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Assessment of Localized Targets of Sustainable Development Goals and Future Development on Hainan Island

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Abstract: Hainan Island in southern China has strong ecological systems and natural resources relevant to multiple Sustainable Development Goals (SDGs). The island has been focusing on economic development and building a national park and a free trade port to improve the economy and people's lives. However, current research on Hainan's SDGs has mainly focused on urban-related indicators (SDG11), resulting in an incomplete evaluation across SDGs. It is necessary to establish a comprehensive assessment framework that incorporates a greater number of indicators for Sustainable Development Goals in Hainan. Based on the United Nations Sustainable Development Assessment System and the current situation in Hainan, a localized study has been conducted on indicators for Sustainable Development Goals 1–4 and 6–11. Our analysis of target scores, SDG scores, and SDG index scores shows the following: (1) The sustainable development of Hainan Island has significantly improved since 2015, with SDGs 1, 3, and 10 showing the largest improvement; (2) most cities and counties have increased their SDG index scores, with Sanya City replacing Haikou City as the top scorer in 2021; and (3) the sustainable development levels are unevenly distributed, with high levels in the north and south, stable levels in the east, and low levels in the central and western regions. Policies, such as the "Haicheng Wending" comprehensive economic circle, are promoting integration between cities and counties. The study provides a localized evaluation framework and methodology for SDGs assessment at the regional level that can serve as a reference for similar work on sustainable development in similar regions and tropical islands worldwide.

Keywords: SDG index; Sustainable Development Goals (SDGs); city and county level; Hainan

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1. Introduction

Sustainable development can be traced back to the World Conservation Strategy published by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme (UNEP), and the World Wide Fund for Nature (WWF) in 1980. The concept refers to development that meets the needs of the present without jeopardizing the needs of future generations [1–3]. In September 2015, 193 countries jointly adopted the 2030 Sustainable Development Agenda at the UN Development Summit, which included 17 Sustainable Development Goals (SDGs) and 169 targets, emphasizing the triad of economic development, social progress, and environmental protection. The SDGs are the world's first overall development framework with specific, measurable targets and completion deadlines to achieve global sustainable development in multiple dimensions, including resources, the environment, and the economy [4]. The agenda also commits to building more peaceful and inclusive societies and sets out paths for implementing these goals. In terms of the main content of each area, it is similar to the general layout of the Five-sphere Integrated Plan proposed for the first time in the 18th CPC National Congress Report, as well as the construction of "new socialist countryside", "beautiful countryside", and "healthy China".

With the formal introduction of SDGs in 2015, research on SDGs emerged, including studies to assess the overall sustainable development status of countries or regions [5–8] and studies on a specific area or on specific SDG indicators [9–11]. There have also been many suggestions on specific decision-making methods for sustainability [12]. In response to the international practice of SDGs, the United Nations has proposed the SDG global indicator framework, collected data on all SDG targets at a global scale, and published annual reports since 2016 [13]. Based on the database collected by the UN, the Bertelsmann Foundation calculated data for all countries in the database, assessed at the global scale, and ranked each country by calculating the sustainability score for each country [14]. To better inform concrete development decisions through sustainable development goal research, an increasing number of scholars are conducting further studies. For example, these studies analyzed the sustainability of renewable energy in 27 European countries by evaluating and examining its sustainability from various perspectives, including energy supply, economic, social, environmental, and technological factors. To address the complexity of the multi-dimensional and uncertain data, Wang et al. [15] proposed a nonlinear multi-factor assessment model and then explored the relationship between economic growth, environmental quality, and urbanization by examining the impact of urbanization on the coupling of these factors. Furthermore, Wang et al. [16] focused on assessing and analyzing the sustainability and influencing factors of the 27 European countries' renewable energy. Wang et al. [17] also investigated the relationship between urbanization, economic growth, and environmental quality by analyzing panel data from 134 countries between 1996 and 2015. They expanded on the traditional EKC theory by including social indicators that align with the three dimensions of sustainable development in 2030, i.e., social, economic, and environmental. Kavvada et al. introduced the application of Earth observation data, methods, and tools to support countries with SDG targets [18]. Franco et al. [19] conducted a comprehensive study on the local implementation of all 17 SDGs, thereby supplementing the deficiency of a comprehensive approach to sustainable development. Xu et al. [6] developed systematic methods to quantify the SDGs and provided a quantification demonstration by performing a comprehensive spatio-temporal analysis of progress towards all 17 SDGs in China, the largest developing country in both areal extent and population, and the results indicated that China had improved its SDG index score at the national level, increased by approximately 21.9%, from a score of 45.5 in 2000 to 55.4 in 2015. Lorenzo-S'aez et al. [20] evaluated the direct contribution of green urban areas (GUA) to the Sustainable Development Goals (SDGs) at high spatial resolution for Valencia, Spain, and made a diagnosis of the quantity and accessibility of GUA at the sub-neighborhoods level. Furthermore, in Ma's study [21], the relative entropy method was used for combination weighting to uncover the dynamic process of changes and spatial distribution characteristics of sustainable development levels in Gansu Province's urbanization from both a systemic and overall perspective.

At the global, regional, and national levels, there are persistent challenges to achieving sustainable development. A key reason is the insufficient understanding and management of the interactions between the goals [22–24]. Recognizing and addressing the potential interactions among the Sustainable Development Goals, leveraging and enhancing synergies while mitigating trade-offs, can play an important facilitating role in the achievement of the 2030 Agenda. Building upon previous research conducted by "The World in 2050" Initiative (TWI2050), a set of six SDG transformations have been proposed as modular building blocks for achieving the SDGs. These transformations provide a scientific action plan while also recognizing the significant interdependencies that exist among the 17 SDGs. The aim is to offer the necessary insights for designing, implementing, and monitoring the transformation of the SDGs [5]. Based on the impact on sustainability, Kebede et al. [25] integrated an assessment of the food–water–land–ecosystems nexus in Europe. Wang et al. [26] reviewed the water–energy extended nexuses from the perspective of relationship and practicability in relieving the challenges towards environmentally related SDGs. Lusseau et al. [27] showed that achieving the SDGs requires balancing the use of human,

economic, and natural resources and that trade-offs between different SDGs are a significant challenge to implementation. Based on the concept of sustainable food, land, water, and sea in the six SDGs, i.e., zero hunger, clean water and sanitation, sustainable cities and communities, climate action, underwater life, and terrestrial life, the Chinese Academy of Sciences conducted case studies on the monitoring and evaluation of six SDGs based on Big Earth Data technology [28]. Currently, most studies on the overall assessment of multiple interrelated SDGs are focused on the national level, providing cases and decision-making for global sustainable development.

However, many observers believed that the focus of SDGs still took too much of a global perspective, which hampered the local implementation of the Millennium Development Agenda. Therefore, to better assess the sustainable development of designated areas, the localization of SDG evaluation frameworks has been developed. For example, Gao and Bryan [29] selected specific targets under SDGs 2, 6, 7, 13, and 15 that are directly related to land sector sustainability to evaluate the feasibility of achieving multiple Sustainable Development Goals (SDGs) targets at the national scale for the Australian land-sector. Wang et al. [30] established an open city sustainability index system based on SDG11, combining traditional statistical data and multi-source data, such as remote sensing and big network data, to provide a reference for the sustainability evaluation of cities in China under the framework of the United Nations. Zhou et al. [31] analyzed the Global Report on the Transformation and Indicators Board for Achieving the Sustainable Development Goals 2019, assessing progress in 162 countries towards achieving the 17 SDGs, with a focus on China's progress, and provided policy recommendations to speed up the construction of a sustainable development goal system in China. Based on these studies, Gao et al. [7] and others systematically explored the relationship between sustainable development and the crucial concepts of ecological security in China, accordingly proposed important factors for analysis and evaluation, and established an index evaluation framework supported by multi-source data. Shao et al. [32] analyzed the progress, opportunities, and challenges of implementing the Sustainable Development Goals (SDGs) globally and in China, proposed a localized evaluation indicator system, and established a technical system for assessing the level of sustainable urban development.

Although there are increasing studies on the localization of sustainable development assessment, there is relatively less research on regions such as provinces, cities, and counties. As development priorities and environmental conditions vary among different regions, it is necessary to conduct research at the local level to accurately identify the key areas for development. Therefore, it is important to carry out small-scale regional studies to achieve a more precise understanding of local development priorities and directions. Guo et al. [8,33] discussed how Big Earth Data could be used to evaluate Sustainable Development Goals (SDGs) and present implementations of Big Earth Data in evaluating SDG indicators in China, concluding that all six SDGs are on schedule to be achieved by 2030. In Hainan Island, Zhang et al. [10] localized the indicators of Sustainable Development Goal (SDG11) at the city and county levels to set up the urban sustainable development assessment framework and found that Haikou and Sanya were close to achieving Sustainable Development Goals, while other cities were still some distance away. Liang et al. [11] constructed a comprehensive assessment framework for the sustainable development of urbanization in Hainan Island based on 11 SDGs covering 23 indicators, using remote sensing products and statistics data, and conducting a spatial and temporal analysis regarding the sustainable development of Hainan from 2011 to 2020, with the assessment scores distributed spatially and each region facing its own challenges for SDG progress. Both studies contribute to the understanding and promotion of sustainable development of urban in Hainan Island. However, Hainan Province is a region that encompasses both land and sea and, therefore, it is not enough to only consider indicators related to urban areas when assessing its overall level of sustainable development. Additionally, Hainan's overall level of urbanization is relatively low, and selecting only urban-related indicators may not fully reflect its characteristics. Therefore, it is necessary to establish a more comprehensive evaluation index system

framework that includes a broader range of indicators to conduct a more comprehensive assessment of Hainan.

