Marine Tourism Infrastructure and Human Resources Development

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Abstract. In the development of marine tourism, two kinds of impacts on the environment will emerge, positive and negative. The positive impacts include: (1) increasing accessibility and economic activities (2) increasing amenities, and (3) creating attractions. The negative impacts include: (1) pollution of the environment, change the quality of the environment, (2) change the original shape of the Marine tourism area, and (3) social impacts. When the development concepts have been realized and managed optimally, it will automatically have a major impact on improving the community's economy in a sustainable manner in the future, which will open up large enough jobs. On the outside the region, the community can feel the positive impact of the development of tourism and economic improvement, because the community can also take the opportunity to try in the fields related to the development of marine tourism around the area. Conversely, it could only receive bad consequences from the development of marine tourism. It can be concluded, that there will be sustainable development if there is a balance between infrastructure development and human resource development. This research is part of a case study on the initial concept of structuring the Gampong Krueng Raya coastal area, Sabang City, NAD, from the socio-economic aspect. This research uses descriptive qualitative and interpretative methods. Data and information obtained by literature study and field observations.

Keywords: Marine tourism, infrastructure, accessibility, amenity, attraction, pollution, social-economic impact, human resource development

1. Introduction

Indonesia with 17,500 islands owned is a maritime country and the largest archipelago in the world, with abundant marine and coastal wealth. Beautiful and impressive natural panorama makes Indonesia a dream and a destination for tourists, both domestic and international tourists. According to Pitana, the image formed from a tourist attraction is a combination of factors that exist in the tourist attraction concerned such as weather, natural scenery, safety, health, etc. on the one hand and information received for tourists from sharing sources from parties another or from his own fantasy [1]. Good performance in the past five years from the tourism sector in Indonesia has shown encouraging developments. Based on Katadata citing data from the Central Statistics Agency (BPS), the number of foreign tourists in the 2014-2018 period grew by 67.6 percent, up almost double compared to the 2009-2013 period growth of 39.2 percent. In addition, according to the Travel and Tourism Competitiveness Index released by the World Economic Forum, Indonesia's tourism competitiveness has increased from 81st in 2009 to 42nd in 2017. The good performance contributes to the country's foreign exchange earnings, while in 2018 the temporary figure reached US $ 16 11 billion. Higher than 2017, which amounted to US $ 15.24 billion. These achievements are inseparable from the various strategies carried out. Among these programs are the four
super priority destinations, called "New Bali": Lake Toba, Borobudur Temple, Mandalika Bay, and Labuan Bajo, as well as the implementation of branding, advertising, and selling strategies. Strengthening the branding "Wonderful Indonesia" also continues to be promoted where during the period 2016 to March 2019 managed to get 150 awards [2]. Two-thirds of Indonesia in the form of sea areas has great potential for the development of marine tourism, a new type of tourism that is growing and being liked by tourists, both domestic and foreign tourists. The potential and variety of Indonesian marine tourism is not only limited to existing tourist destinations, but there are still other marine tourism places that are still hidden and not yet widely known. In its development it must be able to recognize the characteristics of marine tourism so that in its development and management it can preserve marine ecosystems in a sustainable environment. The development of tourism is expected to occur in the marine and coastal areas of conservation towards sustainable development.

This study aims to present the concept of structuring the coastal area of Gampong Krueng Raya. This search uses descriptive qualitative analysis techniques and simple SWOT analysis [3] [4]. Reference reviews in this study are the concept of strategies for the development of tourism, ecotourism, marine tourism, sustainable tourism. The strategy can be applied in relation to the development of sustainable marine ecotourism in Indonesia, namely: the strategy of developing marine ecotourism areas and products through empowering local communities; strategy to develop a network of marine and tourism industries; Infrastructure development strategy (infrastructure and main supporting facilities and marine tourism); development strategy for marketing marine ecotourism products; coastal area planning strategy; strategies to improve the safety of marine tourism; and strategies for institutional and human resource development and marine tourism. Sustainable development of marine ecotourism must be prepared and planned and managed properly, so that it can directly and positively contribute to public welfare, poverty reduction, rural development, cultural and community preservation, and environmental protection. The output of the study on the Arrangement of Coastal Potential of Gampong Krueng Raya, is to compile the potential of various existing resources as a basis for the proposed area arrangement. Data and information are obtained from field data collection and studies that have been done previously as well as various regulations at the regional and national levels.

