Characterization of the Coastal Environment as a Baseline for Alternative Tourism Segments Development in Salinópolis, Pará

Aline de Freitas *, Fernanda Achete * and Susana Beatriz Vinzón *

Coastal and Oceanographic Engineering Area, Ocean Engineering Program/COPPE, Federal University of Rio de Janeiro, CT, I10, CEP, Rio de Janeiro 21949-900, Brazil
* Correspondence: alfreitas.ocn@gmail.com (A.d.F.); fernandaachete@gmail.com (F.A.); susana@oceanica.ufrj.br (S.B.V.)

Received: 19 August 2020; Accepted: 20 October 2020; Published: 9 November 2020

Abstract: Salinópolis in Pará State, Brazil, is a coastal city with a highly seasonal tourism industry. Despite the potentiality of the region, tourism is mainly focused on beach use for recreation. The purpose of this study was to analyze environmental conditions to provide a baseline for development strategies of additional tourism activities, decreasing unwanted impacts, and improving the local economy. We combined wind and pluviosity data, remote sensing, and wave model results for the environmental characterization. Wave climate analysis shows higher waves in the first part of the year, favoring sports like water-surfing. Winds are more intense and parallel to the coast in the second part of the year when rain is low, defining ideal conditions for wind sports, like kitesurfing. Apart from sport activities, appropriately designed beach accesses through mangrove forest would allow a more even distribution of tourists on the beaches. Sustainable walkways projects could include multipurpose structures for beach access and development of ecotourism activities such as environmental education or bird watching. Gastronomic and cultural tourism could also reduce seasonality effects, attracting tourists also during the rainy season.

Keywords: seasonality; tourism impact; tourism segments; coastal management; sustainable tourism

1. Introduction

Coastal areas are traditionally attractive for tourism [1], receiving 80% of the total tourists globally. Visitors usually seek scenic beaches, wildlife, pleasantly warm temperatures, safety, accessibility, and infrastructure [2]. Seasonality is an issue for most tourist destinations; it concentrates visitors in a minor part of the year, causing mass tourism during the high season and leading to negative financial and infrastructural impacts [3,4]. Mass tourism refers to the movement of a large number of tourists, at one time, to popular holiday destinations for recreational purposes [5].

Some examples of mass tourism pressure are the crowded beaches in Mallorca, Spain [6] and Antigua, West Indies [7]; and overcrowding in Venice, Italy [8]. Pollution by sewage and littering, water overuse, and a disorganized development of the city, are some of the mass tourism impacts [9].

Tourism activities, if not appropriately managed, destroy the aesthetic value that originally drew people to destinations [10], overexploiting natural resources, increasing the demand over urban infrastructure, and negatively interfering with the local community [1,9]. The economic benefits of tourism are minimized due to the high investment necessity in facilities that are used in a restricted part of the year [11]. One of the proposed strategies to deal with seasonality and mass tourism impacts is the diversification of tourism segments promoted at the destination [4,12].

Salinópolis is a coastal city, located 220 km from Belém, the State capital of Pará, Brazil (Figure 1). It is one of the regional most popular vacation destinations due to its proximity to the capital, the minor
influence of the river plume, and its scenic beaches under a macro tidal regime (Figure 2). Besides that, Salinópolis has a diversity of natural habitats including estuaries, mangrove forests, tidal flats and sand dunes, and a rich biodiversity.

A study from the Salinópolis government [13] indicates that 94.25% of visitors surveyed nominated the natural beauty as the main factor for their staying. Most of the visitors (89.4%) spent their time with recreation and resting activities while a small portion (8.7%) of the visitors spent their time practicing sports. The focus on the segment of sun-and-beach tourism activity jointly with the highly seasonal weather conditions—Salinópolis has a well-defined wet and dry season—result in an uneven number of visitors throughout the year.

![Figure 1. Top: Main beaches: Corvina and Maçarico, downtown Salinópolis, and Atalaia and Farol Velho on Atalaia Island. Bottom: Location of Salinópolis on the Brazilian northern coast.](image)

The city has about 39,000 inhabitants [14] and the economy is based on tourism and fishing. The high season is July and August, in a dry period, during school holidays. In this period, Salinópolis receives about ten times the city’s population and the urban infrastructure, such as water distribution, sewerage, and garbage collection, operates below capacity [15–17], impacting beaches and mangroves [18]. The city suffers with long traffic jams, since more than half of visitors use private transport [15]. The main visited beach (Atalaia) is located about 12 km from the city center, where most of the accommodations can be found. Out of the short high season, Salinópolis becomes a ghost city, with empty houses, hotels, restaurants, parking lots, and a high unemployment rate.