So far, studies have primarily focused on national or large-scale regional levels, with little research that is localized to specific cities. Thus, it is essential to conduct further assessments at the city level. Hainan Province, the youngest province in China, is surrounded by the sea and is located in the tropical region. Due to its suitable climate and environment, Hainan has a wide variety of plants and a unique coastal landscape, including special tropical mangroves and coral reefs. With an excellent ecological environment and rich natural resources, such as unique land and sea features, tropical agriculture, tropical forests, and beautiful ecology, Hainan Province has all the necessary elements for sustainable development [10]. It has focused on building "three regions and one center" and has been actively carrying out "ecological provinces" and "national ecological civilization construction demonstration areas" in recent years. In terms of the ecological environment, the government is promoting the economic development of Hainan and constructing the Rainforest National Park, which presents both challenges and opportunities for the province. With respect to economic development, in 2018, the Chinese government made a significant decision to build a free trade port in Hainan [34]. Consequently, Hainan's export-oriented economy has thrived, and its economy has rapidly grown. In terms of people's livelihoods, Hainan has actively combated poverty, built 1700 beautiful villages, and taken the lead in national social security card service management. In many ways, Hainan is progressing towards improving its sustainable development, making it crucial to undertake a comprehensive assessment of sustainability in the province. Hainan Province is in the southernmost part of China and includes Hainan Island, the Xisha Islands, the Nansha Islands, and the Zhongsha Islands and their surrounding waters. Among them, Hainan Island is the main island, with 18 cities and counties. Conducting research on Hainan Island can provide a reference for sustainable development studies for people concerned about sustainable development. Scientists engaged in sustainable development and small island countries or regions with similar conditions.

Given Hainan's regional characteristics and status as an "international island", conducting a sustainable development assessment is crucial. Compared with previous studies, our research selects a more comprehensive set of indicators to construct a localized, sustainable development assessment system for Hainan Island, considering the internal conditions of the province in terms of data and threshold selection. The assessment results focus more on comparisons among cities within Hainan Island, reflecting the relative development of various cities and counties in Hainan Island, providing references and comparisons for local governments. In this paper, we took Hainan Island as the study area, using remote sensing data and statistical data to carry out (1) the construction of a localized SDGs system of SDGs 1–4 and 6–11 indicators and (2) a quantitative and comprehensive assessment of SDG indicators at the municipal and city/county levels from 2015 to 2021. To accurately describe the dynamic trends of relevant SDGs in Hainan, we conducted an in-depth analysis of the advantages and limitations for Hainan in achieving the SDGs. Our research is aimed at addressing the concerns of policymakers, sustainable development practitioners, and the general public interested in sustainable development.

2. Study Area and Data

2.1. Study Area

Hainan Island (18°09′00″–20°10′ 00″ N and 108°37′00″–111°03′00″ E, Figure 1) is the second largest island in China, with an area of 33,900 km^2 [35], and the largest 'tropical treasure' in China, accounting for 42.5% of the country's tropical land area, with excellent light, heat, and water conditions. As a large agricultural province in China, the number of small-scale local farmers is large. In addition, the area of arable land operated by small farmers is quite large, and the third agricultural census shows that it accounts for 70% of the total arable land area [36]. The topography of Hainan Island is complex, characterized by hilly regions in the middle and lowlands in the coastal regions. Natural forests (e.g., tropical

rainforest and evergreen broadleaved forest) are in central and southern Hainan Island. Planted forests (e.g., *rubber plantation*, *eucalyptus*, *Acacia mangium)* are mostly distributed on the plains surrounding the mountains. Crops (e.g., paddy, sugarcane, cassava) are mainly cultivated on flatlands near coastal regions [37]. With the dramatically increasing population on Hainan Island (from 4.88 million in 1974 to 10.20 million in 2021) [38], 49 Nature Protection Zones with a total area of 27,023 km^2 have been established to protect local habitats from human activities. The island has a coastal zone landscape with special tropical mangrove forests along the eastern coastline and coral reefs, providing a unique tropical coastal geomorphic landscape with high ornamental value. Hainan Island includes three prefecture-level cities, five county-level cities, four counties, and six ethnic minority autonomous counties.

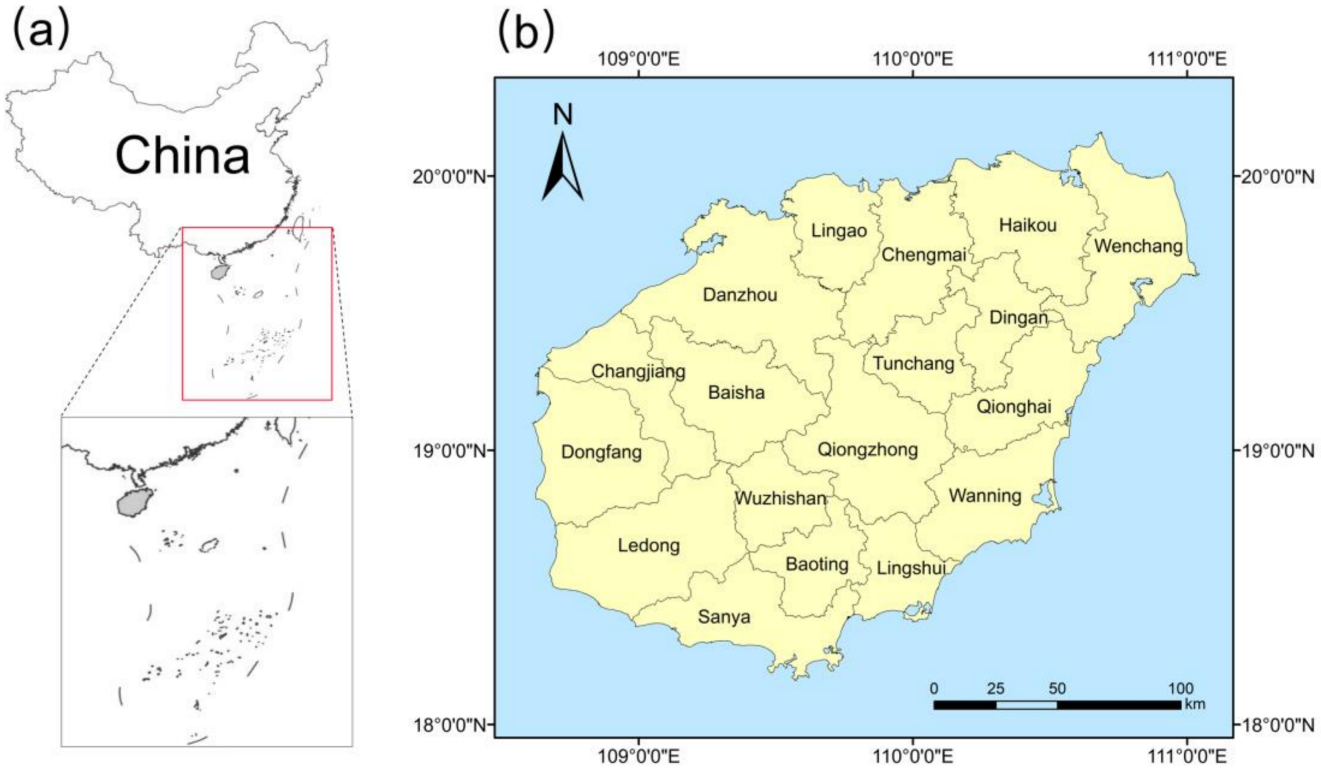

Figure 1. (**a**) Location map of Hainan Island with (**b**) 18 cities/counties of Hainan Island.

Among the cities and counties in Hainan, Haikou serves as the provincial capital, while Sanya is the most renowned tourist city, both of which represent the two most distinctive cities in Hainan. Haikou, the capital city of Hainan Province, is located on the northern coast of Hainan Island. It has a history of over 2000 years and is known as the "Coconut City" because of its abundant coconut resources [39]. The city has many scenic spots and is also home to many high-end hotels and resorts, making it a popular destination for both domestic and international tourists. Sanya, located on the southern coast of Hainan Island, is known as the "Oriental Hawaii" and is famous for its beautiful beaches and tropical scenery. The city has a number of famous tourist attractions and luxury hotels and resorts, attracting many tourists who want to enjoy the tropical paradise [40].

Besides them, Wuzhishan City has also been focusing on the development of its tourism industry, with several new hotels, resorts, and tourist attractions being built in recent years. Wuzhishan City is known for its beautiful natural scenery, with a dense forest cover and a number of rivers and waterfalls. It is also home to many ethnic minority groups, such as the Li and Miao people, who have preserved their unique cultures and traditions. Some of the popular attractions in Wuzhishan City include the Wuzhishan National Forest Park, the Yinggeling Nature Reserve, and the Hainan Qizi Culture Tourism Zone [41].

2.2. SDG Targets and Data Sources

To assess Hainan's sustainable development accurately and comprehensively, it is important to consider the actual situation on the island. According to SDGs 1–4 and 6–11 proposed by the United Nations Statistical Commission in the 2030 Agenda for Sustainable Development, we selected 43 indicators covering 10 SDGs and 26 targets (Table S1) due to the limited data available and part of the obtained data is not applicable to this study. It is necessary to localize the above 10 goals by using reliable, high-quality data that are suitable for the local situation of Hainan Island [42,43]. The main sources and methods of data acquisition are described in Table S1.