2. Research Methods

2.1. Time and Location
The study was conducted in January to October 2019. The location was in Gampong Krueng Raya, Sukakarya District, Sabang City, Nanggroe Aceh Darussalam Province. The material used in this study is the Gampong Krueng Raya area which has the potential for marine tourism. The tools used are administrative area maps, questionnaires, stationery, and digital cameras, UAVs (drones), and other tools.

2.2. Descriptive-qualitative
The method used in this research is descriptive research method and direct observation. Data collection and observation techniques used were: (a) Literature study (b) Identification of types of marine tourism in the study area. (c) Observing and analyzing the utilization of environmental services in the field. (d) Interviews and discussions with stakeholders in ecotourism management. (e) Collecting primary and secondary data. In analyzing the tourism potential of the Krueng Raya Coastal area the guideline used for the assessment of the analysis of the area of operation of natural tourism objects and attractions (ADO - ODTWA) issued by the Directorate General of Forest Protection and Nature Conservation Regional Operational and Tourism Attraction Analysis Guide, 2003 [5]. It is a standard for assessing the Potential and Attractiveness of Natural Tourism Objects, where each value has been determined the weight for each criterion so that by referring to the predetermined value the number of values or scores for one criterion can be determined by Equation 1. In the equation, S is the score / value of a criterion, N is the sum of the values of the elements in the criterion, and B is the weighted value that has been determined for each criterion.

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S = \frac{\sum \text{Value of Elements in Criterion} \times B}{N}
\]
where: $S = N \times B$  

(1)

There are three criteria to be calculated, namely tourist attraction, accessibility, and amenity. The criteria for attractiveness are given 6 (six) because attractiveness is the main factor for someone to travel. Accessibility is given a weight of 5 (five) because it is an important factor that supports tourists to carry out tourist activities. For the amenity (accommodation, facilities and infrastructure) are given a weight of 3 (three) because it is supporting facilities only. The guidelines for assessing the analysis of the area of operation of objects and attractions of nature tourism (ADO - ODTWA) will be used to analyze the tourism potential of the Gampong Krueng Raya Coastal. Then a modification table (from ADO - ODTWA) is made by calculating all element/sub element values according to the weights set in the following criteria for assessment of objects and attractions of natural tourism and other criteria.

- **Attractiveness Assessment Criteria (weight 6):**
  1. The panorama: (a) variation of views of the island at sea, (b) the beauty of the beach and the views towards the sea are beautiful, (c) harmony of beach & ocean view, (d) clear & clean sea water, (e) coral integrity is still maintained, & (f) high diversity of flora-fauna. If there are >5 has score 30, if = 5 it has score 25, if 3-4 it has score 20, if = 2 it has score 15 and if there is 1 only it has score 10. (2) Beach safety/security: (a) there is no dangerous backflow, (b) there is no blast, (c) poison free, (d) there is no annoying trust, and (e) there is no human interference. If it has 5, its score is 30, if has 4, its score is 25, if has 3, its score is 20, if has 2 it's score is 15 and if it has 1 only its score is 10.
  2. Types and colors of sand: if the red sand its score 30, if the white sand it has score 25, if black or brown sand it has score 20, if the sand is sweaty it has score 15 and if there is just a little sandy it has 10. (4) Variations of activities that can be done by tourists on the beach: a. enjoy the view of the sunset, b. swim, c. sight-seeing tour (boat tour, cruising/extended boat tour), d. surfing, e. diving, snorkeling & water sky, f. sailing, and g. fishing. If there are >6 its score is 30, if there are 5-6 its score is 25, if there are 3-4 its score is 20, if there are 1-2 its score is 15 and if there is only 1 its score is 10.
  3. Convenience: a. no trash (odor free), b. no scribble, c. noise free, d. not many animal disturbances, and e. there is no human interference. If there are 5 its score is 30, if there are 4 its score is 25, if there are 3 its score is 20, if there are 2 its score is 15 and there is only 1 its score is 10.

