elements being physical activity, natural environment, and cultural immersion. Similarly, the United Nations World Tourism Organisation (UNWTO, n.d.) defines adventure tourism according to the same three elements, adding that it typically takes place in a destination with specific geographic features. While there are many definitions for adventure tourism in use, our working definition of adventure activities, derived from literature, is the following: recreational activities that require dynamic movement of the body and that take place outdoors (Rantala et al., 2018). This definition acknowledges the natural and dynamic elements as mentioned in literature, and allows us to explore the possibilities of integrating culture or conservation into these activities. Moreover, as our focus is on terrestrial activities, we explore activities that take place on land only.

Based on the definition by the CBI (2023), which additionally makes a distinction between soft and hard adventure travel, we also differentiate between two types of adventure activities. The first one is “soft” activities, which can be carried out by those who are not experienced in outdoor adventure. The second is “hard” activities, for which participation is limited due to physical capabilities and skills of the individuals (CBI, 2023). Some activities could be adapted to be either soft or hard. Hard activities are more challenging to implement and might demand more know-how which is currently lacking in the Seychelles. For this reason, we decided to explore rather soft adventure tourism activities.

According to the Seychelles Tourism Masterplan, the country faces the challenge of accommodating a significant number of visitors, which is putting a strain on the country’s carrying capacity (Sustainable Travel International, 2019). The Masterplan recommends emphasizing quality over quantity of tourists through measures such as introducing additional activities and enhancing the quality of existing ones. This approach aims to increase spending per visitor and improve the quality of their stays while preserving the natural beauty and cultural heritage of the country.

Indeed, adventure tourism could improve tourists’ stays, evidenced by the noticeable trend among travellers seeking new and unique experiences that reflect the essence of the destinations they visit (Government of Seychelles, 2019). Moreover, adventure tourism has become safer and more affordable, making it accessible to a broader range of demographics, and the exposure facilitated by social media has further fuelled people’s desire to replace traditional beach and sun vacations with more exceptional and distinctive experiences (French, 2015). This increased desire and possibility for adventure tourism could present an opportunity for the Seychelles, as the unique aspects of the natural envi-

ronment make the island nation attractive for adventure tourism. For example, the granite rocks pose great opportunities for hiking, rock climbing, and ziplining, with views over the Indian Ocean.

By providing local jobs and linking local industries to tourism, adventure tourism helps to keep revenue inside the country and therefore decrease economic leakage of funds over the country’s borders (Zurick 1992; UNWTO, 2014; Adventure Travel Trade Association, 2021; Lacher & Nepal, 2010). For comparison, to generate 10,000USD that remain in the local economy, it takes on average either 96 cruise tourists, 9 overnight package tourists, or only 4 adventure tourists. In other words, 14% of revenue from mass tourism remains in the country, while for adventure tourism this is 65%. Additionally, mass tourism generates 1.5 local jobs per 100USD, while adventure tourism generates 2.6 local jobs per 100USD (Adventure Travel Trade Association, 2021). On top of retaining money within the local economy, adventure tourism is also assumed to increase the spending per visitor (Government of Seychelles, 2015).

Given these reasons, we believe adventure tourism to pose an opportunity to be further explored, while having as primary goal the preservation of the natural beauty of the Seychelles.

This report aims to explore the implementation of terrestrial adventure activities in the Seychelles. We emphasize that achieving aspirations in adventure tourism must go hand in hand with preserving the quality of the natural environment, which holds great value for visitors and the country. Thus, our research seeks to answer the following core research question:

How can adventure tourism be sustainably established in the Seychelles’ terrestrial environment, ensuring ecosystem protection and integrity?

Our investigation is structured along four sub-questions:

1. Which adventure tourism activities are viable, considering the Seychelles’ available ecosystems, as well as activities’ potential environmental harms and mitigation efforts?
2. What are the preferences of both tourists and locals regarding various adventure tourism offerings?
3. What are the factors that influence tourists’ interests in terrestrial adventure tourism?
4. What are the perspectives of local authorities on this topic?

4.2 Methods

To answer our research questions, we applied a number of methods such as literature review, semi-structured interviews, surveys, and workshops.

4.2.1 Data collection

Literature review (Environmental assessment table)

A qualitative literature review was performed to construct a list of adventure activities which the Seychelles’ ecosystems can allow, and that we believe to be environment-friendly. We conducted an extensive search for existing reports and articles on outdoor

activities as well as the potential ecological side effects of these activities, and how they can be mitigated. The outcome of the list is an harm and harm mitigation analysis. We refer to this list as the environmental assessment table (Table 4.2).

Expert interviews

We performed two semi-structured interviews; one with a local conservation specialist and one with an adventure tourism expert.

The interview with a local conservation specialist had as the objective to discuss aspects such as ecosystem availability, potential environmental harms, mitigation methods of those potential environmental harms, as well as legal barriers. More precisely, it was scheduled to validate and limit the list of terrestrial adventure activities that the Seychelles’ ecosystems can allow, and that we believe to be environment-friendly; in other words, to validate the literature-based environmental assessment table. The interview with the adventure tourism expert aimed to gain further insights on the global adventure tourism market in general, as well as on possibilities and current hurdles in the Seychelles. The interview was developed based on gaps in literature and context that were still remaining during this point of our fieldwork, tailored to the interviewee’s expertise. The interviews were conducted in July 2023, they were recorded, and notes were taken. The interview guideline can be found in Appendix 4.1.

Surveys

The survey focussed on two groups: tourists and residents, as we wanted to find out what the tourists’ preferences were in terms of adventure tourism. The goal of interviewing residents was for them to also take part in adventure activities/or to discover if there would be an interest.

Survey with tourists

The tourist survey was designed to understand and quantify the perceptions of tourists regarding various adventure tourism offerings. We included our list of terrestrial adventure activities from the environmental assessment table to poll the level of interest for each activity (see Table 4.2).

In the month of July 2023, we conducted in-person surveys with tourists at various locations on Mahé such as the Sir Selwyn Selwyn-Clarke Market, the boat port, the airport, and the Beau Vallon beach. We also handed out 150 QR codes at these locations. In total we collected 204 completed questionnaires.

We assessed the preferences of tourists in regard to certain adventure activities using a 5-point Likert scale (1 = ‘not interested at all’, 2 = ‘somewhat not interested’, 3 = ‘neutral’, 4 = ‘somewhat inter-

ested’, and 5 = ‘very much interested’). As a means of comparison, we also included air- and marine-based adventure activities in our survey. As a marine-based activity, we included snorkelling/scuba diving, as it is one of the most popular and widespread activities currently, as well as jet-skiing to see if people are more inclined to do hard adventure activities. As an air-based activity, we included skydiving, which is also a hard adventure activity.

Additionally, we added a question on what factors could stop people from doing an activity of their interests, in order to address barriers if they exist. We also asked on which islands they are staying, in which accommodation type, and with whom they are travelling. The survey concluded with the demographics of the interviewee.

We can observe that most people surveyed were in their twenties (38%) and thirties (36%). The mean age of respondents is 37 years (Figure 4.5, Appendix 4.3), with a balanced gender distribution (51% male, 49% female). Table 4.1 provides an overview of the country of residence of the surveyed tourists. For the full survey, see Appendix 4.2 and for the figures, Appendix 4.3.

Survey with locals

As tourists would not be the only ones performing adventure activities, we asked the local population about their interest in participating in activities from our list. Additionally, we included a question on whether the locals would be interested in doing these activities together with tourists, to show whether these activities could also be shared between the local community and the tourists. We were able to include part of our questions in the survey from the Social Impact of Tourism group (see Chapter 5 of this report), which surveyed locals through a randomized sample. In total, 356 residents were surveyed. The survey was conducted in the month of July 2023. The average surveyed Seychellois was 46 years old (see Appendix 4.3, Figure 4.7 for the age distribution).

Workshop

The objectives of the workshop were to have local authorities understand the other parties’ perspectives on the implementation of terrestrial adventure tourism activities, as well as to identify areas of shared goals and possibilities. An interactive workshop was deemed the most effective method to facilitate and encourage discussion around these topics. We moderated a workshop with representatives from different local authorities such as the Seychelles Park and Garden Authority, the Tourism Department, the Seychelles Island Foundation, the Department of Environment, and the Seychelles Investment Board. A total of eight participants attended. The workshop took place on July 13th in the Botanical House in Victoria.

Table 4.1
Country of residence of tourists surveyed. See Appendix 4.3, Figure 4.6 for details on the category ‘Other’.

Country	Germany	France	Switzerland	UK	USA	Russia	South Africa	UAE	China	Netherlands	Other
Count [%]	20.6	10.8	9.3	7.3	6.9	6.4	2.9	2.5	1.5	1.5	30.4

The workshop was outlined into four key sections: feedback on preliminary findings, sharing initial perspectives – clustering exercise, information exchange, and discussion – case study, and lastly identifying common ground, interdependencies, and the personal role. The outline and the exercises presented to the participants are explained in further detail in Appendix 4.4.

The validation of our preliminary environmental assessment table was incorporated to receive additional expert feedback on our assessment. A clustering exercise was presented in order to have each participant present their initial thoughts on the topic in an undisturbed way, as well as for us to receive an overview of the initial perspectives on terrestrial adventure tourism. The activity ‘canopy trail’ was chosen as the case study, as this was the highest-ranked terrestrial activity that does not yet exist in the Seychelles. The aim was thus to generate a concrete discussion on the potential implementation of an activity, in order to see the interactions and perspectives of the experts present. These exercises served as the base for identifying where the participants share common ground, where they are interdependent, and what each participant’s individual role looks like. Reflection on those points was meant to highlight possibilities for cooperation in the future. We collected the data by taking notes and pictures of the outcome of the exercises of the workshop.

Environmental friendliness-interest matrix

To summarize our results, we created a variation of the BCG matrix, a matrix created by the Boston Consulting Group to decide whether they should invest, discontinue or develop certain products (Hanlon, 2022). We used the BCG matrix to assess the performance of each activity, assisting the decision-makers in deciding where to allocate more resources and which activities not to implement. In our case, the terms growth market and market share have been replaced by interest level and environmental friendliness in accordance with our research topic; for each activity, we plotted environment friendliness against the interest level of the tourists. We placed the nine activities on the matrix according to the results from the survey regarding the interest level, and according to the results from the workshop, interview, and literature research regarding the environmental impact.

The activities scoring positively on both aspects are considered ‘stars’, activities that have the most potential. ‘Dogs’ are activities scoring negatively on both aspects, and are therefore activities that should not be investigated. ‘Question marks’ are activities with high environmental friendliness but low interest among the tourists. They might become a star but most probably need a lot of investment. ‘Cash cows’ are activities with high interest but low environmental friendliness. These activities have the potential to bring money (Hanlon, 2022), however, at an environmental cost.

4.2.2 Data analysis

Environmental assessment table

Based on literature review, and validated by a conservation specialist and workshop participants, we have identified a list of nine terrestrial adventure tourism activities that we judge as being suitable and sustainable for the terrestrial ecosystems of Seychelles, listed in Table 4.2. According to the local conservation

specialist interviewed, the list is complete, and all mentioned activities are theoretically possible in the Seychelles. It is important to note that an activity being possible does not imply its feasibility.

The interview with the conservation expert provided additional insights worth mentioning. According to the specialist, littering could be an overarching problem for all activities. The specialist expressed additional concern regarding the slower-paced activities or activities where individuals take unsupervised breaks. Litter can harm wildlife, introduce non-native species, and pollute water sources. Another threat is people smoking cigarettes, which can result in human-caused wildfires, especially during the dry season. Additionally, the specialist expressed a need to ensure that people do not take plant species, shells, or any organisms with them upon return. This can be limited by providing facilities where people can leave their baggage, such as backpacks, during, for example, wildlife tours.

We then asked about mitigation efforts possible for these activities. The conservation specialist believes that many potential side effects can be managed effectively, as long as an appropriate carrying capacity as well as tourist education is established for different activities and trails. The specialist recommends implementing activities in man-made parks rather than natural parks. Furthermore, the specialist emphasizes that potential implementation is all dependent on which specific activity you wish to implement at which specific site. As an additional note, the slower-paced activities can include educational, conservational and cultural aspects which one could consider as a mitigation effort. These activities include: hiking, canopy trail, yoga, and wildlife tours.

Further information on implementation can be taken from an exemplary case study in Appendix 4.5, which showcases how barriers to implementation were overcome in the case of a canopy trail in Hawaii.

Expert interviews

The interviews were transcribed and qualitatively analysed by reporting the important information. The conservation specialist’s comments validated the findings from the literature research and resulted in additional information, which has been added to Table 4.2.

The interview with the adventure tourism expert was analysed by incorporating relevant information qualitatively into this research. The three overarching themes identified from this interview were: collaboration efforts, adventure tourism expertise, and incentives to enter the adventure tourism market.

Survey with tourists and locals

By using the web-based software Qualtrics for both tourist and local surveys, our data could be easily exported, whereby all values were numerical. The data was then analysed in STATA. In a first step, this quantitative analysis consisted of cleaning up data by removing incomplete surveys and grouping respondents into age segments based on their year of birth. It was checked that the data was normally distributed before performing tests.

Table 4.2

Environmental assessment of selected terrestrial adventure tourism activities.

Activity	Potential harm	Measures to limit harm	Comments	References
Mountain biking	<ul style="list-style-type: none"> • Soil erosion • Trail widening • Littering/human-caused forest fires/people taking natural objects home • Disturbance of wildlife and vegetation • (Non-native) seed dispersion 	<ul style="list-style-type: none"> • Keep bikers on trail (e.g. legal incentives or barriers, sign boards, challenging paths with possibility of avoiding obstacles) • Select soils less prone to erosion: avoid steep descents and curves • Trail hardening • Bike (tire) cleaning between rides • Avoid wildlife-dense areas and key biodiversity areas • Keep people responsible (e.g. legal incentives, trashcan along trails, environmental education for clients) 	Mountain biking is considered off-road cycling, while cycling is on paved roads.	<ul style="list-style-type: none"> • Weiss et al., 2016 • Hardiman & Burgin, 2013 • Goeft & Alder, 2001 • Cessford, 1995 • Wilson & Seney, 1994
Zip-lining	<ul style="list-style-type: none"> • Littering • Disturbance of wildlife • Cutting down plants • Noise pollution (screaming) • Attachment of materials to trees 	<ul style="list-style-type: none"> • Avoid during nesting seasons • Use of wooden buffers, artificial poles • Keep people responsible (e.g. legal incentives, education campaigns) • Check tree health regularly 		<ul style="list-style-type: none"> • Cremonesi et al., 2022 • Marrosu & Balvis, 2020 • Bergen, 2019 • ZipFiji, 2015
Climbing	<ul style="list-style-type: none"> • Littering • Disturbance of wildlife and vegetation • Damage to rocks 	<ul style="list-style-type: none"> • Avoid during nesting or fruition seasons • Build artificial parks/use artificial structures • Keep people responsible (e.g. legal incentives, education campaigns, trashcan along trails) 	We limit the scope of our assessment to bouldering and climbing on equipped paths. Bouldering entails climbing without the help of ropes or a harness, and the participants typically make use of a matress to soften the fall.	<ul style="list-style-type: none"> • Marrosu & Balvis, 2020 • Covy et al., 2020 • Vogler & Reisch, 2011
Hiking	<ul style="list-style-type: none"> • Soil erosion • Trail widening • Littering/human caused forest fires/people taking natural objects home • Disturbance of wildlife and vegetation • (Non-native) seed dispersion 	<ul style="list-style-type: none"> • Keep hikers on trail (e.g. education campaign or barriers) • Keep people responsible (e.g. legal incentives, trashcan along trails) 		<ul style="list-style-type: none"> • Pickering et al., 2010 • Follow Alice, 2022
Canopy trail	<ul style="list-style-type: none"> • Littering • Disturbance of wildlife • Cutting down plants • Attachment of materials to tree 	<ul style="list-style-type: none"> • Avoid during nesting seasons • Use of wooden buffers, artificial poles • Keep people responsible (e.g. legal incentives, education campaigns) • Check tree health regularly • Not all obstacles need to be cut away (as opposed to zipline) 	<p>A canopy trail is a network of walkways consisting of bridges between trees linked up with platforms inside and around trees.</p> <p>For both the zipline and the canopy trail visitors will not be stepping on vegetation or causing soil erosion as the activities take place in the treetops. For the canopy trail not all obstacles have to be removed as the aim is that the trail can be challenging.</p>	<ul style="list-style-type: none"> • Cremonesi et al., 2022 • Bergen, 2019 • Marrosu & Balvis, 2020

Table 4.2
continued

Activity	Potential harm	Measures to limit harm	Comments	References
Cycling	<ul style="list-style-type: none"> • Soil erosion • Trail widening • Littering/human caused forest fires/ people taking natural objects home • Disturbance of wild-life and vegetation • (Non-native) seed dispersion 	<ul style="list-style-type: none"> • Keep riders on trail (e.g. education campaign or barriers) • Keep people responsible (e.g. legal incentives, trashcan along trails) 	Due to the Seychelles' tropical climate, e-bikes can be a less exhausting way to bike around the islands versus conventional bikes. The assessment in the table will be the same, if renewable energy is used for charging.	<ul style="list-style-type: none"> • Hardiman & Burgin, 2013 • Cessford, 1995. • Weiss et al., 2016 • Wilson & Seney, 1994 • Goefit & Alder, 2001
Yoga	<ul style="list-style-type: none"> • Littering/human caused forest fires/ people taking natural objects home • Disturbance of wild-life 	<ul style="list-style-type: none"> • Avoid wildlife dense areas • Keep people responsible (e.g. legal incentives, trashcan along trails) 		No scientific sources reporting any harm to the environment by yoga in nature were found. The information in this table comes solely from the interviewed expert.
Wildlife tours	<ul style="list-style-type: none"> • Littering/human caused forest fires/ people taking natural objects home • Disturbance of wild-life and vegetation • Noise pollution and pollution if motorized vehicle used 	<ul style="list-style-type: none"> • Keep people on trail (e.g. education campaign) • Keep people responsible (e.g. legal incentives, trashcan along trails) • Avoid during nesting seasons • Avoid age of motorized vehicle 		<ul style="list-style-type: none"> • Elizabeth Gorga, 2022
Horseback riding	<ul style="list-style-type: none"> • Soil erosion • Trail widening • Littering • Disturbance of wild-life and vegetation • (Non-native) seed dispersion • Horse wellbeing 	<ul style="list-style-type: none"> • Keep people on trail (e.g. education campaign) • Keep people responsible (e.g. legal incentives, trashcan along trails) • Properly dispose of manure • Check horse health regularly 		<ul style="list-style-type: none"> • Newsome et al., 2004

Descriptive statistics were used to visualize certain variables using RStudio, mainly making use of frequencies and percentages. These values were summarized in histograms or pie charts (see Figures 4.1–4.3 and Appendix 4.3).

To answer what factors influence tourists' interests in terrestrial adventure tourism, a multiple linear regression was performed on STATA. The dependent variable was the sum of the points given for the level of interest per activity, of all terrestrial activities combined (1 = 'not interested at all', 2 = 'somewhat not interested', 3 = 'neutral', 4 = 'somewhat interested', and 5 = 'very much interested'). This resulted in an overall interest score for all terrestrial adventure activities combined, based on the tourist survey data. The independent variables included the data of various questions from the tourist survey. More precisely independent variables included demographics data such as age, gender, and country of residence. It also included data on the tourists' stay in the Seychelles such

as the island(s) stayed on and the types of accommodation (e.g. guest house, large hotel, etc.) they stayed at, and with whom they travelled (e.g. family, friends, etc.). Finally, some questions about their opinions on certain adventure activities were asked, such as the barriers that stop them from doing an activity (e.g. financials, weather), their willingness to do activities in the hotels and also outside the hotels. For more detailed information, please refer to the survey questions in Appendix 4.2 and a summary table in Appendix 4.3, Table 4.1.

Workshop

The workshop data was analysed by summarizing the notes taken during the workshop, and writing qualitative a report of the discussions that took place during the workshop. Additionally, frequently mentioned themes were effectively analysed through the clustering exercise, of which a digital version was created and incorporated into the research results.

4.3 Results

In this section, we present the main results from the surveys (4.3.1), the workshop (4.3.2), and as a last part (4.3.3), the outcome of linking qualitative environmental assessment of activities (Table 4.2) and the results of the quantitative tourist survey.

4.3.1 Survey

Perspective of tourists

First, we wanted to know more about the background of the surveyed tourists. We asked which islands (Mahé, La Digue, Praslin or 'Other') they stayed on, showing that 48% of the respondents were staying on Mahé. Part of our survey participants staying on Mahé also visited other islands. Only a few people stayed solely on one of the smaller islands La Digue or Praslin (Figure 4.1, Appendix 4.3). In the category 'Other', people reported staying on Silhouette, Curieuse, Felicite, Cerf Islands, Desroches, or staying on a boat. The tourists sampled mainly stayed at large hotels (31%). Around a quarter of the people in our sample stayed at small hotels, and another quarter stayed in self-catering accommodations, some people stayed in all-inclusive resorts or bed and breakfasts (Figure 4.2, Appendix 4.3). In the category 'Other', we observe a boat stay and people staying at Seychellois friends or family places. Almost half of the tourists (45%) travelled with their partner or spouse (Figure 4.3, Appendix 4.3). Our survey data also shows that 42% of the respondents are willing to travel to a different island for an activity of interest (Figure 4.4, Appendix 4.3).

Figure 4.1 shows that most people are very interested in doing activities outside the hotel ($M=4.39$, 1 = not interested at all, 5 = very much interested) even more than doing activities inside their accommodations ($M=4.00$). A count of 45 participants (22%) stayed at accommodations that do not offer any facilities/activities, for this reason, their answer was registered as 'NA'.

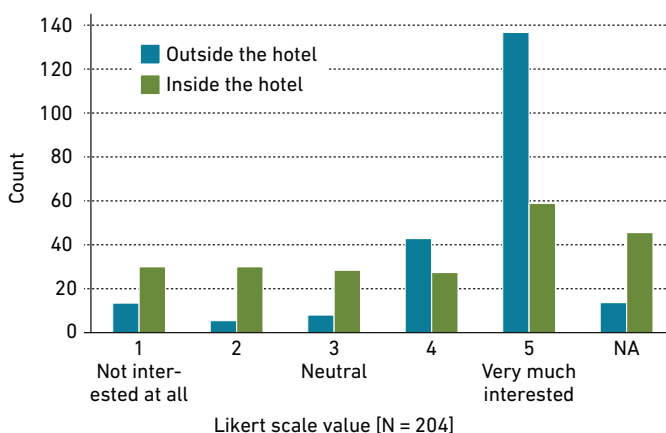


Figure 4.1
Tourists' interest in doing adventure activities outside and inside their hotel (N=204).

Figure 4.2 shows that out of all activities, the most popular one is snorkelling/scuba diving ($M=4.33$), followed by hiking ($M=4.06$), wildlife tours ($M=4.01$), cycling ($M=3.68$), canopy trail ($M=3.54$), jet-skiing ($M=3.13$) and zip-lining ($M=3.04$). The other activities are ranked below a 'neutral' interest.

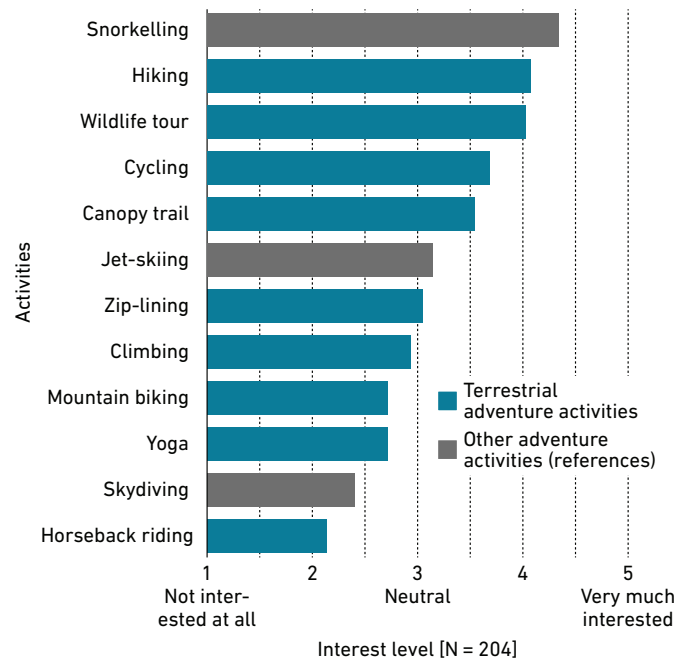


Figure 4.2
Tourists' average interest in adventure activities (N=204).

Figure 4.3 depicts that weather (26%) as well as safety concerns (24%) and financial reasons (20%) are the main barriers for people to participate in adventure activities. Age as well as medical conditions (e.g. pregnancy) were also mentioned by our respondents, and were recorded as additional comments.

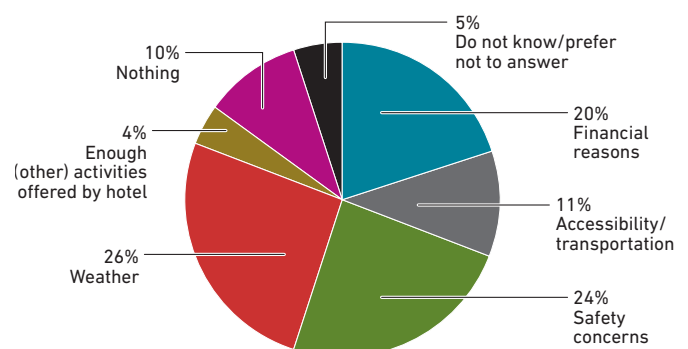


Figure 4.3
Barriers to doing an adventure activity of interest (N=204).

Regression analysis

A multiple linear regression analysis was conducted on the dependent variable 'terrestrial adventure activities', which measures the overall interest in the nine terrestrial adventure activities of interest, to assess the potential effects and their magnitude relating to gender, age, perceived barriers, the specific islands guests are staying on, their interest in engaging in activities outside the hotels, travel composition, and accommodation type (refer to Appendix 4.3, Table 4.1 for details). Our model accounts for 21% of the variance in the dependent variable. Among the variables considered, 'Age', 'Outside' (indicating the willingness to participate in activities outside the hotel), 'Financial' (representing financial barriers to activity participation), and 'Enough' (reflecting the perception of adequate activities offered by the hotel) are found to be statistically significant at a confidence level of 95%.

Table 4.3 is a statistical summary table depicting the coefficients and the p-values of certain variables used in the multiple regression. The coefficients represent beta coefficients, signifying the strength of the respective effects. Specifically, a one-unit increase in an independent variable corresponds to a change in the dependent variable magnitude equal to the beta coefficient. For example, consider the coefficient for age, which is -0.152 . This implies that a one-unit increase in age, such as comparing a 41-year-old to a 42-year-old, results in a decrease of 0.152 in the interest in adventure activities of the 42-year-old compared to the 41-year-old. The variables 'Enough' and 'Financial' exhibit the most substantial negative and positive impacts, respectively, on the dependent variable.

Table 4.3
Statistical results from linear regression showing the effect of certain variables on the sum of the points given to all terrestrial activities. Significance codes: *** $p < 0.001$ (highly significant), ** $p < 0.01$, * $p < 0.05$ (significant).

Variable	Coefficient	p-value
Age	-0.152	0.000 (***)
Gender	0.315	0.750
Family	1.958	0.060
Outside	1.279	0.010 (**)
Financial	2.064	0.049 (*)
Enough	-4.528	0.030 (*)

The p-value helps us check if our ideas match with what we observe in the real world. When we obtain a p-value of 0.05, it means there is a 5% chance that the results we observed happened just by chance. No linear relation was found between different genders at a confidence level of 95%. However, the variables 'Outside' and 'Financial' showed a significantly positive impact, and 'Enough' a negative impact on interest in terrestrial activities. This means that people wanting to do activities outside the hotels, as well as people considering financials as a potential barrier are more inclined to participate in terrestrial adventure activities.

However, people considering that their hotel offers enough activities are less inclined to participate in such activities. Finally, 'Age' exhibited a significant negative influence on the desire to engage in terrestrial adventure activities. Older people are less inclined to engage in terrestrial adventure activities. We note that the variable 'Family' has a non-significant p-value, however, it is still very small, indicating a potential relationship between traveling with families and interest in terrestrial adventure activities.

Our data analysis allows us to identify the target segment for terrestrial adventure activities based on the tourist survey data. The average age of people scoring 'neutral' or higher on the nine different terrestrial adventure activities (i.e., average score 3–5) is about 40 years. Solo-travellers are the most interested in doing the activities (75%, $n = 12$, expressed an interest level of 'neutral' or more for the terrestrial adventurous activities), followed by families (69%, $n = 61$) and friends (63%, $n = 19$). The analysis also shows that tourists are more interested in doing a terrestrial activity if it is located on the same island. Nevertheless, 79% ($n = 94$) are willing to go to another island for a desired activity. Finally, 88% ($n = 58$) of people staying in large hotels are interested in terrestrial adventure activities, and 87% of people staying in all-inclusive hotels ($n = 15$). Of the people staying at bed and breakfasts, 100% are interested in terrestrial activities ($n = 12$).

Perspective of locals

Figure 4.4 shows that there is an interest in wildlife tours ($M = 4.31$), hiking ($M = 4.23$), cycling ($M = 3.89$), yoga ($M = 3.54$), and canopy trails ($M = 3.50$) from the local side.