3. Methodology

3.1. Localization of SDG Targets

The SDG monitoring proposed by the United Nations is based on a national-level assessment, and its criteria cannot fully reflect the specific situation of different regions and local-scale administrative areas; thus, the SDG targets of the United Nations cannot be directly applied to the study area at the provincial scale. Each city has its own unique characteristics and features, and thus, the assessment of sustainable development in a developing country, such as an island, should be based on its specific attributes. For instance, the case of Hainan Island represents a type of island that has a good ecological environment but a relatively underdeveloped economy, which requires further development. Therefore, the evaluation of sustainable development should consider the natural resources and social development themes of each region, and a more characteristic evaluation system should be established, which reflects the unique features of each city, instead of using a uniform set of indicators to evaluate all regions. We need to analyze and improve the practical meaning and usage of SDG targets for Hainan Island based on the local natural geographical features, human characteristics, and development of Hainan Island and then establish a localized SDG target framework. Considering the actual situation of Hainan Island, however, the quantity of relevant data and the evaluation method cannot match these indicators completely. Therefore, it is necessary to adopt reliable, high-quality data applicable to the local situation of Hainan Island to localize the SDG indicators. We will conduct research on the following three issues: (1) Whether the sustainable development level of Hainan has been steadily improving since 2015; (2) whether the economic development of Hainan has affected its overall sustainable development level; and (3) whether the sustainable development level of each city and county in Hainan is synchronously increasing. By investigating these issues, our research aims to provide a comprehensive and nuanced assessment of the status of sustainable development in Hainan, shedding light on the opportunities and challenges faced by the island's development efforts.

Our approach to localizing the indicators was primarily based on three principles: adaptability, measurability, and comprehensiveness, using the UN- SDGs Global Indicator Framework (UN-SGIF) as our main reference. We used a combination of UN indicators, improved the indicators based on the UN framework that is more suitable for the local context in Hainan, and developed localized indicators. After collecting data from various sources and considering the local conditions in Hainan Island, we have constructed the Hainan Sustainable Development Assessment System (Figure 2), as shown in Table S1.

3.2. Calculation of SDG Scores

3.2.1. Normalization and Individual SDG Target Score

Because we collected data from different sources in different units, we first needed to standardize all data to have the same unit before performing data calculations. The individual SDG indicator scores (e.g., SDG 11.2.1) were normalized to a standard scale ranging from 0 (worst-performing target value towards achieving SDGs, or worst performance) to 100 (best-performing target value towards achieving SDGs, or best performance) to ensure comparability across different SDGs [6,13,42].

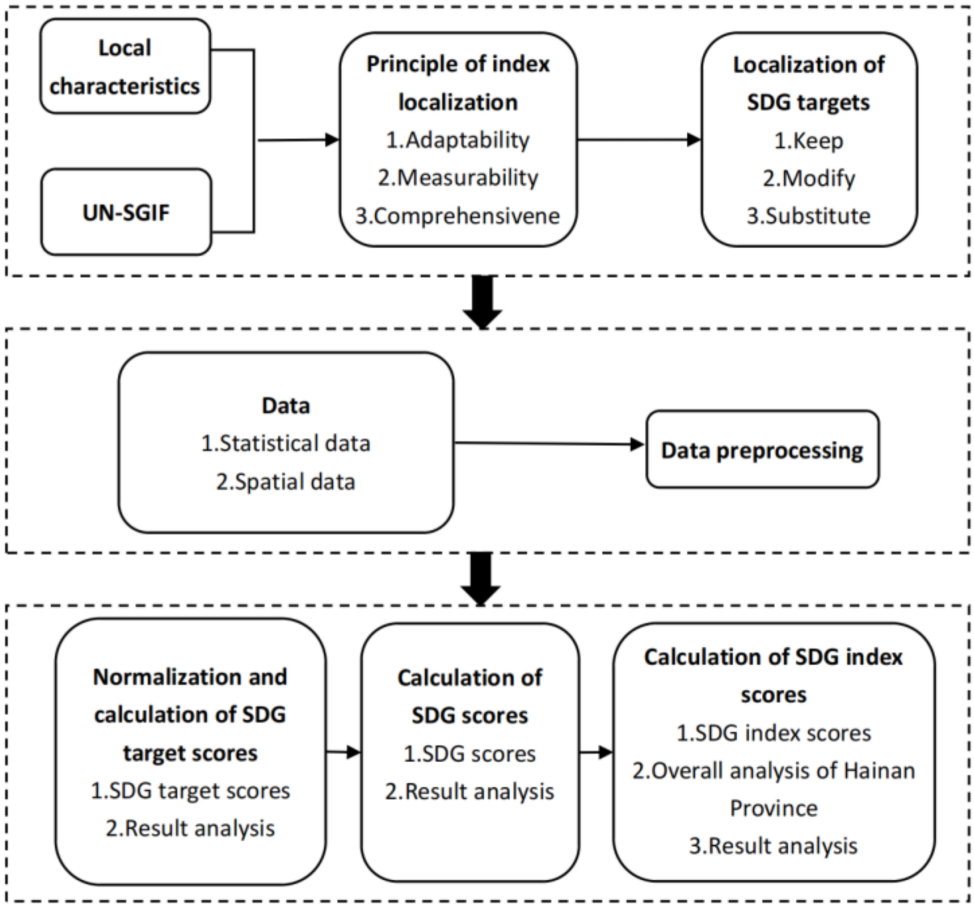

Figure 2. The study scheme.

For selecting upper and lower limits for each data item, we refer to the five-step decision tree proposed in the United Nations Sustainable Development Report [13]. Because our research focuses on the score changes of sustainable development in 18 cities and counties within Hainan Island from 2015 to 2021, rather than a national-level evaluation, we have appropriately modified the selection principles for upper and lower limits based on the localization of data quantity. Specifically, (1) indicators that are fully consistent with those selected by the United Nations use the upper and lower limit values determined in the United Nations Sustainable Development Report, and (2) for other indicators with complete data coverage for the years, the upper and lower limits are selected as the average value of the top three (or bottom three) cities and counties. The decided Hainan sustainable development assessment index system is shown in Table S1. The normalization process of the indicators is as follows:

$$x' = \frac{\boldsymbol{x} - min(x)}{max(x) - min(x)} \times 100 \quad (1)$$

where x is the original data value; max/min denotes the bounds for the highest and lowest data under the same category, respectively; and x' is the normalized value after rescaling.

For some of the indicators, if a higher data score implies comparatively lower sustainability, the normalized Equation (2) is used to obtain the score:

$$x' = 100 - \frac{\mathbf{x} - min(x)}{max(x) - min(x)} \times 100 \quad (2)$$

where x is the original data; x_{max}/x_{min} represents the upper and lower bounds of the data, respectively; and x' is the normalized value after rescaling.

In this paper, the target (e.g., 11.1) was used as the base unit for evaluation. For the calculation of the score of targets, we used the average weight of the scores of indicators.

$$s' = \frac{\sum_i^n x_i'}{n} \tag{3}$$

where n is the total number of indicators, and x_i' is the score of an individual indicator.

3.2.2. Individual SDG Score

For the calculation of the SDG score, we used the average weight of the target scores, and the resulting score was the score for an individual SDG in the corresponding city and county on Hainan Island. The formula is as follows:

$$X' = \frac{\sum_i^n s_i'}{n} \tag{4}$$

where n is the total number of targets, and s_i' is the score of an individual target.

3.2.3. SDG Index Score

The overall sustainable development level of Hainan Island cannot be reflected by the evaluation of individual SDG scores, so it is necessary to construct the SDG index scores for Hainan Island to evaluate its overall sustainable development level. We calculated SDG index scores at the provincial and city/county levels using arithmetic means, following the approach used in the 2022 SDG Index and Dashboards Report [13]. The equal weighting was also consistent with the spirit that all countries need to achieve all 17 SDGs through integrated strategies. The SDG index is an assessment of overall performance regarding SDGs for each city (or county) or Hainan Island:

$$S = \frac{\sum_i^n X_i'}{n} \tag{5}$$

where n is the total number of SDGs, and X_i' is the score of an individual SDG. In this paper, the average level of all cities and counties represented the overall level of the province.

4. Results

4.1. Analysis of Individual SDG Target Score

We normalized and computed the individual score for each SDG target (Equations (1)–(3)) for cities and counties in Hainan Island for the years 2015–2021 (Figure 3). From the dashboard, we observe a significant increase in the number of "green indicators", indicating that most of the individual target scores in Hainan cities and counties rose notably over the seven-year period.

During the 2015–2021 timeframe, most cities and counties in Hainan Island performed well in the following targets: the proportion of the population using a safely managed drinking water service (target 6.1), the proportion of the population primarily relying on clean fuels and technologies (target 7.1), energy consumption per unit of GDP by region (target 7.3), unemployment rate by region (target 8.5), and urban fine particulate matter concentration (target 11.6). Per capita, disposable income (target 1.1) shows the most significant improvement, with all cities and counties changing from "red indicators" or "orange indicators" in 2015 to "green indicators" or "yellow indicators" in 2021. In terms of the reception of overnight tourists by region category (target 8.9), Sanya, a tourist city, has the highest score, followed by Haikou, the provincial capital.

