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# Implementation of WISE (Wonderful Indonesia Sustainable Tourism) Trips – A Journey Towards Low Carbon Geotourism Activities in Raja Ampat Geopark

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**Abstract.** Tourism is a sector that significantly impacts the Indonesian economy and contributing 8% of carbon emissions in the atmosphere. Raja Ampat, renowned as one of the best diving destinations in the world, faces a serious threat due to the occurrence of coral bleaching events at several diving sites. As the UNESCO Global Geopark, the Encouraging the Implementation of the Manokwari Declaration program aims to implement national policies, including WISE (Wonderful Indonesia Sustainable Experience) Trips, which focus on low-carbon practices in tourism activities. In collaboration with CarbonEthics, carbon emissions related to geotourism are calculated by considering factors such as transportation, accommodation, food and beverage, and energy and plastic waste from activities. Geotourism activities packaged in the Raja Ampat UGGp geotrail are part of the Authentic Experience of Southwest Papua activity package. The calculation results indicate that the Geotrail Cruising the Sea of The Legend carbon emissions of 0.098 tons of CO<sub>2e</sub> per person, and tourists are encouraged to plant at least one mangrove trees in areas managed by BUMDES (Village-Owned Enterprises). Through this initiative, local communities not only benefit economically but also become educated and directly involved in climate change mitigation and conservation of their villages, in accordance with the principles of the SDG's where this program fulfills 10 of the 17 Sustainable Development Goals.

*Keywords:* geopark, raja ampat, climate change, carbon, geotourism

## 1. Introduction

According to 2021 data, tourists spent an average of US\$ 3,097.41 per visit, and the number of international tourist arrivals in Indonesia reached 5,889,031 in 2022. Therefore, tourism is a sector that significantly impacts the Indonesian economy. Despite the high competition among countries in this sector, the Indonesian tourism industry has continued to grow year after year, achieving 32nd place in the Travel & Tourism Development Index (TTDI) in 2021, up from 44th place in 2019 [1]. Consequently, one of the government's strategies to enhance the regional



economy is to develop the tourism sector, which holds significant potential for generating regional income [2].

The Southwest Papua Province was officially designated as a separate administrative entity from West Papua Province on December 9, 2022. According to a study conducted by the Economic Bureau of the Regional Secretariat of Southwest Papua, the development of the tourism sector is crucial enough. Following its designation as a new autonomous region, this sector has become a cornerstone of the provincial economy and will be promoted and developed through collaboration across all existing sectors. One of the province's proudest assets is the world's most magnificent karst cluster phenomenon, located in the ocean along the Earth's equator in Raja Ampat Regency. Its geological significance was recognized in 2023, leading to its official designation as a Raja Ampat UNESCO Global Geopark [3].

As a regency where 79% of its area is a conservation zone, Raja Ampat is part as one of the 10 National Priority Tourism Destinations according to Presidential Decree Number 18 of 2020, which outlines the National Medium-Term Development Plan (RPJMN) for 2020-2024. Current data indicates that the tourism sector is responsible for 8% of carbon emissions, a significant figure for a single industry. This percentage is derived from various sources, such as transportation accounts for 49%, goods contribute 12%, food and beverages make up 10%, the service sector represents 8%, and accommodation comprises 6%. This assessment does not include the negative impact of waste generated by tourists [4].

Since 2022, the Indonesian government has committed to mitigate the climate change in the tourism sector by signing the Glasgow Declaration. This commitment aims to adapt to the evolving global tourism preferences that increasingly emphasize sustainability and inclusivity. Additionally, this initiative is reinforced by the Regulation of the Minister of Tourism and Creative Economy No. 9 of 2021, which provides guidelines for sustainable tourism destinations. However, these guidelines have yet to be implemented at the regional level.