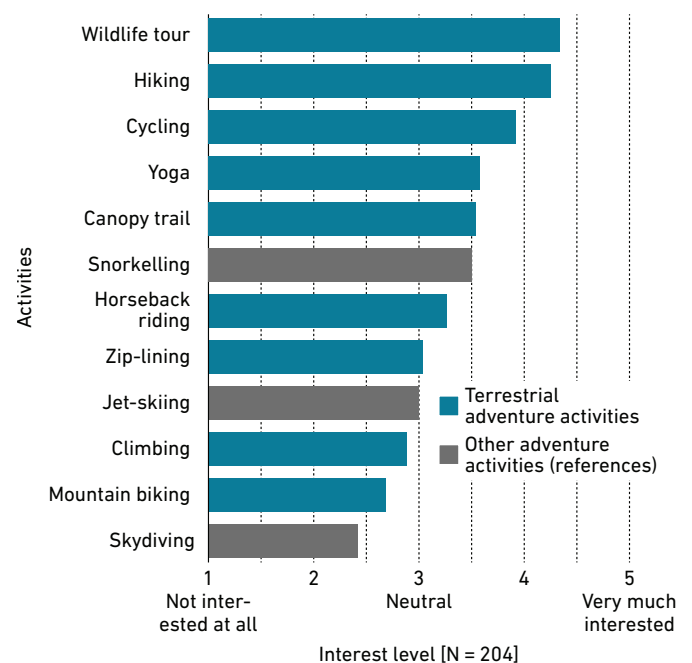


Figure 4.4
Seychellois average interest in adventure activities.

We then asked if locals would be interested in doing these activities together with the tourists; 79% of them would be very much interested in doing so (Appendix 4.3, Figure 4.8).

4.3.2 Workshop

Validating preliminary environmental assessment table

The first segment of the workshop was to validate our preliminary table of potential environmental harms of the selected terrestrial adventure activities (see Table 4.2). Multiple participants suggested incorporating conservation education as well as cultural aspects into the activities. More specifically, a participant shared that there is a trend of visitors wishing to 'give back to nature' during their travels, in the form of contributing to conservation efforts. For more information about the environmental assessment table please refer to the method section and Table 4.2.

Clustering exercise

Following a comprehensive discussion with experts during the workshop, where they were posed with four key questions regarding their perspectives on adventure tourism—covering its advantages, obstacles, necessary regulations and guidelines, as well as areas of concern or potential enhancements—the responses were collected and displayed on the wall. Through this process, akin ideas were grouped together, culminating in the clustering results that are visualized in Figure 4.5.

While discussing the benefits of implementing new terrestrial adventure activities, revenue was the keyword everyone agreed on. According to participants, more adventure tourism opportunities result in an increase in the number of tourists with various interests, and an enhancement of the tourist experience. Additionally, it unlocks a niche market which allows for new business and spending opportunities. It would also positively impact the Seychelles market visibility and tourists would be more prone to come back.

There were participants who shared that there is currently a lack of regulations. According to the participants, there is a need for both national and international policies to be adapted to the evolving tourism industry in the Seychelles and the government should have the role of supporting entrepreneurial endeavours and the need for relevant expertise. These policies and expertise are needed to ensure the safety and security of both tourists and locals, as well as to ensure environmental protection. This leads to the next point, which is a concern for habitat destruction. This was clustered together with challenging terrain in the Seychelles which can limit locations where sustainable adventure tourism is feasible. Lastly, participants expressed a need to ensure capital investment and anticipated that there may be conflicts of interest between different stakeholders.

Safety was considered a main concern for all participants. There was consensus on prioritizing safety measures to ensure a positive experience for visitors and locals partaking in the activities. The majority of participants saw an opportunity in involving the local community and found it important to consider locals' perspectives on this matter.

The importance of protecting the environment and minimizing the disturbances to wildlife was emphasized by the participants. The Environment Protection Act was mentioned multiple times. The participants then discussed that it is important to evaluate the maximum number of visitors that can partake in the activity without causing negative impacts. Each activity would have a carrying capacity, unique to its location.

Canopy trail case study exercise

The third segment of the workshop, on the canopy trail case study, sparked a discussion among the participants. All participants came to a consensus that the canopy trail can be considered a low-impact yet high-value activity. The opinion then divided into

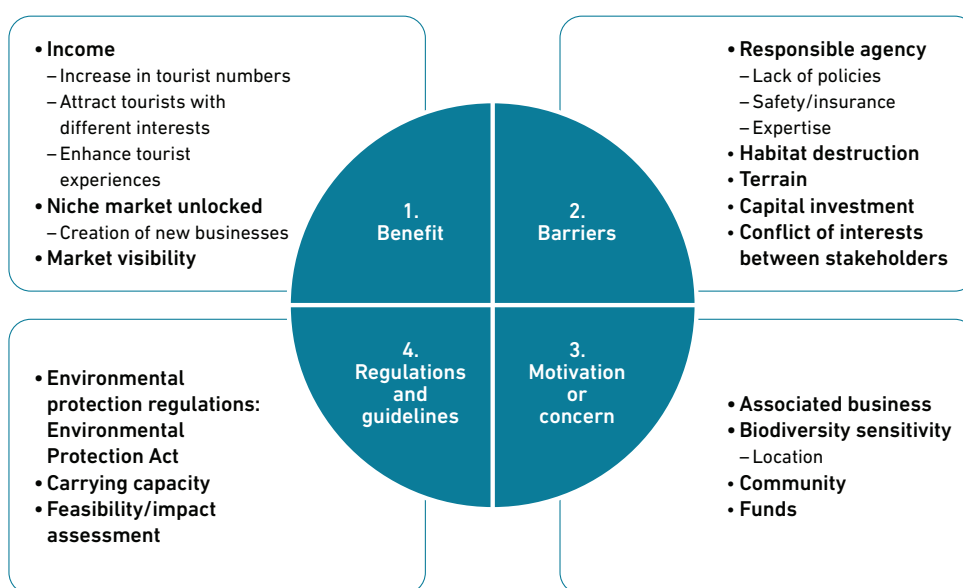


Figure 4.5
Clustering exercise about terrestrial adventure activities. For explanation, see text.

what could be observed as two main standpoints; part of the participants was rather concerned about irreversible environmental impacts, while the others highlighted the advantages the canopy trail could have for both the economy and environmental engagement. Different standpoints were generally correlated with participants' work function. Both perspectives combined, the participants found consensus on a variety of key points.

There was an agreement amongst all participants that a feasibility study would have to be performed before proceeding with the project to bring potential impacts to light, and to determine a suitable location for the canopy trail.

A large proportion of the exercise was taken up by the discussion on the potential location of the canopy trail. Experts mentioned that the Seychelles may not have suitable trees; the trees with much biodiversity are rather short, while the ones with the right height should be avoided to protect endemic species. Concern for invasive species was expressed by certain participants. Overall, the possible and environmentally acceptable locations are rather limited. Expertise and proper management are crucial according to all participants.

Another discussion was sparked after the mention of scientific tourism, as well as the notion that a trail in biodiversity-dense areas can attract an environmentally conscious audience. However, the biodiversity-dense areas ought to be avoided according to participants specialized in conservation. The consensus was that different tourist types need to be considered when determining the potential need for a canopy trail. It is also important to avoid implementing and maintaining an activity that will not be popular enough to be financially self-sufficient. For this reason, it is relevant to consider both tourists' and locals' interest in the particular activity.

Additionally, an agreement was rather easily found on the topic of costs and funding. There were suggestions to allocate a portion of the funding towards environmental protection and education, as well as to combine the canopy trail with education to promote learning about ecosystems and biodiversity. Finally, the participants agreed that there is a bias in decision-making toward environmental concerns. This statement was neither negatively nor positively charged, and rather accepted as the way things are.

4.3.3 Environmental friendliness-interest Matrix: link between results

Figure 4.6 visualizes the results of our report plugging the qualitative environmental assessment of activities together with the quantitative tourist survey into a revisited Boston Consulting Group (BCG) matrix (Hanlon, 2022).

The results from the environmental assessment are on the vertical axis labelled as 'environmental friendliness'. The activities are ranked based on an interpretation of the harm assessment (see Section 4.3.1 and Table 4.2), taking into consideration that mitigation efforts have been applied. The results from the tourist survey are on the horizontal axis labelled as 'interest level'. The activities are ranked based on their mean interest level from the survey results (see Section 4.3.2). The ac-

tivities in the top left quadrant score positively on both aspects and are therefore considered 'Stars'; environmentally friendly activities with high interest from the tourists. 'Dogs' are activities that do not score well on both the environment friendliness and the tourists' interests. 'Question marks' are activities that even with a low interest could become fruitful however good marketing and creativity are needed. Finally, 'Cash cows' have the potential to bring in money, however more research on how to mitigate the environmental harm is needed (Hanlon, 2022). Hiking, wildlife tours, as well as cycling and canopy trails, are classified as stars and thus have the most potential for implementation in the Seychelles. Zip-lining is considered as a 'Cash cow', mountain biking and horseback riding, as 'Dogs'. Finally, yoga and climbing are 'Question marks'.

4.4 Discussion

4.4.1 Significance of our findings

The next section presents the significance of all the data collected in this research, organised into four sections: sustainable terrestrial adventure activities, perceptions of terrestrial adventure activities, factors that influence tourists' level of interest, and finally perspectives of the local authorities.

Sustainable terrestrial adventure activities

Nine terrestrial adventure activities were highlighted considering their respective potential harms and ways to mitigate these. Some are more environmentally sustainable and feasible than others. According to the local conservation specialist we interviewed, these activities can become environmentally friendlier when associated with the opportunity to offset carbon footprints.

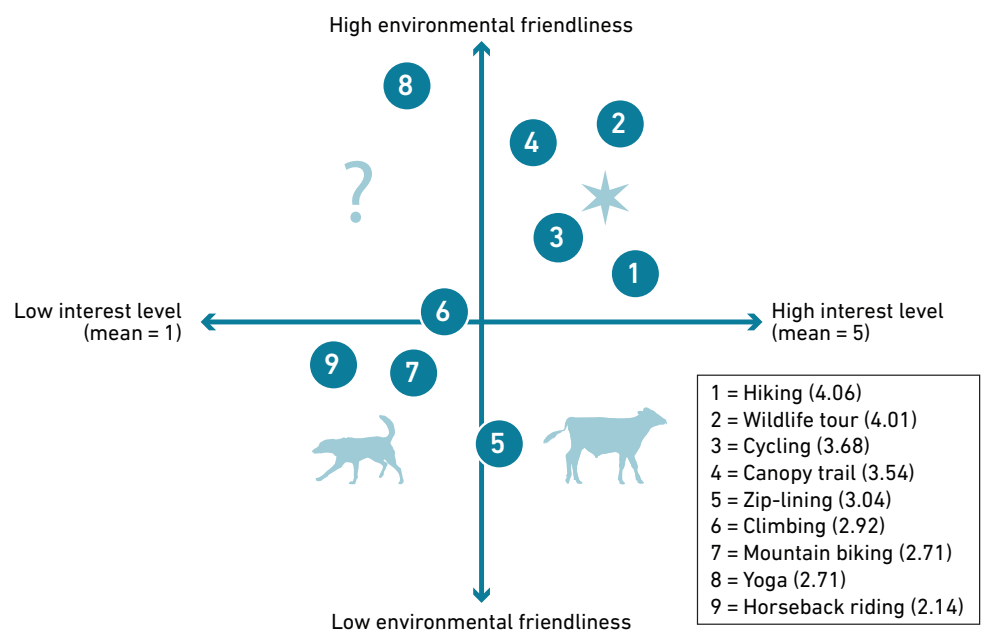


Figure 4.6 BCG matrix assessing the list of terrestrial adventure activities on interest level and environment impact. For detail, see text.

It is interesting to note that horseback riding, jet-skiing, as well as zip-lining, are already in place in the Seychelles; however, they have substantially lower mean interest scores than not yet existing adventure activities from our list, such as the canopy trail and wildlife tour. Considering that hiking is the activity the most liked by the tourists, we see high potential in improving the existing hiking trails, by, for example, putting in place additional facilities (e.g. head trail, steps and cords), exercise stops or educational signs. In our survey we also received comments on the state of the bikes on La Digue, here again, the quality of the bikes could be improved, which would justify a higher price and higher customer satisfaction. Furthermore, some respondents noted that they were very disappointed by the tortoise enclosures at many of the tourist attractions, as they were extremely small and run-down.

Workshop participants suggested allowing visitors to plant a tree or mangrove seeds paired with the activity, and that part of the revenue generated from terrestrial adventure activities can be allocated towards environmental protection. Research performed in Hawaii found a shift in tourists' mindsets, justifying the development of such sustainable practices like tree planting and education. The research quantified that tourists have a desire to engage in sustainable tourism activities and are willing to pay additionally to participate in those. To accommodate these wishes, Hawaii has now provided tourists with opportunities such as beach clean-ups, cleaning invasive plant species, and reforestation efforts (Cathrine et al., 2022).

Our survey data analysis confirms that there is a preference for lower-impact activities which immerse the participants in nature, e.g. snorkelling, hiking, or wildlife tours. Moreover, according to our adventure tourism expert, slower-paced terrestrial adventure tourism activities allow for relatively easy incorporation of educational, conservational, and cultural aspects. These accommodate the tourists wishes, can potentially be considered mitigation efforts, as well as give the activities a unique Seychelles touch.

Tourists' wishes and locals' perceptions of terrestrial adventure activities

The tourist survey results showed that there is an interest in going outside the hotel to explore the country, and that this interest was higher than staying inside the hotel, confirming the literature finding that there has been a shift in consumer demand (Government Seychelles, 2019; French, 2015). Moreover, tourists, as well as locals, are indeed interested in adventure activities from our activities list. Implementation of these activities would appeal to both the locals and the tourists, and could even be experienced together, as locals mentioned being very much interested in doing such activities alongside tourists. The increase in quality and thus price should not exclude the local community from being able to participate; we suggest a special price for Seychellois should be considered, which is already the case for existing activities.

Factors influencing tourists' interests

The multiple linear regressions showed that the country of residence and gender have no impact on the level of interest in terres-

trial adventure activities. However, the desire to go do activities outside the hotel statistically strongly impacts the desire to do terrestrial activities. This means that terrestrial activities could improve the tourists' experience in the Seychelles, as it will accommodate their wishes. Moreover, something to consider while implementing terrestrial adventure activities is age, as the older the tourists, the less likely they are to be interested in such activities.

The most promising target segment for terrestrial adventure activities is middle-aged individuals around 40 years old, who are journeying solo, followed by people traveling with families and with friends, and who have a strong interest in engaging in outdoor activities.

An interesting observation from the multiple linear regression is that respondents who indicate financials, i.e., high prices, as a potential barrier to taking part in adventure activities are in general more interested in terrestrial adventure activities. For this reason, excessively high prices might discourage this segment who would be interested in doing such activities. Moreover, our survey also showed that most participants have a concern for safety, even higher than for financials. While there is no correlation between safety concerns and the level of interest in terrestrial adventure activities, the data shows that safety can still be a barrier for many people to actually participate in activities they would otherwise be interested in.

Respondents who indicate that there are enough activities at their hotel are much less interested in terrestrial adventure activities. Finally, travelling with family has demonstrated a notable, yet insignificant positive influence on individuals' motivation to engage in terrestrial adventure activities, which can be further investigated

Perspectives of local authorities on terrestrial adventure tourism activities

Workshop participants made note that educational adventure activities can attract environmentally conscious individuals. These more environmentally-conscious guests want to learn about the unique flora and fauna of the Seychelles and take home not only experiences, but also knowledge (Hederer, 2022).

Both of our interviewees, as well as the unfolding of the workshop, have highlighted the importance of a close communication and collaboration between stakeholders. People with different backgrounds and expertise, as well as local entrepreneurs, are needed to successfully explore the potential of terrestrial adventure tourism. The participants themselves acknowledged a mutual dependence between research and the guidance of developers.

A significant finding from the workshop case study is that the introduction of canopy trails can enhance adventure tourism, stimulate scientific research projects, and give an economic incentive to landowners to protect the forests. These findings overlap with current literature, which highlights four key benefits of canopy

trails. First, they are ways to inspire tourists to link with nature (Ramadurai, 2022). Second, they promote ecotourism, education, and conservation. Third, they allow a unique viewpoint for scientific research (The Tree Foundation, 2023). And fourth, they provide an economic incentive to preserve forests in their most pristine state, thereby also protecting biodiversity (Lowman, 2023). This in combination with the survey results for tourists and locals, both ranking canopy trails in the top four, provides an incentive to further explore this activity.

It is important to stress that each activity, as well as each site, holds unique characteristics. According to workshop participants, it is essential to perform a feasibility study to identify specific combinations that have potential and to identify any additional harms, whether they be social, economic, environmental, or else. The results of such a feasibility study will give further information on potential risks specific to the site, which can then be used to design or apply mitigation methods to minimize any potential harm to the natural environment (Ahmed, 2023).

4.4.2 Emerged insights

Collaborations

Throughout our field phase, we have witnessed the potential powerful synergy between hotels and local third-party entrepreneurs, notably with the Constance Ephelia Resort's inclusion of SMAC Adventure, which provides zip-lining and climbing, in their facilities. In this partnership, hotels provide a venue for activities while third-party entrepreneurs manage and enhance them, showcasing the undeniable benefits of this cooperation for all involved parties and the broader community. Hotels, by embracing these collaborations, not only enhance guest satisfaction and attract more tourists but also gain the ability to command higher prices, ultimately boosting their revenue. Simultaneously, local entrepreneurs secure a guaranteed audience, financial support, and safety measures. Additionally, according to our adventure tourism expert, as this sector thrives, it catalyses the expansion of related businesses, creating diverse employment opportunities and contributing to overall economic development.

Expertise

From all our data collection, the question of safety, insurance, and expertise was identified as a barrier to implementation. The interviewed adventure tourism expert mentioned that a way to address this could be to make use of global organizations, such as the Adventure Travel Trade Association (ATTA), that can train locals into experts. By educating locals to become experts in safety measures and implementation of activities, it becomes more attractive for insurance companies to provide coverage for these businesses. Plus, the know-how stays in the Seychelles and via the snowball effect, allows the dispersion of this tacit knowledge (Kucharska & Erickson, 2023). A more in-depth case study on insurance and implementation based on literature research can be found in Appendix 4.5.

Incentives

Engaging the local population in the development of adventure tourism provides an opportunity to shift towards more sustainable tourism. Sustainable tourism can be defined as a practice that allows visitors to visit a destination and engage with natural resources, while minimizing the negative environmental effects as well as financially benefiting the local population (Cathrine et al., 2022). According to the interviewed adventure tourism expert and local authorities, Seychellois people with a wish to engage in the tourism industry often think of opening a guesthouse or lodge. However, more accommodations do not fit the Seychelles' future vision of diversification and quality over quantity. Additionally, adventure tourism provides more job opportunities for locals compared to mass tourism (Adventure Travel Trade Association, 2021).

For this reason, it would be beneficial to steer local entrepreneurs towards using their land and resources for other purposes than accommodation such as adventure tourism. This can be achieved by educating the local population about the variety of opportunities available in the tourism sector. The expert mentioned that, if needed, this can be accompanied by providing positive incentives for locals to engage in adventure tourism or other cultural or agritourism activities. These positive incentives can include financial incentives for opening such a business or free training where needed.

4.4.3 Limitations

Despite the important insights highlighted in this report, there are also some limitations that should be addressed in future research. Firstly, our research focuses on terrestrial adventure tourism activities. Nevertheless, as mentioned by one of our workshop participants, it is important to note that terrestrial and maritime ecosystems are connected and dependent on one another to exist. Future research could look more closely at the intersection of sea- and land-based activities. Secondly, unfortunately, local adventure tourism entrepreneurs were not available or responsive for interviews or workshop participation. Opinions from such key stakeholders would have given our research valuable inputs and a different perspective. Thirdly, currently our BCG matrix only considers the mean interest of tourists in each activity. It would be interesting to consider the interest of both tourists and locals because as mentioned, we envisioned the locals to also participate in the activities. However, for such a weighting more data would be necessary, such as the activity market share of tourists versus locals.

The survey also has a number of limitations that need to be mentioned. First, we believe that after 200 surveys, the sample size is powerful enough to obtain significant results. Nevertheless, the larger the sample size, the more confident we can be. Second, as we only surveyed on Mahé, we believe that the surveys taken at the airport and the port are the most representative as people from all islands, accommodations types, and activity interests

will eventually end up at the airport and in some cases the port. However, the surveys taken at these locations only accounted for a portion of the total surveys. Third, there could be a bias in our survey results, as younger people were more inclined to answer our survey, possibly because they see other people of their age or from the same occupation (i.e., student). Conversely, locals surveyed were more likely to be older (median: 46 for locals vs 32 for tourists) than the surveyed tourists, and in that sense, our results can also be biased as the older the people are, the less likely they are to be interested in adventurous activities. Fourth, when asking what could be the barriers to doing an activity of interest, 'Medical conditions' or an 'Other' option could have been included as an answer option. Fifth, in the Likert scale, a 7-point scale should have been used with 'not interested at all' and 'very much interested' as we want to have equidistance between the points, which was not the case in our 5-point scale. Finally, as all data was collected within a span of less than two weeks, the sample is not representative of tourism in the Seychelles in general and conclusions should be carefully interpreted.

4.4.4 Future research opportunities

As an outcome of our workshop, adventure tourism activities often incorporate elements of environmental awareness and education. In addition, to sensitize people to nature, outdoor activities also improve both mental and physical health, such as aiding in weight management and reducing stress (Centers for Disease Control and Prevention, 2023). These two arguments highlight the positive aspects that could be associated with adventure tourism. Future research could look into such effects and weigh them against negative impacts in parallel to the mitigation methods mentioned in our research.

Our research touched on education as a positive by-product and possible mitigation method for adventure tourism. Future research could find linkages between adventure tourism and the Seychellois culture, environmental education, and conservation aspects. By looking into how these aspects can be included in adventure tourism, opportunities for a more diverse group of stakeholders to take part in this industry can be discovered, and a diverse visitor segment can be attracted.

Furthermore, the locals survey was used to determine the perception of terrestrial adventure tourism of locals. Future research could investigate which specific factors influence the interest of locals in taking part in terrestrial adventure activities, analogously as was done in our research with the tourist data.

4.5 Conclusion

Terrestrial adventure tourism appeals to all aspects of a sustainable tourism future in the Seychelles. As evidenced by our survey and literature, tourists nowadays have a desire to leave their accommodations and experience the country, as well as to practice sustainable activities in order to give back to their destinations.

Providing visitors with more activities can accommodate tourist wishes, while simultaneously respecting the nation's carrying capacity. Our interview and workshop found that slow-paced adventure activities allow for incorporation of educational elements and conservation practices, aligning with a current trend of visitors wanting to 'give back' to their destinations. Reforestation efforts and beach clean-ups are just examples of practices that can be incorporated into adventure tourism to accommodate this visitor wish.

Additionally, the development of adventure tourism has financial benefits. It has the potential to increase revenue, and to retain this revenue inside the local economy, by providing business opportunities and jobs for the local population.

Our survey highlighted adventure activities that could be sustainably implemented in the Seychelles. The top-rated and already implemented activities, hiking, and cycling, hold promise for further development by improving their quality and enhancing the customer experience. Indeed, according to the participants of our workshop, currently not many people hike because trails are not well maintained. Along with cycling and canopy trails, the four most interesting terrestrial adventure activities are all considered as 'stars' – scoring positively in both environment friendliness and tourist interest – in the BCG matrix. Therefore, improvement and implementation of these activities in harmony with the country's ecosystems can be considered.

In order to implement activities in harmony with the natural environment, feasibility studies will be needed. These studies will allow for the identification of a proper site per activity, taking into account site-specific circumstances, plus economic and social aspects.

The adventure tourism industry provides an opportunity to create a win-win situation for tourists, locals, and the environment. Sustainably implementing and enhancing adventure tourism could have the potential to increase the nation's revenue, to involve the local community, push conservation practices and environmental education, as well as increase visitor satisfaction; allowing the Seychelles to grow closer to their goal of sustainable tourism.

It is evident that further research, including comprehensive feasibility studies, will be necessary to unlock this potential in a way that the preservation of the natural heritage is preserved. Additionally, efforts should be dedicated towards inspiring and educating the local population on the possibilities, and assisting motivated individuals in realising their activities. The government will play a pivotal role in connecting entrepreneurs with potential clients, in gaining knowledge on insurance practices for example by establishing partnerships with organisations such as the Adventure Travel Trade Association to address, and in supporting feasibility studies to identify specific opportunities.

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5 Local identity and the societal impact of tourism

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Photo: Justine De Groot

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5.1 Introduction

In recent years, Seychelles has experienced a significant surge in tourism, with yearly arrivals increase of approximately 10% from 2009 to 2017. In the year 2018, the direct contribution of tourism to GDP in the Seychelles was 28.6% (Government of Seychelles, 2018a). While the economic benefits of tourism are evident, the broader social and cultural implications of this industry remain a topic of exploration and concern. This chapter delves into the perceptions of residents regarding tourism and seeks to uncover the nuances of Seychellois Creole identity within the context of this evolving landscape.

The Seychellois Creole character is often mentioned in the Seychelles Tourism Masterplan and used for promoting Seychellois cuisine and experiences (Government of Seychelles, 2018a). It is yet unclear what identifies as Seychellois Creole. At the same time authentic cultural tourism experience is being sought after (Ramkissoon, 2015). A challenge arises in the suggestion by Laxson (1991, p. 369) who states "Once something becomes a tourist attraction, it is no longer completely 'authentic'.". To ensure an authentic experience it is important to include the Seychellois people and understand what is part of their identity rather than arranging staged experiences (Atayi, 2021). Therefore, insights from the local Seychellois on their perception of the Seychellois Creole identity are relevant.

Despite the undeniable economic benefits, the magnitude of tourism's influence reaches far beyond financial gains. As Vidal Rua (2020) highlights, tourism is a transversal industry that profoundly affects not only the economy but also the environment, society, and culture of a destination.

Such profound impacts necessitate a comprehensive understanding of the local population's perceptions towards tourism (Mbaiwa, 2005). Recognizing residents' views and sentiments is crucial not only for safeguarding their well-being and quality of life but also for developing tourism sustainably, in harmony with the social fabric of the Seychelles. Studies on the social impact of tourism have already been conducted in the Caribbean islands (Sethna, 1983). More recently, a study by Yeniasır & Gökbulut (2018) for example, measure the perception and attitudes on sustainable cultural tourism and preservation of cultural heritage in Nicosia, the capital city of Cyprus.

To date, none of these types of study have been carried out in the Seychelles, even though the foundations for sustainable tourism have been laid with the publication of the Strategic Land Use Plan 2040 and the Tourism Master Plan (Government of Seychelles, 2015; Government of Seychelles, 2018a). These policy documents may not fully encapsulate the sentiments and opinions of the Seychellois population. Moreover, they may not fully anticipate the nuanced social consequences of tourism development, as suggested by recent research in other destinations (Mitchell & Reid, 2001; Nejati et al., 2014; Saveriades, 2000). As articles already published on the subject explain, tourism can be perceived both positively and negatively by the local community and that these

perceptions can potentially have an impact on the social system (Nejati et al., 2014; Saveriades, 2000). Some locals associate tourism with job creation, income generation, well-being or improved infrastructure and services, while others may be more concerned about the negative consequences of tourism such as socio-cultural and environmental costs (Mitchell & Reid, 2001; Nejati et al., 2014; Saveriades, 2000). In light of these considerations, our study aims to bridge this knowledge gap, shedding light on both the perception of the Seychelles' residents towards tourism and the potential tipping point of its social impact. By tipping point we mean the moment when the social consequences of tourism in the Seychelles become particularly noteworthy. This could be a point where local residents begin to witness more of the perceived negative than positive impacts, or where the social dynamics of the community are notably altered.

This background literature led to the first research question including a sub research question:

RQ1: How is tourism in Seychelles perceived by local people? More concretely: What are patterns in local perception of tourism according to demographics? (RQ 1.1), and Has Seychelles reached a tipping point concerning locals' resentment towards tourism? (RQ 1.2)

Furthermore, to better understand what elements are seen as part of Seychellois Creole identity and culture, a second research question asks:

RQ2: What do local people perceive as part of their Creole Seychellois identity?

Through a rigorous and representative survey carried out on two of the main islands, Mahé and La Digue, we aim to provide insights that will help policymakers and stakeholders to make informed decisions.

5.2 Methods

To investigate our research questions, we first conducted a literature review on studies that looked at the social impact of tourism in other countries or regions. Especially studies conducted on islands were relevant as there are aspects that impact an island differently compared to mainland countries. To guide our survey questions, we used several studies on the social impact of tourism (Vidal Rua, 2020) (Suntikul & Dorji, 2016) (Liu et al., 2015) (Tsunoda & Mendlinger, 2009). Once an idea for the survey questions was gathered, we conducted explorative interviews. We contacted various groups of interest involved in their communities, found on the Citizens Engagement Platform Seychelles (CEPS, 2023). As a result, we were able to carry out three online focus group discussions; one with the Tourism Department, one with students from University of Seychelles and one with the United Nations (UN) Youth Seychelles organisation. These discussions allowed us to gain local insights and a better understanding on existing issues perceived by locals and guided us for the questions we should focus on in our survey.

The core of our method is the survey, which was designed to perform a quantitative analysis on the locals' perception of tourism in the Seychelles. We surveyed a randomized sample of households to get a representative output. The surveys were conducted in a face-to face manner to ensure a high response rate.

5.2.1 Questionnaire

The questionnaire is formed by statements grouped into four sections: (S1) general ideas about tourism; (S2) potential positive and negative impacts of tourism; (S3) potential conflicts between tourists and locals; (S4) Seychellois Creole identity, and finally, the respondent's demographics (S5).