- **Accessibility Assessment Criteria (Weight 5):**
  1. Road condition: a. Good, if the paved roads are in good condition, not bumpy & can be passed by all types of vehicles its score is 30; b. Fair: if the paved roads with good condition & can be passed by 4-wheeled vehicles without difficulty its score is 25; c. Medium: pavement roads or asphalt roads that have been damaged so that it obstructs travel its score is 20; and d. Poor: Roads with very damaged conditions and difficult to pass its score is 15 only. (2) Distance from city center: if there is <10 its score is 30, if there is 10-15 Km its score is 25, if there is 15-20 Km its score is 20 and if there is >20-25 Km its score is 15. (3) Travel time from the center of city: if 1-2 hours its score is 30, if 2-3 hours its score is 25, if 3-4 hours its score is 20 and if need ≥5 hours its score is 15.

- **Criteria for Assessment of facilities and infrastructure/Amenity (Weight 3), the element/sub element and the score are:**
  1. Facilities: (a) Home / food stalls & drinks, (b) Market (c) Banks & ATMs, (d) Souvenir counter, (e) Place of worship & (f) Toilet. If there are >5 the score is 30; if there are 4-5 the score is 25; if there are 2-3 the score is 20; if there are 1-2 the score is 15 and if there is not at all the score is 10 only. (2) Supporting infrastructure (5 km radius): (a) Post office, (b) Medical Center, (c) drinking water network, (d) electricity network, (e) Telephone network & (f) Mooring Pier. If there are >5 the score is 30; if there are 4-5 the score is 25; if there are 2-3 the score is 20; if there are 1-2 the score is 15 and if there is not at all the score is 10 only. (3) Akomodasi: (a) Hotel, (b) Cottage / Bungalow, (c) Guest
house, (d) Home stay, (e) Campground. If there are \( \geq 4 \) the score is 30; if there are \( 3 \) the score is 25; if there are \( 2 \) the score is 20; if there is just \( 1 \) the score is 15 and if there is not at all the score is 10 only.

Scores obtained are then compared with the total score of a criterion if each sub-criterion has a strong value of 5. Karsudi, et al (2010, 148-154) stated that after a comparison was made, a feasibility index would be obtained in percent. An area's feasibility index is as follows: (a) Feasibility level \( > 66.6\% \): feasible to be developed and (b) Feasibility level 33.3\% - 66.6\%: not yet feasible to be developed, and (c) Feasibility rate \( <33.3\% \): not suitable to be developed [6].

2.3. Assumptions

This research uses the assumption that all plans are in accordance with Qanun No. 6 of 2012 concerning Sabang City Regional Spatial Plan (RTRW) for 2012-2032 in the cultivation area of the tourism sub-region of the natural tourism sub-region. Klah Island coast has been designated as a new destination for marine tourism and as an International Trade and Promotion Center (ITPC) promotional area. To see the potential for tourism in the future, a regression and estimation analysis of the Passenger flow and Vessel Visit at the planned Port of Gampong Krueng Raya is made from valid secondary data. Furthermore, it will be explored more specifically about the potential and problems of socio-economic aspects that exist in the coastal areas of Gampong Krueng Raya, which will be supplemented by simple internal and external analysis (SWOT) to produce recommendations for development strategies.

2.4. Geographical location

Geographically, the area of Sabang City includes Weh Island, Klah Island, Rubiah Island, Seulako Island, and Rondo Island, with an area of 153 Km\(^2\), Sabang City is located on the lines 05\(^\circ\)46'28"LU - 05\(^\circ\)54'28"LU and 95\(^\circ\)13'02" BT – 95\(^\circ\)22'36"BT with the following territorial boundaries: in the north it is bordered by the Malacca Strait, in the east it is bordered by the Malacca Strait, in the south and west is in the Indonesian Ocean. Gampong Krueng Raya is located in Sukakarya District, at position 05\(^\circ\)49'29"LU - 05\(^\circ\)52'39"LU and 95\(^\circ\)18'29"BT – 95\(^\circ\)19'39"BT, with the following territorial boundaries: the north is bordered by Sabang Bay, the east borders with Gampong Aneuk Laot and Balohan, in the south it is bordered by Gampong Paya Seunara, in the west it is bordered by the Male Laot Bay.