The Ministry of Tourism and Creative Economy aims to reduce emissions from 8% to 4% by 2030 [5]. To achieve this goal, a national policy has been introduced in the form of the Wonderful Indonesia Sustainable Experience (WISE) Trips program. This initiative implements the principles of the Blue, Green, and Circular Economy (BGCE) guidelines within the tourism sector. In 2024, the focus will be on establishing baseline calculations and disseminating information to all tourism stakeholders, particularly in the Accommodation, Tourist Attractions, and Travel Agencies sectors, regarding the significance of carbon emissions in tourism. This initiative is a priority due to the direct threat that climate change poses to tourism, including rising global temperatures that contribute to increasing sea levels, which is likely endanger the islands of Raja Ampat. Additionally, warmer sea temperatures lead to coral bleaching, a phenomenon that divers have reported is already occurring in Raja Ampat, one of the world's premier diving destinations [6]. Therefore, it is crucial for the tourism sector to take steps to mitigate the effects of global warming while collectively working to reduce greenhouse gas emissions. This effort not only aims to improve air quality and ecosystems at tourist destinations but also to protect biodiversity and create high-quality tourism experiences.

This paper aims to describe the process of sustainable tourism development in West Papua, where biodiversity and landscape protection are prioritized while creating high-quality tourism experiences. It emphasizes the involvement of local communities and tourists in climate action and conservation efforts. This initiative also supports the implementation of the Manokwari Declaration, which is part of the Master Plan 2020-2030 for the Raja Ampat UNESCO Global Geopark.

## 2. Theoretical Background

### 2.1 Carbon in Karst Ecosystem

The karst ecosystem is one of the areas with significant potential for carbon absorption; therefore, the conservation of karst regions is crucial for supporting carbon emission reduction programs in Indonesia [7]. The carbon cycle within this ecosystem occurs through two primary processes: geological processes in the rock substrate and biological processes within living organisms. In organisms, atmospheric carbon is captured through photosynthesis and calcification, occurring over relatively short timeframes. Consequently, ecosystems such as mangroves and peatlands are often recognized as effective carbon sinks. However, it is less commonly acknowledged that the karst ecosystem also plays a vital role in carbon absorption through the karstification process. This process involves the dissolution of calcium carbonate ( $\text{CaCO}_3$ ), which consumes atmospheric carbon (C) in an open system comprising three phases: gas ( $\text{CO}_2$ ), liquid ( $\text{H}_2\text{O}$ ), and solid ( $\text{CO}_3^{2-}$ ), facilitating the binding and release of calcium ions ( $\text{Ca}^{2+}$ ). A comprehensive understanding of the complexities of the karst system and the carbon cycle—encompassing water, rock, soil, atmosphere, and biology—integrated with various types of carbon sinks (e.g., soil, forest, karstic area), can significantly contribute to sustainable development within local communities [8].

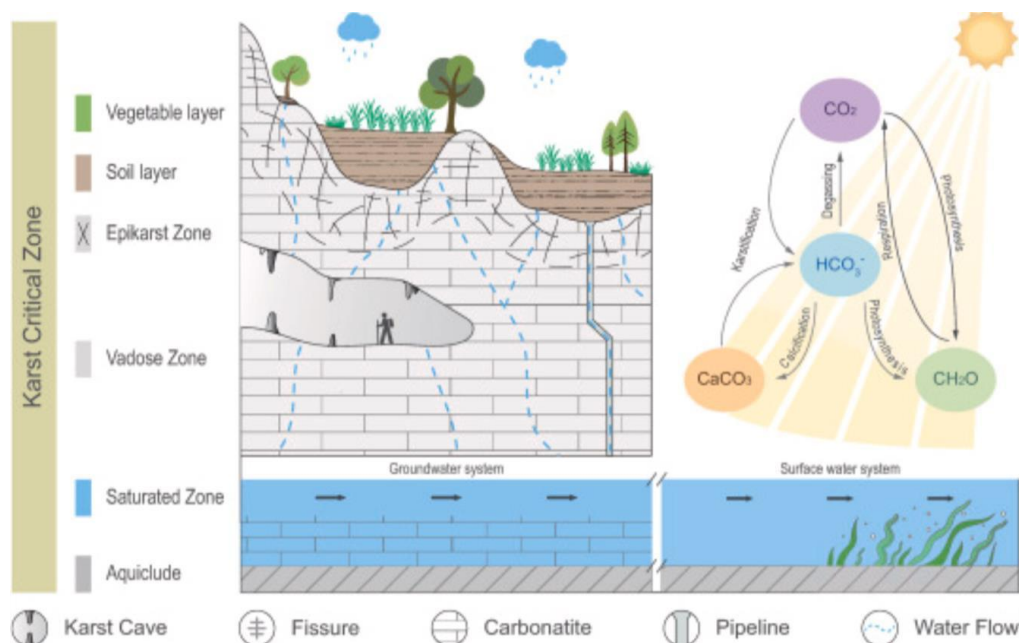


Figure 1. Sectional structure of a typical karst area [9].