At the end of the 1990s, an investment was made in an urbanization project along the Maçarico beach, which was the most visited beach at the time. The project included a promenade with kiosks, two concrete pedestrian beach access points, and a parking lot. Shortly after the construction, the beach grew, with the waterline moving offshore about 500 m. A mangrove forest developed in front of the promenade, further restricting the beach access. Therefore, the beach infrastructure became obsolete
and failed to capture the expected economic return from the beach activity. However, a natural habitat was added that could be explored as ecotourism if properly adapted.

![Figure 2. Some of the attractions in Salinópolis: (A) tidal flats and white sand beaches; (B) mangrove forest and the typical Salinópolis bird, the scarlet ibis; (C) kitesurfers at the beach.](image)

Tourism in Salinópolis can be considered as predatory mass tourism, repeating a similar pattern observed worldwide [3,4,11,12,19]. Without a proper management plan to improve tourism distribution, both natural and economic resources are overexploited with little return to the city or to the local community.

The aim of this work is to analyze the environmental conditions in Salinópolis to improve knowledge of the city’s potential. The presented information aims to improve tourism distribution, both timely and spatially, enhancing the potential for sporting and natural activities, as well as promoting other leisure activities that may diversify the tourist profiles throughout the year. Salinópolis has natural potential that is underexploited for aquatic sports, ecotourism, and cultural activities. Based on this physical characterization, a sustainable tourism development plan can be addressed, promoting the local economy.

2. Materials and Methods

The environmental characterization of Salinópolis, Brazil, was based on wind, rainfall, wave and coastline changes data. With the physical perspective in mind, we show the city’s potential for each touristic segment: surfing and kitesurfing, ecotourism and birdwatching, and cultural tourism.

Wind intensity and direction hourly data (2009–2016) were obtained from the Brazilian Meteorological Institute (INMET). The station is located at 00°37′ S and 47°21′ W in the city center. Wind data was divided into 8 main directional categories every 45° (north, northeast, east, southeast, south, southwest, west, northwest). A 37-year (1978 to 2015) period of daily rainfall data from the Brazilian National Water Agency (ANA) was analyzed. The station is in Salinópolis city center. Both databases are publicly available on the agency’s website [20,21].

To assess the wave climate of the coastal waters, modeling results were examined. The coastal region has a wide and shallow coastal shelf. The ERA-Interim offshore wave climate hindcast data [22] evidences a seasonal pattern of wave climate. From December to May, waves from the north present higher significant wave height (Hs) and peak wave period (Tp) (3 m and 12 s). From June to November, eastern waves are smaller and shorter (Hs of 2 m and Tp of 8 s). The ERA-Interim offshore wave climate
hindcast data [22] were used to propagate waves to the coast using a coupled wave-hydrodynamics model. The model grid extended 600 km from the coast. The hydrodynamic model used was DELFT3D averaged over depth (2DH), and the wave model was SWAN (Simulating Waves Nearshore) [23]. The model results were compared with offshore data at 20 m depth, located at 1.7° N, 48.58° W.

The macro-tidal regime combined with the wave action results in significant coastline changes. During low tide, the water depth decreases, and the energy is lost before reaching the coast. The opposite is observed during high tide: the increase of more than 5 m depth allows more energetic waves to reach near shore. Using the vegetation line as a proxy for coastline evolution, Landsat 8 satellite images from 2013 to 2018 were analyzed to assess coastline change rates. After defining 65 transects separated by 100 m, the rate of the shoreline movement (End Point Rate (EPR), [24]) was calculated using the ArcGIS Digital Shoreline Analysis System (DSAS) tool [24] by dividing the distance of the total shoreline movement by the time elapsed from oldest to most recent shoreline.

Based on the physical analysis, we link environmental aspects with development potential of some activities that could contribute to tourism distribution through the year.

3. Results

The region is under the influence of the Inter Tropical Convergence Zone (ITCZ), with a well-established seasonal variation. Semidiurnal and macro tides are observed in Salinópolis with tidal range of about 5 m [25]. Life follows the tides and a tidal forecast can be found every day at the fire brigade or at the entrance of supermarkets. With mild slope, beach face length reaches up to 200 m, and infrastructure needs to fit those conditions. When the rainy season matches equinoctial tides, in March, flooding or coastal erosion episodes can be observed, leading to rapid coastal changes.

Data indicate an increase in wind speed during the second half of the year (Figure 3A). The highest monthly mean wind speed is observed in September (approx. 4 m·s⁻¹), and the lowest in April (approx. 1.7 m·s⁻¹). Winds from east and northeast dominate throughout the year and have the highest magnitude, reaching values above 6 m·s⁻¹. An increase in the occurrence of east wind from June to September is associated with the most northern position of ITCZ [26]. At a daily base, wind speeds are higher between 8 am and 5 pm. During these hours, the wind from east, northeast and north dominates. In the early morning and late afternoon winds turn direction, blowing from the south and southeast.