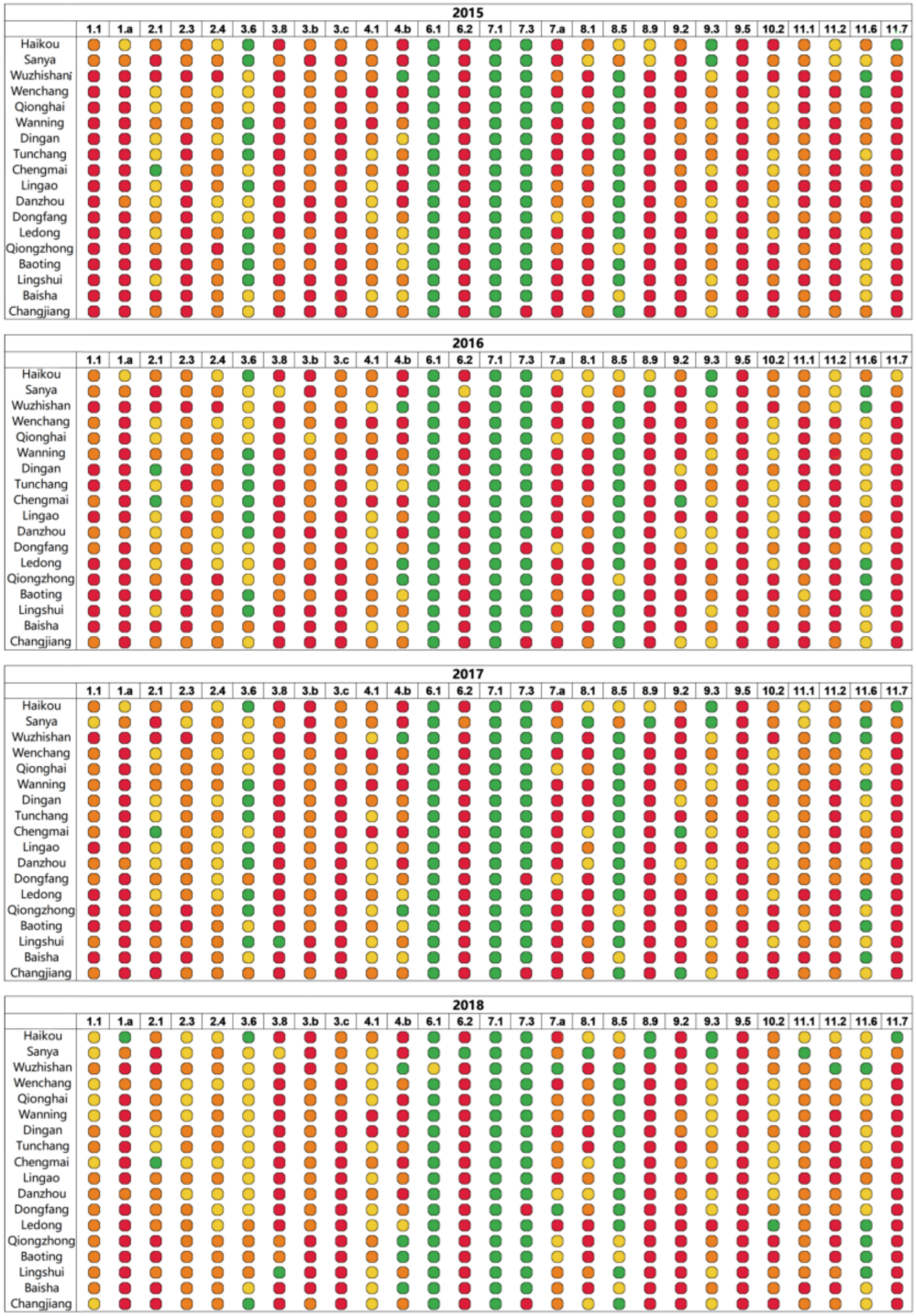

Figure 3. *Cont.*

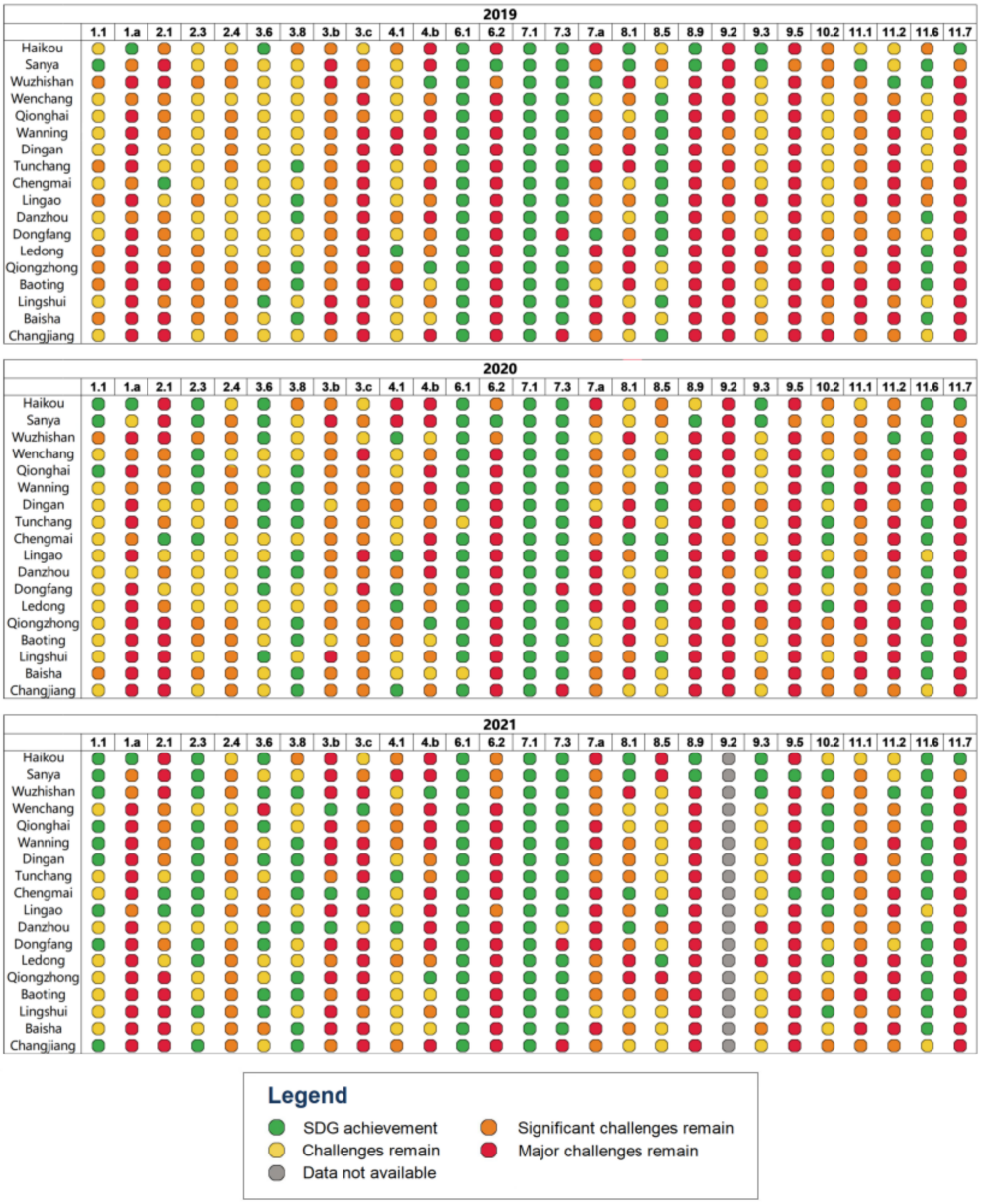

Figure 3. Dashboard of individual SDG target scores for cities or counties of Hainan during 2015–2021.

Sanya received the most "green indicators" overall during the 2015–2021 period, followed by Haikou. Both cities maintain a higher level of sustainable development than most cities and counties in the province. Sanya performs better in per capita disposable income (targets 1.1 and 2.3), the proportion of the population using a safely managed drinking water service (target 6.1), the number of public toilets per 10,000 people (target 6.2), the proportion of output value of secondary and tertiary industries (target 9.5), and the ratio of urban and rural per capita disposable income (target 10.2). However, Sanya has poor performance in targets related to food security guarantees (target 2.1), scholarship ODA amounts by sector and type of study (target 4.b), and unemployment rate by region (target 8.5). On the other hand, Haikou scores higher in the proportion of the population primarily relying on clean fuels and technologies (target 7.1), the proportion of output value of secondary and tertiary industries (target 9.3), and the proportion of the population with easy access to public transport and public space area (target 11.7), while performing poorly in scholarship ODA amounts by sector and type of study (target 4.b), environmental protection expenditure (target 7.a), and science and technology expenditure as a percentage of the general public budget expenditure of the local government (target 9.5).

In 2015, Wuzhishan City and Lingao County had the most "red indicators", but both show considerable development with fewer "red indicators" and more "green indicators" by 2021. By 2021, Ledong County have the highest number of "red indicators", followed by Tunchang County and Qiongzhong County. Nevertheless, the sustainable development levels of all the above three counties have improved compared with their values in 2015.

4.2. Analysis of Individual SDG Score

We calculated the individual SDG scores for cities or counties of Hainan during the period of 2015–2021 (Equation (4), Figure 4). This approach allowed for a comprehensive and nuanced assessment of progress toward achieving the SDGs, with each individual score representing a specific aspect of sustainable development. The use of this methodological framework ensures that the resulting SDG index score is robust, reliable, and informative, providing valuable insights into the status of sustainable development efforts in the evaluated region. From the assessment results, Sanya tied for the highest number of "green indicators" for the seven-year period, followed by Wuzhishan. Sanya scores higher overall for SDG 1 (no poverty), SDG 3 (good health and well-being), and SDG 11 (sustainable cities and communities), ahead of most other cities and counties, while Wuzhishan performs better for SDG 4 (quality education) and SDG 7 (affordable and clean energy). In 2015, Wuzhishan, Qionghai, and Lingao had the highest number of "green indicators", and Qiongzhong had the highest number of "red indicators". In 2021, Sanya and Chengmai both have the highest number of "green indicators", while all cities and counties have no "red indicators" or only one "red indicator".