The first three sections contained different impact types which we grouped into the four themes cultural, economic, environmental, and social impacts of tourism. Section 4 aimed at better understanding which elements are perceived to be important to today's culture in the Seychelles. Our survey consisted of 40 statements (items), that we evaluate in our report, excluding the demographics. Besides that, the full questionnaire also includes one statement regarding a bus ticket system and 12 statements regarding outdoor activities in the Seychelles that served the adventure tourism research group (see chapter 4).

The participants were asked to respond to the statements according to a 5-point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neutral/prefer not to say, 4 = somewhat agree, 5 = agree). This applies for the sections S1 to S4.

In section 5 of the survey, we asked for demographic data such as gender, age, education level, household size, monthly income, how long they have lived in the Seychelles if they work in a tourism-related sector and if they own their own tourism business. These data are crucial as independent variables to test patterns and analyse relationships in the respondents' perceptions.

The questionnaire was pre-tested with one Seychellois volunteer. This pre-testing of the questionnaire was performed in order to make sure the respondent understood and interpreted the questions correctly. As a result of the pre-testing, we were able to finalize the survey with certainty that the wording was properly and no questions were redundant. The questionnaire can be found in the Appendix 5.1 in English and in Appendix 5.2 in Creole.

5.2.2 Data collection and sample

The surveys were conducted during the working hours from 4 to 8 and 10 to 14 July 2023. The data collection took place within the household sample provided by the National Bureau of Statistics (NBS). Depending on the feasibility and preference of the participants, the surveys were conducted in English or in Creole.

238 surveys were conducted in English and 119 in Creole. We selected the household member according to age (no one under 18 was allowed) while trying to maintain a balance between gender. During the day, most of the respondents were housewives, so in the evening from 4pm onwards we targeted more male respondents or younger people from the respondents working away from home. If no one was at home, we moved on to the next house, taking care to stay within the boundaries of the zones of the districts we had to sample. We checked for age/gender distribution and that all districts were proportionally covered to have a varied and representative sample. For the in-person surveys we used Qualtrics and the associated Offline Survey Application for Android and iOS. As a backup we also used some paper versions. The duration for completing a survey took on average 10–15 minutes, with some durations being closer to 30 minutes.

Sample

The randomized household sample for the Survey was selected by the NBS. Our target group were a representative set of residents (Household level) of the Seychelles, and our goal was 250 respondents on Mahé and 100 on La Digue, see Figure 5.1 and Table 5.1. The total sample provided by the NBS included 500 households on Mahé and 150 on La Digue. For the sample provided by NBS and the process of randomising see Appendix 5.3 and Appendix 5.4 respectively.

Table 5.1
Sampling of door-to-door household survey.

Region	District	Collected sample	Target sample
Central	Mont Buxton (MB)	51	49
	Les Mamelles (LM)	34	29
North	Belombre (BO)	62	65
West	Port Glaud (PG)	23	21
East-South	Pointe La Rue (PL)	34	35
	Anse Royale (AR)	47	52
Mahé total		256	250
La Digue	Digue and Inner islands (LD)	101	100
		N _{total} = 357	N _{total} = 350

Respondent demographics

In total, we collected 357 valid responses. 168 (47%) respondents are males and 189 (53%) are females. About 97% of them have lived in Seychelles for more than 10 years. Tables 5.2–5.5 show the distribution of age, education level, monthly income of our respondents as well as whether they work in the tourism sector or not.



Figure 5.1
Map showing surveyed areas on Mahé and La Digue (N=357).

Table 5.2
Age classes.

Age class [years]	Collected sample
18–30	67
31–40	71
41–50	78
51–60	66
61–70	49
>70	21
Prefer not to say	5
N _{total} = 357	

Table 5.3
Highest education level.

Education level	Collected sample
Less than primary	5
Primary	28
Secondary	130
Post secondary/ tertiary	192
Prefer not to say	2
N _{total} = 357	

Table 5.4
Monthly income.

Income in SCR/month	Collected sample
<10,000	153
10,000–30,000	120
>30,000	26
Prefer not to say	58
N _{total} = 357	

sample were above 60 years old, potentially indicating an over-representation of older individuals compared to the general population.

5.2.3 Data Analysis

In the data analysis phase, we processed the collected survey responses, ensuring the exclusion of any incomplete answers, and merged the data from both the English and Creole versions. Leveraging the power of Excel and R, we conducted a comprehensive descriptive analysis to gain valuable insights into the social impact of tourism in Seychelles.

Based on the provided statistics from the National Bureau of Statistics (NBS) for 2022, the gender ratio in the local population is approximately 54% men and 46% women, indicating a slightly higher proportion of males due to significant change in the age structure attributed to the large increase in male foreign workers in 2022. However, in our survey sample we have 168 (47%) male and 189 (53%) female respondents, which suggests a slightly more balanced gender distribution in the sample compared to the overall population. Regarding the age structure, the NBS data indicated that the age class of 15–64 years accounted for 69% of the population, while the elderly aged 65 and over accounted for 9%. In contrast, our survey sample showed that 282 respondents were between 18–60 years old, which corresponds to 80% of the total sample. Additionally, 70 (20%) respondents in our

Table 5.5
Number of respondents who are working in the tourism sector.

Working in tourism sector or not	Collected sample
No	205
Yes, without my own business	106
Yes, with my own business	41
Prefer not to say	5
N _{total} = 357	

To guide our analysis, we explored specific factors that might influence respondents' perceptions of tourism. One hypothesis (H1) was that individuals working in the tourism sector would tend to perceive more positive aspects of tourism due to their direct involvement and exposure to its benefits compared to those in other sectors. Another hypothesis (H2) on potential variations in perceptions between residents on La Digue and Mahé, was that respondents on La Digue might feel more negatively impacted by tourism. Additionally, we examined the relationship between age and the identity of the Seychellois culture, hypothesizing (H3) that younger individuals might attribute less importance to identity elements compared to older generations possibly due to evolving cultural values, impact from western cultures from social media and generational shifts. Our analyses included a range of statistical methods such as t-tests, ANOVA, correlation analyses, and regression modelling to test these hypotheses.

Out of Likert scale data format, a standard impact score was calculated. This procedure allows us to obtain the standard impact scores of each respondent for the perception of the impact of tourism in each aspect, as well as a total score by averaging these scores. A score of 1 for a certain aspect means that the respondent tends to have a rather positive perception of this aspect of tourism in Seychelles, and –1 means that the respondent will have a rather negative perception of this aspect of tourism in Seychelles. Concretely, out of 18 items, 9 concern the potential positive impacts of tourism that could be perceived by residents and 9 concern the potential negative ones. In the latter case Likert scale is inverted from 1–5 to 5–1 so that their tendencies reflect the degree of agreement of respondents on the impact of tourism as being positive or negative in a consistent manner. These 18 items can be separated in four sub-categories: 3 items concern the perception of the cultural and identity aspects of tourism, 5 items refer to perception of the economic aspect, 3 other items are about the perception of the environmental aspect, and the last 7 items concern the perception of the social aspect of tourism. We then calculated the average scale value of the statements for each aspect and normalised them between –1 and 1, in order to clearly visualize positive versus negative answers.

We also used a multiple linear regression to analyse the relationship between a dependent variable (in this case, impact scores in different categories such as “Cultural”, “Economic”, “Environmental”, “Social”) and potential conflicts between tourists and locals, respectively, and multiple independent variables (the factors such as gender, age, education, etc.). For each dependent variable we ran a multiple regression. The analysis aims to determine how changes in the independent variables are associated with changes in the dependent variable.

As a final step of our data analysis, we applied hierarchical clustering to the survey answers to understand some shared portraits of the respondent group (Murtagh & Contreras, 2012). All complete samples (N = 296) are grouped with different sequences according to the similarity between them. The answers to all statements except for those related to Seychellois Creole identity are included for the clustering. Based on the height of convergence between groups potential clusters can be identified.

5.3 Results

This section provides an overview of the results generated with our survey. Here we present results with regards to answering our research question.

The results are structured according to the four sections of our questionnaire: (S1) general perception on tourism; (S2) potential positive and negative impacts of tourism; (S3) potential conflicts between tourists and locals; (S4) Seychellois Creole identity. Finally, we discuss the three respondent groups identified through the hierarchical clustering.

5.3.1 General perception on tourism in the Seychelles (S1)

Part of our survey includes general questions to assess the behaviour and opinions of residents in relation to current tourism in Seychelles (Figure 5.2). About 90% of respondents feel proud that Seychelles attracts a lot of tourists corresponding to a mean score of $M = 4.77$ ($SD = 1.06$) on a 1–5 scale; 63% of respondents like tourism as it is now corresponding to a mean score of $M = 4.20$ ($SD = 1.43$). Most respondents are aware that Seychelles depends too much on tourism: 68% agree with, 8% somewhat agree, 4% are neutral, 5% somewhat disagree and 15% disagree. Most respondents disagreed with the fact that residents suffer from living in a tourist destination area (60%) but a minority that cannot be ignored, around 14%, think the opposite. We see the same pattern with the question about avoiding tourists and places too busy with tourists: the majority of respondents disagree (69%), but there are also around 15% who have the opposite opinion.

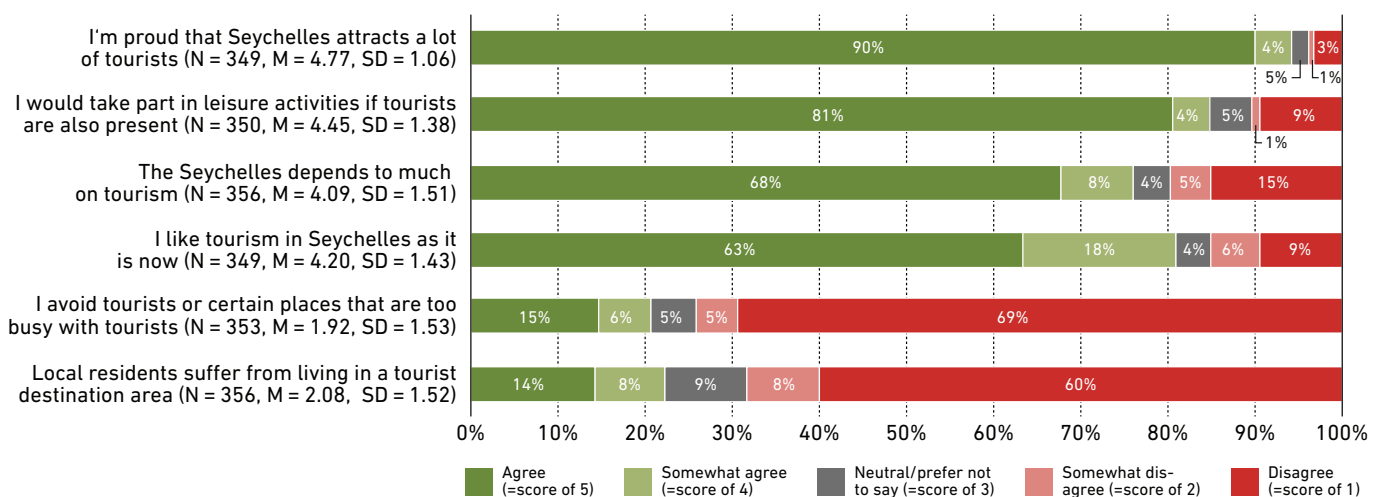


Figure 5.2

Answers to statements regarding residents' opinions and behaviours related to current tourism. N = Number answering this question; M = Mean value; SD = Standard deviation.

5.3.2 Perceived positive and negative Impacts (S2)

This part of our survey is devoted to assessing the perceived positive and negative impacts of tourism in the Seychelles.

Positive impacts

Questions relating to positive impacts obtained high mean scores, meaning that most of respondents agree with these impacts (Figure 5.3). The increase in opportunities for local business caused by tourism reached the highest agreement with a mean score of $M=4.68$ ($SD=1.11$) on a 1–5 scale: around 86% of respondents agreed with this statement. The provision of jobs through tourism is also a positively perceived impact of tourism ($M=4.66$; $SD=1.10$). The same pattern can be observed with the positive perception that tourism may allow residents to meet new people as well as learn about other places ($M=4.59$; $SD=1.03$). The other items evaluating the positive perceptions of tourism such as the provision of an incentive for the conservation of Seychelles' natural environment and the promotion of local arts, crafts and traditional practices have mean scores of $M=4.41$ ($SD=1.22$) and $M=4.46$ ($SD=1.24$). The improvement of living conditions, the development of infrastructures, the wider choice of restaurants and shops and the facilitation of interaction between locals and visitors have a little lower mean score, meaning that several respondents somewhat agree, their response is therefore more nuanced.

Negative impacts

Questions relating to the perceived negative impacts obtained low mean scores, meaning that most respondents somewhat disagree or disagree with them (Figure 5.4). The lowest mean score of $M=1.57$ ($SD=1.17$) on a 1–5 scale concerns the increase in crime in Seychelles due to tourism: around 77% of respondents disagree with this statement. The trend is the same for the increase in drug problems potentially caused by tourism, which has a mean score of $M=1.67$ ($SD=1.22$): 73% of respondents disagree with that statement. The loss of identity and authenticity of Seychelles also reached a high disagreement rate with 71% of respondents disagreeing, a mean score of $M=1.81$ ($SD=1.39$). The other negative impacts caused by tourism such as the increase in traffic congestion, the cost of living, the division of people into high and low social classes, the relocation of locals, harm to nature and damage to the enjoyment of beaches are more nuanced because a certain number of people are of the opposite opinion, even if this remains a minority.

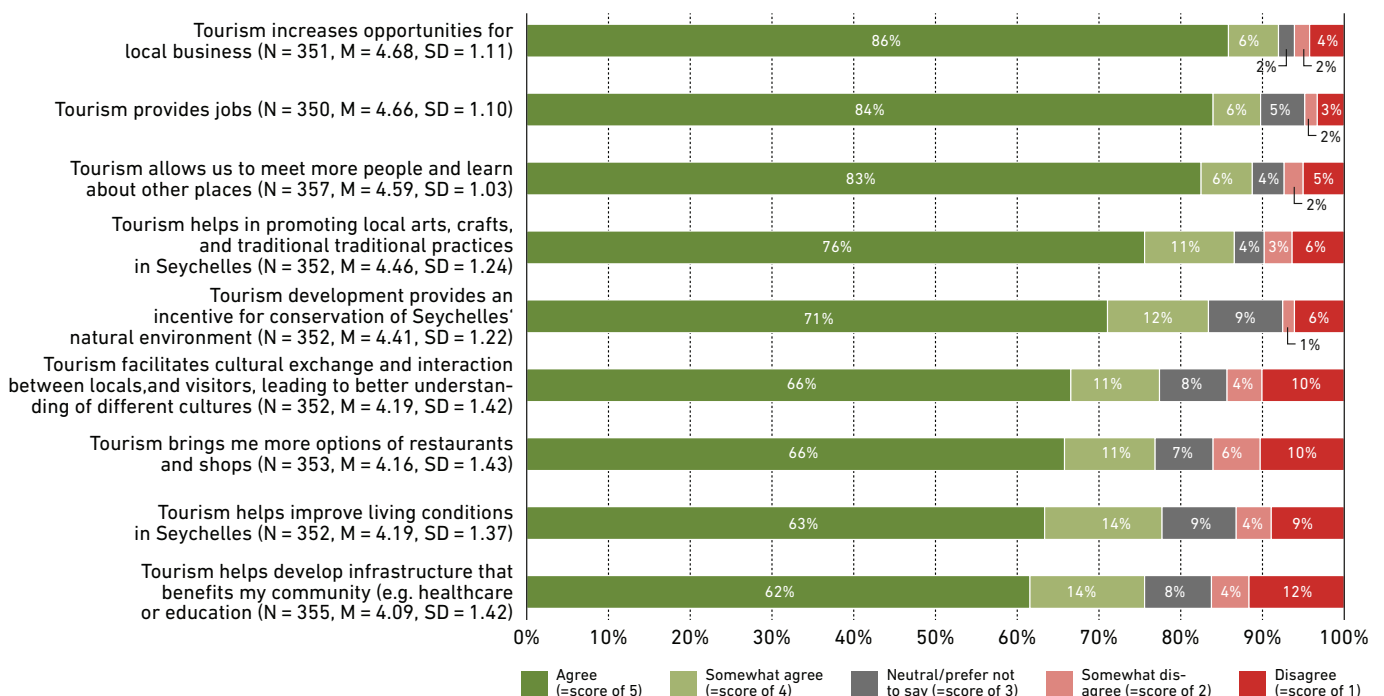


Figure 5.3
Answers to statements regarding positive impacts of tourism.

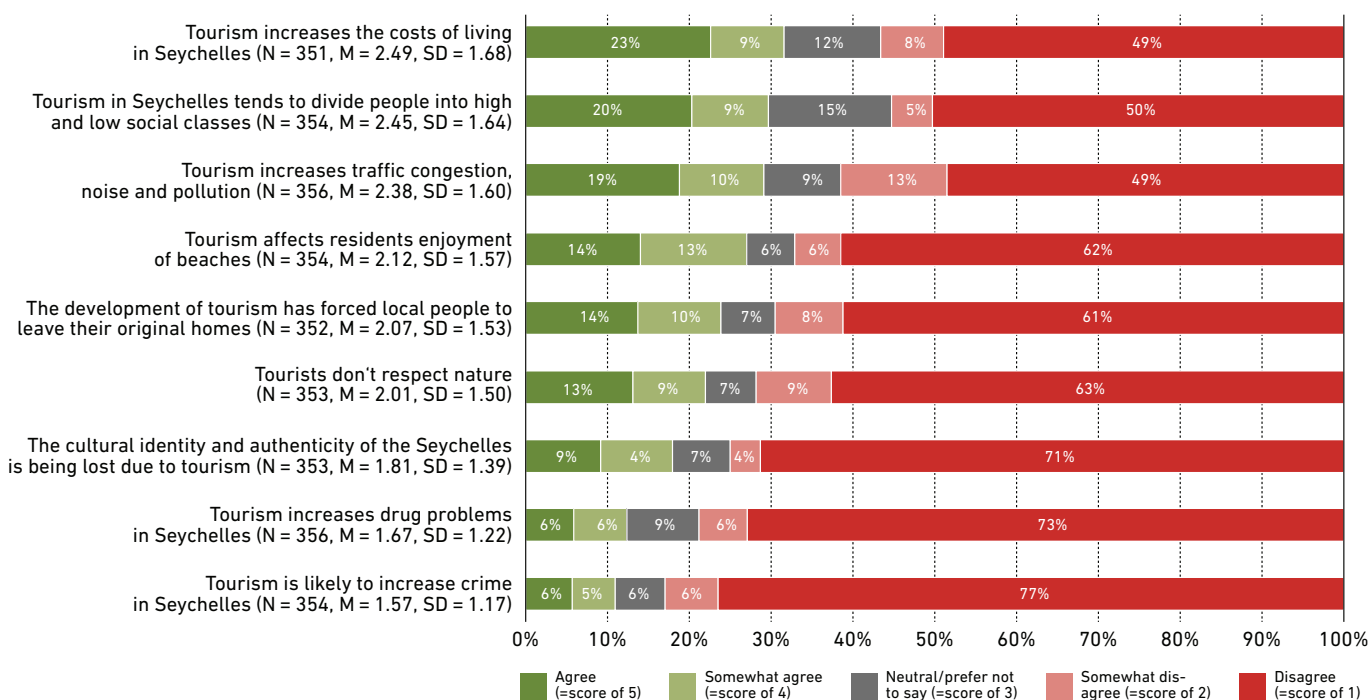


Figure 5.4
Answers to statements regarding negative impacts of tourism.

Thematically categorised impacts

General 'model'

The questions used to assess the impact of tourism were then grouped into four categories: cultural, economic, environmental, and social impact. The results are shown in Figure 5.5. The figure shows the distribution of the data. For this model, the values from the Likert scale were normalized between -1 and 1, i.e. the standard score -1 corresponds to a mean value of 1 (disagree) on the Likert scale, a standard score 0 reflects a mean value of 3 (neutral), and a standard score of 1 corresponds to a mean value 5 (agree) on the Likert scale. The median (a value that divides the sample into two equal groups) standard impact score is overall 0.64, and spreads between 0.50 and 0.83 in the four aspects. All but the social aspects see a bi-polarized distribution of the standard impact score, with the highest sample density around 1, but another sample density maxima around 0.30 to 0.60. The cultural aspect has the highest standard impact score, while the environmental aspect has the lowest.

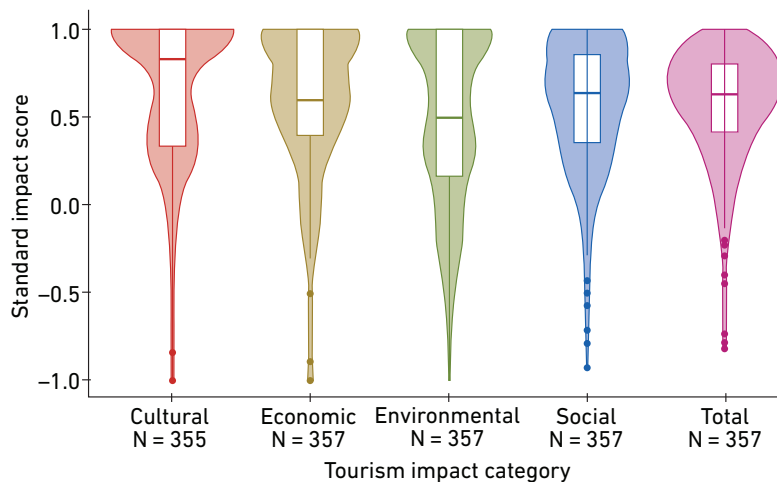


Figure 5.5
Standard impact score of thematically categorised impacts. The width of the violin shape indicates the smoothened sample density at different standard impact score, with the boxplot displaying the median, upper and lower quartiles (50% of data points) and 5%-95% percentiles (90% of data points). Outliers are marked with round points. The violin includes all data points.

Age

Figure 5.6 plots the standard impact score of every respondent in each aspect against their age. Respondents over 70 generally have a lower standard impact score in cultural and environmental aspect, meaning that this group tends to perceive a bit less the positive impacts or a little more the negative impacts of tourism on culture and the environment. A larger standard deviation can be observed among younger and older people, which means we have a wider range of responses in these groups.

Island

Figure 5.7 compares the standard impact score between respondents on Mahé and La Digue. The 101 respondents on La Digue show a higher standard impact score in economic aspect but lower in environmental and social aspects than those on Mahé. However, the difference is only significant in environmental aspect ($p < .01$). The overall standard impact score difference is insignificant.

Districts

Figure 5.8 compares the standard impact score between respondents according to the districts in which they live on Mahé. Belombre and Les Mamelles scored lower than the other districts in the cultural, economic, and social categories meaning that respondents living in these districts perceive the impacts of tourism on four categories a little less positive.

Occupation

Figure 5.9 compares the standard impact score between respondents who works in tourism related sector or not, and if they have their own tourism-related businesses. Those working in tourism-related sector bear a higher average standard impact score in cultural aspect, and those do not own a business have an even higher score (the median standard impact score is 1). The t-tests show that this difference is significant with $p < .05$. Also, respondents working in tourism-related sector have a lower average standard impact score in the environmental aspect. Scores of those owning tourism-related business are even lower. Nevertheless, the overall standard impact score, combining the four aspects, is not significant.

Regression analysis

In the previous sections, we found some significant differences in the response patterns to the four thematic categories (cultural, economic, environmental and social) in relation to the independent variables such as age, island, district and occupation. In a multiple regression

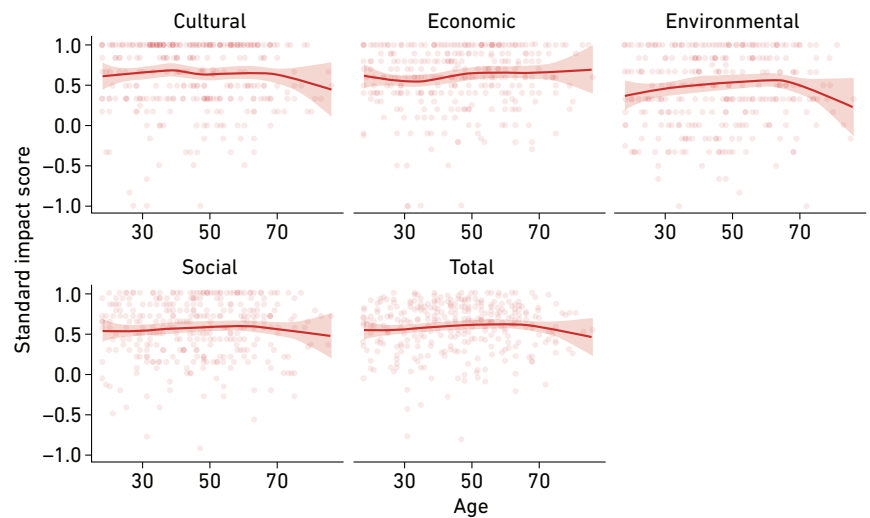


Figure 5.6

Standard impact score of respondents at different ages. Each scattered point represents one survey sample, with the red line a polynomial fit of the overall trend, and the shade upper and lower standard deviation.

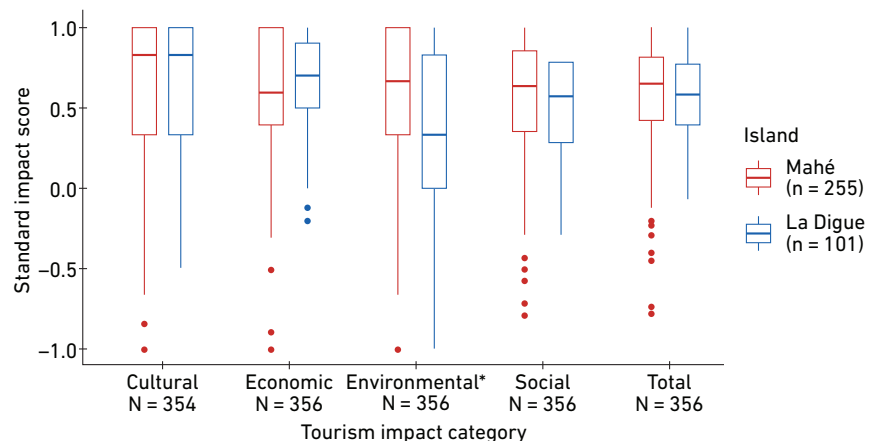


Figure 5.7

Standard impact score distribution of respondents for the different thematic categories of tourism according to which island the respondents live on. Boxplot displays the median, upper and lower quartiles (50% of data points) and 5%-95% percentiles (90% of data points). Outliers are marked with round points. Only the environmental aspect has a significant difference ($* p < .01$) in score depending on whether people come from Mahé or La Digue.

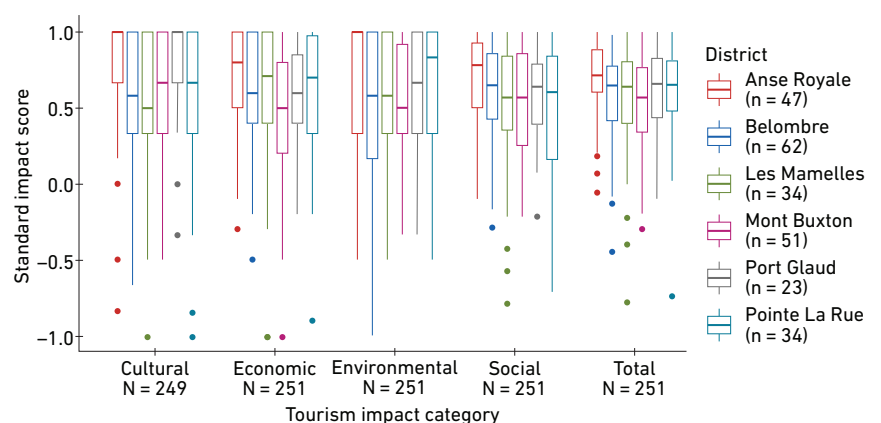


Figure 5.8

Standard impact score distribution of respondents by districts, on Mahé. Boxplot displays the median, upper and lower quartiles (50% of data points) and 5%-95% percentiles (90% of data points). Outliers are marked with round points.

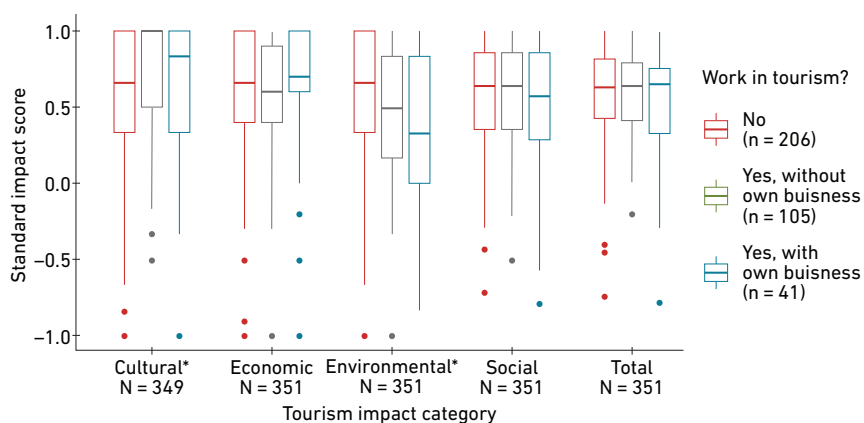


Figure 5.9

Standard impact score distribution of respondents who don't work in tourism-related sector, work in tourism-related sector but don't own a business and owns a tourism-related business. Only the cultural and environmental aspects have a significant difference in score (* pairwise t-test, $p < .05$). Boxplot displays the median, upper and lower quartiles (50% of data points) and 5%-95% percentiles (90% of data points). Outliers are marked with round points.