Regarding the number of rainy days per month (Figure 3F), March shows an average of 26 days, and the highest rainfall volume. March has on average 16 consecutive rainy days, reaching 22 days in wet years and 10 days in dry ones. In contrast, dry season months have on average less than 5 days of rain per month. During the wet season (January to May), the monthly mean rainfall volume varies from 341 to 621 mm. During the dry season, from August to November, it ranges from 5 to 35 mm, an order of magnitude smaller than in the wet season.

Wave model statistics show an underestimation in significant wave height by 2 cm (1.7%) and wave period by 0.22 s (2.75%) compared to measured data. Wave direction was biased by 3.8°. Low values of the uRMSE statistic for wave height (−0.09 m), peak period (−1.25 s), and wave direction (4.78 deg) indicate that the model reproduced data variability.

Model results showed predominant waves occurring from north–northeast throughout the year due to wave refraction on the shelf (Figure 3E). Northern waves are higher from December to May (~0.5 m to ~1 m). From June to November, waves from northeast are lower (~0.25 m to ~0.5 m). The peak period varies from 7 to 9 s and is positively correlated with wave height. Occurrence of longer waves may happen due to North Atlantic Ocean storm waves during the winter time (December to May) [27].

The shoreline evolution analysis based on remote sensing data shows that over the 5 years of the analyzed period (2013–2018) the largest observed changes were about 20 m·y⁻¹. These changes were found near tidal channels which usually show significant lateral migration. Maçarico beach showed an accretion rate of 2–10 m·y⁻¹. Previous studies [28] calculated comparable values, rates of 18 m·y⁻¹ from 1988 to 2001 and 5 m·y⁻¹ from 2001 to 2013.
waves may happen due to North Atlantic Ocean storm waves during the winter time [27].
The shoreline evolution analysis based on remote sensing data shows that over the 5 years of the
analyzed period (2013–2018) the largest observed changes were about 20 m $\cdot y^{-1}$. These changes were
found near tidal channels which usually show significant lateral migration. Maçarico beach showed
an accretion rate of 2–10 m $\cdot y^{-1}$. Previous studies [28] calculated comparable values, rates of 18 m $\cdot y^{-1}$
from 1988 to 2001 and 5 m $\cdot y^{-1}$ from 2001 to 2013.

**Figure 3.** Results from the environmental data. Top to bottom: (A) wind speed and (B) wind direction
at Salinópolis station; (C) significant wave height, (D) wave peak period, and (E) wave direction in a
coastal location (model results at 24.5 m depth), and (F) mean number of rainy days in Salinópolis
(with shaded percentile).

4. Discussion

From the physical characterization, two marked seasons can be addressed. The first semester of the
year has high rainfall volumes, more energetic waves, and more inconstant winds, changing intensities
and directions. The second semester shows low rainfall volumes, with dry months from September to
November, less energetic waves, and a more uniform, strong wind pattern. Environmental seasonality
highly influences the possibility of activities to be developed and a better understanding of the system
dynamics may improve tourism planning and promotion. With this evaluation we propose the following tourism segments to be developed: aquatic sports; sun-and-beach; cultural; ecotourism and bird watching.

4.1. Aquatic Sports

The Brazilian surf industry, comprising surf wear, boards and accessories, has been growing since about 2011 with the emergence of the “Brazilian storm”, a reference to the new generation of surfers which has been standing out in world surfing championships. In 2016, the Brazilian Surf Institute estimated a revenue of USD 2 billion per year in the surf industry [29,30].

Due to persistent trade winds, a flat sea is rarely seen in Salinas (Figure 3C). The wide surf zone with multiple breaks is appealing for aquatic sports. The presence of different environments including exposed and sheltered areas draws athletes and beginners. Aquatic sports, like surfing, are not dependent on sunshine, and they can benefit from less crowded beaches and especially higher waves from December to May (Figure 3C), during low season and when rain volume is higher.

In the second semester, good conditions for kitesurfing occur, combining a drop in rainfall, increase in wind intensity, and wind direction which is constantly parallel to the coast (Figure 3A,B). Parallel or onshore winds bring security to the activity making the return to the beach easier. It can be practiced at low wind speeds (10 knots or 5 m·s\(^{-1}\)), as the necessary equipment is small and light. Wind speed, equipment weight, and wide beaches make kitesurfing extremely attractive in the region. Equipment rental and kitesurfing classes could contribute to the local economy. Rental cost is about USD 75 per day and the fee for an hour of kitesurfing class varies from USD 35 to 51.