2.5. Potential Development of Tourism Area

The distance is 38.3km from Banda Aceh, currently Sabang City can be accessed by ship from Ulele Harbor to Balohan Harbor. The growth of tourists is rising continuously. To reach the target of tourist visits which are expected to increase, an alternative journey has been planned from the Port of Ulele to Gampong Krueng Raya. Gampong krueng Raya coastal tourism areas that have the potential to be developed include: Klah Island coastal area, Jurong Ilham Syukur Beach and Teupin Ciriek Beach.

3. Results and Discussion

3.1. Potential and Problems of Gampong Krueng Raya

Gampong Krueng Raya, which is located in the Sabang City area, as a small part of the Nangroe Aceh Darussalam Province, has a large tourism potential to be developed. The tourism sector can have a multiplier effect. Multiplier effect is an effect in the economy where an increase in national/regional expenditure (in certain sectors) will affect income and consumption to be higher than the previous amount in the sector even in other sectors. Then the tourism potential in Sabang is believed to be quite strong because it is supported by the history of the greatness of Aceh in the past, about the uniqueness of the existing arts and culture, and also supported by its beautiful natural panorama. The tourism sector here
is a sector that is full of attractiveness and has the potential to be developed in Gampong Krueng Raya. From literature studies and field observations, information is obtained that Gampong Krueng Raya has several tourism potentials, such as Klah Island which is a small island separated from the coastal mainland of Gampong Krueng Raya. The natural panorama offered by the island is very interesting and directly confronts the high seas, a calm sea with interesting fish, which is also very suitable for diving, swimming and snorkeling for anyone who likes marine nature activities. The potential for the development of water tourism in the form of diving and snorkeling is very likely to be developed there. Fishing tourism can also be developed in certain spots which of course have taken into account the suitability of the land and its feasibility.

Various types of thematic tourism will be developed in this region because Krueng Raya also has Ujung Sekundo Beach and Pulau Klah Beach which have very beautiful panoramas. There are also sacred tombs that can be used as historical attractions or cultural tourism. There can be developed tourist destinations by building special buildings that are aligned with the tourist destination behind it, it can even become a landmark that is a distinctive trait of the resort to Gampong Krueng Raya.

Ilham Syukran beach is beautiful and interesting and has enough potential to be a tourist village. In this village there is a coffee shop, paddle duck games and seaweed breeding that can be visited directly for those who want to see it. The clear sea and nice corals can also be enjoyed by the duck rowers in the sea. If it is developed it will be more interesting, tourists will spend more time and money at these tourist attractions. It is possible to reach the Fishermen's Village, the location must cross the Krueng Raya Bay using a motor boat or Krueng Raya water bus, quickly and easily. When he arrived at the location, tourists were treated to views of fishing boats lined up neatly along the dock. To further revive this tourist destination can be prepared typical vehicles of the fishing village and all the attractions of the daily life of the residents of the fishing village which would attract the attention of visitors. In the fishing village, tourists can not only enjoy the beauty of the beach, neat line of fishing boats, and clean underwater scenery, but also can enjoy the daily activities of the fishing population. The visitors can also try fishing experience with fishermen.

There is an interesting culinary spot, namely Rujak Pulau Klah, a place to enjoy Aceh's unique salad in the afternoon until sunset many people come to the place to enjoy the beautiful panorama of Klah Island which is illuminated by the sun which begins to set into a very beautiful silhouette. The atmosphere is quiet and late at night will make visitors want to always feel homesick to set foot in that place. There is potential to be developed as an attractive resting place for travelers who will enjoy the atmosphere and panorama in this area. It can develop into a resort place if it is better designed and laid out.