Table 5.6

Regression model showing the effect of socio-demographic variables on the dependent variable 'cultural aspects'. * $p < .05$.

Variable	Coefficient	p-value
Gender	.088	.092
Age	.000	.922
Education	.098	.019 (*)
District	.098	.126
Residence	.152	.164
Income	-.044	.099
Work in Tourism	.086	.171
Business in Tourism	-.199	.035 (*)
Language	-.052	.385

analysis, we analysed which of the socio-demographic variables influence the responses to these four categories. Amongst all the above four categories, we found that the demographic variables had the most significant influence on the perception of cultural impact. As can be seen in Table 5.6, "Education" and "Occupation in tourism" have a significant influence on the dependent variable "Cultural aspects". Though this regression model cannot be used for predictions as it has a low R-squared value ($R^2 = 0.04$), which means that only a small part of the variability can be explained by the model. It still shows the significant influence of some parameters which can later be used in fine-tuned models. The influence of education is positive ($B = .098$, $p = .019$), i.e., the higher the respondents' education, the more positively they view the impact of tourism on cultural aspects, while the influence of business in tourism is negative (-0.199 , $p = .0348$), which means that the cultural aspect is less positive for people with a business activity in tourism than for those without. All other variables such as gender, age, etc., have no significant influence on the culture category. The regression model for the other categories (economic, environmental and social) is not significant. For details see Appendix 5.5.

5.3.3 Potential conflicts between tourists and locals (S3)

In our survey we also asked questions to assess respondents' perception of potential conflicts between residents and tourists. Opinions are divided on most of these questions, as can be seen in Figure 5.10 where the number of people disagreeing is in the same range as the

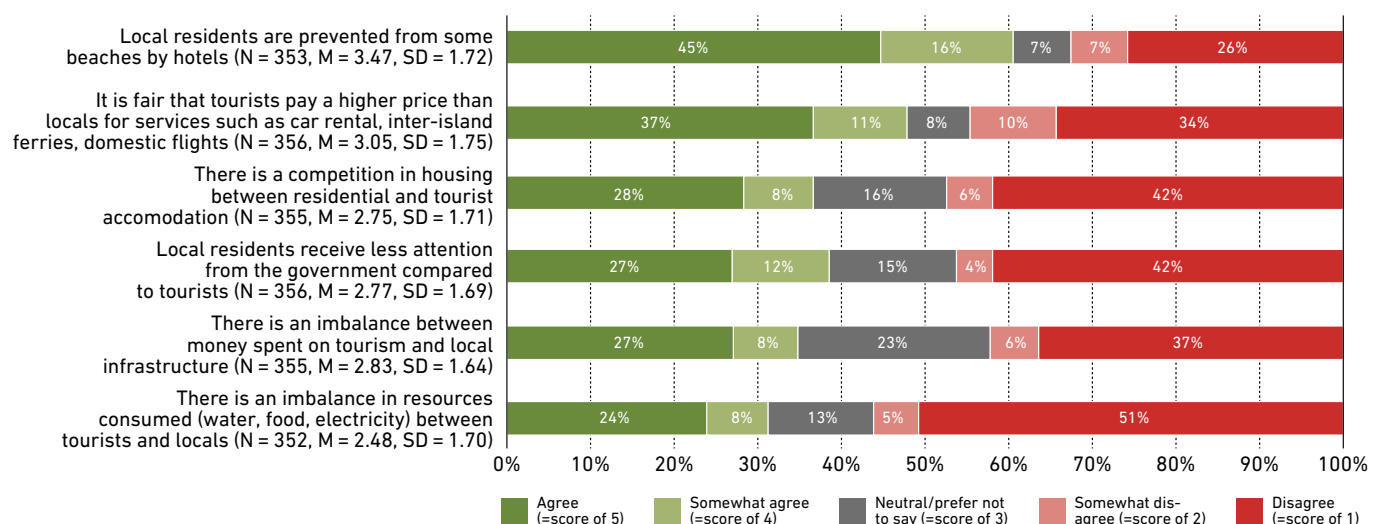


Figure 5.10

Answers to statements regarding potential inequalities (conflicts) between tourists and locals.

number of people agreeing. The imbalance in terms of money spent or resources consumed, as well as the attention paid by the government and the competition in housing all have a mean score below 3 on a scale of 1–5, showing that the majority of respondents tend to be neutral or disagree. The refusal of access to the beach by hotels had a mean score of 3.47 (SD = 1.72): precisely, 45% of respondents agreed that this still happens, 16% somewhat agreed, 7% were neutral, 7% somewhat disagreed and 26% disagreed. The question on price differences between locals and residents is the question on which opinions are most divided, with 37% of people agreeing and 34% of people disagreeing.

5.3.4 Seychellois Creole identity (S4)

A final part of the question is understanding the cultural heritage and what forms part of the Seychellois Creole identity (Figure 5.11). For all questions, a large majority of respondents consider these characteristics part of their identity as Seychellois (65+% agree on the statements). Creole cuisine and language are most prominent; 94% agree that this is part of their identity, followed by art music and dance which is agreed at 87%. Interesting to see is that also Seychellois colonial history gets high agreement (72%).

When categorizing the degree of respondent agreement on elements of Creole identity from 1 to 5 according to age group, we did not find any significant differences in the answers (see Appendix 5.5). We still obtained a slightly lower degree of agreement of

younger people (18–30 years) on all elements except for the Creole language as important part of Creole identity compared to middle-aged (31–70 years old) and old people (71 years and older). The degree of respondent agreement on elements of Creole identity is overall similar between respondents from Mahé and La Digue. Respondents on La Digue have a lower average agreement degree of the philosophy of diversity and inclusiveness than those on Mahé. No significant difference between their agreement degrees of other elements is found (see Appendix 5.5).

The degree of respondent agreement on elements of Creole identity is overall also similar between respondents working in tourism or not. Respondents with their own tourism-related business have a lower average agreement degree of the philosophy of diversity and inclusiveness than other respondents but nothing significant (see Appendix 5.5 Table 5.1).

5.3.5 Portraits of respondent groups

A final part of the question is understanding the cultural heritage and what forms part of the Seychellois Creole identity (Figure 5.11). For all questions, a large majority of respondents consider these characteristics part of their identity as Seychellois (65+% agree on the statements). Creole cuisine and language are most prominent; 94% agree that this is part of their identity, followed by art music and dance which is agreed at 87%. Interesting to see is that also Seychellois colonial history gets high agreement (72%).

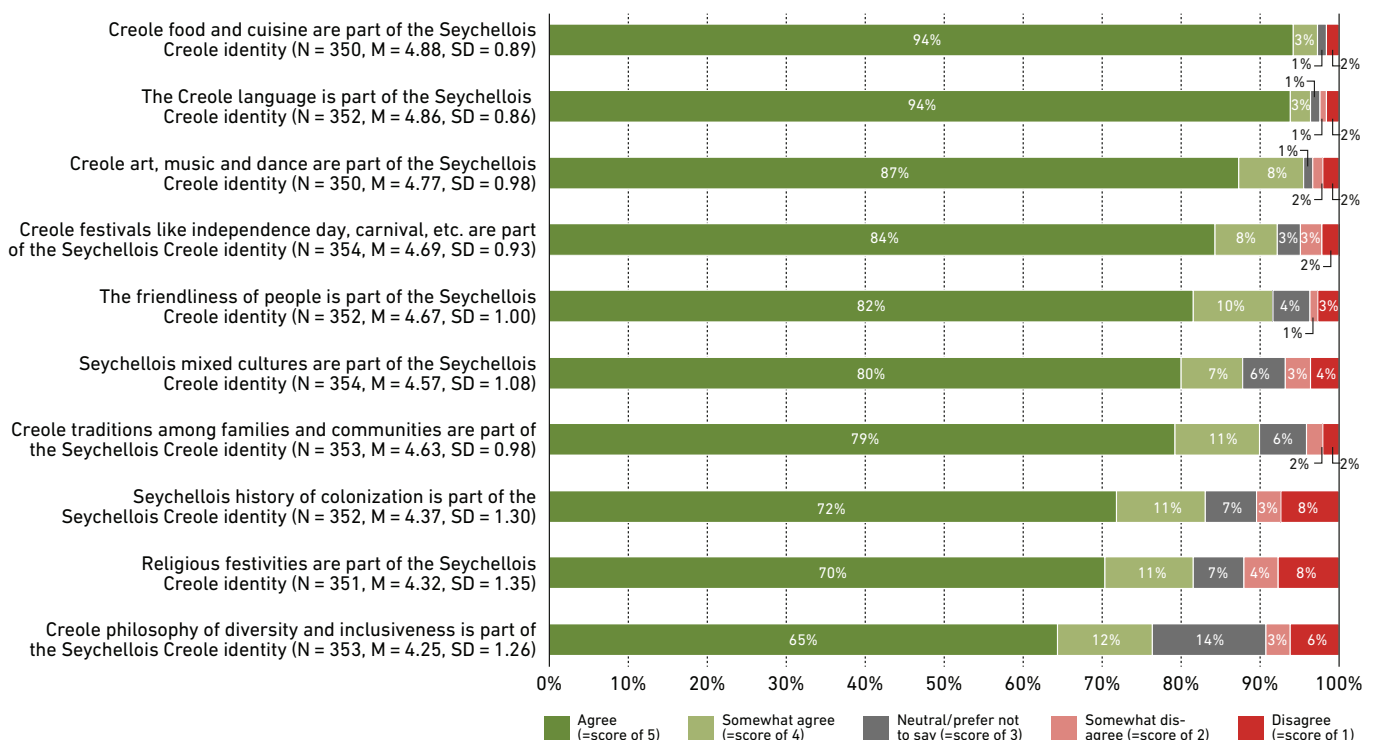


Figure 5.11
Answers to statements regarding the Seychellois Creole Identity.

With deeper inspection into answers of the survey, applying hierarchical clustering (see 5.2.4, Data Analysis), we can begin to understand the portraits of those groups (see Figure 5.12).

Group 1: “Tourist welcomers” (194 respondents)

This cluster (in blue) can be titled “tourist welcomers” because it is a group of respondents that generally display a strong friendliness towards tourists and disagrees that tourism has any negative impact to them or causes any inequity between tourists and locals. They never avoid tourists, but rather are always prepared to help them or chat with new faces. They are especially proud of Creole’s mixing culture. Many of them are middle age or old women, who now (or used to) operate their own business and earns a relatively high income. Anse Royale has the largest percentage of people in this group.

Group 2: “The ambivalent group” (94 respondents)

This cluster (in green) can be titled “Seychellois working class” because it is a group of respondents that generally sees the benefits brought by tourism to the country as well as the tourist welcomers. However, they acknowledge more of the downsides of tourism, such as more noise and pollution, and that some local people may have to leave. They are especially concerned that hotel establishments occupy lands from locals. They are overall friendly to tourists but may avoid them if it’s too crowded. A large proportion of the group are younger and more active men, working in a company or a hotel. More of them earn less than 10kSCR per month. Many of them live on La Digue.

Group 3: “Victims of tourism” (8 respondents)

This cluster (in red) can be titled “victims of tourism” because it is a small group that repels the tourism most. They don’t see any benefit from tourism, but mostly troubles and disadvantages. They are suspicious that tourism may intensify the drug and crime problems on the island. They are also annoyed by some hotels that prevent them from using the beaches and have no interest in working in a tourism-related sector. They don’t recognise the mixing culture and history of colonization as part of Creole identity. Most of them seem to be unmarried men living with only one family member (if any). Many of them are reluctant or unable to communicate in English. Les Mamelles has most members in this group.

5.4 Discussion

This discussion section is organised along the research questions as addressed in the Section 5.1.

5.4.1 Local people’s perception of tourism in the Seychelles (RQ 1)

The findings of this study reveal a widespread understanding among the respondents regarding the paramount importance of tourism in Seychelles. The positive impacts of tourism, such as its contribution to infrastructure development and job creation, are evident, with high mean scores indicating that the local population recognizes these benefits for the overall well-being of the country. Although the agreement on negative impacts were

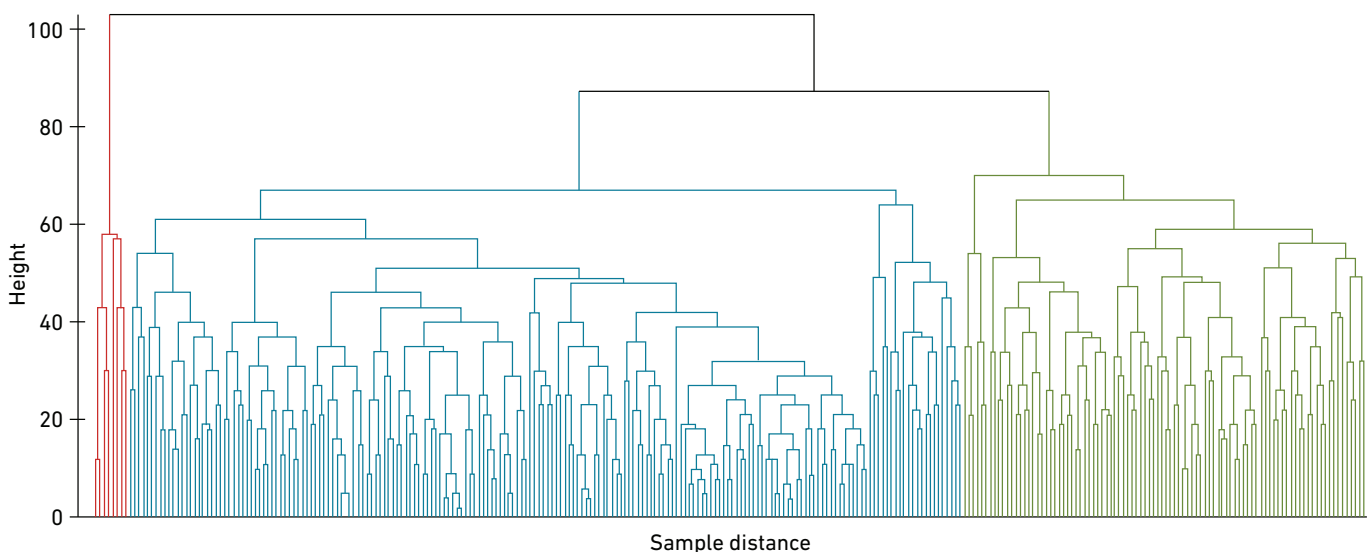


Figure 5.12

Visualisation of hierarchical clustering processes of survey results. Each line from the bottom corresponds to the answers of one respondent to the survey. The height of the hierarchy that groups two lines or subgroups beneath marks the sample distance between the two samples or subgroups, e.g. how similar they are. The higher the hierarchy is relative to the clustered samples or subgroups beneath it, the more different they are.

low, some of them, such as traffic congestion and pollution, the increase in the cost of living and the division between the upper and lower social classes, generated divided opinions and cannot be ignored. In general, residents are aware of the importance of tourism for their country and accept it even if they think that Seychelles depends too much on it. However, a pertinent question arises: is there a potential bias towards overlooking the negative impacts of tourism due to its significant economic significance? It is crucial to consider this perspective, as the socio-cultural and environmental consequences of tourism should not be dismissed merely because of its economic benefits.

The survey results show that respondents who work in the tourism-related sector tend to rate the cultural aspect higher (even though there is no significant difference in the standard impact score), indicating a more positive perception of the cultural impacts of tourism. This observation aligns with the concept of Positive Work Spillover, a theory in psychology and sociology (Thrane, 2000). Positive Work Spillover suggests that individuals who have positive experiences or perceptions related to their work are likely to have these positive feelings spill over into other aspects of their lives (Thrane, 2000). In the context of the tourism industry, individuals working within the sector may develop a more favourable view of its cultural impacts, potentially because their daily interactions with tourists and cultural elements foster a sense of pride and appreciation, which can make them less prone to recognizing negative aspects. It was also found that this group also tend to perceive less the negative impact of tourism on the environment. These results can be understood through the lens of cognitive dissonance theory (Festinger, 1957): one strategy used to reduce the discomfort of cognitive dissonance is to add other (consonant) thoughts that justify or reduce the importance of one thought and therefore diminish the inconsistency (Rabin, 1994). As individuals working in the industry may seek to reduce dissonance by emphasizing the positive aspects while acknowledging the challenges and negative impacts of tourism, especially on the environment.

The study also sheds light on potential differences in perceptions of respondents living in La Digue and Mahé, the two islands where the survey was conducted. While the analysis does not explicitly compare the two locations, the distinct characteristics of these islands, such as varying levels of tourism development, geographical features, and population density, might influence the residents' perceptions. We hypothesized that the residents on La Digue see tourism more critically than those of Mahé. However, the results showed that the standard impact score for the cultural aspect was higher for La Digue than for Mahé. On the other hand, the standard impact score for the environmental aspect was lower for La Digue than for Mahé, meaning that La Digue residents agree more that tourism has a negative impact on the environment. In addition to how we argued in the previous paragraph, La Digue is a small island which may have reached (socially and environmentally) its carrying capacity with damaging environmental effects through the consumption of resources, the generation of

waste and CO₂ emissions etc. (Sustainable Travel International, 2021). The reaching or approaching of this carrying capacity could explain that in the statement "Local residents suffer from living in a tourist destination area" (Figure 5.2), the agreement to this question is approx. 30% higher among participants from La Digue than among those from Mahé.

Resentment towards tourism/tourists in Seychelles?

The exploration of the tipping point regarding locals' resentment towards tourism in Seychelles reveals a nuanced perspective among respondents. The survey results indicate that while there are concerns and criticisms expressed by a minority of residents, particularly regarding issues such as over-dependence on tourism and potential negative impacts, there is no clear evidence of a widespread tipping point where resentment toward tourism has become predominant. Instead, the data suggests that Seychellois attitudes toward tourism remain multifaceted. Further research and ongoing surveying on residents' sentiments regarding tourism will be essential to adapt and develop sustainable strategies that address the concerns of the minority while preserving the economic benefits and cultural enrichment that tourism brings to Seychelles.

5.4.2 Creole identity (RQ2)

The intricate relationship between Seychellois identity and tourism awareness is a topic worth exploring further. Identity plays a significant role in shaping the branding of tourism products and experiences (Tsaur et al., 2016). While tourism can provide opportunities for cultural exchange and enrichment, it may also influence and reshape local identity (Picard & Wood, 1997). The awareness of Seychellois identity can contribute to the development of a unique and authentic tourism brand that aligns with the values and traditions of the local community. However, it is essential to be mindful of the potential impacts of tourism on cultural identity, as excessive commercialization and the influx of foreign influences may lead to the dilution or distortion of local traditions and values (e.g. Zhuang et al., 2019).

The results showed that Seychellois respondents demonstrated a strong attachment to their cultural heritage, placing significant importance on Creole identity, cuisine, language, and arts. The data does not provide clear evidence to support the idea that younger residents attribute less importance to elements of the Seychellois identity compared to older generations. While there is a slightly lower degree of agreement among younger respondents (18–30 years) on most elements, it is important to note that these differences are not statistically significant. This finding suggests that, at least in the context of the survey, younger generations continue to value and identify with key aspects of Seychellois culture as the other age groups do. Furthermore, the degree of agreement on elements of Creole identity was generally similar between respondents from Mahé and La Digue, with only a slight variation in the philosophy of diversity and inclusiveness. Similarly, respondents working in tourism-related roles did not signifi-

cantly differ in their agreement on these elements. It is important to acknowledge the potential limitations in how the construct of Seychellois Creole identity was measured. While the survey covered several important elements, there may be additional facets of the identity that were not fully captured, and future research could explore these aspects in greater depth.

Overall, the survey results indicate that Seychellois people, regardless of age or location, generally perceive key cultural elements as integral parts of their identity. This result emphasizes the need to promote and protect the Seychellois cultural heritage while fostering a sustainable tourism industry (Government of Seychelles, 2018b; Giampiccoli et al., 2021). Some respondents mentioned that clients such as hotels and airports prefer to hire foreign artists over local artists, which keeps tourists from experiencing Creole culture and could be an area for improvement.

Further observations

The insights gained from the door-to-door surveys offer valuable context-specific information, providing a deeper understanding of the Seychellois residents' attitudes towards tourism. For example, we learned that working in the tourism sector is widely considered to be the most profitable option in Seychelles and many respondents would be interested in working in this sector, but there is a lack of promotional opportunities and reach higher positions for Seychellois which can be discouraging.

Limitations of the study

Despite the valuable insights gained from this study, it is important to acknowledge certain limitations that should be considered when interpreting the results. The primary limitation of this study arises from the door-to-door survey methodology. Most of the surveys were conducted during daytime workdays, with only limited coverage during evenings and weekends. Consequently, individuals who were occupied during typical working hours may not have been adequately represented in the sample. A further bias can arise from the presence of interviewers, which can lead to interviewee tending to answer in the way they think the interviewer would prefer to hear, known as social desirability. (Kuncel & Tellegen, 2009). There may also be a limitation regarding language translation. Respondents were given the option to complete the survey in either English or Seychellois Creole. Although efforts were made to provide accurate translations, language differences could have led to misunderstandings in respondents' interpretations of questions and answers. Finally, the survey does not give insights in the individual's reasoning of their choice. The survey didn't include open questions and might not be used for qualitative explanation of results. While these limitations are important to note, they do not diminish the significance of the insights gained from this study. The findings contribute to our understanding of Seychellois perceptions of tourism and cultural identity, providing a valuable foundation for future research and policy considerations in the region.

5.5 Conclusion

In conclusion, we can highlight several key findings that emerged from this research:

First, there is a widespread recognition among Seychellois residents of the vital importance of tourism to their nation's economic well-being. When a significant portion of a country's economy relies on a single sector, such as tourism, it becomes highly vulnerable to external shocks. Events like global economic downturns, natural disasters, health crises (e.g. pandemics), or political instability in key source markets can severely disrupt tourism flows. The Government of Seychelles has already highlighted the problems of economic leakage. Residents are also aware of the danger of economic dependence on tourism but seem to accept it, demonstrating the resilience of the Seychellois people. Nevertheless, it is essential to reduce leakage by encouraging and supporting local entrepreneurs to establish and run businesses in the tourism sector and by strengthen linkages with local suppliers.

Second, the study highlights the complexity of residents' perceptions. Residents' perceptions influence their level of support for tourism development. That is why sustainable tourism development requires community buy-in and support. Sustainable tourism is not solely about economic gains but also about preserving cultural heritage, protecting the environment, and ensuring the well-being of local communities. Local residents live in the destination and are directly affected by tourism, so when local residents understand and appreciate the value of tourism beyond its economic aspects, and when they actively participate in shaping and benefiting from it, it can lead to more responsible and enduring tourism practices. By engaging the local community in decision-making concerning tourism, promoting entrepreneurship, and strengthening linkages with local suppliers, sustainable tourism development can better align with the collective interests of Seychellois residents, thus fostering a more resilient and balanced tourism industry for the future.

Finally, through our surveys and exchange with the respondents, we have learned that tourism can be both a good thing and a challenge for the Seychelles. It can make them more connected to the world, but they must be careful not to lose their unique identity and culture in the process of welcoming tourists. It's a question of finding a balance between sharing and preserving what they are. Further research is needed to delve deeper into the evolving dynamics of tourism and identity in Seychelles. Longitudinal studies could track changes in perceptions over time, while qualitative research can provide a richer understanding of residents' motivations and reasoning. Additionally, exploring the role of identity in shaping tourist behaviour and preferences would offer valuable insights for destination marketing and management.

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6 Coordination of food demand and supply between farms, hotels and restaurants

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Photo: Denise Baur

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6.1 Introduction

The Seychelles, much like many other Small Island Developing States (SIDS), are a net food importer, with approximately 80% of its food supply being imported. This reliance on imports stems from limited opportunities for agricultural expansion and poses an obstacle to achieving self-sufficiency in food production (Government of Seychelles, 2015). Several factors contribute to this challenge; among them land scarcity, insufficient infrastructure, soil infertility, pest infestations, limited access to low-interest loans/insurance, labor force etc. These limiting factors are not unique to the Seychelles and can be observed in various other SIDS (Government of Seychelles, 2015; Glimmann, 2017; FAO, IC-RISAT, and CIAT, 2019).

Despite this reliance on imported food, and in addition to these limiting factors of self-sufficiency, events of overproduction and surplus of particular agricultural products, leading to food waste, have repeatedly been reported (McEwen and Bennet, 2010; Government of Seychelles, 2015; Glimmann, 2017). This phenomenon has been related to the production of the same products by many farmers simultaneously. A lack of supply coordination, high transportation costs to markets, the inability to find or afford trustworthy workers needed for selling processes, overcrowded marketplaces and competition from food importers are all factors related to overproduction (Glimmann, 2017).

Considering 22% of total (locally produced and imported) vegetables supply and 31% of total fruits supply were demanded by the tourism sector, hotels and restaurants would be the potential market for local agriculture (Ministry of Agriculture, Climate Change and Environment, 2021). Also, while tourism contributed 25% of the GDP, it brought limited gains to local agriculture. According to a 2018 report, hotels, resorts, and restaurants imported the majority of agricultural products for their guests, rather than using the locally produced products (Government of Seychelles, 2018). Although hoteliers showed their willingness to buy local agricultural products, this market is not easy for farmers to access due to the inconsistent production, food quality requirements, and pricing mechanism (Government of Seychelles, 2018).

A successful agriculture-tourism linkage can play a crucial role in mitigating food overproduction and optimizing sustainable tourism. In this linkage, local farmers represent the agricultural sector while hotels and restaurants stand for the tourism sector. Such a successful linkage can be observed for example in Gambia; the “Gambia is Good” horticulture to tourism linkages project has been successful in helping farmers access market/price information, in distributing products directly to hotels, in introducing the investment support for new techniques, and so on (McEwen and Bennett, 2010). So far, little attention has been dedicated to

improving this linkage in the Seychelles, even though the Ministry of Agriculture, Climate Change and Environment has developed a strategy that aims to create stronger inter-sectoral links (Ministry of Agriculture, Climate and Environment, 2021). The overproduction issue is the reflection of the currently poor linkage between local agriculture and tourism in the Seychelles.

In this study, besides finding possible reasons for the overproduction issue, we analysed the collaboration between food production at local farms and consumption in hotels and restaurants in terms of challenges and opportunities. Based on their current collaboration mode, we proposed the possible solutions to enhance these linkages, and better balance supply and demand, respectively. In this research, we focused solely on crop products.

Our research was guided by the following questions:

- RQ1 Why are certain crop products currently overproduced?*
- RQ2 How are farmers and hoteliers currently related in the food supply chain? What other actors are involved in the food supply chain?*
- RQ3 How can we improve the connection between food production (farmers) and consumption (hoteliers/restaurateurs)?*

In order to answer these research questions, we used interviews as our main methodological tool. The selection of interviewees was diverse, ranging from hotels and restaurants, farmers, to governmental entities, and entrepreneurs. The significant findings and identified links will be presented in this report, with the intent to present how to better farmers with hotels and restaurants.

6.2 Methods

We addressed the research questions (Figure 6.1, column Operational Questions) via literature review, semi-structured interviews and other forms of data collection (e.g. data requests from the National Bureau of Statistics (NBS)) to gather the respective information (see column Extract Information). Question 1 and Question 2 aim to understand why the overproduction occurs, how the food flows from farms to hospitalities and how other stakeholders are involved. Question 3 aims to identify what the opportunities and limitations are in improving the connection between farmers and hotels. During interviews with different stakeholders, we also asked for their perceptions on two proposals: Online Platform and Labelling System (see section 6.2.2), which may turn out to be important in identifying how to better connect the farmers and hotels/restaurants. Data and information (column Expected Outcome) related to questions 1–3 (boxes to the right highlighted in green) allowed us to discuss and answer our main research questions (right side of figure in blue).

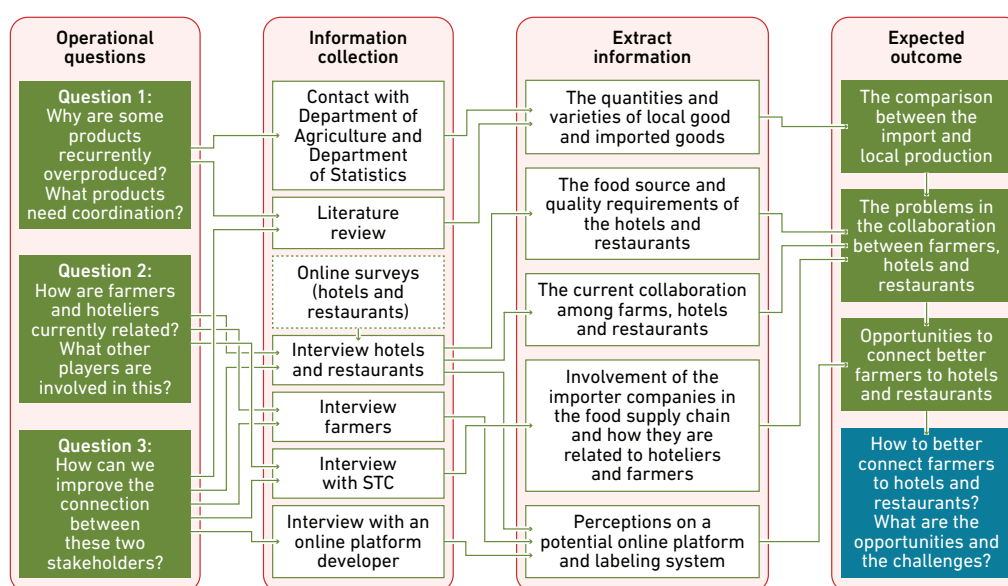


Figure 6.1
Diagram of the work procedure of our research. See text for explanation.