Aquatic sports tourists would allow more even occupancy over the year of hotels and restaurants. Economic growth promoted by aquatic sports is intrinsically sustainable due to the practitioner’s connection with nature.

4.2. Sun-and-Beach Tourism

Sun-and-beach tourism is based on leisure activities and rest. It is the major tourism segment in Salinópolis. People go to the beach using private cars and occupy the sand area. Sun-and-beach tourism began at Maçarico beach (Figure 1). The large beach accretion and the growth of mangrove forest detached the available infrastructure, promenade, parking lot and kiosks, from the beach area. The forest restricts ventilation from sea breeze in the city center, and with the lack of beach access sun-and-beach tourism became underexploited.

An important step in integrating Maçarico beaches to the existing tourism infrastructure in Salinópolis is to provide appropriate beach access. A vegetation-line variation study showed areas of high erosion and accretion rates supporting the idea that accesses need adaptability to the environment. The infrastructure must conform to natural processes such as coastal and vegetation dynamics.

Currently, a concrete walkway provides access to Corvina beach (Figure 4A,A.1,A.2). It has been partly destroyed by erosion in the past; and nowadays, due to accretion, the end of the walkway is 200 m from the high-water line. A second access (Figure 4B,B.1,B.2), a small wooden walkway, was recently built (2017). It crosses a tidal inlet and has been already adapted to morphodynamics changes. Lighter materials are easier to replace or reconstruct. Wooden walkways can be observed in parks and beaches worldwide. They have high adaptability and support the idea of integration with nature.
Sun-and-beach and aquatic sports activities can be boosted by multiple purpose walkways. This infrastructure can enhance beach access and infrastructure, city ventilation, and ecotourism. Wide walkways would allow the use of light motorized vehicles, bikes, and trolleys, substantially improving beach accessibility. By knowing the main wind direction, it is possible to optimize the design of walkways, parallel to the east and northeast winds, to ventilate the city center. The walkways could be used as a path for other services such as potable water and sewage pipelines, electricity and internet cables, and litter collection. Those services, if well planned accordingly with the number of visitors, would help sustainable beach use.

4.3. Ecotourism and Education

A mangrove forest extends from downtown along Maçarico and Corvina beach all the way to the harbor area. Mangrove forest is seen as a problem by the local community. However, a preserved mangrove forest is not only a way to sustain the local gastronomic activity, since some species are only found in this ecosystem, and coastal protection against erosion [31], but also a potential tourism attraction for the city [32]. The long forest stretch could be transformed in the Contour Park, where different ecosystems could be highlighted. Among them can be cited: different stages of mangrove forests, coastal dunes and barriers, tidal inlets, coastal lagoons, marsh and tidal flats.
Mangroves are breeding and feeding areas for many species of ecological and economic importance. The forest also acts as a natural coastal protector by dampening incoming waves and tidal energy. The devastation of these ecosystems has been causing erosion problems along the coast as, for example, in Indonesia [33,34]. The region hosts extensive mangrove areas that are threatened by land reclamation and real estate.

Knowing that the persistent wind is east–northeast, it is possible to optimize the design of walkways. The walkways could work as wind tunnels when orientated to the wind, thus promoting necessary ventilation to the city center.

As visitors might not be aware of the environmental impacts of their activities, educational programs on touristic destinations are important to draw attention to the potential impacts associated with recreational activities in natural settings [15,35]. Educational boards are tools to inform about life in the ecosystems, provide environmental information for visitors, and raise awareness of visitors about their activities’ impact [35,36].

4.4. Bird Watching

Bird watching is a recreational activity where 17.8 millions of people [37] from a select group of visitors, who are highly educated and environmentally conscious [38], travel the world to watch birds in their natural habitat. It is an expanding market that has grown in recent years and has potential to promote community-based conservation [39,40]. It is also a touristic segment of great economic value. In Costa Rica, birding enthusiasts would be willing to pay USD 250 per person per day for a tour, on average, due to the expertise level required [40].

The main types of birds that observers expect to see are songbirds, birds of prey, and those that are migratory, colorful, or endemic [40] and rare [41]. The littoral region of Pará accounts for more than 90% of the population of migratory birds species, including endangered and endemic species [42]. Some of the species found are Arenaria interpres (turnstones), Calidris pusilla (semipalmated sandpiper), Limnodromus griseus (short-billed dowitcher), Numenius hudsonicus (Hudsonian curlew), Pluvialis squatarola (grey plover), Tringa semipalmata (willet), and the beautiful Eudocimus ruber (scarlet ibis) (Figure 2B), a symbol of the Brazilian north coast [42].