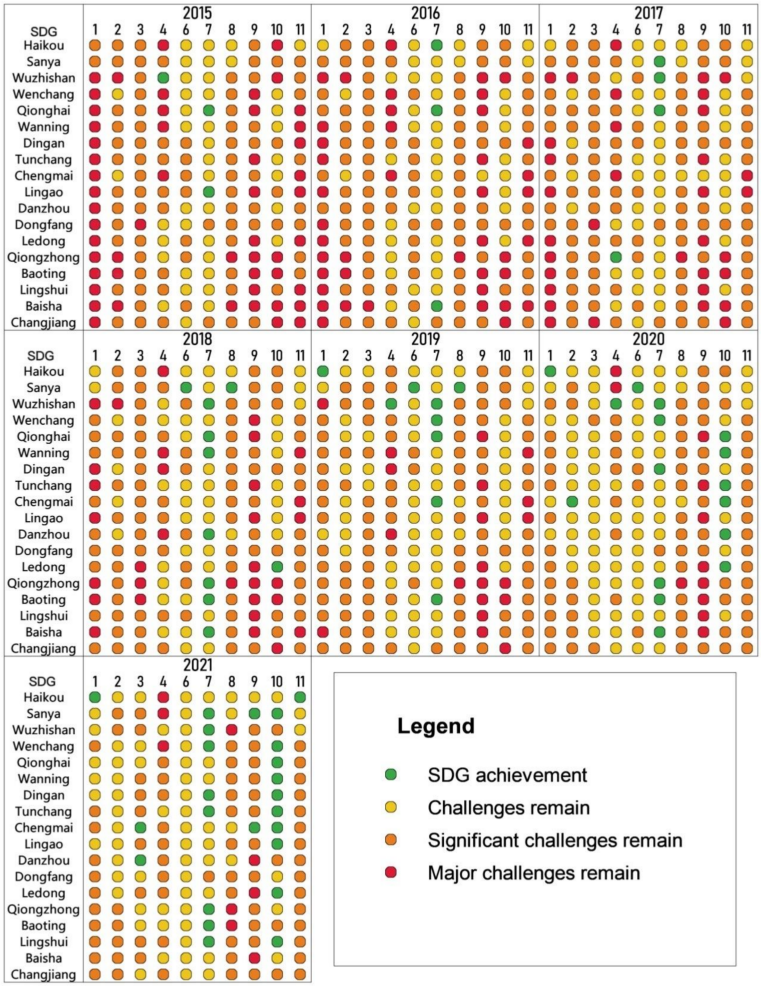

Figure 4. Dashboard of individual SDG scores for cities or counties in Hainan during 2015–2021.

We further calculated the individual SDG scores for the entire Hainan province during 2015–2021 (Figure 5) and observed an overall increasing trend in most SDG scores. In 2015, SDG 6 (clean water and sanitation) and SDG 7 (affordable and clean energy) had the highest scores, while SDG 9 (industry, innovation, and infrastructure) had the lowest score. By 2021, the scores for SDG 1 (no poverty), SDG 2 (zero hunger), and SDG 11 (sustainable cities and communities) had shown the greatest improvement, while the scores for SDG 4 (quality education) and SDG 9 (industry, innovation, and infrastructure) remained relatively low.

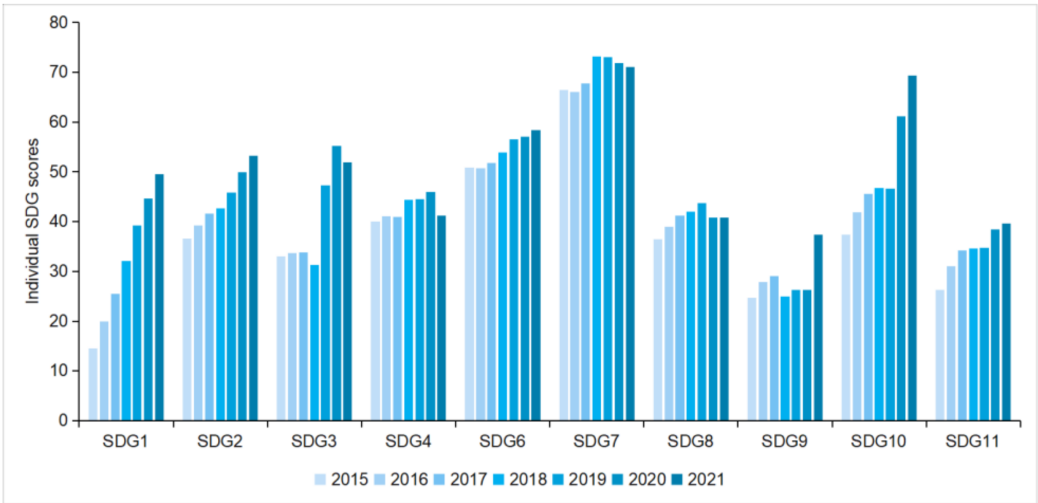

Figure 5. Individual SDG scores for Hainan during 2015–2021.

The seven-year score showed that the best-maintained SDG was SDG 7 (affordable and clean energy), which remained stable at a high level. In terms of SDG 7 (affordable and clean energy), the gas penetration rate in Hainan was 92.62% in 2015, which has reached 97.74% by 2021. In 2021, the gas penetration rate in China had an average of 98.04% [44], and Hainan has already approached the national average. Moreover, the energy conservation and environmental protection expenditures as a percentage of fiscal expenditure in Hainan were 3.14% and 3.86% in 2015 and 2021, respectively, both of which exceeded the national average of 2.25% in 2021 [45]. These data demonstrate that Hainan has made significant progress in SDG 7 and has maintained a good level of performance. The long-term performance of SDG 9 (industry, innovation, and infrastructure) is poor, mainly due to the low employment rate of the manufacturing industry and the general low science and technology expenditure in various cities and counties within the province. In terms of SDG 9, the proportion of secondary and tertiary industries in Hainan was 65.09% and 69.57% in 2015 and 2021, respectively, which is significantly lower than 2021 China's average of 92.7% [46]. Moreover, Hainan's expenditure on scientific and technological research as a percentage of government expenditure was 0.28% and 1.18% in 2015 and 2021, respectively, which is also lower than China's average of 3.93% in 2021 [47].

From the differences in SDG scores in cities/counties in Hainan between 2015 and 2021 (Figure 6), the cities and counties of Hainan showed an increasing trend for most of the SDGs, especially SDGs 1 (no poverty), 3 (good health and well-being), and 10 (reduced inequalities), where several cities and counties significantly increased their scores. The scores for SDG 1 (no poverty) and SDG 10 (reduced inequalities) in each city and county increased very significantly, reflecting that the per capita disposable income of residents improved significantly, and the protection of people's livelihoods also improved. The improvement of health and other related indicators, i.e., SDG 3 (good health and well-being) score, also showed significant progress. However, some cities and counties performed poorly for some SDGs, the cities and counties with the largest decrease in scores for SDG4 (quality education) and SDG7 (affordable and clean energy) are six cities and counties for SDG4 and five cities and counties for SDG7. For example, the SDG 4 score for

both Sanya and Ledong declined by 20 points or more, which means that emphasis should be given to expenditure on education.

Figure 6. Differences in SDG scores between 2015 and 2021 for cities or counties in Hainan.

Overall, the trend of most indicators improved since 2015, and Hainan received the most improvement in total for SDGs 1 (no poverty), 3 (good health and well-being), and 10 (reduced inequalities) over the seven-year period of 2015–2021.

4.3. Analysis of SDG Index Score

To comprehensively evaluate the sustainable development level of Hainan Island, it is insufficient to rely solely on the evaluation of individual SDG scores. Therefore, it is essential to construct SDG index scores for Hainan Island, which can provide a more holistic and accurate assessment of the island's overall sustainable development level. By considering the interrelatedness of the various SDGs and their impact on sustainable development as a whole, the SDG index scores can provide valuable insights into the progress made towards achieving Sustainable Development Goals, as well as areas that require further attention and improvement. The SDG index score was calculated based on individual SDG scores (Equation (5)). Our results indicate that Hainan has improved its SDG index score at both the provincial level and the city-and-county levels over time. Based on Figure 7, it can be observed that the provincial SDG index score for Hainan has significantly increased from 36.62 in 2015 to 51.27 in 2021, which represents an increase of approximately 40%. This suggests that Hainan Island has made substantial progress in achieving the SDGs and improving its overall sustainability. This study takes 2015 as the starting point and finds that the sustainable development level of Hainan will be greatly improved by 2021. However, due to internal imbalances in development, there are still considerable disparities in sustainable development levels among cities and counties based on differences in economic and ecological aspects. Therefore, there is still considerable room for improvement in the overall sustainability of Hainan.

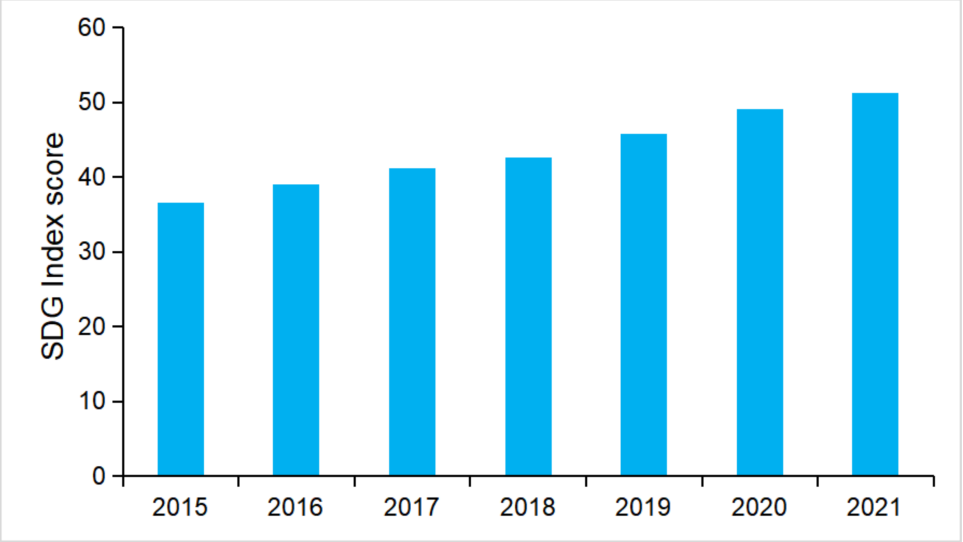

Figure 7. SDG index score in Hainan during 2015–2021.