6.2.1 Online surveys

To establish first contacts with the hotels and restaurants we created a short online survey (Appendix 6.1), where they could answer simple questions about their food source and additionally leave their contact details. We sent the online surveys to over 200 hotels and more than 50 restaurants/cafeterias, of which the initial contact information was received from the Tourism Department. The hotels include small, medium, and large facilities as well as self-catering establishments with more than ten rooms. In total, we received valid responses from 16 hotels and restaurants. The intent of these surveys was to have an initial overview of the establishments' food supply and how many of them collaborate with local farmers. We then further contacted the establishments and managed to perform interviews with some of them to further explore the obstacles of linking farmers with the hotels and restaurants.

6.2.2 Sample

To further investigate the connection between farmers and hoteliers, and how they perceive the overproduction problem, we conducted several interviews with farms, restaurants and hotels. Furthermore, other key stakeholders that could influence the interaction between farmers and hotels were interviewed. More information on the interviews with different stakeholders is introduced in the following sub-sections. The questions we used to guide our interviews can be found in the Appendices 6.2, 6.3, 6.4, and 6.5. For each interview, we took notes and recorded the audio by phone after asking for the permission of the interviewees. During the interviews with different stakeholders as specified below, we provided two proposals (Online Platform and Labelling System), which aim to strengthen the linkage between farmers and hotels and asked for their opinion. Their feedback could help us better understand the opportunities and limitations of such systems and guide us to investigate improvements to better connect farmers to hotels and restaurants through an online platform and a labelling system.

Online Platform: Inspired by Farmlike (TecDam Innovations S.L, 2022), we proposed that there would be an online platform where both farmers and establishments can post; farmers can post what they are producing, including the estimated quantity and harvest time, and hotels can post what type of products they demand. Also, the locations and contacts of farmers and buyers will be displayed on this online platform.

Labelling System: We proposed the labelling systems "Organic" and "Made in Seychelles". Farmers would follow the specific procedures of production and are then allowed to receive the labels for their agricultural

products. For example, to receive the "Organic" label, farmers would have to use organic fertilizer instead of inorganic fertilizer, like NPK (Nitrogen–Phosphorus–Potassium fertilizer). "Organic" agricultural products can be sold at a higher price.

Settings and participants

We conducted semi-structured interviews online and in person with key stakeholders involved in the food production and consumption (Table 6.1) of Mahé, Praslin, La Digue and Alphonse Island, between 1 July and 14 July 2023. The in-person interviews were performed with the stakeholders on Mahé, and the online interviews were scheduled with farmers, hotels and restaurants on Praslin, La Digue and Alphonse Island.

Hotels and restaurants

The purpose of these interviews was to learn about the food source of the hotels and restaurants, as well as their collaboration with local farms; if they had any. Furthermore, we wished to receive feedback on the potential online platform where farmers and hoteliers sell or buy agricultural products respectively and on the potential implementation of a labelling system. Most hotels and restaurants we interviewed were distributed across Beau Valon and Victoria. Others interviewed were located at Au Cap and Anse Royale. The selected hotels were of different sizes, between small with 20 beds, medium with 50 beds and large with 330 beds. The restaurants also ranged from smaller to bigger ones. Restaurants in hotels were considered as hotels. We called the

Table 6.1
Overview of the participants of the interviews.

Participants of interview	Total
Farmers	12
Hotels	9
Restaurants	12
Department of Agriculture	1
Import company	1
Online platform developer	1
Total	36

establishments and scheduled the interviews. In some instances, we approached the establishments spontaneously and conducted interviews with them directly.

Farmers

The purpose of these interviews was to investigate how farmers run their business. In other words, what they mainly produce, what marketing strategy they have, their participation to any farmer's association and their willingness to use a potential online platform and labelling system. Here, we mainly focused on interviewing the vegetable and fruit farms. Local meat production is very low and there is often overproduction of vegetables and fruits only. Contacting farmers was more difficult compared to contacting hotels and restaurants. In fact, many farms cannot be found on google maps or do not have any contact information. Therefore, we initially approached farms spontaneously to conduct interviews. In each interview we asked the contacts of other farms, using a snowballing system. Although it was not possible to pre-select the farms, we still managed to interview farms with different sizes and from different regions. We interviewed three farmers from Au Cap, four from Val d'Endor and five from Anse Royale. From the other islands we interviewed two from La Digue.

Import company

To know more about how the import of food products works, and how import companies play a role in the overproduction phenomenon, we interviewed one of the trading companies in the Seychelles: the Seychelles Trading Company (STC). In the interview some questions were included regarding the relationship between STC and hotels, restaurants, and farmers, if they collaborate directly with any of them, and how this collaboration works.

Department of Agriculture

The purpose of this interview was to first collect data about the local production of food. Furthermore, we interviewed the Department of Agriculture to obtain an opinion from their side as well, to know how they are addressing and trying to solve the overproduction problem. We also wanted to know more about the role they play in the food flow between the different stakeholders we analysed.

Developer of an online platform

There is already an online platform that is similar to the one we propose. This online platform is a webpage where farmers can sell their food and buyers can find what they need. This online platform is still in the developing phase and not yet published.

The purpose of this interview was to learn more about this running project, whose objective is also to better connect food producers and food buyers. We wanted to know more on how the platform works, what they are currently doing and what challenges they are facing in the creation of it.

6.2.3 Data analysis

The interview and online survey data was used to create a diagram of the food flow between farmers, hotels, restaurants, STC (import company), shops, markets, and supermarkets. We extracted the information relating to food flow and then used an online application called ProcessOn to generate a figure (Figure 6.2).

To analyse the data collected from the Department of Agriculture about the local products and the imported products, we used RStudio to create graphics.

We analysed the interviews thematically, i.e., for each operational question, we prepared various sub-questions. We grouped the answers under different bigger questions to answer our operational questions. Such topics were for example crop sales, farm association related questions, and questions on over/underproduction, and questions on collaboration. The significant findings from the interviews, and especially the links between various topics and stakeholders, are reported in the results section. The main themes in the output are collaboration, over/underproduction, and challenges for farmers.

Lastly, we used Excel to create a pie chart showing the proportion of local food used in the hotels/restaurants based on the online survey data.

6.3 Results

In this section, we will first introduce the food flow network in the Seychelles, which is based on our online surveys, interviews and data analysis. The focus is on the connections between farmers and restaurants/hotels. We will then give possible explanations of overproduction issues and provide stakeholders' perceptions on our two proposals.

6.3.1 Food market function in Seychelles

This section will introduce the Seychelles' food flow network (farmers, hotels, restaurants and other stakeholders) according to our interviews (Figure 6.2).

Food Flow Network

The majority of interviewed farmers sell their products to a combination of purchasers, such as supermarkets (e.g. STC), markets (in Victoria), road markets, groceries hotels, and restaurants. The market refers to the main markets in Victoria, which have larger sizes and more clients compared to the road markets and groceries. Supermarkets like the International Sales and Promotion Company (ISPC) and STC mainly sell imported food in their shops. For example, in the case of STC, food from the local origin makes up an estimated 25% of the sales and imported products account for the remaining 75%. A few farmers also sell their products to other farmers. Only a very small portion of farms is privately owned by large hotels, and they only produce for the hotel. Other players in this food flow network are the import companies. Their products flow to different retailers (supermarkets and shops) and to hotels and restaurants.

Market access for farmers

Respondents were asked to provide which transport mode they In terms of marketing, the buyer's accessibility and proximity play a crucial role in farmers' decisions regarding where to sell their products. As shown in Figure 6.2, farmers mainly sell their products to supermarkets, markets, road markets, groceries, hotels, and restaurants. Medium and large-sized farms tend to sell their goods directly to hotels and restaurants, as they claim they can sell a significant quantity at fair prices. Some of them can also

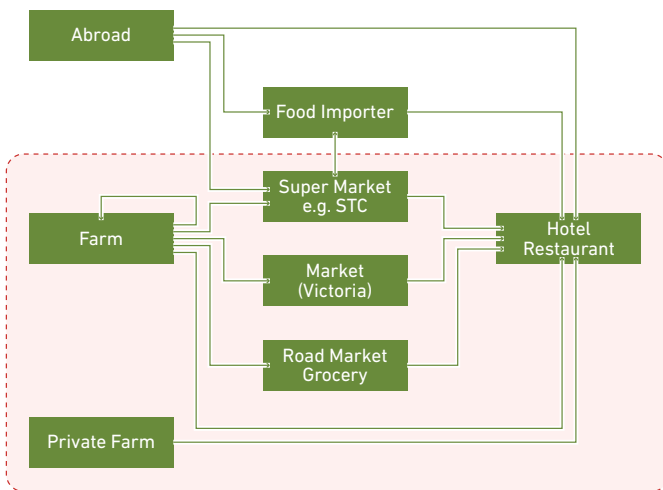


Figure 6.2
The food flow (fruits and vegetables) diagram from local agriculture to tourism, based on the interviews with different stakeholders. The local food flow is shown in the dashed box.

have a stall at the big market in Victoria or sell at the street markets near their farms. The situation is different for small farms, which usually sell their products in street markets or shops, as it is easier to access these without stringent quality requirements. However, some small farms also manage to sell their products to certain hotels. Some farmers sell their products to other farmers. This happens for two reasons: 1) the farmer did not manage to produce the agreed quantity for the hoteliers, 2) the farmer has difficulties in selling their products, so receives help from farmers that have easier access to the market. During our interviews, farmers indicated that if they collaborate with hotels or restaurants, they tend to choose those that are nearby, especially for farmers in the Val d'Endor area, where transportation is a primary consideration.

Market access for hotels and restaurants

To explore the food source of hotels and restaurants in the Seychelles, we conducted online surveys in May and interviews in July 2023. Based on the online survey, 14 out of 16 hotels and restaurants buy over 50% of their needs from local food production, including vegetables, fruits, meat, fish and other categories, which shows they have a high preference for purchasing local agricultural products (Figure 6.3). The results from the online surveys align with the information we obtained from interviews. In our interviews, nearly all of the hotels and restaurants offered over 50% of local food, especially for vegetables, fruits and fish. All of them declared that they used a mixture of local food and imported food for their guests.

Farm

Hotels and restaurants mainly access the local food through the market and directly from the farmers. Ten out of 21 hotels and restaurants we interviewed have direct collaborations with some local farms. Among them, restaurants usually collaborate with one to five farmers to ensure their food supply, while hotels have collaborations with three to ten farmers. They highlighted that it is cheaper to buy food directly from the farmers than from the

market. Most hotels and restaurants declared that they try to buy the local food as much as possible and only when it is not available, they will buy the imported goods. However, it was mentioned that some restaurants and hotels only contacted the farmers they already knew, and that they did not search for new ones.

Farms owned by hotels

Two out of 21 interviewed hotels and restaurants are self-sustaining by establishing their own farms for vegetables and fruits. One hotel additionally feeds four cows to produce dairy products, like cheese and yogurt. This allows them to rely on their internal resources for over 90% of their food requirements, with only certain specific agricultural products needing to be sourced externally.

Market, road market and grocery

The market is another source of locally produced food, where farmers and fishermen set up stalls to sell their goods. Food from the market, road, and grocery is also preferred by the hotels and restaurants in our interviews, because they can easily access these fresh food products. One owner of a small restaurant in Victoria said the markets were his preferred choice as he could purchase goods in small quantities, adapting to his guest numbers more flexibly, while saving time and transportation costs.

Supermarkets (STC) and food importer

STC, for example, working as a distributor in the food supply chain, has the contacts of almost all farmers on Mahé, Praslin, and La Digue. Typically, the STC requests the products from the farmers; sometimes farmers contact the STC themselves to sell their products. The main customers for STC include retailers, residents, and a few hotels. All of the hotels and restaurants we interviewed declared that they bought imported food from supermarkets or food importers. Since many of the commodities of these suppliers are imported, their supply, especially that of fruits and vegetables, is not affected by seasonality, thus making them a reliable source of food for the hotel and catering industry. Eight hotels and restaurants said that supermarkets were not their first choice. Only one restaurant owner in Victoria said he mainly ordered the food from food importers because as a foreigner he was not familiar with local farmers.

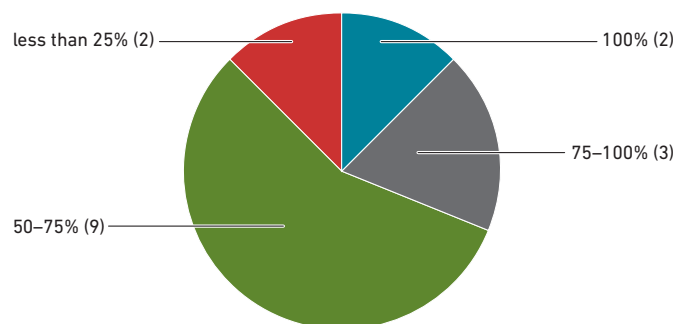


Figure 6.3
The proportion (percentage) of the local food products bought by the hotels/restaurants. Data refer to the online survey (N=16). The numbers within the pie chart in brackets represent the number of interviewed hotels/restaurants.

6.3.2 Collaboration between farmers and hotels/restaurants

The market's intricate dynamics revolve around farmers diligently selling their products and hoteliers actively purchasing essential ingredients. Collaboration between these stakeholders is vital in the market. In this section, we explore their dynamic partnership, highlighting the problems they face while striving for sustainable and productive cooperation.

Collaboration without contracts

Typically, this cooperation is not guaranteed by contracts and is similar to a gentleman's agreement. Most hotels and restaurants stated that usually, the farmers contacted them and then delivered the products to the hotels and restaurants. If the quality of the products meets the buyers' standards, the hotels and restaurants keep the contact of the farmers and reach out to them for a long-term collaboration. One farm that provides food to a luxury hotel mentioned they started with a contract ten years ago and that it always worked well, although the contract became outdated with time. One hotel that highly relies on local products told us sometimes they had to buy extra food from the farmers to build up and maintain the relationship with them.

Benefits in their collaboration

Most hotels mentioned that this type of collaboration helped them to save time and transportation costs needed for searching the local sellers. Hoteliers also prefer to buy directly from farms, so they can be more flexible and place orders based on guests' demands. Furthermore, many hoteliers search for fresh products at good prices so the farms' products are very appreciated. From the side of the farmers, they showed their willingness to collaborate with the hotels and restaurants. One farmer said that if he had a stable partnership with the hotels, he would produce certain types of products based on the hotels' demand.

Problems in their collaboration

Food quality and quantity

The collaboration between farmers and restaurants/hoteliers is characterized by some difficulties. Usually, hotels and restaurants are satisfied with the quality of the products they buy from the farms. Nevertheless, there are also instances where the food does not meet the hotels' and restaurants' quality standards. In terms of food quality, most hotels and restaurants were satisfied with their collaborated farmers, because the quality of the products was high and the prices were fair. However, several hotels and restaurants mentioned local products with unsatisfactory quality. For example, one restaurant in Victoria said the farmers provided the smaller cabbages which were unexpected, and as a result, they failed to make a deal. Another restaurant in Beau Vallon said the local fruits, such as bananas, became rotten quickly.

Payment

Besides, one restaurant at Au Cap suggested barriers caused by the conflicts in payment methods and the inability to provide proper documentation when working with the small farms. As cash is the preferred payment method for most farmers, sometimes there are difficulties having sufficient cash to complete purchases. Additionally, some small farms cannot provide receipts and invoices, which are necessary for reimbursement.

6.3.2 Production imbalances: overproduction and underproduction

The previous sections demonstrated how different stakeholders of the food flow network are involved and how they interact. Although they seem to be strongly connected, there are still events of overproduction and underproduction that can emerge, exerting significant implications on the entire supply chain. Remarkably, hotels and restaurants grapple with underproduction, while farmers face challenges in overproduction. In the subsequent content, we will explore these existing market imbalances and stakeholders' perspectives on their potential causes.

Underproduction

As reported by the Department of Agriculture in the interview, the available land for agriculture in Seychelles is insufficient to meet the local demand, resulting in a permanent underproduction issue. Restaurants and hotels demand more specific products that are underproduced and which could potentially be grown locally. In general, they noticed that there is a low local production of vegetables and fruits. Especially, the local production of some fruits, like mandarins and strawberries, is so low that it can be ignored. This trend is further reinforced by the importation of several agricultural products (tomato, lettuce, eggplant, chinese cabbage, capsicum, cabbage, and beans) to meet the demand gaps in the

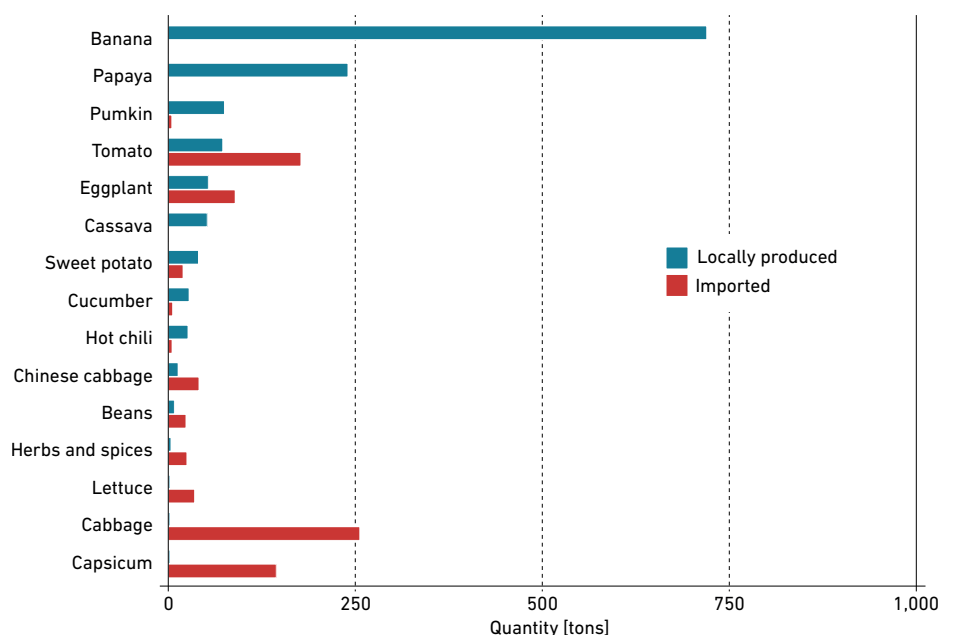


Figure 6.4
The amount of 15 imported and locally produced products in 2022 (Source: Department of Agriculture, Seychelles).

market. This is depicted in Figure 6.4. Among the underproduced products, tomatoes were one of the most frequently mentioned in the interviews, followed by pumpkins and papaya. Other highlighted underproduced goods were pineapple, watermelon, passion fruits, salad greens and eggplants. Most of the hotels and restaurants stated that they do not experience food supply problems, so they always find somewhere to buy their goods. However, some of them expressed dissatisfaction with purchasing more expensive imported alternatives, for example for pineapple and passion fruits, due to limited local availability.

Overproduction

A common opinion from the farmers' side is that there is an overproduction of certain goods. The most frequently mentioned was lettuce (3 out of 12 farmers), followed by cucumber (2 out of 12 farmers) and pumpkins (2 out of 12 farmers). Other highlighted products were mangoes, lemons, breadfruit, tomato, cabbage, eggplants and root crops. This phenomenon can be explained by farmers copying each other and growing the same products simultaneously. Other factors that also cause this copying mechanism are seasonality, unfavourable environmental conditions, knowledge gaps in marketing, and competition with imported products. The farmers produce what is in season and for some of them the choice of a variety of crops is limited since they rely on those that are easy to cultivate, that require less inputs, that are more profitable (they can be sold at higher prices) or that they know more about. These challenges are further described in the following sub-chapters.

Seasonality

Limited by the temperature and precipitation, some agricultural products can only be produced in a certain period of the year. In other words, the production of agricultural products is not consistent over the year. In the Seychelles, the temperature is warm all year round, so the two seasons depend on the precipitation. The dry season is from May to September and the wet season is between November and March. Depending on which season is approaching, the farmers will choose the crops that are more

adapted to it. This is also why overproduction was defined as a seasonal event by one of the farmers we interviewed. Half of the farmers we interviewed produce a wide range of vegetable and fruit products, like lettuces, tomatoes, cabbages, bananas, and papayas. However, the crop choice is reduced if they have to be adapted to the season. This is why farmers, each season, end up producing the same products at the same time.

Unfavourable environmental conditions

Besides seasonality, there are other production constraints that limit the choice of cultivated varieties. For example, the farmers in the Val d'Endor, highlighted soil fertility and steepness as challenges in the production. On one hand, the soil is dominated by ferritic soil, which is low in fertility and water-holding capacity. Ferritic soil refers to a specific soil type characterized by a high concentration of iron oxides (Storrier & Muir, 1962). One farmer explained that compared to other areas, he had to use more NPK fertilizers to be able to harvest, which is a fertilizer mainly composed of nitrogen, phosphate, and potash (Baligar & Bennett, 1986). On the other hand, three farms we visited are established on the terrace to reduce soil erosion. The sloping terrain increases the difficulties of farming and the demand for human labour. One farmer told us that it was not possible to use machines to remove the weeds as other farmers did in the plains. For these reasons, farmers tend to grow root crops and vegetables with less maintenance and their cultivated varieties are very similar.

Knowledge Gap in Marketing

There are other factors that can lead to overproduction, not related to the environmental constraints, but to the education of the farmers and their access to information. One farmer indicated that often farmers do not know what is demanded in the market and they only produce what they know to produce. Also, farmers generally prioritize cultivating products that generated high revenue in the previous year, leading to overproduction in the following year. It was also pointed out that farmers tend to sell their products as soon as they harvest because many farms do not have cold storage for their vegetables and fruits. Therefore,

it is more difficult to find purchasers like hotels and restaurants since they need to know in advance, especially for bigger accommodations, if they will have the products available or if they have to import. Related to this, it was also pointed out that for the farmers it is hard to predict the quantity and quality of products they will have available until a certain time. It is thus difficult for hotels and farmers to make a deal in advance, before the harvest.

Competition with imported products

Another reason given to explain the overproduction was the competition with imported food. This was also confirmed by the Department of Agriculture in our interview.

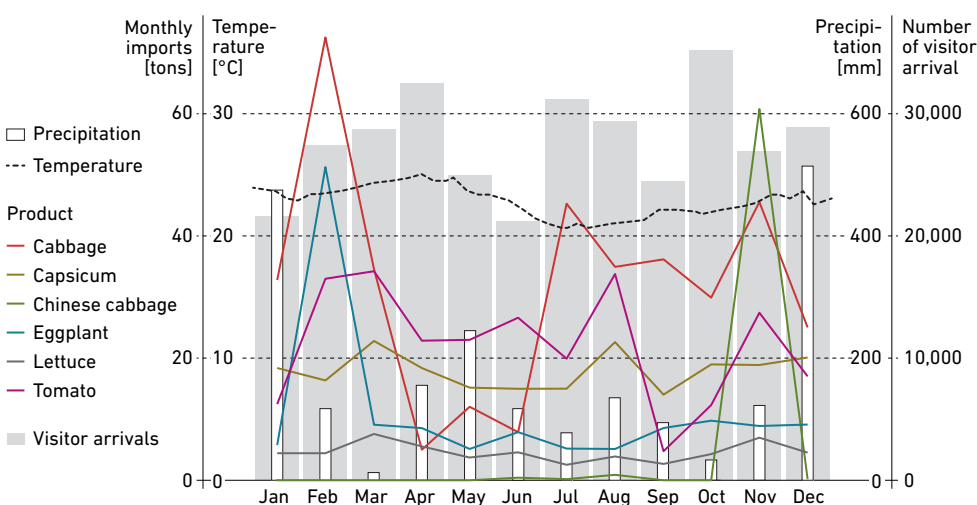


Figure 6.5

The lines show the monthly import (tons) in 2022 of cabbage, capsicum, Chinese cabbage, eggplant, lettuce, and tomato (Source: Department of Agriculture). The bar chart in grey represents the monthly visitor arrivals in 2022 (Source: National Bureau of Statistics Seychelles). The bar chart in white represents the monthly precipitation in 2022 (Source: TuTiempo.net) and the dashed line in black represents the average temperature (Source: meteoblue).

Figure 6.5 shows the import amounts of agricultural products. Products like lettuce are consistent all year round, which may be related to the low local production and consistent total demand. Certain products, like cabbages and tomatoes, exhibit fluctuating patterns with peaks and valleys in different seasons, highlighting the seasonality of local production as well as the peak season of tourism. On one hand, the number of imported products may be reduced during the harvest seasons; on the other hand, the total demand of food will increase in the peak season of tourism. Thus, it is not easy to estimate how much food will need to be imported to meet the total demand. During the interview with STC, they revealed that they served as the government's importers and strive to bridge demand gaps in the market. As a precaution, they often import slightly more food products to prevent food shortages. However, from the farmers' perspective, especially during the harvesting season, the market is then saturated, leading to challenges in selling their products. Moreover, STC pointed out that imported food usually has lower prices due to the lower production costs of the exporting countries, making it even harder for farmers to sell their products. Similarly, the Department of Agriculture highlighted that the local products, such as lettuce and tomatoes, did not have price advantages compared to the imported ones.

6.3.4 Other challenges for farmers

In the previous section many causes related to overproduction and underproduction have been pointed out. However, there are further challenges that farmers face that limit their production, including unfavourable climate conditions, production costs, inadequate support systems, and knowledge gaps. In this section, we explore these diverse challenges.

Climate change and agricultural pathogen

The Seychelles has a tropical maritime climate with a warm temperature and high mean annual precipitation. 'Winter' temperatures, strong winds and frequency of drought episodes have increased during the last 10 to 20 years (Etongo et al., 2022). This climate is ideal for the growth and reproduction of various of agricultural pathogens, i.e., insects, fungi, and bacteria, causing serious crop yield reduction problems. In addition, some interviewed farmers mentioned that the windy nature in some regions has led to yield reduction problems due to crop lodging. Besides, one farmer said it tends to be harder to produce tomatoes in recent years due to drought and hot weather as a result of climate change.

Production costs

All the farmers we interviewed use a mixture of manure and inorganic fertilizer on their farms. They buy the manure from the local animal farms; one small farm obtains their manure from their own animal. Herbicide is not the dominant method in most of the farms we visited. Many farmers said herbicides and pesticides were imported and the prices were not affordable to them. To reduce the cost, they remove the weeds by hand. When it comes to organic pesticides and herbicides, more than one farmer mentioned that the price of organic pesticides or herbicides was much higher than the inorganic ones, thus they were less likely to use the imported organic pesticide or herbicides. The use of pesticides is quite important for some crops, in fact three farmers

pointed out that pests, like fruit flies, and disease were the main challenges in the production. This is especially the case in tomato production, which is why tomatoes are sold at higher prices. To work against the unfavourable environmental conditions described in the previous section, four farms we visited have hoop houses on their farms. The crops growing in the hoop house are less likely to be infected/attacked by diseases and pests. Additionally, the hoop house can protect the vine crops such as tomatoes, melons, and cucumbers, from the strong wind and reduce the damage to the crops. However, the cost of building a hoop house is high. One farmer told us the 30m*10m hoop house in his farm required 500,000SCR to build, since all building materials were imported.

Knowledge gap in production

Two farmers pointed out that many farmers in Seychelles lack the knowledge and skills in agricultural production. Some farmers do not have the skills to produce more delicate crops such as tomatoes, zucchini, cucumbers, and so on. It is one of the potential reasons that most of them prefer growing root crops, which require less maintenance. The lack of skills and knowledge was also highlighted by other farmers. For example, one farmer showed us that the leaves of his beans became wilt and he did not know how to deal with this. Another farmer experienced post-harvesting loss due to improper storage and lack of storage facilities for his products. The limited knowledge related to different stages of production, in turn limits farmers' propensity to choose crops other than what they are used to, or to choose crops that are easy to grow.

Inadequate internal and external support

According to our interviews, all the farmers tend to collaborate with other farmers in the same regions. Some of them share their problems and advice. Some of them explore the market and sell their products together.

There are eight farmers' associations in the Seychelles. Eight out of the twelve farmers we interviewed participate in at least one of these associations. They have different opinions about the farmers' association. More than one farmer complained that they did not receive much help from the association and that is why some of them left the association. One farmer revealed that farmers received better resources from the association if they were more familiar with the staff in the association. Positive feedback on the associations includes that the farmers can receive training and support during production.

In terms of external support, nine out of twelve farmers pointed out that they did not receive any economic and technical support from the government and that they had to do everything by themselves. Only one farmer, who joined in the "Agroforest" project led by the government, told us that the government provided him with fertilizer, machines, and 25,000SCR to hire employees. Besides the support from the government, two farmers mentioned that when they encountered problems, such as pest outbreaks, they would contact UNDP (United Nations Development Programme) for help. From the interview with the Department of Agriculture, it was highlighted that the main financial support is dedicated to farmers producing livestock and that they provided free training

to farmers for crop production. There might be more support than the farmers reported in our interviews, for example, Sustainability for Seychelles (S4S) supported many farmers at Val d'Endor with drip-irrigation systems (S4S, 2023).

6.3.5 Perceptions on the Online Platform and Labelling System

To enhance the connection between farmers and hoteliers, we proposed two potential solutions: an Online Platform and a Labelling System. Through interviews with various stakeholders, we sought their valuable opinions on these initiatives. In this section, we present an overview of our ideas and the feedback received from different stakeholders.