Trails and walkways are important for birdwatchers. Educational boards about the ecosystem, bird biology, and identification, add value to the paths and stimulate environmental protection for both visitors and residents [43]. This would aggregate educational and ecotourism values to the walkways, adding multiple functionalities without the necessity of devastating the forest.

Accessibility and advanced birding infrastructure such as trails and walkways are important for birdwatchers. Safety, availability of healthy food and safe drinking water, and experienced guides with fluent English are also pointed to as important issues [40] enhancing the importance of investments in infrastructure and local community capacity. Landscape preservation is another point that birdwatchers valorize [44], enhancing the necessity of preserving the natural ecosystem. Birdwatching in Salinópolis can become a source of local profit and conservation of biodiversity without excluding local communities.

4.5. Cultural Tourism

Local food has an important role in visitors’ experience. It is a popular way to interact with the local culture [45–47]. Gastronomic tourists look for different tastes and memorable food and drink experiences during the trip. Tourists interested in this activity value a good restaurant ambiance, tasty ingredients, and good presentation of food and drinks [48]. Gastronomic tourism involves culinary schools, gastronomy tours, dining at local restaurants, and visiting local shops [49].

The culinary particularities of the region should be considered as an attraction for developing tourism [50,51]. An annual event calendar including gastronomic and cultural events can improve touristic activities during the low season and create a tradition for the city [4,12].
Promoting gastronomic tourism before and during the tourist experience is essential for the development of the activity [49]. It could be done using social media, events, and public–private partnerships.

Pará’s culture has a rich cuisine of indigenous origin that uses mainly Amazonian ingredients [50]. Traditional dishes as well as regional ingredients are known internationally for their exotic flavors and health benefits [50]. As a coastal city, Salinópolis also has the tradition of fishing, serving dishes of crab, shrimp, oysters, and fresh- or saltwater fishes at particularly good regional restaurants. A food festival called “Comidinha de Praia” (Beach Snacks), where participant restaurants present a special dish using at least one regional ingredient in the recipe, had its sixth edition in 2020. The festival is a way of fostering gastronomic cultural identity although it needs to be better organized and disseminated to attract tourists to the city [15]. It was created in 2013 as a way of promoting the city outside the high season.

5. Conclusions

Present touristic activities in Salinópolis are unsustainable due to their high seasonality. Activities based on beach recreation are concentrated during the summer break. Mass tourism overexploits the natural resources and the city’s infrastructure. However, the city has a high potential for other tourism segments that could encourage protecting the natural characteristics of the city and contribute to the reduction of seasonality.

Nowadays, surfing and kitesurfing already exist in the region, but can be further explored and promoted in Maçarico where the safety conditions are higher. Based on the available data analysis in Section 3, the best conditions for surf practice are in the first semester when the waves are higher, the number of rainy days is also higher, and attractiveness for sun-and-beach tourism is lower. Surfers can benefit from the less crowded beaches to better enjoy the waves. The promotion of competition and special events based on the sport lifestyle coupled with a good marketing campaign is an alternative to attract visitors in the first semester. Kite surfing has better conditions for practice during the second semester, especially during September, October, and November due to the low rain occurrence. The same strategy applied to surfing can be mirrored to kitesurfing, with the promotion of events and competitions during those months.

Cultural tourism is a potential tourism segment to reduce seasonality effects in Salinópolis. Pará has a traditional cuisine that uses regional ingredients such as the Açai berry, Cupuaçu and Brazilian nuts that are known internationally for their exotic flavors and health benefits. Salinópolis, as a coastal city, has the tradition of dishes with fish, crab, shrimp, and oysters, and particularly good restaurants that serve regional food. A food festival has been promoted yearly but it is done during the high-season months. The idea could be extended to low season and include a better marketing promotion to attract visitors.

The development of the Contour Park with a network of walkways would largely improve the local nature-based tourism by raising awareness of local ecological values. The definition of a park would attract investments of international funds to further sustainable developments in the area. Walkways and educational boards would improve mobility and access and link the existing promenade to Maçarico and Corvina beaches, enhance air circulation in the city center, provide environmental education tools to visitors, and allow the development of bird watching and other eco-friendly activities. Sustainable and organized tourism growth would benefit the local community, its economy, and the ecosystems. Environmental and cultural quality improvement, the reduction of opportunity costs and vigorous publicity and education programs could stimulate local communities to participate in ecotourism [52]. Besides, a study [15] reveals that the majority of Salinópolis’ visitors (89%) would pay for local guided tours, an economic potential of R$11,945,580,00 (almost USD 2 million) in the high-season month of July, and that 94% would like to have trails and sports offers, reinforcing the city’s potential for alternative tourism segments.