### 2.2 Geotourism in Karst Landscape of Raja Ampat UNESCO Global Geopark

Raja Ampat is an archipelago consisting of 2,713 islands, with four main islands: Waigeo, Batanta, Salawati, and Misool. It is in the heart of the Coral Triangle, which is renowned for its marine biodiversity. This extraordinary diversity has made Raja Ampat one of the world's most famous diving destinations. In addition to its rich marine life, the islands are home to a variety of endemic

species, including the Bird of Paradise (*Cenderawasih*). As a result, 79% of the area is protected, either as Nature Reserves in terrestrial ecosystems or as Marine Nature Reserves and Regional and National Marine Protection Areas in its waters.

In 2023, Raja Ampat was officially designated as member of the Global Geopark Network (GGN) due to its geological significance, which includes the exposure of older rock units from the Silurian and Devonian basements, dating back nearly one-tenth of the Earth's history. The overlying Mesozoic rocks, including ultramafic that represent the ocean floor, contribute to the basement of the karstic carbonate formations. Notably, karst topography is well developed in both the older (Eocene) and younger (Miocene to Pliocene) limestone units [9].

The phenomenon of sea level rise during the Quaternary time is believed to have influenced the formation of "archipelagic karst" in the Raja Ampat area, which has been followed by an ongoing natural karstification process. This further karstification has resulted in the creation of numerous caves, including those located below the sea level. These sites have become renowned diving destinations. In certain locations, steep limestone cliffs and eroded holes or niches along the seafront reveal cave paintings. This rock art was created by prehistoric humans who inhabited the Geopark area several thousand years ago. This situation highlights the close relationship between geological heritage and cultural one in the Raja Ampat region [10].

Beautifully conserved landscapes that are unique and rare attract visitors to further explore the aesthetic and scientific value of the Geopark area. People come to Raja Ampat not only as tourists but also as explorers. Geological formations, such as joints and faults, facilitate dissolution and denudation, resulting in limestone islands or sea-stacks with unusual and distinctive shapes, like those found in Wayag, Kabui, and the islets east of Misool. As part of the National Priority Tourism Destination initiative, Raja Ampat attracts an average of 35,000 tourists annually, peaking in 2019 with 46,375 visitors, 52% of whom were foreign tourists. The COVID-19 pandemic caused a dramatic decline in tourist numbers, reducing them by 91.6%. However, in 2023, there has been a resurgence, with 20,273 tourists visiting, 82% of whom are foreign nationals [11].

One of the foundational elements of master plan of the Raja Ampat UNESCO Global Geopark is the Manokwari Declaration, which is included in the program to promote the implementation of this declaration. This initiative emerged from the International Conference on Biodiversity, Ecotourism, and Creative Economy, held on October 7, 2018, during which a Memorandum of Understanding was signed by all provinces on the island of Papua. The agreement focuses on Sustainable Development Based on Customary Areas in the Land of Papua, with the vision of creating a "Land of Papua that is Peaceful, Sustainable, and Dignified" [12].

Geotourism, as implementation of the Geopark concept, is founded on three fundamental principles: it is geologically based (rooted in the Earth's geoheritage), sustainable (economically viable, community-enhancing, and supportive of geoconservation), and educational (achieved through geo-interpretation) [13]. Geotourism is a form of nature tourism that specifically emphasizes geology and landscapes. It encourages visits to geosites, conserves geodiversity, and fosters an understanding of Earth Science through appreciation and learning. This is accomplished through special visits to geological features, the use of geo-trails and viewpoints, guided tours, geo-activities, and the patronage of geosite visitor centers, all of which serve as instruments of sustainable development [14]. Geotrails play a crucial role in geotourism by providing an immersive experience in exploring geological phenomena and geomorphological sites. These trails highlight points of interest, often accompanied by explanations, and are frequently linked to biological and cultural narratives along the special route.