Online Platform

When we asked the farmers about their opinions on the online platform, most of them showed their interest in the platform, where they can share their products' information and access the contacts of the hoteliers. Most of them expressed that it could be a good way to access more markets. Two farmers suggested that they expected the training sectors to teach them how to use it.

For the hoteliers, some of them expressed it could be helpful for them to search local products. However, several restaurants showed less interest because they were close to the markets. In the Seychelles, this online platform is already developed by the Ministry of Investment, Entrepreneurship, and Industry. This platform is almost finalised, but requires more financial support for implementation. The developer pointed out that since the internet is expensive and unstable in the Seychelles, farmers could upload their information offline and this information will be automatically updated when they access the internet. He plans to train the students from Seychelles Institute of Technology, who can teach the farmers how to use this platform.

Labelling System

We presented the potential labelling systems, such as "Organic" and "Made in Seychelles", in the interviews with farmers and hoteliers. Eleven out of twelve farmers stated they were willing to learn how to receive these labels and agreed that it could promote local and organic agriculture in the Seychelles. Some farmers emphasized they could meet the requirements for organic production since they already reduced the use of inorganic products. Several farmers are worried about the high cost of organic herbicides and pesticides. Concerns about prices were also expressed by the hoteliers. They pointed out that to use organic products they had to consider the cost in their business. Only one hotel proposed that organic products may be not too expensive compared to the imported products in locally produced in the Seychelles. Another restaurant shared positive feedback, highlighting that if the clients would like to have more organic or local products then they would be willing to offer them on their menu. The Department of Agriculture allows certain products, such as dried cassava, for export with the label "Made in Seychelles", emphasizing standardized packaging and labelling to maintain product quality and promote the country's agricultural exports.

6.4 Discussion

In previous research, the overproduction phenomenon has been defined as the simultaneous production of the same products (Glimmann, 2017). In the results section, we have mentioned the factors that cause the overproductions, how the farmers and hoteliers work with each other, and the problems currently existing in their collaboration. Based on the results, we will further discuss the feasibility of our two proposals and other ways, mentioned by farmers and the Department of Agriculture in the interviews, to strengthen the linkage between farmers and hoteliers, including the opportunities and potential challenges of implementation.

6.4.1 How to better connect the farmers to hoteliers?

Online Platform

Given that hotels and restaurants typically do not actively search for other farmers, even when their existing collaborated farms cannot meet their demand, it becomes crucial to find an efficient way for them to share their demand information. On the other hand, farmers who have difficulties finding purchasers would benefit from sharing their supply information. One possible solution is to develop and implement an online platform where farmers can post what they have available and what they are producing, including the estimated quantity and harvest time, while hotels can post what type of products they demand. Normally, hotels and restaurants tend to pre-order the products based on their bookings, while farmers usually harvest and sell their products on the same day. Through this platform hotels and restaurants can access information about local production. This way they may not pre-order the food from other suppliers. Besides, from the side of the farmers, it could be a significant tool for them to know the demand of the market, which is crucial in order to align their production with the local demand (TecDam Innovations S.L, 2022).

Regarding the implementation of such a platform, potential risks were mentioned in our interviews. The yield is unpredictable and easily affected by the weather, especially on Praslin. Farmers are aging and old-fashioned in the Seychelles (Etongo, 2023). The training sessions are necessary for them to learn how to use the online web page and access the information. When it comes to the cost, the financial support to develop and maintain this platform is a key to realizing this proposal. From our interview with the developer, it became clear there is trouble in funding the platform. It is reported that only 3% of the government's annual expenditure is contributed to the agriculture sector, which is much lower than the 10% recommended by the Maputo Declaration of 2003 (Ministry of Fisheries and Agriculture, 2015). Interviewing the Department of Agriculture, they pointed out that the subsidies for agricultural sectors mostly flow to livestock farms. Thus, the agriculture industry in the Seychelles lacks the investment. Especially for the vegetable and fruit farms, more financial support is needed to promote local production.

Implement grading and labelling system for quality control

Considering the local agricultural production pattern and the challenges in accessing certain markets, a robust grading system and a well-recognized labelling system may be a useful solution for farmers to control their product quality and gain recognition for their products in the Seychelles. For example, in Guadeloupe, an archipelago in the Caribbean, a “sustainable” label can significantly increase consumers’ willingness to pay for yams and the “organic” label helps farmers to increase their income (Barlagne et al., 2015).

For the labelling system, a well-established and transparent production control system is helpful in boosting consumer trust. Distrust in the control system and the authenticity of foods sold with an organic label have a significant impact on consumer purchasing decisions (Nuttavuthisit et al., 2017). In this regard, the Seychelles government already indicated the labelling system as a way to control the quality and the safety of food products and increase the recognition of these products. Nevertheless, this system is still very much underdeveloped (Government of Seychelles, 2013; Glimmann, 2017). Some farmers sell their products as organic, but without an officially regulated label as reported by the National Biosecurity Agency in the Seychelles News Agency. The government should take responsibility for establishing a complete system of organic agricultural products to help the farmers gain accreditation (Laurence, 2020). These products are sold at higher prices, yet some of these products do not fulfil the requirement for such labels. Implementing official labels like “Locally produced” or “Organically produced” could not only help in the control of the quality and safety of food products, but would also protect the farmers that effectively produce organically or meet the quality standards, and eliminate the importers.

For the grading system, the government can set grades and standards for their main fruit and vegetables and make the grading and sorting of fruits and vegetables part of the production process. Take the grades and standards of blueberries in the USA as an example (U.S. Department of Agriculture, 1997). The basic requirements for blueberries are that they have similar varietal characteristics, that they are clean, well coloured, not overripe, not wet, and so on. The fruits and vegetables grading system serves three main purposes: 1) Fruits of different qualities are sold separately so that their quality matches the selling price; 2) The size and quality of fruits after classification are similar, which is conducive to the standardization of fruit packaging, transportation and other aspects of the operation and reduces losses; 3) Increasing the competitiveness of locally produced fruits and vegetables with imported products.

Despite the benefits of a labelling and grading system such as those described above, there are still some realities to consider. Implementing a label on products means that initial investment has to be made from farmers and that if the demand for labelled food is not high enough, the label will not be profitable. Many restaurants and hotels highlighted the risks of implementing a label, and the costs that come with it. Only two shared positive feedback, as for them various customers and tourists who are interested in being more sustainable or trying local food would be willing to pay more for these products.

Consistent food supply – Value-added products

Producing processed food could be a potential way to solve over-production issues and reduce post-harvest losses. Through food processing, farmers can extend the shelf life of perishable products, like tomatoes, and differentiate their products (Glimmann, 2017). Taking into account that the products with smaller sizes and imperfect shapes are more likely to be rejected by hoteliers and other customers, farmers can transform these unmarketable products into value-added products. In this way, farmers can reduce on-farm food loss and waste, utilizing the entire harvest and maximizing their productivity. Moreover, processing enables farmers to diversify their product offerings. Instead of relying solely on fresh produce, they can create a range of processed products such as jam, chips, sauce, and so on, which may help them to remain active on the market even when product are out of season, and therefore open up new market opportunities. In implementing a new form of agri-processing, the private sector has been identified as an important role (Ministry of Fisheries and Agriculture, 2015). Currently, there are already some value-added products in the Seychelles, like juices, jams, chips, processed meat and honey (Glimmann, 2017). However, the investment on food processing facilities is not affordable, as mentioned by small farmers in the Seychelles. In order to also include smaller farmers, the intervention of the government could play an essential role by implementing new facilities and strategies to process food. In the future, the government could publish relevant policies to standardize the food processing procedures, and provide funding and infrastructure development to facilitate processing initiatives in order to maximise the positive impact of reducing food waste and increasing income for local farmers.

Increase the local products price advantage

The information from different stakeholders is controversial and it is hard to say whether the local products are cheaper than the imported food. Most hotels and restaurants insist that the local agricultural products are cheaper which is the main driver for them to buy the local food as much as possible. From the side of farmers, they also claim that the locally produced food was more affordable. However, during the interview with the Department of Agriculture and STC, they emphasised that the local produce could be preferred due to its freshness, but that in many cases the imported products were cheaper, especially for most animal products and some vegetables, such as tomatoes and lettuce.

In the Seychelles, imported food is subject to various internal taxes, including Value Added Tax, Excise Tax, Levy, and Customs Duty (Government of Seychelles, 2022). VAT refers to a consumption tax on goods and services that is levied at each stage of the supply chain where value is added, from initial production to the point of sale (Schenk et al., 2015). As we learned from the interview with STC and from the trade policy review, VAT and excise tax are not applied on imported and locally produced agricultural products, such as vegetables, fruits and animal products (Government of Seychelles, 2022). To support farmers and reduce their production costs, certain regulations are in place. For example, VAT refunds are available for goods related to agricultural production, including fertilizers, pesticides and machines. Customs duty exemptions are also granted on goods imported for agricultural use. Individual farmers, farmers’ entities, and farmers’ partner-

ships also benefit from a reduced business tax rate. They pay zero business tax (instead of the standard 15%) on the first SCR 250,000 of taxable income and a reduced rate of 15% (instead of the standard 25%) on the remainder, depending on the agricultural activity (Government of Seychelles, 2022).

6.4.2 Limitations

In a previous report, it was reported that only 11% of farmers sell their products directly to hotels and 4% to restaurants and that many farmers are constantly struggling finding an accessible market to sell their products (Seychelles Agricultural Agency, 2015). However, based on our interviews, it is surprising to see that most of the farmers we interviewed do collaborate with hotels; about half of the hotels and restaurants we interviewed also collaborate with more than 2–3 farmers. When it comes to the food source, most hotels and restaurants in our interviews stated that over 50% of food they used was local. But the Department of Agriculture highlighted that the hotels did not buy more than 20%, which was the standard amount requested from every hotel. Therefore, our samples might be biased. Within our sample, 18 out of 21 hotels and restaurants we interviewed were from Victoria and Beau Vallon. Our research did not include the small takeaways and restaurants in other regions. Also, we interviewed only 12 out of 14 farmers on Mahé island and 2 out of 14 farmers from La Digue. Given that 35% of crops produced in Praslin and only 6% of crops produced on Mahé were sold to hotels (Seychelles Agricultural Agency and National Bureau of Statistics, 2013), the relationship between farmers and hoteliers on Praslin may be different from that on Mahé. It is important to consider the farms on Praslin because they may provide different feedback on the linkage between farmers and hoteliers.

Despite these limitations, our study highlights the characteristics of the current food network in the Seychelles, its obstacles but also opportunities to improve collaboration between farms and hotels/restaurants to better balance the demand for and supply of local food.

6.5 Conclusion

Overproduction issues in agriculture stem from various factors, not only limited to environmental and climate challenges but also intertwined with critical social factors. To create sustainable solutions, it is imperative to recognize the complexities of these challenges and address them collectively. Environmental factors play a significant role in hindering agricultural productivity. Unfavourable hot and humid climates, poor soil quality, and challenging landscapes impose formidable obstacles on farmers, making it difficult for them to yield optimal produce. Climate change and pest outbreaks further exacerbate the fragility and unpredictability of the local agriculture system, increasing risks and uncertainties for farmers. Moreover, the social aspect of overproduction issues cannot be overlooked. The lack of education among farmers inhibits their ability to adopt modern techniques that could enhance productivity and access the latest information

on the market. Additionally, they face stiff competition from imported products, which limits their market accessibility. In the existing supply chain, farmers find themselves in passive positions while hoteliers and other buyers have multiple choices, leading to difficulties in selling their produce.

Addressing these issues requires a holistic approach. One potential solution lies in strengthening communication between farmers and hoteliers. Creating platforms for direct communication and collaboration can foster mutually beneficial partnerships, allowing hoteliers to access fresh local produce while ensuring farmers find reliable buyers. To maintain the quality of produce, implementing stringent food quality control measures is essential. This involves promoting sustainable agricultural practices, minimizing the use of harmful chemicals, and adopting responsible farming techniques. Furthermore, reducing food waste through efficient food processing methods can contribute to more sustainable agricultural practices.

However, implementing these solutions requires collaboration between various stakeholders. Governments, farm associations, and relevant institutions need to work together to provide sufficient funding and support for the development and maintenance of online platforms and communication channels. Policies and regulations should be put in place to standardize production, food processing, packaging, and other aspects of the supply chain. Education also plays a pivotal role in ensuring the success of these solutions. Collaborating with educational institutions can empower farmers with knowledge in both production and marketing, equipping them with the tools needed to thrive in the competitive market. In the implementation, government and policymakers play a significant role to lead this long-term process. Policies, like the Seychelles National Agricultural Investment Plan highlight the importance of a resilient and sustainable agricultural sector to contribute to food security and economic growth. However, the outcome of this plan is unknown, and the farmers remain faced with many challenges in production and marketing. It seems that more practical support, both financially and technically, are necessary to promote local agriculture.

Future research on the linkage between farmers and hoteliers should consider not only stakeholders on Mahé but also on Praslin, especially the farmers on Praslin. Considering that 35% of crops produced in Praslin and only 6% of crops produced on Mahé were sold to hotels, the connections between farmers and hoteliers may be stronger on Praslin and the way to collaborate may be different from that on Mahé. Thus, understanding the linkages between farmers and hoteliers could provide a complete comprehension of integrating the local agriculture into the tourism sector. Additionally, the local people's and tourists' perceptions of the Seychelles food can be included in the future investigation, which could become guidance for the government to contribute to sustainable tourism. Lastly, future research is needed on the role that technology can play in optimizing food production, especially in the context of limited land area as is the case in the Seychelles.

6.6 References

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7 Performance Assessment Tool for Tourism Establishments

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7.1 Introduction

Small Islands Developing States (SIDS) typically have small, open economies heavily reliant on sectors like tourism, which makes them highly susceptible to external factors like foreign economic conditions or natural disasters (Briguglio, 1995; Pratt, 2015). As a result, they must carefully manage their internal resources to mitigate external challenges. Seychelles' strong reliance on tourism as the cornerstone of its future development is a two-sided coin. While this vibrant sector brings life to the nation's capital, it also exposes the country to a whole range of external factors that can affect social, economic, and environmental prosperity. Potential global economic changes, geopolitical tensions and, as we recently witnessed during the SARS-CoV-2 pandemic, unforeseen crises are reminders of this vulnerability. However, amidst these complex and often uncontrollable external factors, there might be an opportunity for Seychelles to strengthen its sustainable development through available national resources such as land, natural beauty and authentic cultural heritage. More specifically, tourism-related land use can be one of the critical internal factors to steer positive change on a range of sustainability issues (Ruggieri & Calò, 2022).

Land is a precious and limited resource in Seychelles and in high demand for various development needs. The Strategic Land Use and Development Plan outlines a 25-year roadmap aimed to balance the country's natural beauty and environmental factors with its socio-economic development goals (Seychelles Planning Authority, 2015). Careful land allocation for the tourism sector is pivotal to future development in sectors beyond tourism, including housing, industry, business, infrastructure, conservation, and agriculture. The increase in the built tourism establishments (e.g. hotels and guest houses) not only transforms land use and hence affects the environmental factors, but also has socio-economic effects. It has created jobs with social impact and generated a substantial economic profit from tourism-related activities (NBS, 2023a).

The increase in the number of beds, which is not followed by proportional tourist arrivals, could indicate a possible imbalance of supply and demand of tourism establishments. This imbalance can be reflected in the rather low occupancy rates of 62% for hotels and 40–50% for guesthouses and self-catering accommodation, both before and after the SARS-CoV-2 pandemic (NBS, 2019, 2020, 2021, 2022a, 2023b). Still, Seychelles looks ahead to 2040 with ambitious plans. The Strategic Land Use and Development Plan forecasts a need for an additional ~6,200 beds, signifying a substantial 78% increase in the number of beds compared to the present state (~8,000) (TD, 2022). This projection highlights the delicate balance between economic growth through tourism and the need for sustainable land-use planning in the coming decades. So, the vision for a sustainable future in tourism is to achieve “high value and low impact” (i.e. while maximizing the positive contributions of tourism, it is equally important to minimize its negative effects on the environment) (Esparon, 2023). To achieve this vision, careful consideration of the limited availability of resources becomes crucial.

In Seychelles, land scarcity amplifies the challenges associated with the water-energy nexus, a complex interaction between energy and water demand. The planned increase in accommodations further strains the demand for freshwater and energy. During the wet season, water is primarily sourced from rivers and, to a lesser extent, groundwater. Two reservoirs on Mahé, Rochon and La Gogue, currently store 1,050,000m³ of water (PUC, 2021a) plus a recent additional capacity of 600,000m³. Four energy-intensive water desalination plants on Mahe (with a total treatment capacity of ~24,000m³ per day) are heavily utilized during the dry season, with occasional water imports in extended droughts. The high demand for freshwater coincides with increased energy consumption, primarily driven by the tourism sector. According to the Public Utilities Corporation (PUC) annual report 2022, the available overall electrical energy production capacity is approximately 87MW, primarily from diesel generators (PUC, 2022; PUC, 2021b). Nonetheless, in 2022, the share of renewable energy stood at 5% with a target of reaching 15% of the country's total electrical energy demand by 2030 (PUC, 2022; PUC, 2021a).

To encourage and guide accommodations towards more sustainable consumption, the Seychelles Sustainable Tourism Label (SSTL) was established. It provides an opportunity to acknowledge efforts of establishments for resource saving practices such as water management plan or monitoring water consumption per tourist. Similarly, for electricity, the practices involve the use of energy-efficient lighting fixtures and establishing minimum temperature settings for air conditioning units in rooms (Seychelles Sustainable Tourism Label, 2019). As of 2023, there are ten establishments certified on Mahé (Seychelles Sustainable Tourism Label, 2023).

The above-mentioned points illustrate the importance of sustainable and optimized resource use for the future development of tourism in Seychelles. It is therefore of high importance to provide estimates for environmental, social and economic impacts of development of accommodation establishments. In this study, these impacts are examined, and the findings are integrated into an assessment tool, to help gain a systemic overview of the environmental, social and economic impact of accommodation establishments. This study will specifically focus on the island of Mahé. Our research question is as follows:

How will increased tourism accommodation development influence environmental, social and economic sustainability on Mahé?

To answer this question, we developed an assessment tool including land use, water, energy, employment and generated revenue linked to the accommodation development to explore possible scenarios for the future.

7.2 Methods

7.2.1 Overview

This research has used a twofold methodology. The first step revealed the importance of accommodation and possible development scenarios with the goal of a “High value, low impact” tourism sector for the Seychelles in the future. We have then developed a tool to help authorities explore future accommodation development opportunities of the tourism sector in the Seychelles. The tool is able to estimate the impacts of different accommodation development solutions on important social (e.g. employment), economic (e.g. revenue) and environmental (e.g. the water-energy nexus, land use) parameters in Seychelles.

During the field study in Seychelles in July 2023, stakeholders participated in collecting the data needed and were involved in developing an assessment tool. Collected data was prepared and processed before feeding into the tool. In two final workshops, the method of data processing was validated by experts and the tool to assess potential alternative development solutions was demonstrated to potential users at the Tourism Department (TD). We present the detailed methodology in the following sections.

7.2.2 Conceptual model: Assessment tool for tourism establishments

To gain a more systemic understanding of the impacts of tourism accommodations and their development on Mahé, we aimed to design a tool to assess environmental, social, and economic impacts for the different accommodation categories. A conceptual model of the tool is shown in Figure 7.1, while Figure 7.2 shows a more technical illustration of the input and output of the model. In addition, the tool’s manual can be found in Appendix 7.1

The tool aims to illustrate detailed resources used by different tourism establishments, such as water, energy, land-use, and out-

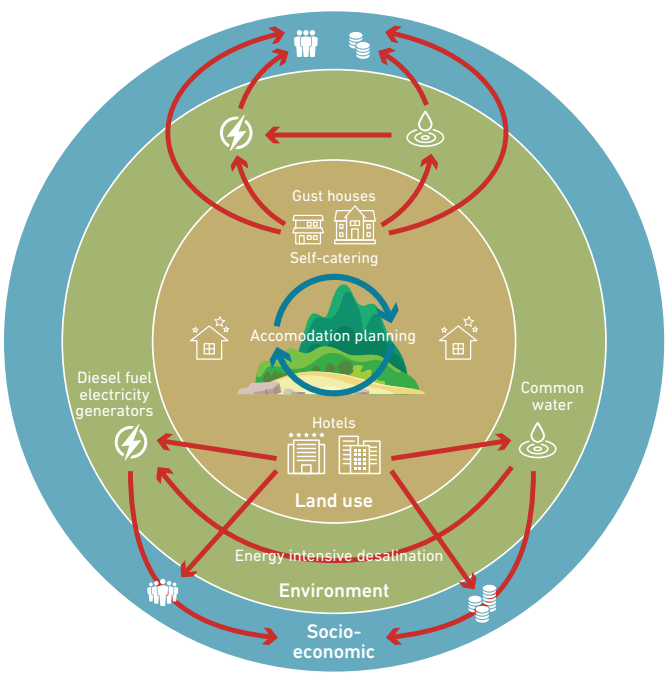


Figure 7.1 Base matrix for stakeholder mapping (own work, based on: Mendelow (1981)). Conceptual model of the tourism establishment assessment tool shows the interconnected system of accommodation development in the Seychelles. The buildings represent the different tourism establishments, the icons underneath the buildings indicate the parameters that were studied. The diagram shows that the accommodation planning is the core of the sustainable development practice involving three spheres of land-use, environment and socio-economic factors.

puts generated, such as revenue and employment as important sources for economic and social sustainability. Underlying factors are general conditions like population, visitors or the distribution of beds, which the tool user can modify. The underlying factors are illustrated in figure 7.2. For example, the user can increase the visitor numbers by 10%, allocate more beds towards a certain

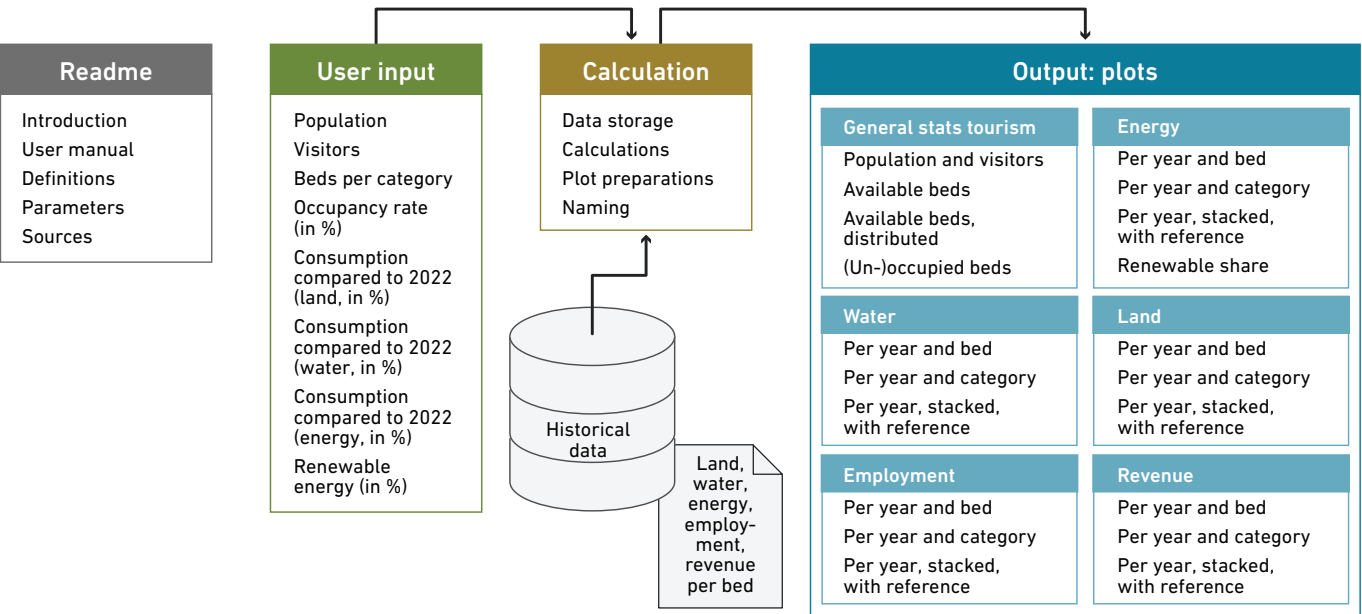


Figure 7.2 Input and output scheme of the model. For explanation see text.

category or increase the occupancy rates for each category of establishment. The user is able to define two different scenarios. The tool then calculates the resource parameters (water, energy, land-use, revenue, employment) and generates output figures of the two base years 2018 and 2022 as well as the two scenarios defined by the user. This feature allows the user to explore the development of tourism accommodations in scenarios, rather than thinking about it with definite initial conditions.

Figure 7.2 displays an input and output model of the tool, with each box representing a specific function. The readme sheet introduces the tool, provides user instructions, briefly defines accommodation types and parameters, and includes reference values for energy and water production capacity. Users can define scenarios in the user input section, with 2018 and 2022 serving as reference years. Scenarios are customizable relative to the benchmark year 2022; for instance, users can adjust water consumption to be 10% higher than in 2022, augment the capacity of large hotels by 300 beds, and/or enhance the occupancy rate for self-catering facilities. The calculation sheet processes user inputs to derive output values, incorporating the historical data for 2018 and 2022 on the parameters land usage, water consumption, energy production, employment, and revenue. The Output sheets feature plots that visually represent the outcomes for each parameter across 2018, 2022, and the defined scenarios. See Appendix for more details.

7.2.3 Data

In the following section the data collection, the data processing and the data sample is explained.

Data collection

In order to estimate the energy consumption, water consumption, land-use, employment and revenue for the five accommodation categories, data was collected for the years 2018 and 2022. It is important to avoid the data for the years in between (2020–21) as they could not be checked for the impact of the SARS-CoV-2 pandemic.

Even though, the data from the year 2022 may still be affected by SARS-CoV-2 pandemic, it could be validated by the local experts and used in our model. The data were collected from various authorities (which will follow in the next subsections). It turned out that the data lacked uniformity in format, resolution and completeness. Therefore, the collected data was consolidated into a *Masterlist*, in order to make the data objects comparable (see below). In the following section, a more detailed description of the obtained data and responsible authorities are provided.

Accommodation categories

The accommodation categories are defined according to the Accommodation Policy (Tourism Department, 2019) and grouped into Self-Catering, Guest Houses, Small Hotels, Medium Hotels and Large Hotels, as agreed upon in the Validation Workshop. Self-Catering establishments provide the facilities for the guests to cook their own meals. Guest Houses are defined by the exclusive use of the common facilities by its guests. Hotels are categorised by number of rooms: Small Hotels provide 1 to 24 rooms, Medium

Hotels 25 to 50 rooms and Large Hotels more than 50 rooms. Appendix 7.2 Table 7.1 shows a more detailed definition of the accommodation categories.

Parameters

Five parameters were chosen for the assessment of the sustainability of different accommodation categories. Three parameters depict the environmental aspects, namely water consumption, energy consumption and land use. To assess economic and social aspects, revenue, and employment were chosen as indicating parameters. A more detailed description of the parameters is provided in Appendix 7.2 Table 7.2.

Tourism Department (TD)

From the Tourism Department, a list of all tourism establishments on Mahé was obtained containing information on the category of accommodation, an ID number, establishment name and address, number of beds, manager name, and telephone number (Tourism Department, 2023). In Appendix 7.3 Table 7.3, an excerpt from the data is provided as an example.

Public Utilities Corporation (PUC)

The PUC provided a list of all the active accounts corresponding to a water or electricity meter, which they use for billing purposes and monitoring usage. The list contains customer account number, name, mobile phone number, customer grouping, telephone number, address, city, district, customer group and tariff group. A shortened excerpt from the data file is shown in Appendix 7.3 Table 7.4 serving as an example. From preliminary processing in 2018, a list of customer numbers with corresponding tourism establishment was additionally obtained from PUC.

Seychelles Licensing Authority (SLA)

From the Seychelles Licensing Authority (SLA) website, a list of all licensed accommodations was obtained containing name, home address, telephone number, business name, premise address and expiry date (SLA, 2023a, 2023b, 2023c). In Appendix 7.3 Table 7.5 an example excerpt can be found.

National Bureau of Statistics (NBS)

From the National Bureau of Statistics (NBS), data on average employment (2018), total revenue (Business Tax Receipt, BTR, for the year 2018) and total revenue (Value Added Tax, VAT, for the year 2018) is obtained. For the data request, the NBS was provided with a first version of the *Masterlist*, which helped to link business names or trade names to the corresponding establishment. However, the data was obtained in an already aggregated format of the parameters for the accommodation categories, meaning that we received an average value for revenues per category (and not for all the objects within a category), which is why a more detailed analysis of revenues was not possible.

Ministry of Lands and Housing (MLH)

From the Ministry of Lands and Housing (MLH), GIS data on tourism establishments and land parcels was obtained. The data on tourism establishments includes location, name and categories of accommodation according to the MLH and was received via a Web Feature Service. The data on parcels includes location and

area and was received as a shape file and provides valuable information about land use linked to tourism accommodations. The land-use pattern was later used to complement the environmental factors such as energy and water consumption. The categories of accommodation of MLH do not correspond to the definition of accommodations of the Tourism Department.

Department of Employment (DoE)

From the Department of Employment (DoE), figures for immigration permits issued in 2022 were obtained. The figures include the name, job title, organization, date issued and more. As this data is very sensitive, no example excerpt is shown in the Appendix.

Data processing

This section provides an insight into the data processing methodology, a crucial step given that the data was initially received in a raw format, lacking information regarding the specific category of each accommodation. This data processing was essential not only to address inconsistencies stemming from unmatched data sources but also to extract valuable insights from the raw data through further integrated analysis.