Tourism development is an interdisciplinary issue. This work aimed to contribute with the physical environmental aspect of the study area to promote sustainable development from a natural
point of view. For future works, we recommend a further investigation of the interest of visitors in each of the presented activities: gastronomy, kitesurfing and surfing, and nature-based tourism, as well as the economic estimation of each activity’s potential, for example, using the birdwatching potential index [39] as well as to catalog bird species present in the Salinópolis mangrove forest. A marketing research effort would also be important to understand the best way to promote the city not only on a national scale but also worldwide [49]. The methodology proposed in [12] that catalogs visitors by their main travel motivation could be applied as a tool for a base plan to reduce tourism seasonality in the city.

Author Contributions: Conceptualization, S.B.V.; methodology, S.B.V., F.A. and A.d.F.; software, A.d.F. and F.A.; validation, A.d.F., F.A. and S.B.V.; formal analysis, A.d.F.; investigation, A.d.F.; resources, S.B.V.; data curation, A.d.F.; writing—original draft preparation, A.d.F.; writing—review and editing, F.A. and S.B.V.; visualization, A.d.F.; supervision, F.A. and S.B.V.; project administration, S.B.V.; funding acquisition, S.B.V. All authors have read and agreed to the published version of the manuscript.

Funding: Financial support from CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brazil)—Finance Code 001 and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico).

Acknowledgments: Financial support from CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brazil)—Finance Code 001 and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) are acknowledged. We thank Ashish Mehta, Marcos Gallo, graduated students Patricia Marroig, Pedro Paulo Freitas and Lucas Lopes for their assistance.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

References
1. Mowforth, M.; Munt, I. Tourism and Sustainability: Development and New Tourism in the Third World, 4th ed.; Routledge: London, UK, 2016.
2. McKenna, J.; Williams, A.T.; Cooper, J.A.G. Blue Flag or Red Herring: Do beach awards encourage the public to visit beaches? Tour. Manag. 2011, 32, 576–588. [CrossRef]
3. Banki, M.B.; Ismail, H.N.; Muhammad, I.B. Coping with seasonality: A case study of family owned micro tourism businesses in Obudu Mountain Resort in Nigeria. Tour. Manag. Perspect. 2016, 18, 141–152. [CrossRef]
4. Connell, J.; Page, S.J.; Meyer, D. Visitor attraction and events: Responding to seasonality. Tour. Manag. 2015, 46, 283–298. [CrossRef]
5. Naumov, N.; Green, D. Mass tourism. In Encyclopedia of Tourism; Jafari, J., Xiao, H., Eds.; Springer International Publishing: Cham, Switzerland, 2016; pp. 594–595.
6. Garcia, C.; Servera, J. Impacts of Tourism Development on Water Demand and Beach Degradation on the Island of Impacts of Tourism Development on Water Demand and Beach Degradation on the Island of Mallorca (Spain). Tourism 2003, 287–300. [CrossRef]
7. Baldwin, J. Tourism development, wetland degradation and beach erosion in Antigua, West Indies. Tour. Geogr. 2000, 2, 193–218. [CrossRef]
8. Harrison, D.; Hitchcock, M. The Politics of World Heritage: Negotiating Tourism and Conservation, 1st ed.; Channel View Publications: Clevedon, UK, 2005.
9. Davenport, J.; Davenport, J.L. The impact of tourism and personal leisure transport on coastal environments: A review. Estuar. Coast. Shelf Sci. 2006, 67, 280–292. [CrossRef]
10. Komar, P.D. Beach Processes and Sedimentation; Prentic-Hall, Inc.: Englewood Cliffs, NJ, USA, 1976.
11. Bar-On, R.R. The measurement of seasonality and its economic impacts. Tour. Econ. 1999, 5, 437–458. [CrossRef]
12. Cisneros-Martinez, J.D.; Fernández-Morales, A. Cultural tourism as tourist segment for reducing seasonality in a coastal area: The case study of Andalusia. Curr. Issues Tour. 2015, 18, 765–784. [CrossRef]
13. Batista, C.F.S.; Magalhães, R.D.; Borges, D.F.D. Pesquisa de Turismo Receptivo: Demanda Turística do Município de Salinópolis; Caxiuanã Planejamento e Gestão em Turismo LTDA: Pará, Brazil, 2008.
14. IBGE. Censo Demográfico de Salinópolis, PA. Available online: http://cidades.ibge.gov.br/xtras/perfil.php?codmun=150620 (accessed on 29 March 2017).

15. Ribon, H.C.; de Souza, I.C.M.; da Silva, I.M.; Pfeiff, G.K. Turismo como potencial para promoção do desenvolvimento local sustentável no Atalaia, em Salinópolis/PA. Rev. Griffos 2018, 26, 43. [CrossRef]

16. De Souza, D.L. Produção do Espaço, Infraestrutura Turística e Desenvolvimento Sócio-Espacial: Uma Análise do Complexo Orla do Maçarico e da Urbanização da Praia do Atalaia em Salinópolis-Pa; Universidade Federal do Pará: Para, Brazil, 2014.