Raja Ampat UNESCO Global Geopark has developed three geotrail routes, with plans for further expansion. These routes aim to showcase the unique geosites of the region and provide visitors with a comprehensive experience of how Raja Ampat celebrates the Earth's heritage through its distinctive natural and geological landscapes, rich biodiversity both on land and in the sea, and the cultural diversity of the indigenous people in the area. The first geotrail, "Cruising the Sea of the Legend", invites tourists to explore a route that traverses Kabui Bay and Kali Raja, which is steeped in the legend of the egg stone—the origin of the name "Raja Ampat", *Raja* means King and *Ampat* means Four, to one of the most renowned geosites in Raja Ampat Geopark, the Karst of Pyainemo. The second geotrail, "Journey to the King's Crown," takes tourists across the Equator, heading north along Kawe Island to the Wayag Islands, which resembles a "crown" and is the lagoon is recognized as the first confirmed nursery ground in the world for manta rays (*Mobula alfreddii*). The third geotrail, "Travel to Origin's Hidden Treasure," invites visitors to delve into the underwater – yet on the land – to explore the past of Waigeo Island, featuring outcrops of older volcanic rocks and deep-sea sediments, culminating in the serene and enchanting waters of Mayalibit Bay [15].

### 2.3 Wonderful Indonesia Sustainable Experience (WISE) Trips in Southwest Papua Province

Since 2022, the Government of the Republic of Indonesia, through the Ministry of Tourism and Creative Economy, has committed to signing the Glasgow Declaration to contribute to climate change mitigation in the tourism sector. This initiative is also expected to enhance the adaptation to changing global tourism preferences, which now emphasize sustainability and inclusivity. This commitment was formalized through the Minister of Tourism and Creative Economy Regulation No. 9 of 2021, which provides guidelines for sustainable tourism destinations. This regulation is anticipated to be a significant step in implementing the Blue, Green, and Circular Economy (BGCE) framework. Additionally, a national policy entitled WISE Trips has been introduced, with Southwest Papua designated as a pilot destination for this program.

The WISE Trips Southwest Papua program is an initiative by the Southwest Papua Provincial Government aimed at developing sustainable tourism in the region. It encourages tourists to actively participate in and take responsibility for the carbon emissions generated during their travel. This program essentially curates tour packages that account for the CO<sub>2</sub> emissions produced, which include:

1. *Authentic Experiences of Southwest Papua*, an authentic activity package offered by Southwest Papua, showcasing the natural wonders protected by the local wisdom of the Indigenous People, offering experiences that can only be experienced when adventuring in Southwest Papua;
2. *Scenic Hideaway Accommodations of Southwest Papua*, an activity package offered by accommodations that offer a beautiful hideaway from the hustle and bustle of daily routines, which also implement several ways to contribute to reducing the carbon footprint in the management of their accommodation;
3. *Nature Adventures of Southwest Papua*, a travel package prepared by a tour operator whose carbon emissions are calculated, to be able to provide input for understanding climate change mitigation for tourists; and
4. *Voyages Through Southwest Papua's Islands*, a Liveaboard tour package that provides an ocean exploration experience with a traditional *pinisi* ship in one of the largest conservation areas in Indonesia.

Piloting the WISE Trips Program in Southwest Papua is deemed appropriate because this region is part of the UNESCO Global Geopark, featuring a magnificent karst ecosystem that plays a crucial role in the carbon cycle. Traveling in Southwest Papua essentially means exploring a well-preserved conservation area that remains largely untouched by modern development. Therefore, it is vital to cultivate a sense of responsibility among tourists. This initiative is expected to enhance economic opportunities through conservation activities. Additionally, monitoring and evaluation will be conducted to ensure the program is implemented effectively, avoiding mere greenwashing or superficial green labeling without genuine action.

### 3. Methodology

This research was conducted through 2 stages, namely carbon calculations on travel trips and the preparation of appropriate thematic packages, referring to the results of existing calculations and observations. Calculations and observations through field observations and in-depth interviews with geosite managers were conducted to obtain data on the amount of carbon emissions (CO<sub>2</sub>) per person per trip/night (depending on the type of activity) and determine low-carbon initiatives, other sustainable initiatives, and the uniqueness of the trip carried out.