Based on the results of the SDG index scores, the difference in the SDG index scores between 2015 and 2021 in Hainan is further analyzed. As can be seen in Figure 8, all the SDG index scores improved for Hainan between 2015 and 2021. There is some variation in the degree of improvement for different scores, with SDG 1 (no poverty) showing the most significant improvement, while SDG 4 (quality education) shows the least improvement. Overall, Hainan's SDG index scores significantly improved by 14.65 points between 2015 and 2021, indicating that Hainan's sustainable development process has significantly advanced in recent years.

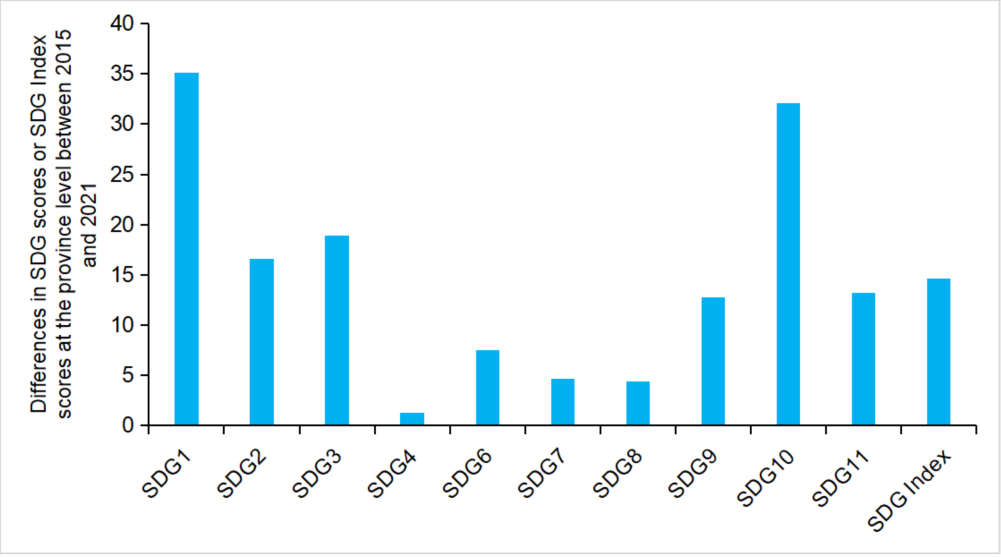

Figure 8. Differences in SDG index scores between 2015 and 2021 in Hainan.

The SDG index measures progress toward all 10 SDGs mentioned in our study (Figure 9), highlighting significant progress made by different cities in the province toward achieving these goals. Figure 8 shows that most of the cities and counties in Hainan have improved their SDG scores between 2015 and 2021. For instance, Haikou City's score has increased from 45.99 in 2015 to 58.79 in 2021, while Sanya City's score has increased from 42.65 in 2015 to 63.29 in 2021. The top three cities with the highest SDG index scores in 2015 were Haikou, Sanya, and Danzhou, they were Sanya, Chengmai, and Haikou in 2021, and the city and county with the lowest scores in both 2015 and 2021 were Baisha.

The cities and counties of Wuzhishan, Chengmai, and Baoting showed the most significant growth in SDG index scores between 2015 and 2021.

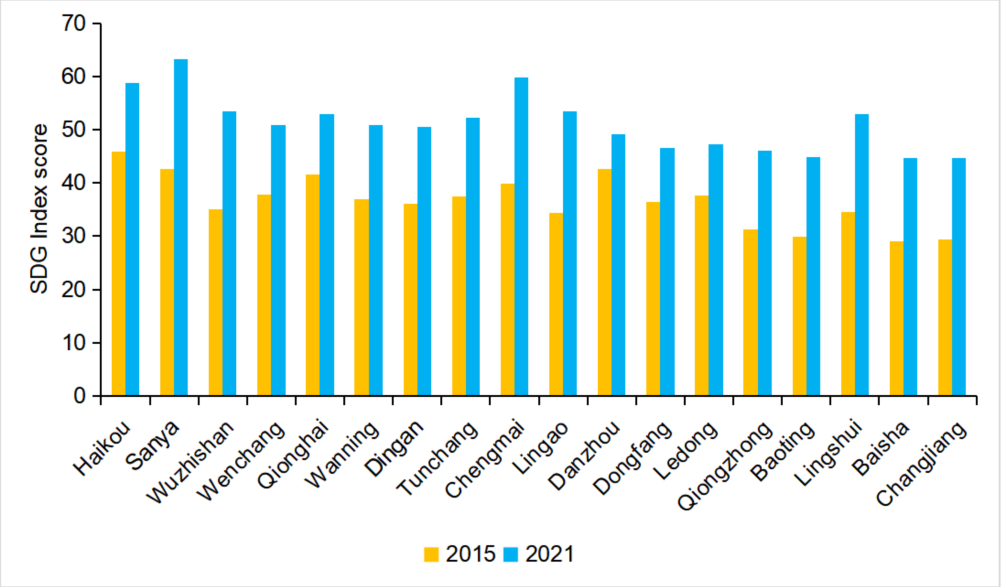

Figure 9. SDG index score for cities or counties of Hainan in 2015 and 2021.

As shown in Figure 10, the sustainable development of Hainan Island is not evenly distributed, generally showing a high score in the north and south but a low score in the middle and west. The present discovery aligns with the findings of Zhang et al.'s investigation [10], which unveiled an unequal distribution of Hainan's development, chiefly concentrated in the northern and southern areas while remaining low in the central and western regions. In addition, Liang et al. [11] also indicated that the development of Hainan Province is uneven, but the level of sustainable development is increasing year by year. Their study indicates that from 2011 to 2020, the assessment scores of cities and counties in Hainan Island have continuously improved, with Haikou and Sanya performing outstandingly and Chengmai showing better growth in recent years. The sustainable development scores of urbanizations exhibit a spatial pattern with high scores in the north and south and low scores in the central and western regions. In particular, Wuzhishan and Baisha have low sustainable development scores for urbanization. These findings are similar to those in our study and corroborate each other. Haikou, the administrative center of Hainan Island, and Sanya, an important tourist city in China, have the highest overall levels of sustainable development and have been in the leading position in the province. Baisha and Baoting in the central part of the island, on the other hand, perform poorly in terms of the SDGs. The coastal cities (Sanya and Haikou) are rich in resources and have better economic development, while the central areas are more mountainous and relatively less resource-rich, and less developed. Chengmai and Wenchang in the vicinity of Haikou have significantly improved their sustainable development levels, mainly due to the encouragement of the "Haicheng Wending" comprehensive economic circle, which has accelerated their respective economic development driven by the development of Haikou. In 2021, the city with the best sustainable development level in the province was Sanya City (63.29 points), followed by Chengmai County (59.88 points). Baoting County, Baisha County, and Changjiang County obtained scores below 45 points, while other cities and counties scored between 45 and 55 points.

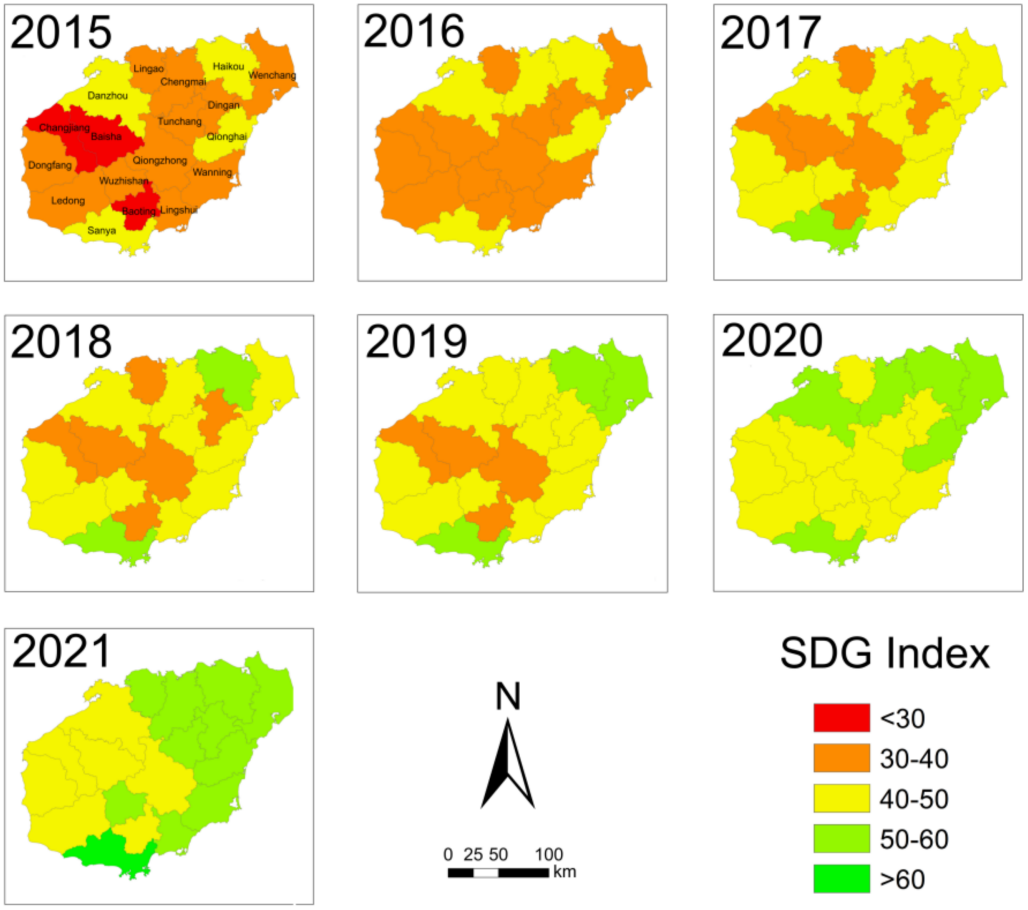

Figure 10. Spatial pattern of SDG index scores in 2015–2021 for 18 cities or counties of Hainan Island.