17. De Souza, D.L. Urbanização Turística, Políticas Públicas e Desenvolvimento: O Caso de Salinópolis/PA. Geogr. Questão 2014, 7, 65–86.

18. Almeida, J.d.A.; Neto, C.P.A. Ocupação e uso das Praias do Maçarico e das Corvinas (Salinópolis/PA): Subsídios à Gestão Ambiental. Anaz. Foco. Edição Espec. Emprendedoria Sustentabilidade 2013, 1, 160–178.

19. Jang, S.C. Mitigating tourism seasonality-A quantitative approach. Ann. Tour. Res. 2004, 31, 819–836. [CrossRef]

20. INMET. Banco de Dados Meteorológicos. Available online: https://bdmeinmet.gov.br/ (accessed on 31 October 2018).

21. Hidroweb, A.N.A. HIDROWEB. Available online: http://www.snirh.gov.br/hidroweb/apresentacao (accessed on 31 October 2018).

22. Dee, D.P.; Uppala, S.; Simmons, A.; Berrisford, P.; Poli, P.; Kobayashi, S.; Andrae, U.; Alonso-Balmaseda, M.; Balsamo, G.; Bauer, P.; et al. The ERA-Interim reanalysis: Configuration and performance of the data assimilation system. Q. J. R. Meteorol. Soc. 2011, 137, 553–597. [CrossRef]

23. Deltares. Delft3D-WAVE; Version 3; Delft: Deltares, The Netherlands, 2017.

24. Thieler, E.R.; Himmelstoss, E.A.; Zichichi, J.L.; Ergul, A. The Digital Shoreline Analysis System (DSAS) version 4.0—An ArcGIS Extension for Calculating Shoreline Change. In U.S. Geological Survey Open-File Report 2008–1278; U.S. Geological Survey: Reston, VA, USA, 2017.

25. Diretoria Nacional de Hidrografia Cartas de Correntes de Salinópolis a Belém. Available online: https://www.mar.mil.br/dhn/chm/box-publicacoes/publicacoes/ccm/CCM-Salinopolis-a-Belem.pdf (accessed on 22 February 2017).

26. Gruber, A. Fluctuations in the Position of the ITCZ in the Atlantic and Pacific Oceans. J. Atmos. Sci. 1972, 29, 193–197. [CrossRef]

27. Fisch, C.I. Caracterização do Clima de Ondas na Costa do Ceará; Universidade Federal do Rio de Janeiro: Rio de Janeiro, Brazil, 2008.

28. Ranieri, L.A. Morfodinâmica Costeira e o Uso da Orla Oceânica de Salinópolis (Nordeste do Pará, Brasil). Thesis (Doctorate in Geology and Geochemistry)—Geoscience Institute, Universidade Federal do Pará, Belém. 2014. Available online: http://repositorio.ufpa.br/jspui/handle/2011/6344 (accessed on 20 August 2017).

29. Neto, J.S. Surfe Movimenta R$ 7 bi ao Ano Em Roupas, Pranchas e Acessórios. Available online: https://oglobo.globo.com/economia/surfe-movimenta-7-bi-ao-ano-em-roupas-pranchas-acessorios-20547660 (accessed on 4 April 2018).

30. Diniz, P. Bom Desempenho de Brasileiros do Surfe Estimula Consumo Associado ao Estilo. Available online: http://www1.folha.uol.com.br/mercado/2016/06/1785587-bom-desempenho-brasileiros-do-surfe-estimula-consumo-associado-ao-estilo.shtml (accessed on 4 April 2018).

31. Hilmi, E. Mangrove landscaping using the modulus of elasticity and rupture properties to reduce coastal disaster risk. Ocean. Coast. Manag. 2018, 165, 71–79. [CrossRef]

32. Azis, S.S.A.; Sipan, I.; Sapri, M.; Zafrirah, A.M. Creating an innocuous mangrove ecosystem: Understanding the influence of ecotourism products from Malaysian and international perspectives. Ocean. Coast. Manag. 2018, 165, 416–427. [CrossRef]

33. Viswanathan, P.K. Conservation, Restoration, and Management of Mangrove Wetlands Against Risks of Climate Change and Vulnerability of Coastal Livelihoods in Gujarat. In Knowledge Systems of Societies for Adaptation and Mitigation of Impacts of Climate Change; Nautiyal, S., Rao, K.S., Kaechele, H., Raju, K.V., Schaldach, R., Eds.; Springer: Berlin/Heidelberg, Germany, 2013; pp. 423–441.