The data on the amount of carbon produced will be converted to the number of tree or mangrove seedlings that must be planted by each tourist as a carbon offset. Data on sustainability initiatives that have been carried out can be used as material to be shared with other managers or accommodations in the surrounding area. The uniqueness that exists will be additional material for branding and product marketing to the target market of Raja Ampat tourists.

#### 3.1 Study Area

The research location for this study is the Raja Ampat UNESCO Global Geopark, specifically at Cruising the Sea of the Legend geotrail (**Figure 2**). This journey traverses several geosites, beginning in Waisai City. It enters through Kabui Bay and makes a stop at Geosite RA 07 – Sea stacks of Kabui Bay. The trip then crosses The Passage strait, pausing briefly at RA 11 – Pef Island to view the prehistoric human handprint (Austronesian Painting Tradition). The journey continues with a stop for snorkeling and exploring the cultural attractions of the tourism village on Arborek Island. Afterward, travelers can enjoy the stunning karst landscape from the viewpoint at Geosite RA 09 – Karst of Pyainemo. Following lunch, the trip proceeds to Geosite RA 15 – Uplifted Sands of Mansuar for another snorkeling opportunity before finally returning to Waisai City.

#### 3.2 Carbon Emission Accounting

The data obtained was calculated in collaboration with CarbonEthics [15], utilizing reference emission factors as listed in **Table 1**. The data has several limitations, and various assumptions were made. Carbon emissions are quantified by calculating the greenhouse gases (GHG) produced, utilizing the collected data through the following formula.

$$\text{Carbon Emission (Ton CO}_2\text{e)} = \text{Data of Activities} * x \text{ Emission Factors}$$

Specifically, the scope of emissions includes only those from transportation (i.e., land and sea transport), food and beverage, accommodation, and activities (i.e., energy-related and single-use plastic generated). The sources of data and their accuracy are also limited, as they were primarily collected from interviews with tour operators and accommodation owners. This may necessitate the use of estimates and extrapolations, which could affect accuracy. The operational assumptions





**Figure 2.** Geotrail of Raja Ampat UGGp – Cruising the Sea of The Legend. The legend of the name Raja Ampat (*Raja* means King and *Ampat* means four) originates from folklore about eggs that hatched into four kings, while one egg that failed to hatch transformed into a sacred stone, revered by the indigenous people of Kali Raja in Teluk Kabui. With a variety of legendary tales surrounding the bay, which was the first area inhabited on this island, tourists embark on a journey through the sea of legends. This route showcases the stunning geological features of Kabui Bay, which is comprised of Waigeo Island and Gam Island. Travelers can navigate through the passages and sail the waters to reach the most famous karst island in Indonesia, Pyainemo.

**Table 1.** The reference method of the Emission Factor of the Greenhouse Gas (GHG) Protocol standards in calculating emissions used by CarbonEthics<sup>a</sup>

| Type of Activity                      | Reference Method  |
|---------------------------------------|---|
| Land Transportation                   | DEFRA UK 2024   |
| Sea Transportations                   | DEFRA UK 2024   |
| Accommodations                        | Cornell Hotel Sustainability Benchmarking (CHSB) Index 2024   |
| Food & Beverages                      | Climatiq 2021   |
| Activity – Energy                     | DEFRA UK 2024 & Ministry of Energy and Mineral Resources 2019 |
| Activity – Trash (Single-Use Plastic) | DEFRA UK 2024   |

include estimates of fuel consumption for transportation and food and beverage expenses based



on data gathered from interviews. Additionally, assumptions regarding tourist behavior were made concerning the average occupancy rate and commuting habits.

### 3.3 Thematic Tours Packaging

The tour packages analyzed in this study are not new offerings; rather, they consist of pre-existing, best-selling packages that are already in demand among tourists visiting Raja Ampat UNESCO Global Geopark. These packages are evaluated in relation to low-carbon initiatives, other sustainability efforts, and their unique features. The findings will serve as recommendations for tour operators and accommodation owners, enabling them to adjust the packages they offer accordingly.