Linking Water and Electricity Consumption within Masterlist Data

In a first step, the customer accounts from PUC were matched manually with the establishment list provided by the Tourism Department to find out which customer accounts, respectively consumption belongs to what accommodation category. In Appendix 7.4, some examples for the matching process are shown. The list with the already matched customer numbers done by PUC in 2018 was used to supplement the first matching list. Electricity and water usage were calculated on a per-bed consumption basis for all five types of establishments. This approach allowed for a

more detailed analysis of resource consumption in relation to occupancy rates across different accommodations. Occupancy rates were obtained from hotel statistics of the year 2018 and 2022 (NBS, 2019, 2023).

From the matching process, a *Masterlist* with all establishments, which could be linked to a corresponding customer account, was obtained. Table 7.1 shows an example excerpt of the *Masterlist*. A schematic flowchart of the data processing is also presented in Appendix 7.4 Figures 7.2 up to 7.5. It is evident that certain establishment names vary between the different authorities.

Land use data

The land use data was received using the Web-GIS Service of Seychelles. The main purpose of the GIS data collection was to link land use data to social, economic and environmental factors. The GIS data was processed using the Software ArcGIS Pro (version 3.0.3.) and Q-GIS (version 3.28.0-Firenze). In ArcGIS Pro, the name of the island was joined to the tourism establishment via the tool *spatial join*. In QGIS, the number of establishments within the parcels was counted using the tool *field calculator*. Using the tool *intersect*, for each tourism establishment, the corresponding area of the parcel was identified. Invalid geometries were omitted. The table was exported as .csv and missing values were added manually. The exported file was matched via the attribute name to the *Masterlist*, in order to use consistent categorisation.

Revenue and Employment Data

Data on revenue and employment were aggregated by a team within the NBS. However due to the limitation of manual processing, the NBS team could only manually find 42 of the Tax Identification Numbers (TIN) out of the 102 provided establishments.

Table 7.1

Excerpt of the *Masterlist*, which was obtained after matching the establishment list from the Tourism Department (TD) to the corresponding PUC account and licensing name (SLA). Some establishment names differ for each authority. For reasons of confidentiality, we replaced all Managers' names by NN.

Customer Number	Establishment Name (TD)	Accommodation Category	Number of Beds	Manager (TD)	Name PUC Private	Address PUC	Name (SLA)	Business Name (SLA)
CUS-XXXXXX	Petit Amour Villa	Small Hotels	8	NN	MR MICHEL BENOIT	PETIT AMOUR VILLA	CASA LUXURY VILLAS (PTY) LTD	PETIT AMOUR VILLA
CUS-XXXXXX	Four Seasons Resort	Large Hotels	134	NN	FOUR SEASONS RESORT	C/O MR. PATRICK VAN PEE	FS (SEYCHELLES) MANAGEMENT LIMITED	FOUR SEASONS RESORT (SEYCHELLES)
CUS-XXXXXX	A Peace in Paradise Villa (Ex Brise De Mer Villa)	Guest House	4	NN	ERADE POOL	ANSE LAMOUCHE	Erade, Bernardette POOL	A PEACE IN PARADISE
CUS-XXXXXX	L'Escale Resort marina and Spa	Medium House	50	NN	BLUE WATER HOLDING SEY LTD	ROCHE CAIMAN, WHARF RESIDENCE & MARINA	BLUEWATER HOLDINGS (SEYCHELLES) LTD	L'ESCALE RESORT

Employment figures and revenue in Business Tax Receipt (BTR) and Value Added Tax (VAT) were identified using the TIN and data provided by Seychelles Revenue Commission (SRC). Dividing the total average employment and revenue by the total number of beds in an accommodation category yields values per bed and year.

Final Data Structure

Table 7.2 shows the size of the data samples that could be identified for each parameter. For water and energy usage 102 establishments could be matched on Mahé. These samples represent the basis for the *Masterlist* and were used to reach out to the authorities to provide us with the data for the other parameters. Data for revenue and employment could only be obtained for 42 establishments contained in the *Masterlist*. For immigration data, 34 establishments could be matched with the *Masterlist*.

Table 7.2
Sample size by accommodation compared to the total number of establishments in each category (TD, 2023).

Data	Self-Catering	Guest Houses	Small Hotels	Medium Hotels	Large Hotels	Total
Water consumption	24	9	9	3	8	53
Energy consumption	32	12	8	2	7	61
Land use	43	16	11	4	8	82
Revenue	60	17	6	11	8	102
Employment	60	17	6	11	8	102
Total on Mahé	219	71	40	31	39	400

7.2.4 Workshops

Once the data had been collected, processed and fed the assessment tool, a validation process took place in two workshops. The first workshop involved validation of the methodology by several experts, while the second workshop specifically focused on the validation of the tool with experts from the Tourism Department – a key target group for the use of this tool.

First Workshop – Validation of data processing

The primary aim of this workshop was to engage with the departments that provided the data, to thoroughly discuss the data aggregation process, and to verify the accuracy of both the aggregation process and the resulting findings. In addition to this main objective, a secondary goal was to raise awareness among participants about the significance of cross-departmental data sharing and consistent data management practices. A total of 15 participants from various stakeholder groups, namely Tourism Department (TD), Department of Finance (DoF), Department of Employment (DoE), National Bureau of Statistics (NBS), Seychelles Licensing Authority (SLA), and Central Bank of Seychelles (CBS), took part in the workshop. The workshop was held at the office of the Tourism Dept. on 14 July 2023.

The workshop was divided into three segments: Introduction, Validation, and Discussion. During the Introduction, the overall study and a basic outline of our tool were presented. In the Validation step, we discussed our data requirements, the data collected, and the data processing methods, followed by a feedback session on the presented findings. The data processing was demonstrated using examples found in Appendix 7.4. Also, the tool manual which was provided is presented in the Figure 7.2. In the final part of the workshop, the Discussion, participants were posed with several key questions, including the potential benefits of increased data accessibility for individual departments, the main obstacles to cross-departmental data alignment, potential solutions to overcome these challenges, suitable parameters for unique identification of datasets (with a focus on commercial datasets), and the next feasible steps to achieve improvement. The workshop concluded with a brief closing statement.

Second Workshop – Validation of assessment tool

The primary objective of the second workshop was to familiarize the members of the department with the functionality and applications of the tool, as well as highlight its benefits, as they are the potential users of the tool. Additionally, the workshop aimed to assess how the tool can be enhanced and tailored to meet the specific needs of the Department. This workshop was held on 17 July 2023 at the office of the Tourism Department, with a total of eight participants representing the Tourism Department.

The workshop was organized into three parts: Introduction, Demonstration, and Use Case. In the Introduction, the case study and the basic methodology were outlined, along with the presentation of preliminary estimates for the five social, economic and environmental parameters. The Demonstration involved showcasing the tool through screenshots of the Excel-tool. Next, the first use case was presented, allowing participants to plan for an additional 6000 beds in Seychelles including 3360 additional beds in Mahé. In groups of two and with the help of laptops provided by the workshop organizers, the participants navigated through the development of the given use case and were able to gain practical experience. The different approaches on how to distribute the additional beds as well as the consequences were discussed in the plenary, and a second use case was presented, focusing on the use of the tool for varying the input parameters. The participants were asked to think about, how the input parameters (i.e. electricity consumption) could change in magnitude in 2040 (i.e. due to increased temperature and thus increased use of air conditioning). The tool allowed them to make and compare different assumptions and combination of assumptions. The workshop concluded with a feedback session, providing participants with the opportunity to express their views on the tool's usability, propose potential modifications, and suggest various tool applications.

7.3 Results

First, we will provide a descriptive statistical overview of our data sample. We will then provide a detailed account of the estimates for the five parameters, which were acquired through our analytical process. We will finally present the outcomes of the validation workshops and use cases. The results can also be found in table form in Appendix 7.5 Table 7.6, 7.7 and 7.8. Additional boxplots are provided in Appendix 7.6 Figure 7.7 – Figure 7.10.

7.3.1 Descriptive Statistics and Parameter Estimates

Water use

Figure 7.3 shows the overall water consumption per year and occupied bed. It illustrates that Medium Hotels have the highest water consumption per year and occupied bed, followed by Large Hotels, Self-Catering, and finally Small Hotels and Guest Houses. The maximum value lies at 435m³ per year and occupied bed (Medium Hotels, 2022), the minimum value at 110m³ per year and occupied bed (Guest Houses, 2022). While some accommodation categories, such as Guest Houses and Medium Hotels, show little

change in water consumption between the years 2018 and 2022, whereas others, like Large Hotels, Small Hotels, and Self-Catering, experienced substantial increases in water consumption between 2018 and 2022. It should be noted that the sample size is small, and outliers may have strongly influenced the results.

Additionally in Appendix 7.5 Table 7.6 the results on the water use of establishments certified with and without Seychelles Sustainable Tourism Label is shown.

Energy use

Figure 7.4 illustrates the energy consumption in MWh per occupied bed and year for different accommodation categories on Mahé for the years 2018 and 2022. Again, Medium Hotels have the highest share of energy consumption, followed by Large Hotels, Small Hotels, Self-Catering and finally Guest Houses. With exception for Large Hotels all other accommodation categories have a higher energy demand in 2022 than in 2018. Generally, the variations between the two years are rather small with exception for Medium Hotels, where the consumption in 2022 exceeded the consumption of 2018 by roughly 10MWh per occupied bed per year.

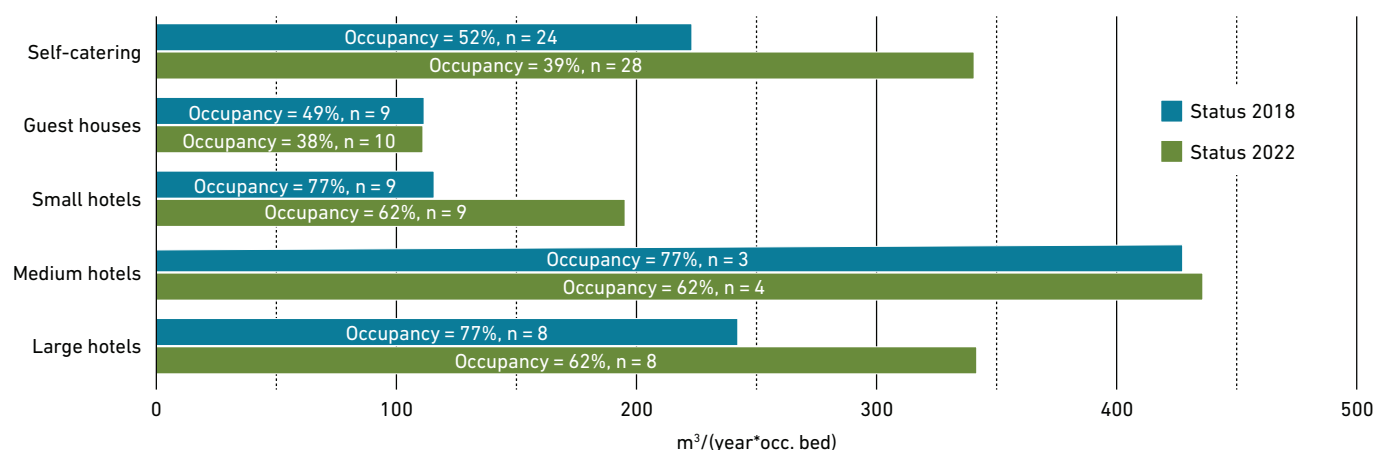


Figure 7.3

The bar chart illustrates the water consumption per year and occupied bed for the different accommodation categories on Mahé.

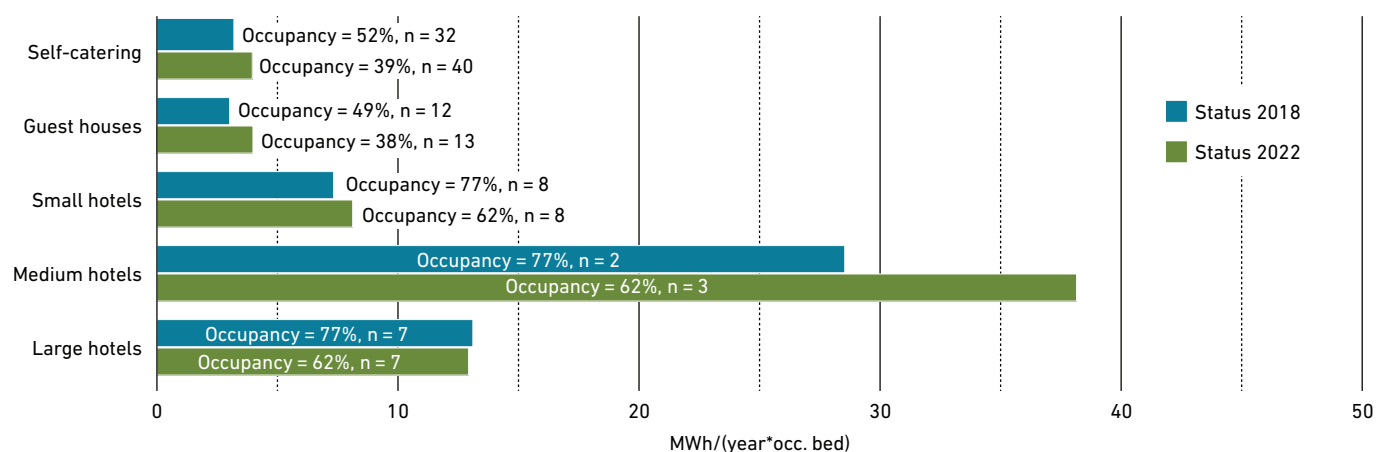


Figure 7.4

This graph displays the energy consumption in MWh per occupied bed and year amongst the different accommodation categories on Mahé for the years 2018 and 2022.

The maximum value lies at ~38MWh per year and occupied bed (Medium Hotels, 2022), the minimum value at ~3MWh per and occupied bed (Guest Houses, 2018). It should be noted that the sample size is small, and outliers may have strongly influenced the results.

Land use

In Figure 7.5 the land use in m² per bed for the five different accommodation categories in Mahé for the year 2018 is presented. The land use in m²/bed decreases in the following order: with more than 600m²/bed Large Hotels have the highest share, followed by Medium Hotels, Self-Catering, Guest Houses and finally Small Hotels with 115m²/bed. It should be noted that the sample size is small, and outliers may have strongly influenced the results.

Employment

The bar chart presented in Figure 7.6 illustrates the average employment per bed for the accommodation categories on Mahé in the year 2018. An average employment per bed of 1 indicates that one person employed is required per bed. The average employ-

ment per bed decreases in the following order: Large Hotels, Medium Hotels, Small Hotels, Guest Houses and Self-Catering. The maximum value lies at 1.19 average employment per bed (Large Hotels), the minimum value at 0.08 average employment per bed (Self-Catering).

In addition, the survey examined the foreign labor hired by the various accommodation categories in 2022. For Large Hotels, the percentage of foreign talent hired in that year was 4%, for Medium Hotels it was 6%, for Small Hotels it was 3%, for Guest Houses it was 7%, and for Self-Catering it was 3%.

Revenue

The graph in Figure 7.7 shows the generated revenue in USD per year and occupied bed for the year 2018 on Mahé of the accommodation categories. The highest share was generated by Large Hotels and followed in descending order as follows: Medium Hotels, Small Hotels, Guest Houses and Self-Catering. The maximum value lies at 127,356USD revenue per year and occupied bed (Large Hotels, 2018), the minimum value at 4,213USD revenue per year and occupied bed (Self-Catering, 2018).

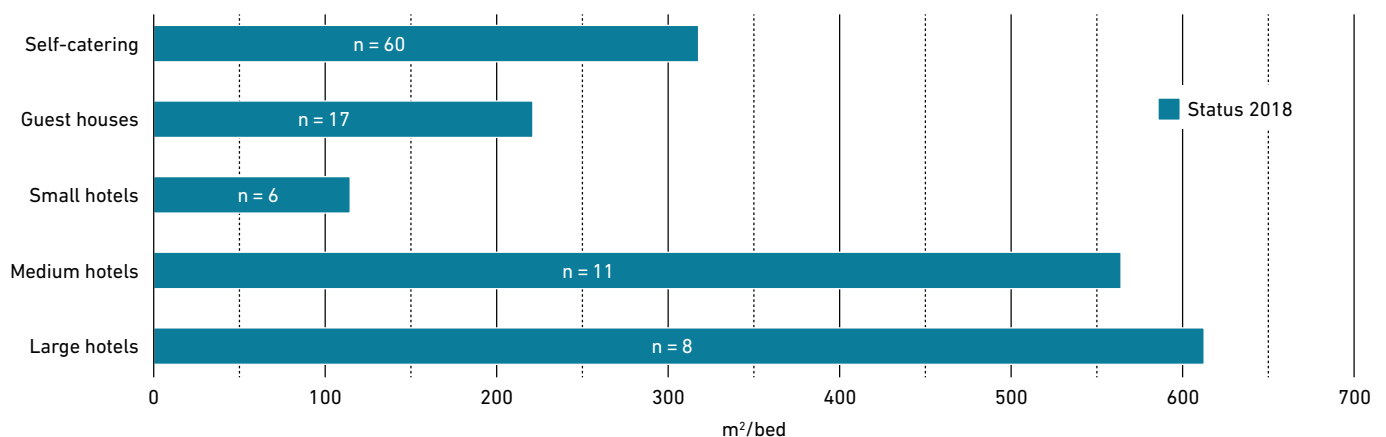


Figure 7.5

This plot illustrates the land use in m² per beds for the five different accommodation categories in Mahé for the year 2018.

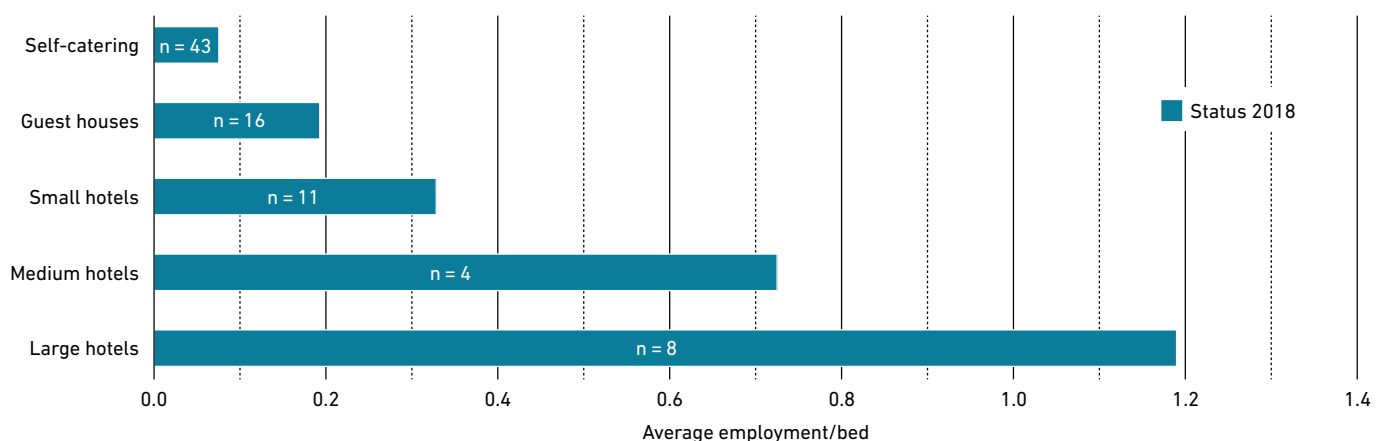


Figure 7.6

The figure above describes the average amount of employment per bed for the different accommodation categories on Mahé in the year 2018. An average employment per bed of 1 indicates that one person employed is required per bed.

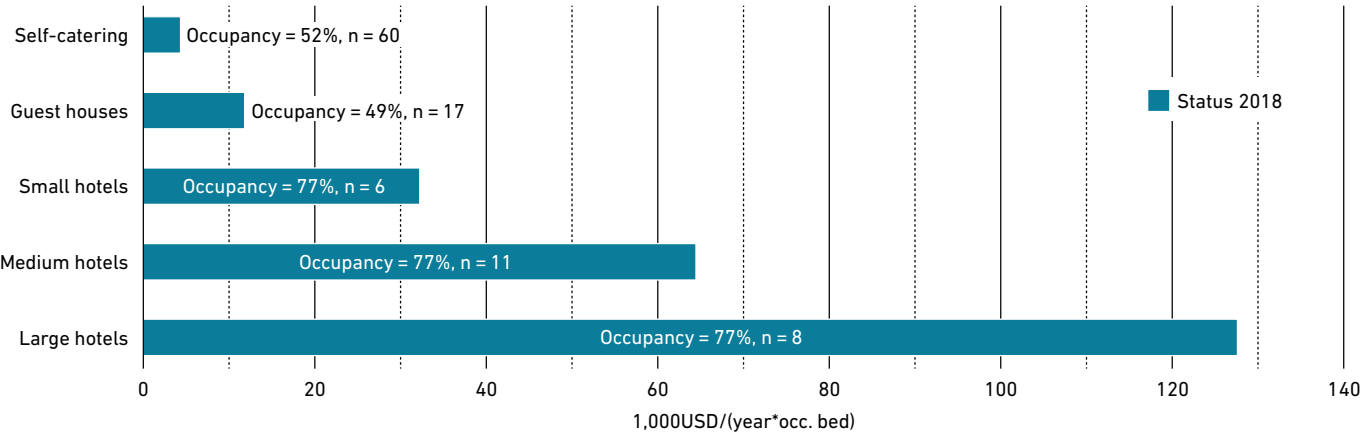


Figure 7.7
The graph shows the generated revenue in USD per year and occupied bed for the different accommodation categories on Mahé in the year 2018.

7.3.2 Scenario Analysis: Accommodation development by 2040

The second workshop allowed participants to actively engage with the tool and gain practical experience in its application. During this session, we designed a scenario together with the participants which was thoroughly discussed in the plenary (which will be explained in more details in the next section). This scenario portrays a situation on Mahé, wherein a total of 3,360 additional beds are constructed, distributed across the accommodation categories of Large Hotels and Medium Hotels. This use-case mirrors a real-world context in the Seychelles, as a total of 6,000 additional beds have already been approved or are in the pipeline.

The scenario is based on the following assumptions: Population, visitor numbers, occupancy rates and the resource consumption (energy, water, land) are the same as in the year 2022. Electricity production on Mahé was 402GWh in 2022 (PUC, 2022). There are 6,000 additional beds planned in Seychelles of which 56%¹ (3,360) will be built on Mahé. The additional beds on Mahé are equally divided between the accommodation categories Large Hotels and Medium Hotels (1,680 beds each). According to the above-mentioned scenario and assumptions we can illustrate what would be its effect on the energy consumption. Figure 7.8 indicates that the total electricity demand by all hotel categories in 2018/22 is approx. 40GWh corresponding to about 10% of total energy supply on Mahé. Electricity consumption would more than double under the scenario conditions (2040) to almost 100GWh/year.

Energy consumption is dominated by Medium and Large Hotel in all three scenarios. In 2018 and 2022, the share of consumption of the Large Hotels is higher than in the 2040 scenario, where the consumption of the Medium Hotels accounts for the largest share.

Validation and scenario design

First workshop – Validation of data processing

Introducing the data processing triggered discussions about the parameters, energy consumption and revenue.

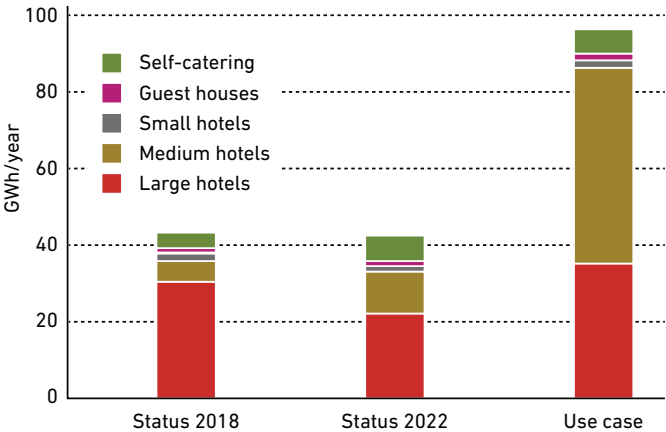


Figure 7.8
The three bar plots show the total energy consumption summed up over the different accommodation categories for 2018 and 2022 (real data) and the scenario use case with the additional 3'360 beds on Mahé. See text for details.

The Validation of the data processing resulted in similar findings, with all workshop participants arriving at a consistent conclusion. The assignment procedure employed was considered conclusive and reliable. Moreover, the NBS confirmed that they had utilized a similar matching procedure for the dataset they provided to us.

The succeeding group discussion was structured through five steps of questions:

- 1) What potential benefits could your department realize from having greater access to cross-departmental data?
- 2) What are obstacles to better align data across different departments?
- 3) How might potential solutions look like in order to overcome these obstacles?
- 4) Can you think of a unique identifier in order to align the data sets from different departments?
- 5) What would be the next steps for enhancing cross-departmental data using?

¹ Reflects the distribution of beds on Mahé compared to the total amount of beds in Seychelles in the year 2022 (TD, 2022)

The most frequently stated benefit was an improved understanding of the Seychelles' system, which would serve as a foundation for informed decision-making and more accurate forecasts. Additionally, participants believed that better data management among different stakeholders could lead to simplified enforcement of existing regulations, as sometimes not all the necessary information are available for different departments.

The second question inquired about the existing hurdles for aligning various stakeholders' data sets. One of the most frequently mentioned obstacles is the lack of digitalization, while digitalization makes data processing easier. Much of the data is still collected in paper form, leading to inefficiencies in data storage and exchange among different actors. Moreover, there is a lack of an overarching data structure and unified platforms (including identifiers). Commonly needed definitions can vary significantly among different departments and stakeholders. Another commonly referred challenge is the lack of working capacity. Nearly all stakeholders have already reached their working capacity, and reconciling data with other stakeholders requires additional resources. Due to limited working capacity, each stakeholder tends to collect individual data tailored to their specific needs, which hinders the potential synergies between stakeholders. Furthermore, workshop participants highlighted issues with data collection, as data is sometimes inadequately or incorrectly gathered, leading to time-consuming error corrections, which are often not corrected. However, most participants agreed that the existing few regulations that allow them to collect data from customers are not enough for enforcement, if the required data is not provided. Additionally, it was mentioned that most customers do not see a benefit to sharing their data and are therefore reluctant to work with various stakeholders if there are no regulations forcing them to hand over the data. Finally, some participants expressed concern that customers will share even less information with NBS and TD once they realize that the data will be shared with various stakeholders.

Thirdly, the participants discussed possible solutions to improve the overall data management and overcome the above hurdles. All participants agreed that digitization is a key issue needed to future solutions. Furthermore, it was noted that standards across the departments need to be developed to make data unification possible. Some participants mentioned, that within their area, policies need to be developed or amended in order to have a sound legal basis to data processing. Additionally, it was mentioned that it would be beneficial to have a platform that would allow for matching with existing data. It was also mentioned that there needs to be an incentive for customers to voluntarily share their data.

The answers to the fourth question circled around determining possible unique identifiers, which could be used to align the data of the different stakeholders. The group proposed the Business Registration Number (existing), the TIN (existing) and a Business Identification Number (not existing).

Towards the end of the workshop, the participants were asked to think about possible next steps. Overall, participants agreed on the need to collect new data in digital form and to digitize existing data. Furthermore, they believe it is necessary to come together and harmonize the standards for data collection so that alignment becomes possible in the first place.

Second Workshop– Validation of assessment tool

The second workshop had the purpose of validating the tool and to create a hands-on experience for the members of the Tourism Department with the tool. After a short introduction, the participants were given the opportunity to suggest modifications of the tool. One suggestion put forward was to include the additional cost for the extra diesel used at higher energy consumption in USD. This would help to provide a clearer perspective on expenses. Another adjustment proposed was to allow individual customization of the parameter consumption compared to reference for the different accommodation categories, allowing for more tailored analysis. There was unanimous agreement on the need to customize the tool for the various islands in Seychelles. Participants also recommended differentiating the land use parameter into two distinct categories: New Development Areas and Redevelopment Areas, to provide more specific insights. Additionally, they highlighted the importance of introducing a higher resolution within the accommodation categories, distinguishing between different luxury types. Another suggestion was to calculate by rooms instead of beds. Unfortunately, there is no reliable way of converting beds into rooms, which is why we have retained the beds as a reference. Finally, a minor adjustment involved changing the unit for the turnover data from SCR to USD for improved consistency.

By the end of the workshop the participants were asked for feedback on the tool. They agreed on its overall positive user-friendliness. After the introduction and a first application it was clear for all participants how to use the tool. The participants confirmed that they consider the already integrated features as useful and sensible.

7.4 Discussion

The discussion starts with a broad overview, before discussing each parameter including its limitations. We then further elaborated on the occupancy rates and the use case.

7.4.1 Environmental Factors: Historical Water and Energy Consumption

Analysis of historical data reveals a consistent increase in both water and energy consumption within the tourism sector from 2018 to 2022, with one notable exception: large hotels witnessed a slight decrease in energy consumption. This reduction might be attributed to ongoing efforts in energy conservation initiatives, including the SST Label project, or due to electricity generation from Photo Voltaic (PV). However, a critical evaluation of the SST Label is imperative to determine whether it genuinely promotes more efficient use of natural resources.

The SST Label also requires a reasonable water use for luxury hotels (4 to 5 stars). Its evaluation rates the consumption of less than 0.8m³ per guest night as good, whereas a consumption of more than 1m³ per guest night is considered improvable (Seychelles Sustainable Tourism Label, 2019a). In our case, the average water consumption for Medium Hotels per occupied bed per night equals more than 1m³, which indicates that in general, the water consumption in tourism accommodations is improvable.