5. Discussion

This study presents a comprehensive evaluation of sustainable development on Hainan Island, assessing ten goals comprising SDGs 1–4 and 6–11. Overall, the study finds that the sustainable development of Hainan Island has progressed favorably, with comprehensive scores of all cities and counties increasing between 2015 and 2021. The provincial capital (Haikou) and the major tourist city (Sanya) demonstrated the highest scores due to their superior economic development and emphasis on environmental protection [34]. While heavy industry bases such as Danzhou, Dongfang, and Changjiang had lower scores in 2015, considerable progress has been made toward sustainable development in recent years, with scores increasing from 42.56 to 49.19 for Danzhou, 36.43 to 46.59 for Dongfang City and 29.44 to 44.67 for Changjiang. Conversely, the central inland region with lower urbanization rates and poor urban modernization exhibits the lowest level of sustainable urban development. For instance, Baisha had a composite score below 45 by 2021, with neighboring Baoting and Changjiang also scoring low within the province.

Although the overall sustainable development level of cities and counties in Hainan is on the rise, there are still some issues that need to be addressed. For example, multiple cities have performed poorly on certain indicators of SDG4, SDG9, and SDG11, and progress between 2015 and 2021 has not been significant enough. This indicates that Hainan may need to increase investment in education and scientific innovation, encourage cities and counties to increase spending on education, research, and development, and increase urban green space to improve the urban environment. As Hainan develops, the issue of uneven development among different regions becomes increasingly prominent. Coastal cities generally have more abundant resources and more advantages in economic development, while mountainous regions in central areas are relatively underdeveloped and will face more challenges. To achieve the goal of core cities driving the development

of surrounding areas, policies related to the "Three Axes and One Belt and One Zone" should be encouraged. This plan consists of five economic zones in China, namely, the Haikou-Chengmai Wenchang-Ding'an Metropolitan Area, the Greater Sanya Metropolitan Area, the Danzhou-Yangpu Area, the coastal urban belt, and the central mountainous ecological conservation zone.

Our study distinguishes itself from previous research by adopting a unique indicator framework, data selection, and evaluation levels, specifically evaluating data at the city- and county levels within Hainan. Prior to our study, Zhang et al. [10,11] and Liang et al. [10,11] evaluated the Sustainable Development Goals of cities and counties in Hainan from different perspectives. Zhang's research solely focused on SDG11, while Liang's research evaluated multiple goals based on four sub-system layers. Consistent with our study, they also concluded that the sustainable development level of cities and counties in Hainan has been increasing year by year and that the development is uneven. Compared with their studies, our research selected a larger and more comprehensive dataset and evaluated three levels of content. Using a larger dataset may improve the statistical power and generalizability of findings, while evaluating target scores, SDG scores, and SDG index scores may provide a more nuanced understanding of the phenomenon under investigation.

We provide an evaluation framework for sustainable development and a methodology for identifying cities that can serve as a reference for similar work on sustainable development in similar regions and tropical islands worldwide. We would like to emphasize that our research primarily focuses on analyzing sustainable development practices within Hainan and comparing them internally. Our aim is to provide insights into sustainable development trends and patterns within Hainan that can guide and inform future sustainable development efforts within the region. Furthermore, our assessment system for local, sustainable development in Hainan utilizes a more comprehensive set of indicators, which facilitates a more in-depth evaluation of sustainable development. We mainly focused our research on the city level, utilizing a combination of remote sensing and statistical data. However, the data obtained for each indicator are limited, and the number of indicators used is also limited, which may affect the overall assessment of these indicators. In future research, we aim to enhance the reference ability of our study by incorporating more Earth observation data, in addition to traditional statistics, and by including more city-related indicators. We will also strive to align with international standards by introducing additional indicators where applicable.

6. Conclusions

In this study, we found that the overall sustainable development score of cities and counties on Hainan Island showed an upwards trend, and the development level of all aspects was improved. The calculated SDG index scores (0–100) indicated that the sustainable development of Hainan Island had significantly improved since 2015. Most individual SDG scores in Hainan showed an overall increasing trend from 2015 to 2021. Between 2015 and 2021, SDGs 1 (no poverty), 3 (good health and well-being), and 10 (reduced inequalities) are the ones with the largest improvement in sustainability over the seven-year period, as the social security system has been improved, people's incomes have increased, and the urban-rural income gap has gradually narrowed. Among the 18 cities and counties, Haikou City (SDG index: 45.99), as the provincial capital, has the highest score on SDG index scores in 2015, yet Sanya City (SDG index: 63.39), as the tourist, city placed at the top in 2021. Since 2015, the SDG index scores of most cities have increased by more than 10 points. The scores for all the cities and counties were lower than 40 in 2015, and the scores for most cities (11 of 18) reached over 50.0 in 2021. Undeniably, the overall sustainable development level in Hainan Island is unevenly distributed, showing a spatial pattern of high levels in the north and south, stable levels in the east, and low levels in the central and western regions. This is mainly because the coastal areas are rich in resources and have better economic development, while the central areas are more mountainous and relatively less resource-rich, and less developed. The integration of sustainable development between

cities and counties is steadily advancing under the promotion of policies, such as the encouragement of the "Haicheng Wending" comprehensive economic circle.

Through our comprehensive assessment of sustainable development on Hainan Island, all cities and counties have made some progress in achieving sustainable development, but each city has its own unique level of development. Prior to the study in this paper, Xu [6] conducted a study of Chinese provinces and cities based on the United Nations Sustainable Development Assessment system, and its time range was 2000–2015. In his study, the comprehensive score of Hainan in 2015 Sustainable Development Goals was 54.88 points, while China's overall score of Sustainable Development Goals in the UN report was 72.1 [13], indicating that the level of sustainable development in Hainan in 2015 was relatively low in China, and there was still a large room for improvement. In recent years, Hainan Province has made progress in ecological civilization construction, and new policies and plans have been introduced, such as the "Hainan Province '14th Five-Year Plan' Ecological Environmental Protection Plan" [37], which aims to elevate the ecological and environmental quality, resource utilization efficiency, and ecological and environmental governance capacity of Hainan to the advanced national level by 2025. Hainan is poised to become a beautiful region that showcases China's active participation in global climate change and ecological civilization construction. Despite varying levels of sustainable development among different cities and counties in Hainan, the province as a whole has successfully achieved a balance between economic development and ecological preservation. Most cities have been able to develop while also making progress in ecological sustainability. To further promote overall development and progress in Hainan, the government may consider strengthening its policies on "province-wide" and "whole-island" requirements, improving connectivity between cities, and enhancing the radiation drive capacity of the provincial capital city and the province's gateway function.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15118551/s1, Table S1: Localized SDG indicators (SDG1–4, 6–11) for Hainan and rationale for optimal indicator values.

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References

1. Bednarska-Olejniczak, D.; Olejniczak, J.; Svobodová, L. How a Participatory Budget Can Support Sustainable Rural Development—Lessons From Poland. *Sustainability* **2020**, *12*, 2620. [CrossRef]
2. Mainali, B.; Luukkanen, J.; Silveira, S.; Kaivo-oja, J. Evaluating Synergies and Trade-Offs among Sustainable Development Goals (SDGs): Explorative Analyses of Development Paths in South Asia and Sub-Saharan Africa. *Sustainability* **2018**, *10*, 815. [CrossRef]
3. United Nations General. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015.
4. Liu, B.; Wang, T.; Zhang, J.; Wang, X.; Chang, Y.; Fang, D.; Yang, M.; Sun, X. Sustained sustainable development actions of China from 1986 to 2020. *Sci. Rep.* **2021**, *11*, 8008. [CrossRef] [PubMed]
5. Sachs, J.D.; Schmidt-Traub, G.; Mazzucato, M.; Messner, D.; Nakicenovic, N.; Rockström, J. Six Transformations to achieve the Sustainable Development Goals. *Nat. Sustain.* **2019**, *2*, 805–814. [CrossRef]