34. Van Wesenbeek, B.K.; Balke, T.; Eijk, P.; Tonneijik, F.; Siry, H.Y.; Rudianto, M.E.; Winterwerp, J.C. Aquaculture induced erosion of tropical coastlines throws coastal communities back into poverty. Ocean. Coast. Manag. 2015, 116, 466–469. [CrossRef]

35. Priskin, J. Tourist perceptions of degradation caused by coastal nature-based recreation. Environ. Manag. 2003, 32, 189–204. [CrossRef]
36. Surjanti, J.; Soejoto, A.; Seno, D.N. Waspodo Mangrove forest ecotourism: Participatory ecological learning and sustainability of students’ behavior through self-efficacy and self-concept. Soc. Sci. Humitat. Open 2020, 2, 100009. [CrossRef]
37. U.S. Fish and Wildlife Service. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation; U.S. Department of the Interior: Washington, DC, USA, 2012.
38. Kerlinger, P.; Brett, J. Hawk Mountain Sanctuary: A Case Study of Birder Visitation and Birding Economics. In Wildlife and Recreationists: Coexistence Through Management and Research; Knight, K.J., Gutzwiller, R.L., Eds.; Island Press: Washington, DC, USA, 1995.
39. Santos, M.; Carvalho, D.; Luis, A.; Bastos, R.; Hughes, S.J.; Cabral, J.A. Can recreational ecosystem services be inferred by integrating non-parametric scale estimators within a modelling framework? The birdwatching potential index as a case study. Ecol. Indic. 2019, 103, 395–409. [CrossRef]
40. Maldonado, J.H.; Moreno-Sánchez, R.d.; Espinoza, S.; Bruner, A.; Garzón, N.; Myers, J. Peace is much more than doves: The economic benefits of bird-based tourism as a result of the peace treaty in Colombia. World Dev. 2018, 106, 78–86. [CrossRef]
41. Booth, J.E.; Gaston, K.J.; Evans, K.L.; Armsworth, P.R. The value of species rarity in biodiversity recreation: A birdwatching example. Biol. Conserv. 2011, 144, 2728–2732. [CrossRef]
42. Bio, I.C.M.C. Relatório Anual de Rotas e Áreas de Concentração de aves migratórias no Brasil. CEMAVE/ICMBio 2016, 87. [CrossRef]
43. CBI Birdwatch Tourism from Europe. Available online: https://www.cbi.eu/market-information/tourism/birdwatching-tourism/ (accessed on 12 March 2018).
44. Brambilla, M.; Ronchi, S. Cool species in tedious landscapes: Ecosystem services and disservices affect nature-based recreation in cultural landscapes. Ecol. Indic. 2020, 116, 106485. [CrossRef]
45. Güzel, B. Gastronomy Tourism: Motivations and Destinations. In Global Issues and Tends in Tourism; St. Avcıkurt, C., Dinu, M.S., Hacıo˘glu, N., Efe, R., Soykan, A., Tetik, N., Eds.; Kliment Ohridski University Press: Sofia, Bulgaria, 2016; pp. 394–404.
46. Sengel, T.; Karagoz, A.; Cetin, G.; Dincer, F.I.; Erutherford, S.M.; Balik, M. Tourists’ Approach to Local Food. Procedia Soc. Behav. Sci. 2015, 195, 429–437. [CrossRef]
47. Gheorghe, G.; Tudorache, P.; Nistoreanu, P. Gastronomic Tourism, a New Trend for Contemporary Tourism. Cactus Tour. J. 2014, 9, 12–21.
48. Bertan, S. Impact of restaurants in the development of gastronomic tourism. Int. J. Gastron. Food Sci. 2020, 21, 100232. [CrossRef]
49. Pavlidis, G.; Markantonatou, S. Gastronomic tourism in Greece and beyond: A thorough review. Int. J. Gastron. Food Sci. 2020, 21, 100229. [CrossRef]
50. Quinzani, S.S.P.; Capovilla, V.M.; Corrêa, A.A. A pluralidade gastronômica da região amazônica: Sabores acreanos, paraenses e do Alto Rio Negro. Rev. Hosp. 2016, 13, 248–271. [CrossRef]
51. Sormaz, U.; Akmes, H.; Gunes, E.; Aras, S. Gastronomy in Tourism. Procedia Econ. Financ. 2016, 39, 725–730. [CrossRef]
52. Wang, W.; Feng, L.; Zheng, T.; Liu, Y. The sustainability of ecotourism stakeholders in ecologically fragile areas: Implications for cleaner production. J. Clean. Prod. 2021, 279, 123606. [CrossRef]

Publisher’s Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.