For Self-Catering and Guest Houses, the electricity and water consumption are in line with the average domestic consumption in Seychelles, which equals around 4.5MWh per person per year for electricity and around 250m³ per household per year for consumed water (PUC, personal communication, 12 July 2023; PUC, 2022). The comparison of the calculations with the domestic consumption may be helpful for validating our calculations, as self-catering and guest houses accommodations have no additional facilities such as pools, and their consumption may therefore be rather similar to the domestic consumption. The classification of the accommodations could therefore benefit from identification of the luxury segments which yield a clearer understanding of the drivers of excessive water and electricity consumption. For example, medium hotels are identified as luxury but they do not necessarily have to incorporate luxury facilities.

7.4.2 Socio-Economic Factors: Employment and revenue

The variations in employment and revenue across different accommodation categories can be attributed to the additional amenities and facilities offered by Medium Hotels and Large Hotels on their premises. Given that Medium and Large Hotels are often associated with upscale and luxurious experiences, it is unsurprising that they exhibit higher employment rates and generate more substantial revenue. These establishments tend to offer a broader range of services, such as restaurants, sport centres, and larger pool areas, which not only enhance the guest experience but also contribute to a more significant economic footprint.

Regrettably, a more detailed analysis of employment and revenue disparities within accommodation categories was hindered by the format of the provided data, which was already aggregated. However, it is plausible that there exist considerable differences in revenue and employment levels among individual establishments within the same accommodation category. Factors such as location, management, and marketing strategies can all influence the performance of these establishments, underscoring the importance of finer-grained data for a more comprehensive assessment of the sector. Such data could shed light on best practices and areas for improvement, contributing to the overall growth and sustainability of the tourism industry.

7.4.3 Connecting Factor: Land Use

Land use plays a central role in the complex dynamics of Seychelles' tourism industry, acting as a vital link between water and energy consumption, and employment and revenue generation. The allocation of land to tourism establishments exerts a significant influence on the utilization of essential resources. Larger facilities, like Medium and Large Hotels, require more land to support their operations (e.g. Gössling and Peeters, 2015; Gössling et al., 2002), which, in turn, amplifies the demand for water and energy. These establishments rely on these resources for various purposes, including maintaining extensive landscapes and operating recreational amenities. Furthermore, land use exhibits a profound connection with employment and revenue. Medium and Large Hotels, characterized by their higher land consumption compared to the other categories are substantial contributors to both employment and revenue in the tourism sector. Therefore, the extent of land use becomes a critical factor in determining resource consumption and economic impact in Seychelles' tourism, underscoring the necessity for judicious land allocation and sustainable accommodation planning to secure long-term prosperity in the industry. Moreover, the data, obtained from a relatively small sample of 42 establishments, exhibited a high variance, introducing an additional layer of uncertainty to the results (see Table 7.2). To further understand the aspect of land use allocation, it would be valuable to differentiate between new developments and redevelopment concerning land use. Redevelopment repurposes already utilized land without the need for additional natural areas, which can have a different set of implications and resource consumption patterns.

7.4.4 The complexity of the low occupancy rates

One issue in sustainable accommodation planning that we have been confronted with is the occupancy rate, which is an important factor. Our tool can shed light on whether the sustainability focus should lay on building new establishments or to focus on achieving higher occupancy rates and prefer quality over quantity. As already mentioned above, the occupancy rate has a high influence on the resource consumption per occupied bed and year. A valid question to invest in is whether higher occupancy rates would not have a higher benefit than building new establishments. As shown in the example in section 7.3.2, the construction of 6,000 new beds in Large and Medium Hotels would be a huge burden on

the already strained infrastructure. Furthermore, it is questionable if the land available would be sufficient or move in a direction of high value low impact development.

The increase in water and electricity consumption per occupied bed and year could be explained with the decreased occupancy rates in 2022. Hotels always have a certain fixed consumption, which is then divided among fewer visitors and therefore results in a higher consumption per occupied bed and year. Therefore, the consumption per occupied bed and year can be mitigated with achieving higher occupancy rates.

7.4.5 Accommodation development scenario 2040

Based on the scenario developed in the second workshop, the social, economic and environmental status in 2040 was predicted based on the 6000 additional beds in Medium Hotels and Large Hotels (see Section 7.3.2) in Seychelles, of which 3360 beds would be equally distributed on the named categories on Mahé, using the same ratio of beds per island as in 2022. It is assumed, that in this estimation, electricity supply would require a substantial increase and the grid would be overwhelmed – and in the worst case the additional electricity demand would have been met by fossil fuels if no other alternatives are provided. Likewise, if the water demand rises beyond the current water capacity limits, new desalination plants might need to be built, which would increase electricity demand even more. Despite receiving sufficient annual rainfall, there is a lack of capacity to effectively retain or capture this water to cover the water demand (Tourism Department, 2012). As a result, the water supply is interrupted throughout the day in dry seasons, which can be easily circumvented by some larger establishments by filling up large water tanks overnight (PUC, personal communication, 12 July 2023). However, not all residents have a water tank and therefore no access to running water during shortages.

7.4.6 Limitations

The significance of the underlying data in assessing the sustainability of tourism establishments cannot be overstated. Evident from the high standard deviation and variability, and the small sample size, the data requires careful interpretation, as showcased in Appendix 7.6 Table 7.9. This variability can be attributed to two main factors: the remarkable disparities within accommodation categories ('outliers') and the inherent uncertainties in data collection and merging across different datasets. This limitation not only impacts the current research but also holds implications for future studies dependent on data collection, underscoring the necessity for improved data collection and sharing practices among public stakeholders.

Another critical point to consider is the potential inaccuracies in the data derived from the Public Utilities Corporation, particularly concerning energy and water consumption. In some cases, these data may become associated with the wrong customer number due to reassignments upon account closure. Anomalies in billing, such as higher consumption in one month being offset in the following month, can lead to overestimations or underestimations, which must be taken into account during annual billing analysis. Furthermore, limitations in the analysis are intertwined with the classification of accommodations. Variances in water and energy consumption among different accommodation categories are largely attributable to the additional facilities found in larger and medium-sized hotels. These establishments feature a range of supplementary amenities, including restaurants, sports centers, extensive pool areas, and irrigation systems. However, the small number of some of the accommodation categories analysed may also explain this. The excessive consumption of individual establishments as observed can have a major influence on the average values and lead to a distortion of the data.

7.5 Conclusion

The sustainability assessment tool applied to Seychelles' tourism sector has uncovered a range of interconnected insights that collectively may steer the country towards a more sustainable future. The tool provides a comprehensive understanding of resource use in the tourism accommodation sector as a function of occupied beds. Our research shows that the impact of new tourism facilities needs to be carefully analysed, as they can put pressure on natural resources and jeopardise compensation through increased revenue. Prioritizing higher occupancy rates over new development emerges as a promising alternative that conserves precious resources. The need for promoting renewable energy use and thoughtful water management is evident to reduce dependence on desalination and fossil fuels. Furthermore, our findings underscore the significance of standardized data practices to obtain more accurate insights.

Achieving higher occupancy rates, the use of more renewable energy and efficient water management, and standardized data practices, requires the formulation of appropriate policies, efficient resource allocation, and the enforcement of robust data collection methods. These insights now serve as a beacon for shaping the nation's trajectory towards a more prosperous, inclusive, and sustainable tourism industry in the years to come.

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General discussion and conclusions

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Summarizing discussion

From insignificant to the major economic pillar

Until the early 1970s, the Seychelles' economy was based on agriculture, with copra (the dried white flesh of the coconut from which coconut oil is made) being the main source of export revenue (Mathiot, 2020). Tourism was marginal at this time; the small number of "adventurous" tourists travelling by boat was manageable. There were only a few accommodations such as the Hotel des Seychelles (s. Photo c.1; see also Figure c.2 and c.3 referring to the Reef hotel opening in 1972 and Banyan Tree resort built in 2002) with 12 bungalows on the beach of Beau Vallon, which was built in the mid-1950s (Nation, 2015). This situation changed fundamentally with the opening of Mahé International Airport on 20 March 1972, inaugurated by Queen Elizabeth II. It manifests a dramatic turning point that would change the country in an unprecedented way. By 1976, the number of visitors had already reached 75,000 (Georges, 2020). This figure has increased fivefold in five decades and reached its temporary peak for the time being in 2019 with more than 380,000 arrivals, having risen significantly by 10% per year in the 2010s (Government of Seychelles, 2018). Tourism has become the most important pillar of the Seychelles' economy, and the impact of tourism is obvious: a prosperous economy; resorts along the coastal strip; abundant hired cars; traffic from/to the airport, frequent helicopter flights, etc.

While tourism will continue to grow globally (WTTC, 2022), the growth strategy for tourism in the Seychelles is under scrutiny as it appears to have reached its carrying capacity (Sustainable Travel International, 2021). What happens next: Limiting the numbers? Diversification? More qualitative growth? Let the market decide? Innovating and developing other sectors? Fact is that 12,000 beds are available (2018) and another few thousand beds are planned or under construction (Government of Seychelles, 2018). The development is much faster than predicted ten years ago (Government of Seychelles, 2015), when 348,000 visitors were estimated for 2040, i.e. this figure was reached 20 years earlier than predicted. Tourism competes for scarce land. However, the country must also provide space for infrastructure, housing, businesses and industry, public buildings, etc. At the same time, tourism is of utmost importance to the country's economy (21% contribution to GDP; 27% of employment) and further growth seems inevitable.



Photo c.1

Hotel des Seychelles at Beau Vallon, opening in 1955. Source: With the kind permission of Mrs Antoinette Le Grand.



Photo c.2

Reef Hotel at Anse Royale, the first tourist establishment of international standard, built in 1972. Source: pinterest.co.uk/ajas49.



Photo c.3

Banyan Tree luxury resort at Anse Intendance, built in 2002. Source: Adobe Stock.

Quo vadis – where to go with tourism?

This is a question that our study cannot answer. It is a question that only the Seychellois can answer. However, our study can provide information and insights that will help the Seychelles (authorities) to find the (right) way forward. Our study is entitled *Rethinking the Sustainability of Tourism in the Seychelles*. We recall that sustainability was defined by the Brundtland Commission as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (WCED, 1987). But what does this mean in concrete terms for the Seychelles, for tourism in the Seychelles? Sustainable development is a normative concept, as a society defines where it wants to go. Science can provide criteria-based evidence as to whether a development is going in the desired direction. This requires a reference point and a target state to be defined. For this purpose, data is required to determine the reference state on the one hand and to measure the delta between the reference state and the target state on the other. In addition, we also need transformation knowledge to answer the question of how we can move from the current situation to a more sustainable target state. This is where our study comes into play.

The findings of our study

Our study has produced new (quantitative) perception data from both the tourists’ and the residents’ point of view. This data is important as it provides direct feedback to the authorities on whether they are on the right track with tourism and whether there may be issues on the horizon that need to be addressed. We have also generated new qualitative data on tourism niches and synergies between sectors, mainly through interviews and workshops, which provide both the administration and the private sector with the necessary information to plan, implement and manage the realisation of these niche markets. Finally, we have collected and cross-referenced existing data from various administrative bodies so that it can be used to plan the next phases of tourism in Seychelles. In the following sections, we present the key findings and explore what these findings tell us.

Data and data formats

In addition to existing accommodation, several thousand new beds are planned or under construction. A tool to assess whether future strategies are heading in the right direction in terms of sustainability allows decision-makers to “model” the good balance between the different accommodation categories (Chapter 7). However, we have learned that the data formats of the different administrations often do not match, the data is not available, inaccurate, in poor resolution, or is even not shared among the different bodies. This is a problem for two reasons: firstly, a good database is needed for planning. We cannot plan if we do not have solid data. Secondly, any projection into the future needs reliable data, because projections are only as good as the data we feed into the model.

The beach users’ perspective

The results show that the situation on the beaches, exemplified by the two most affected beaches on Mahé and La Digue, is perceived as good by beach users (Chapter 1). The beach users appreciate what nature offers them, such as the beautiful view, the pleasant sand and the water temperature, while they are somewhat less satisfied with some facilities related to beach activities, such as the lack of toilets, rubbish bins, etc. Another issue is safety, as there is a risk of items being stolen while swimming. On the other hand, the results show that the beaches are not perceived as overcrowded. Clear water and the absence of rubbish together with suitable facilities are the most important aspects for a satisfactory beach experience in the eyes of the respondents. However, the results show that the beaches are not free of litter, even if they are cleaned regularly. This can become a problem as it is known from studies on littering that people tend to deposit more rubbish where litter is already present (e.g. Tehan et al., 2017). It is advisable that the authorities and hotels invest resources in daily cleaning, and it is also advisable to provide sufficient rubbish bins and other facilities to keep the beaches clean. Water samples show that we are in an area of uncertainty when it comes to water quality. In view of the limited informative value due to the number of samples and the duration of the measurements, it is advisable to carry out a more detailed analysis of the water quality over a longer period and to include other beaches.

The local perception of tourism

If we now turn to the local population and ask about the possible effects of tourism, it is noticeable that the interviewees have a fairly positive and relaxed relationship with tourism (Chapter 5). This is understandable considering the economic importance of tourism. However, there are also some concerns that should be kept in mind. For example, a long-standing problem is that Seychellois complain about being kept away from some hotel beaches. Our survey confirms this. Another, possibly even more significant consequence of tourism is that it drives up prices, including for building land. Informal information from various sources indicates that foreign investors are bidding huge sums for land that can be developed with tourist facilities. This is fuelling construction activity and reducing the space available for other purposes. It may also lead to dissatisfaction and anger if part of the population can no longer keep up with property prices and construction costs.

Another question we wanted to find initial answers to is that of Seychellois identity. Identity is something that is unique to each individual. Identity is also something that characterises a group or a larger entity. This can include shared memories, history, experiences, values and interests (Buckingham, 2008). Our findings show that there is a shared Creole Identity that manifests itself in

Creole language, dance, cuisine and music. Studies have shown that tourism and external influences can change the identity of the local population (Xue, Kerstetter, & Hunt, 2017; Anglin, 2015). Whether this Creole identity comes under pressure from external influences or has already been changed are questions we cannot answer with our study. However, we suggest paying more attention to this issue, e.g. in further (qualitative) studies, as we postulate that external influences may lead to a loss of traditional values, characteristics and general features of the Creole element, which in turn may affect the attractiveness for tourists.

Diversification of the tourism sector

In line with the current strategy of the Seychelles Tourism Board to diversify the tourism offer, our study analysed the potential and possible obstacles of three (currently) niche market segments: Cultural Tourism, Agricultural Tourism and Adventure Tourism (Chapter 2–4). The conditions for this type of tourism are in place. The Seychelles have a rich, lively culture such as the Creole language, cuisine, music and dance. There is also a cultural heritage in the form of buildings, ruins, monuments, etc. In addition, small farmers offer another facet (agritourism) of Creole life that should be attractive to beach tourists. Moreover, the landscape characterised by granite rocks and forest offering winding paths in the mountains invite “adventurers” to take part in activities such as walks, hikes, etc.

As surveys of tourists and residents show, adventurous activities such as wildlife tours, hiking, canopy trails, cycling, etc. have great potential to complement existing beach tourism. However, these adventure activities should be conducted in harmony with the environment. This requires feasibility studies to identify the possible negative impacts and thus optimise this tourism offer in this regard.

Private sector players and the ministry are ready to explore the rich cultural and natural heritage and develop it for tourism. The Creole Rendez-Vous, is the brand and the vehicle to be utilised. Our study identifies pathways that address the key elements for realisation: Raising awareness; training young talent and commercialising Seychellois culture; creating access to resources and cultural spaces; supporting the capacity of entrepreneurs; and improving policy. Cultural entrepreneurs play a crucial role in implementation. However, the results indicate that communication and coordination between stakeholders are far away of being ideal and needs to be improved.

Another niche that could be utilised is agritourism. Although there are virtually no agritourism activities, stakeholders are in favour of exploring this further. When it comes to implementation, there may be a lack of financial resources and expertise, to name just the most important obstacles. The lack of communication

between stakeholders is also a problem here. Both tourists and locals show interest in adventure activities, which is a good basis for promoting this market segment. However, this needs to be handled correctly to minimise negative impacts. Overall, these three market niches have the potential to expand the tourism offer and complement beach activities. Provided they are managed properly, this would have little negative impact on social and environmental systems. At the same time, they would create jobs and income and increase revenue from visitor traffic.

The cross-sectoral issue

While there are likely to be synergies between the three niche segments and between these and traditional beach tourism, there is also potential for synergies between the agricultural sector as a supplier of food and the tourism sector as a consumer of food (Chapter 6). A major problem that limits the link between the two sectors is the lack of coordination between the (seasonal) demand for food of the right quality and the supply from local producers. This problem has long been recognised (Government of Seychelles, 2015) and cannot be easily solved. Production constraints such as climate and seasonal weather conditions, soil fertility and geomorphology are limiting factors. However, as the agricultural sector is being restructured (integration into MACCE), there is also a momentum for improved cooperation between the two sectors of tourism and agriculture. A first step would be to better understand the needs and potential of the other sector and how any obstacles can be overcome. A study like the one conducted here has the potential to bring the two sectors together. This cooperation is already taking place on an individual level here and there, as the results of our study have shown. But this issue should also be addressed at an association level, not only to better understand the potential for (and limitations of) coordinated and synergistic action, but also to give new impetus to cooperation. Communication and coordination adapted to the pressure of the problem, involving all levels of the sectors from the top level to the farmer/buyer, is crucial, because if the farmer and the buyer do not understand the big picture, they may not act in the desired direction – or not act at all.

Limitations and blind spots

Our investigation was guided by three elements: the findings of the 2015 strategic plan; the Tourism Board’s assumption that a diversification strategy increases spending per tourist; and the study should also take into account the learning objectives and interests of the students. It is therefore designed differently to a classic consultancy study or a research-orientated study. It has a more holistic, systemic character. As a result, it may be somewhat less goal-orientated but more problem-orientated. The study collected a lot of primary data and can therefore be used as a data source or basis for further studies in addition to the insights gained.

However, our study also has some limitations. For example, we did not conduct an actual sustainability assessment of tourism in the Seychelles. This would have gone beyond the scope of our study. Nonetheless, a comprehensive assessment study of where the Seychelles stands in terms of tourism sustainability would be important. On the one hand, it would provide a baseline against which tourism development could be better planned and later reviewed. On the other hand, on the basis of such a “stocktaking”, a discussion can be held on how and in which direction tourism should develop.

Cruise tourism was not included in our study. Nevertheless, it is a fact that cruise ships are a booming sector (Papathanassis, 2019) and Seychelles is obviously an attractive destination for cruise ships. However, the economic benefits of this tourism sector for the Seychelles have not yet been proven, and the potential negative impacts on the local society and environment have not yet been investigated. A comprehensive study on the potential economic benefits and the social and environmental costs would provide clarity and would be recommended. Another blind spot that we were unable to touch on in our study is tourist activities near the coast and off the coast. These include speedboats, water scooters, water skiing, paragliding, island hopping by catamaran, snorkelling and diving. This growing sector may also help to generate more income, but it raises safety and environmental concerns. A study would provide hard data (current state), but the interests and needs of different stakeholder groups (providers, users and beach tourists) should also be analysed. This could provide important basic data that would help to better coordinate the further development of this area.

We have provided solid data on the topics of beach, agro, cultural and adventure tourism. The same applies to the study on social effects. However, we suggest initiating further studies on individual topics such as water quality. This topic seems important to us to be tackled more thoroughly than our study was able to do. Identity and the social effects of tourism in general are further topics that should be investigated in greater depth. Our research provides a basis on which to build.

Conclusions

In the following, we will conclude with some general insights that can be derived from the seven modules.

Interactions and coordination across sectors

The problem of inadequate communication and coordination between different administrations, sectors and stakeholder groups is a recurring theme throughout the chapters. The problem is not new. We have observed similar problems in our previous studies, in which different ministries and government agencies were af-

ected than in the current study. It seems to be a general problem. We do not want to speculate about the causes here. Rather, we would like to suggest once again that the sectors improve their information exchange and make data available. One possibility would be to create a (digitalised) centralised and cross-sectoral information system that makes information available independently of individuals. This requires the administration and political bodies to be aware of the problem, after which a structure must be created and implemented. However, an equally or even more important factor than a “platform for hard facts” is personal contact. Direct contacts help to build trust between the sectors and are of central importance for efficient coordination. Furthermore, it has become apparent that the flow of information between the administration and the stakeholders still needs to be improved. We have observed that some people do not know what the others have planned, or only find out late. It is essential that those people or groups who will later be responsible for implementation are involved in the planning at an early stage.

Synergies (between the market segments)

The new market segments analysed –cultural tourism, agrotourism and, to a limited extent, adventure tourism– have in common that they are aimed at the same tourist segment, namely to people who are looking for complementary tourism offers in addition to beach tourism. In order to create synergies between the latter and the new market segments, active management seems to be necessary, which requires cooperation between the players involved. The players in these niche offers would have to coordinate their offers, harmonise them and, if necessary, offer them jointly to fully exploit their potential. In addition, the same (high) environmental and social standards would also have to apply here in order to realise the desired sustainability effect for the segments

There is also potential for synergies between agriculture as a producer of food and the tourism sector (including catering) as a consumer. The seasonal coordination of production and consumption is not easy to realise. A round table at association level, possibly also involving the two departments of agriculture and tourism, to achieve a common understanding of the potential between the two sectors, would be a first concrete measure to better utilise the synergies.

Monitoring the linkage between tourism and society

The Seychelles are a small, fragile system. In the 250 years of Seychelles eventful history, a number of cultural characteristics such as language, cuisine, dance, music and peacefulness have emerged. They all have an identity-forming and unifying effect, promoting awareness of what is common and strengthening the cohesion of local society. This Creole element is likely to have an impact on visitors and can be an important element of a sus-

tainable holiday experience. However, the Creole element is not something static. This local speciality is subject to constant external influences. This is not a cause for concern per se. Societies are dynamic entities and are constantly changing. Cultural change should therefore be seen as part of this dynamic process and not just in a negative light. The question is therefore perhaps rather what is the Creole core that is important for identity? Our study could not answer this question. However, we believe it is important to determine this for two reasons: Firstly, as mentioned earlier, to determine what is important to the Seychellois' sense of self and therefore social cohesion. Secondly, this is also important for tourism and visitors. This can be used for marketing to the outside world and Creole life is certainly something that can offer visitors a special experience. However, there is one concern: over-commercialisation. There is a danger that we are jeopardising what we want to preserve. Excessive commercialisation can endanger local culture.

It is the strength of the country compared to many other destinations that, despite all the differences within society, it is a safe country with very little crime. Tourists can therefore move freely and safely almost everywhere, which also allows them to experience the Creole element and ensures an additional holiday experience. It is therefore important to keep this link between local character and the influence of tourism in mind. This also includes the unique landscape and the relatively intact nature. There are beaches and water in many other destinations that rival the Seychelles – but the local culture and nature of the Seychelles is unique.

An open discussion about the future of tourism in the Seychelles

The development of the 2015 strategic plan led to an initial –also a first public– discussion on how and in which direction the country should develop. There were three scenarios to choose from. The preferred scenario, a combination of all three, essentially suggests focussing growth on Mahé and in particular on Victoria and the strip along the coast to Anse Royale. In terms of tourism, a diversification of the tourism offer was proposed, very similar to the current strategy: less volume, more revenue. Nevertheless, the focus of the 2015 strategy development was on land use in general, rather than on individual sectors such as tourism.

We therefore suggest carrying out a review of tourism. It would follow the guiding question, similar to the one in Charette II of the 2015 strategy process: What does the future of tourism in the Seychelles look like?; What is good for the people, the environment, the economy? And this should be done in a broad public discourse. This would again involve thinking in scenarios and anticipating and evaluating the possible consequences of different tourism scenarios. Why are we proposing this? For one thing, the country is in a

different political setting than it was in 2015. It is a freer environment –at least from an external perspective– that also allows for more and more critical opinions. Secondly, unlike what the 2015 strategic plan suggested, the country was on a steep growth path for tourism, which was only interrupted by SARS-CoV-2. There is a risk that this path will be resumed and continued without reflection: Keyword path dependency: more rooms require more tourists, requires more flights, requires more infrastructure, more goods to be imported, more waste produced, etc. Intervention in one sector has an impact on the other sectors.

Anticipation and long-term planning (landuse)

The work on the 2015 strategic plan has shown the way: long-term planning. Long-term planning is related to the above-mentioned open discussion about the future of tourism in the Seychelles. By this we mean that tourism development cannot be viewed in isolation from other development and must be planned for the long term to avoid uncontrolled developments. Land is a scarce resource in the Seychelles; tourism needs land for facilities, land for various activities, and infrastructure. Tourism should therefore be considered as a part of integrated and long-term planning. Planning should also be underpinned by scientific evidence. For example, it should be clarified whether, as proposed in the 2015 strategic plan, tourism infrastructure should and can also be permitted in mountainous regions (eco-tourism, eco-lodges). It would also need to be shown what the ecological effects would be. Furthermore, it would also need to be clarified what the maximum upper limit for visitors is and why, what the consequences of a maximum limit would be and how such a maximum limit could be implemented. We believe that the Seychelles are at a critical point here: Mass tourism or selective tourism focussing on high quality and sustainability? This is the inward-looking perspective. However, there are also external factors that influence the development of the country –and tourism. Long-term planning must of course also take exogenous factors into account. Seychelles is not an isolated system globally, as it is highly dependent on what is happening in the world. Examples of this are global economic crises such as 2008, pandemics such as SARS-CoV-2, piracy, terrorism, international conflicts including wars that affect, for example, the transport routes of ships and aircraft and lead to rising transport and goods costs, the effects of climate change, etc. Such factors must be anticipated and their impact on the country assessed, otherwise they could catch the country completely unprepared. We therefore suggest thinking in exogenous scenarios and including such scenarios in the planning process. In this sense, the exogenous scenarios form the framework for inward-looking planning. The experience of recent years teaches us that the world has become more complicated and that developments are in some ways less predictable than before. This must be taken into account.

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TdLab's transdisciplinary Case Study 2023

This is the fourth in a series of transdisciplinary case studies (tdCS) in the Seychelles. Following studies on waste management and transport, the focus is now on tourism (see: <https://tdlab.usys.ethz.ch/livlabs/seychelles.html>). Tourism is an important economic pillar of the Seychelles. It accounts for more than 20% of the country's GDP, 27% of jobs and is an important source of foreign exchange earnings. After a decade of steep growth in tourist arrivals with a growth of 10% per year and a peak of 380,000 arrivals in 2019, the Seychelles authorities are rethinking their strategy, which was also triggered by the dramatic decline during the SARS-CoV-2 pandemic. The new tourism masterplan envisages that arrivals will not increase as before, but that the sector will simultaneously generate more revenue per capita through a strategy of diversification.

Against this background and taking into account the findings of the country's strategic plan from 2015, this case study analysed various facets of the Seychelles' tourism sector from a sustainability perspective.

The overarching theme 'rethinking the sustainability of tourism in the Seychelles' was worked on in seven modules (groups) in order to obtain a comprehensive and in-depth picture of the topic: Socio-cultural and environmental sustainability of beach tourism; the potential and challenges of three diversification portfolios, namely cultural tourism, agri-tourism and adventure tourism; the impacts of tourism on the socio-cultural system; the supply and demand link between the agriculture and the tourism sectors; and the sustainability performance of future tourism strategies (assessment tool).

The methods employed varied across groups and included literature reviews, semi-structured interviews, surveys, stakeholder workshops, environmental sampling, modelling, theory of change.

The study shows that beach users are generally satisfied with the facilities (e.g. sea view, access to the beaches). Respondents have concerns about safety (theft), lack of facilities (e.g. toilets, rubbish bins) and littering. Cultural, agricultural and adventure tourism are environmentally friendly niches which, if properly managed, can complement beach tourism and at the same time create jobs and income. There is a rich cultural heritage that is not yet being utilised. Adventure tourism, such as hiking or canyoning, are non-invasive forms of tourism that attract the interest of tourists.

An important question in this study concerns the impact of tourism on the local population. The results of a representative survey of the local population show a fairly positive picture. The locals surveyed are very tolerant of tourism and are generally satisfied with the current situation. They see the potential for the economic sector, the jobs created and even the positive impact on nature conservation as positive aspects of tourism. On the negative side, the locals see tourism as a driver of the rising costs of living. Another concern and latent conflict is that the locals are kept away from some beaches by hotel owners.

There are opportunities to make tourism in the Seychelles more sustainable. Existing offers can be improved; new niche markets can take the pressure off beach tourism and open up entrepreneurial opportunities. Nevertheless, it remains a challenge to balance the three pillars of sustainability: The system is small and fragile, the interests of those involved are diverse, and the path dependency of the chosen path does not allow for quick corrections. Progress can only be made if the private sector and all relevant public institutions communicate and coordinate their efforts and the various stakeholders are involved.

The case study involved 25 ETH Zurich master's students with diverse scientific backgrounds and five bachelor's students at the University of Seychelles. The research was conducted over six months, including a three-weeks field phase in the Seychelles. Researchers and teachers guided the students throughout the case study, complemented by the additional support of a panel of local experts. The students intensively engaged with numerous stakeholders from the government, public administration, the private sector, and civil society.

This problem-oriented and research-based teaching course is part of a collaboration agreement between the TdLab at the ETH Zurich Department of Environmental Systems Science, the University of Seychelles, the Tourism Department of the Seychelles' Ministry of Foreign Affairs and Tourism, and the Ministry of Agriculture, Climate Change and Environment.

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