## 4. Result

### 4.1 Carbon Emissions Calculation in Geotrail Cruising the Sea of The Legend

The Geotrail: Cruising the Sea of Legends is the most popular and widely recognized tour package for tourists visiting Raja Ampat, which is one of an Authentic Experience of Southwest Papua. This package is designed to accommodate travelers who wish to explore Raja Ampat in a relatively short time, enhancing the experience for those specifically interested in diving. The trip lasts approximately 9 hours (from 8:00 AM to 5:00 PM) and covers a sea journey of about 230 kilometers. During this route, visitors will pass at least 12 Geopark sites but will typically stop and spend time at 4 to 5 locations, depending on infrastructure, weather conditions, and the preferences of the tourists.

According to calculations conducted by CarbonEthics, the total carbon emissions amount to 0.098 tons of CO<sub>2e</sub> per person, with detailed information available in **Table 2**. The low-carbon initiatives included in this tour package have significantly reduced single-use plastics by eliminating food straws for coconuts and minimizing the use of disposable plastics in lunch packaging. The decision to forgo straws in coconut sales has become an internal policy of the Pyainemo Geosite management. Additionally, efforts to reduce single-use plastics in lunch

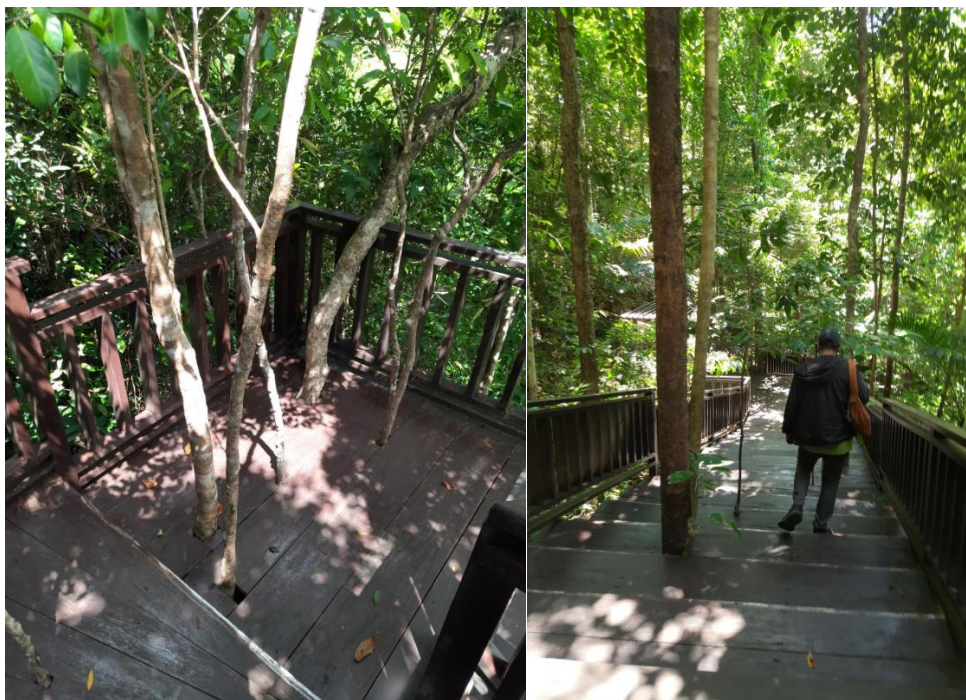
**Table 2.** Carbon emission calculation result Geotrail Cruising the Sea of The Legend.

| Category   | Total Emission (kg CO <sub>2e</sub> ) |
|--|---------------------------------------|
| Land Transport   | 0.0                                   |
| Sea Transport <sup>a</sup>   | 98.0                                  |
| Food & Beverage <sup>b</sup>                                       | 0.3                                   |
| Activity - Energy  | 0.0                                   |
| Activity - Waste (single-use plastic)                              | 0.0                                   |
| <b>Total Emissions / person (kg CO<sub>2e</sub>)</b>               | <b>98.4</b>                           |
| <b>Conclusion - Total Emissions / person (Ton CO<sub>2e</sub>)</b> | <b>0.098</b>                          |

<sup>a</sup> Start and end in Waisai City Area, <sup>b</sup> Including 1x lunch

packaging are being implemented by most tour operators, who provide meals in lunch boxes or adopt a picnic-style approach.