6. Xu, Z.; Chau, S.N.; Chen, X.; Zhang, J.; Li, Y.; Dietz, T.; Wang, J.; Winkler, J.A.; Fan, F.; Huang, B.; et al. Assessing progress towards sustainable development over space and time. *Nature* **2020**, *577*, 74–78. [CrossRef]
7. Gao, F.; Zhao, X.; Song, X.; Wang, B.; Wang, P.; Niu, Y.; Wang, W.; Huang, C. Connotation and Evaluation Index System of Beautiful China for SDGs. *Adv. Earth Sci.* **2019**, *34*, 295–305. (In Chinese)
8. Guo, H.; Liang, D.; Sun, Z.; Chen, F.; Wang, X.; Li, J.; Zhu, L.; Bian, J.; Wei, Y.; Huang, L.; et al. Measuring and evaluating SDG indicators with Big Earth Data. *Sci. Bull.* **2022**, *67*, 1792–1801. [CrossRef]
9. Fu, B.; Wu, X.; Wang, Z.; Wu, X.; Wang, S. Coupling human and natural systems for sustainability: Experience from China's Loess Plateau. *Earth Syst. Dyn.* **2022**, *13*, 795–808. [CrossRef]
10. Zhang, C.; Sun, Z.; Xing, Q.; Sun, J.; Xia, T.; Yu, H. Localizing Indicators of SDG11 for an Integrated Assessment of Urban Sustainability—A Case Study of Hainan Province. *Sustainability* **2021**, *13*, 11092. [CrossRef]
11. Liang, A.; Yan, D.; Yan, J.; Lu, Y.; Wang, X.; Wu, W. A Comprehensive Assessment of Sustainable Development of Urbanization in Hainan Island Using Remote Sensing Products and Statistical Data. *Sustainability* **2023**, *15*, 979. [CrossRef]
12. Di Lucia, L.; Slade, R.; Khan, J. Decision-making fitness of methods to understand Sustainable Development Goal interactions. *Nat. Sustain.* **2021**, *5*, 131–138. [CrossRef]
13. Sachs, J.; Kroll, C.; Lafortune, G.; Fuller, G.; Woelm, F. *Sustainable Development Report 2022*; Cambridge University Press: Cambridge, UK, 2022.
14. Juanle, W.; Kai, C.; Lingling, B.; Xuehua, H.; Mingming, W. Integration Framework and Key Technology of Big Earth Data for SDGs and Beautiful China Evaluation. *Remote Sens. Technol. Appl.* **2018**, *33*, 775–783. (In Chinese)
15. Wang, Q.; Zhan, L. Assessing the sustainability of renewable energy: An empirical analysis of selected 18 European countries. *Sci. Total Environ.* **2019**, *692*, 529–545. [CrossRef]
16. Wang, Q.; Yang, X. Investigating the sustainability of renewable energy—An empirical analysis of European Union countries using a hybrid of projection pursuit fuzzy clustering model and accelerated genetic algorithm based on real coding. *J. Clean. Prod.* **2020**, *268*, 121940. [CrossRef]
17. Wang, Q.; Wang, X.; Li, R. Does urbanization redefine the environmental Kuznets curve? An empirical analysis of 134 Countries. *Sustain. Cities Soc.* **2022**, *76*, 103382. [CrossRef]
18. Kavvada, A.; Metternicht, G.; Kerblat, F.; Mudau, N.; Haldorson, M.; Laldaparsad, S.; Friedl, L.; Held, A.; Chuvieco, E. Towards delivering on the Sustainable Development Goals using Earth observations. *Remote Sens. Environ.* **2020**, *247*, 111930. [CrossRef]
19. Franco, I.B.; Chatterji, T.; Derbyshire, E.; Tracey, J. Towards Impact Sustainability. In *Actioning the Global Goals for Local Impact: Towards Sustainability Science, Policy, Education and Practice*; Franco, I.B., Chatterji, T., Derbyshire, E., Tracey, J., Eds.; Springer: Singapore, 2020; pp. 1–4.
20. Lorenzo-Sáez, E.; Lerma-Arce, V.; Coll-Aliaga, E.; Oliver-Villanueva, J.-V. Contribution of green urban areas to the achievement of SDGs. Case study in Valencia (Spain). *Ecol. Indic.* **2021**, *131*, 108246. [CrossRef]
21. Ma, Y.; Zhang, Z. Evaluation of sustainable development of urbanization in Gansu Province and analysis of the influencing factors under SDGs framework. *J. Lanzhou Univ. (Nat. Sci.)* **2021**, *57*, 627–636. (In Chinese)
22. Fuso Nerini, F.; Tomei, J.; To, L.S.; Bisaga, I.; Parikh, P.; Black, M.; Borrion, A.; Spataru, C.; Castán Broto, V.; Anandarajah, G.; et al. Mapping synergies and trade-offs between energy and the Sustainable Development Goals. *Nat. Energy* **2017**, *3*, 10–15. [CrossRef]
23. Thacker, S.; Adshead, D.; Fay, M.; Hallegatte, S.; Harvey, M.; Meller, H.; O'Regan, N.; Rozenberg, J.; Watkins, G.; Hall, J.W. Infrastructure for sustainable development. *Nat. Sustain.* **2019**, *2*, 324–331. [CrossRef]
24. Fuso Nerini, F.; Sovacool, B.; Hughes, N.; Cozzi, L.; Cosgrave, E.; Howells, M.; Tavoni, M.; Tomei, J.; Zerriffi, H.; Milligan, B. Connecting climate action with other Sustainable Development Goals. *Nat. Sustain.* **2019**, *2*, 674–680. [CrossRef]
25. Kebede, A.S.; Nicholls, R.J.; Clarke, D.; Savin, C.; Harrison, P.A. Integrated assessment of the food-water-land-ecosystems nexus in Europe: Implications for sustainability. *Sci. Total Environ.* **2021**, *768*, 144461. [CrossRef] [PubMed]
26. Wang, X.-C.; Jiang, P.; Yang, L.; Fan, Y.V.; Klemeš, J.J.; Wang, Y. Extended water-energy nexus contribution to environmentally-related sustainable development goals. *Renew. Sustain. Energy Rev.* **2021**, *150*, 111485. [CrossRef]
27. Lusseau, D.; Mancini, F. Income-based variation in Sustainable Development Goal interaction networks. *Nat. Sustain.* **2019**, *2*, 242–247. [CrossRef]
28. Chinese Academy of Sciences. *Big Earth Data in Support of the Sustainable Development Goals*; Chinese Academy of Sciences: Beijing, China, 2021.
29. Gao, L.; Bryan, B.A. Finding pathways to national-scale land-sector sustainability. *Nature* **2017**, *544*, 217–222. [CrossRef]
30. Penglong, W.; Feng, G.; Chunlin, H.; Xiaoyu, S.; Bao, W.; Yanqiang, W.; Yibo, N. Progresson Sustainable City Assessment Index System for SDGs. *Remote Sens. Technol. Appl.* **2018**, *33*, 784–792. (In Chinese)
31. Zhou, Q.; Dong, Z.; Pan, R. Policy analysis and recommendations of Sustainable Development Report 2019: Transformations to Achieve the Sustainable Development Goals: Includes the SDG Index and Dashboards. *Environ. Sustain. Dev.* **2021**, *46*, 95–101. (In Chinese)
32. Shao, C.; Chen, S.; Gao, J.; He, Y.; Zhou, H. Design of China's sustainable development evaluation index system based on the SDGs. *China Popul. Resour. Environ.* **2021**, *31*, 1–12. (In Chinese)
33. Guo, H.; Chen, F.; Sun, Z.; Liu, J.; Liang, D. Big Earth Data: A practice of sustainability science to achieve the Sustainable Development Goals. *Sci. Bull.* **2021**, *66*, 1050–1053. [CrossRef]
34. Hainan Free Trade Port. *Hainan's Financial Industry 14th 5 Year Plan Released*; Hainan Free Trade Port: Haikou, China, 2021.

35. Zhang, T.; Wang, Y.; Zhang, S.; Wang, Y. An estimation and development model of tourism resource values at the township scale on Hainan Island, China. *PLoS ONE* **2022**, *17*, e0262837. [CrossRef]
36. National Bureau of Statistics. *The Third National Agricultural Census Compilation of Census Data*; National Bureau of Statistics: Beijing, China, 2019.
37. Liu, R.; Wang, C.; Fu, L. Thoughts about the Establishment of a Think Tank for High-efficiency Tropical Agriculture in Hainan. *Chin. J. Trop. Agric.* **2018**, *38*, 98–102. (In Chinese)
38. The People's Government of Hainan Province Statistical Yearbook. Available online: https://www.hainan.gov.cn/hainan/zfsj/xsj.Shtml (accessed on 18 December 2022).
39. Travel China Guide. Haikou Travel Guide. Available online: https://www.travelchinaguide.com/cityguides/hainan/haikou/ (accessed on 13 November 2022).
40. Tripadvisor. Explore Sanya. Available online: https://www.tripadvisor.com/Tourism-g297427-Sanya_Hainan-Vacations.html (accessed on 13 November 2022).
41. Tripadvisor. Explore Wuzhishan. Available online: https://www.tripadvisor.com/Tourism-g1017017-Wuzhishan_Hainan-Vacations.html (accessed on 13 November 2022).
42. Ionescu, G.H.; Jianu, E.; Patrichi, I.C.; Ghiocel, F.; Țenea, L.; Iancu, D. Assessment of Sustainable Development Goals (SDG) Implementation in Bulgaria and Future Developments. *Sustainability* **2021**, *13*, 12000. [CrossRef]
43. Peng, K.; Jiang, W.; Ling, Z.; Hou, P.; Deng, Y. Evaluating the potential impacts of land use changes on ecosystem service value under multiple scenarios in support of SDG reporting: A case study of the Wuhan urban agglomeration. *J. Clean. Prod.* **2021**, *307*, 127321. [CrossRef]
44. National Bureau of Statistics of China. China Statistical Yearbook. Available online: http://www.stats.gov.cn/sj/ndsj/2022/indexch.htm (accessed on 18 December 2022).
45. Ministry of Finance of the People's Republic of China. Report on the Implementation of China's Fiscal Policy in 2021. Available online: http://www.gov.cn/xinwen/2022-02/27/content_5675913.htm (accessed on 1 November 2022).
46. National Bureau of Statistics of China. Statistical Communiqué of the People's Republic of China on the 2021 National Economic and Social Development. Available online: http://www.stats.gov.cn/english/PressRelease/202202/t20220227_1827963.html (accessed on 1 November 2022).
47. Xinhua Statistics: China's R&D Spending Intensity Builds up in 2021. Available online: http://english.www.gov.cn/archive/statistics/202209/02/content_WS63113df8c6d0a757729df8a2.html (accessed on 1 November 2022).