Low-carbon initiatives that are significant at Geosite Pyainemo include conscious design and architecture. The design is tailored to the existing ecosystem, considering the condition of the trees, while the construction of wooden pathways minimizes tree removal and mitigates environmental impact, as shown in **Figure 3**. This approach is noteworthy, especially considering that Geosite Pyainemo is a major tourist spot where infrastructure development is undertaken thoughtfully. In contrast, other geosites often feature only simple decks for tourists to take photographs, or they lack any infrastructure development altogether.



**Figure 3.** The wooden pathways are designed to minimize tree removal and mitigate environmental impact.

Other sustainability initiatives focus on community empowerment. In this approach, geosite management is conducted by management partners that include local communities, who are also trained in the production of souvenirs. The production of souvenirs such as Virgin Coconut Oil (VCO), lotions, and coconut-based soaps, along with ecoprint products developed by the community, utilizes the abundant resources available in this area.

#### *4.2 Carbon Offset in Geotrail Cruising the Sea of The Legend*

A tree can absorb an average of 10 to 40 kg of CO<sub>2</sub> per year [16], depending on various factors such as species, soil quality, light availability, climate, and the age of the tree. Young trees absorb CO<sub>2</sub> more rapidly because they are in a growth phase, while mature trees, due to their higher biomass, ultimately sequester more CO<sub>2</sub> overall [17]. In terrestrial ecosystems, data indicates that

the rate of carbon absorption in mangrove ecosystems is two to four times greater than that in mature tropical forests [18].

According to calculations by the Eden Reforestation Project that was conducted in Africa, each mangrove tree can absorb an average of 12.3 kg of CO<sub>2</sub> per year [19]. However, secondary research conducted by CarbonEthics in Indonesia—specifically in Bintan and Tanjung Pakis—shows that every mangrove tree can absorb up to 67kg CO<sub>2</sub>e/20 years [20]. Based on the WISE trips Program, the carbon emissions produced during each Geotrail Cruising to the Sea of Legends trip, which generates 98.4 kg CO<sub>2</sub>e, necessitate that each tourist compensate for these emissions with a calculation result of 1.46, which can be interpreted as many as one to two mangrove trees planted for the timeframe of 20 years.

It is important to remember that the WISE Trips Program is a government initiative primarily aimed at influencing changes in the behavior of both the community and tourists. So, even though the calculation has yielded ideal outcomes, at the outset of the program's implementation, it is expected that each tourist will plant at least one mangrove tree. This activity will be conducted periodically, allowing the BUMDES (Village-Owned Enterprises) responsible for managing this initiative to learn and develop their capabilities. It is important to note that this program is being implemented within community groups in suburban areas.

#### *4.3 WISE Trips Implementation Plan in Raja Ampat UNESCO Global Geopark*

The WISE Trips implementation plan for the Raja Ampat UNESCO Global Geopark begins with compiling and identifying packages, as well as calculating the total carbon emissions for the Geotrail Cruising the Sea of Legend. Various implementation strategies are being developed to ensure that the program operates as intended and remains sustainable. Below is the WISE Trips implementation plan that will be executed in Raja Ampat UGGp.

1. **Education on Carbon Emissions:** Tour operators and accommodation owners will receive training on the carbon emissions generated by their activities. This knowledge will enable them to inform and encourage guests to take responsibility for reducing their own carbon footprints.
2. **Renewable Energy:** This initiative encourages tour operators and accommodation owners to utilize boats equipped with more efficient engines or renewable energy sources, such as solar batteries. Additionally, it urges geosite managers and accommodation owners to adopt solar-powered energy systems to enhance tourism infrastructure.
3. **Waste Management:** The implementation of local government policies requires all tour operators and accommodation owners to eliminate the use of single-use packaging, such as plastics and cans. Additionally, these policies promote waste reduction initiatives, including composting organic waste and recycling materials. Furthermore, they encourage local governments to establish an integrated waste management system, ensuring that only residual waste is sent to landfills.
4. **Government Support as Policy Stakeholders.** The government should develop and enforce regulations that provide incentives for the adoption of renewable energy and low-carbon practices within the public sector. Additionally, it should create and promote guidelines for low-carbon tourism practices, which include measures such as environmental education, energy efficiency, renewable energy, sustainable transportation, waste reduction and management, water conservation, and carbon offsets. Furthermore, a certification program should be established for low-carbon and sustainable tourism operators to recognize and promote best practices.

5. Travel Code of Ethics: Promote the use of coral reef-friendly sunscreen and discourage littering in the code of conduct at tourist spots/geosites.

## 5. Discussions

The commitment of the government of Southwest Papua and Raja Ampat Regency to sustainable development commenced with the initiation of a Geopark. As UNESCO Global Geopark initiative, the development of the Raja Ampat area will undoubtedly align with the 17 Sustainable Development Goals, including the promotion of sustainable tourism through the WISE Trips program.

The WISE Trips scheme in Southwest Papua has a direct impact not only on the environment but also on tour operators, accommodation owners, geosite managers, local communities, and tourists. Tour operators and accommodation owners with a business-oriented mindset are committed to adhering to existing regulations and policies to become certified partners. These partners receive promotional benefits from the Regional Government, which in turn enhances trust among the niche market of tourists visiting Raja Ampat.

Geosite managers from local communities can develop their managed areas sustainably by collaborating with local governments and NGOs that can aid and training. Communities in regions without tourist attractions can partner with the government and NGOs to establish BUMDES, which will serve as a platform for managing carbon offset initiatives. This may include providing mangrove seedlings or endemic trees, as well as producing various environmentally friendly products and souvenirs. Meanwhile, tourists, particularly those interested in responsible tourism, will receive comprehensive information about Raja Ampat, instilling confidence in their decision to spend their time and money vacationing in this area.

From the scheme, it is evident that not only is Goal No. 13, Climate Action, being implemented through this program, but also nine other goals. These include Goal No. 1 - No Poverty, Goal No. 4 - Quality Education, Goal No. 8 - Decent Work and Economic Growth, Goal No. 10 - Reduced Inequalities, Goal No. 11 - Sustainable Cities and Communities, Goal No. 12 - Responsible Consumption and Production, Goal No. 14 - Life Below Water, Goal No. 15 - Life on Land, and Goal No. 17 - Partnerships for the Goals. A total of ten out of the seventeen Sustainable Development Goals have been successfully implemented and promoted through the WISE Trips Program in Southwest Papua, particularly in the Raja Ampat UNESCO Global Geopark area.

Concerns from stakeholders, particularly those in the conservation sector, regarding the issue of greenwashing in this program are significant. Conversely, there are additional concerns that, if conservation actions are implemented effectively, they will lead to an increase in tourist visits. This is supported by research results obtained through a bibliometric analysis of tourism development issues, utilizing English-language journals published between 1991 and 2020, with keywords such as tourism, tourists, economic growth, and environmental conditions. The findings indicate that a reduction in greenhouse gas emissions correlates with an increase in the number of tourists, which in turn stimulates GDP growth. This evidence reinforces the notion that well-enforced conservation efforts can align with economic growth [21]. Monitoring and evaluation, conducted in collaboration with NGOs or community groups focused on conservation, are expected to sustain this program, ensuring its proper implementation rather than merely serving as a form of green labeling.

## 6. Conclusion

Raja Ampat UNESCO Global Geopark is a stunning karst ecosystem and a priority tourist destination in Indonesia. Although it is less popular than mangrove and peat ecosystems, the karst environment is also a vital carbon sink; its degradation can lead to significant carbon emissions that adversely affect the Earth's atmosphere. The Geotrail Cruising the Sea of The Legend is one of the most popular routes among tourists visiting Raja Ampat which is one of an Authentic Experience of Southwest Papua. Calculations indicate that each visitor releases at least 0.098 tons of CO<sub>2</sub>e, which is equivalent to the carbon absorption of one to two mangrove trees per trip. The WISE Trips Papua Barat Daya initiative is a sustainable tourism development program launched by the Papua Barat Daya Provincial Government. This initiative aims to benefit all sectors involved in tourism, including tour operators, accommodation providers, geosite managers, local communities, and tourists. Additionally, it has a direct positive impact on the conservation of both land and marine ecosystems. The WISE Trips program promotes conservation through sustainable, low-carbon tourism, with the expectation of stimulating growth in Papua Barat Daya by increasing the number of tourists who engage in conservation activities, such as planting at least one mangrove tree per trip.

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