To develop educational tourism / education the Krueng Raya area has the LIPI Oceanographic Research Station and the Maritime Cultivation Center which can be developed into an integrated Technoscience in this region. Various posters, slides, videos and marine survey tools as well as those related to oceanography can be displayed at the technopark, of course it will be very interesting for tourists or students.

Fishing tourism also has a pretty good prospect to be developed because this area has fishing spots that are very interesting and pleasing to fans of the sport of fishing. Especially for the yachter who saw the trend of his visit tends to increase from year to year, it is very potential if a Public Facilities Yick Club is built, a gathering place for the yachter to be able to enjoy the fun of being in the land of Sabang.

Furthermore, with the increasing trend of tourist visits, there is the potential for the development of accommodation facilities in the form of lodging in the form of inns, resorts, villas, hotels and restaurants with various attractions that attract travelers. The culinary existence will certainly follow an increase in the number of tourist visitors. It is recognized that the relationship between tourism and culinary is inseparable. Indeed, the importance of the relationship between food and tourism cannot be ignored. Each destination has different levels of attraction that can attract tourists from various regions or countries. So the development of culinary tourism that is typical of Sabang-Aceh cuisine can be built around the coast of Krueng Raya. Various dishes with ingredients derived from the sea and land with typical spices will
certainly be an extraordinary attraction. Some tourism experts have conducted research that there is about 30-40% of the budget of travelers will be spent on culinary.

3.2. Analysis of Potential Assessment and Attractiveness of Natural Tourism Objects
As mentioned in the methodology, in analyzing the tourism potential of the Krueng Raya Coastal Area using the assessment guidelines for the analysis of the area of operation of natural tourism objects and attractions (ADO - ODTWA) issued by the Director General of PHKA in 2003 and is a standard for assessing the Potential and Attractiveness of Natural Tourism Objects. Specifically for the areas around Sabang Bay and Krueng Raya Bay, based on the results of air mapping in 2019 land use is dominated by quite varied vegetation.

Klah Island is dominated by vegetation with a very tight cover, with quite varied types of vegetation, on the east side of the island Klah looks a collection of coconut trees that is quite striking seen from the UAV Aerial Photography. There are only a few non-residential buildings on this island, as well as footpaths leading to a small pier to the south of the island. To the north of the island there is a vast expanse of coral reefs that are quite wide and shallow, with a depth of less than 5 meters as far as more than 100 meters from the coastline, so this location is often used for tourist purposes both for diving, snorkeling or enjoying the beauty of the sea from the beach. In the coastal area of Gampong Krueng Raya Bay, it is dominated by the appearance of low density vegetation accompanied by population settlements that tend to spread or dispered types with not so many numbers, this type of settlement is found in hilly areas with varying topographic conditions, outside the settlement area is dominated by the appearance of vegetation, including visible vegetation managed by residents such as banana trees and coconut trees that are quite patterned. There are a number of small piers used by residents to dock their boats. In the eastern part there are settlements that are quite dense and have a cluster type settlement pattern (gathering) in several places, with still dominated by the appearance of surrounding vegetation. The main road branched out to the south and to the southwest which is linear with the coast. Not so many buildings are located on the side of the road either building stalls or residential buildings. One of the important buildings in this area is the Marine Research Station in the Sabang City of LIPI which is under construction. Attraction is a factor that makes people want to visit and see directly to a place that has that attraction. The assessment of the attractiveness component aims to find a description of the forms of recreational activities that are in accordance with the attraction and available resources. Each of these attractions has their respective values and these values indicate how strong an attraction can attract the interest of visitors. The results of an assessment of the attractiveness of the Tourism Object of the Krueng Raya Coastal Area can be seen in the following:

- **Assessment Results of the Components of Krueng Raya Coastal Attraction:**
  (1) The beauty of the sea & coast which has: (i) Variations in the view of the island from the sea (ii) The beauty of the coast and views towards the beautiful sea (iii) Harmony of the beach & panoramic views of the sea (iv) Clear & clean sea water (v) The integrity of the coral is still maintained (vi) Diversity of dense/high flora and fauna. With a weight of 6 and a value of 30, the total score (1) is 180.
  (2) Coastal safety / security: (i) There is no dangerous rip current, (ii) There are no storms, (iii) free of poison, (iv) No disturbing beliefs, (v) no human disturbance. With a weight of 6 and a value of 30, the total score (1) is 180. (3) Types & colors of Sand: White sand. With a weight of 6 and a value of 25, the total score (1) is 150 (4) Variations of activities that can be done by tourists on the beach: (i) Enjoying the sunset, (ii) Swimming, (iii) Touring (boat tour, cruising/extended boat tour), (iv) Surfing, (v) Diving & Snorkeling, (vi) Water sky (g) Sailing (h) Fishing. With a weight of 6 and a value of 30, the total score (1) is 180. (5) Comfort: (i) No trash (odor free), (ii) No scribble, (iii) Noise free (iv) No animal disturbance (v) No human interference. With a weight of 6 and a value of 30, the total score (1) is 180. Then the total score for the Attraction Component is $180 + 180 + 180 + 180 + 180 = 870$.

- **Assessment Results of the Components of Krueng Raya Coastal Accessibility:**
  Accessibility is a factor that makes it easier for visitors to travel from the end of the residence to the location of the tourist attraction to be visited. These factors are very important in driving the market potential of an object. The following is an overview of the accessibility of Krueng Raya Marine Tourism
Object. To reach Gampong Krueng Raya, you can go through alternatives such as through Sabang city center and through Balohan and through Gampong Iboih. The mileage of Gampong Krueng Raya to Sabang City is around ± 3 km. The distance from Balohan to Krueng Raya is about ± 14 Km and for the distance of Gampong Iboih to Krueng Raya is about ± 18 Km. The location of Klah Island is right in the center of Sabang Bay. To go to this tourist location, first of all arrive at the City of Sabang. To go to Sabang City on Weh Island, the trip can be reached by air by plane. This flight serves the route of Kualanamu Airport Medan - Maimun Saleh Sabang Airport, and vice versa. However, the airport is currently closed and a new and bigger airport will be built. In addition, it can be reached by sea travel by using the ferry service. This ship sails daily from the Ulee Lheu Port in Banda Aceh to the Balohan Sabang Port (and vice versa). Furthermore, after arriving in the city of Sabang, continued by taking the route to Iboih Beach which is the entrance to the Sabang underwater tour. From Iboih Beach then continued to cross to Klah Island by renting a boat, the journey takes about 15 minutes.

The travel time from the city center: (1) Accessibility: Good enough with paved roads with good condition & can be passed by 4-wheeled vehicles without difficulty. Weight 5 values 25 Total Score 125. (2) Distance from City Center: Distance from City Center (Sabang) ± 3 km, distance from Balohan around ± 14 Km and for distance from Gampong Iboih around ± 18 Km. Weight 5 values 25 Total Score 125. (3) Travel time from downtown: 15 minutes. Weight 5 values 25 Total Score 125. (4) Total Score for Performance = 125 + 125 + 125 = 375.

- Assessment Results of the Components of Krueng Raya Coastal Amenty:
  The existing condition of existing facility for amenities in Krueng Raya is as follows: (i) The road network in the coastal and coastal areas of Krueng Raya is sufficient to connect between locations in Krueng Raya. But the width of the road is still inadequate. (ii) The water source in Krueng Raya is provided by PDAM Sabang City but has not yet reached every area in Krueng Raya. (iii) Drainage in the Krueng Raya Area is inadequate because not all roads have ditches. Even so, the rate of absorption of water into the soil is still good because of the large amount of open land that has not been covered by asphalt and concrete roads. (iv) Waste management in the Krueng Raya Area is sufficient with the number of Temporary Disposal Sites (TPS) spread throughout the Krueng Raya Area (v) Street lighting facilities in the Krueng Raya area are inadequate at night (vi) Internet facilities in the Krueng Raya area are inadequate with an unstable 4G internet signal. (1) Facilities: (i) Houses/food stalls/drinks (ii) Markets (iii) Banks & ATMs (iv) Stalls (v) Souvenirs (vi) Places of worship (vii) Toilets. With a weight of 3, value 30, the total score is 90. (2) Supporting infrastructure (radius of 5 km): (i) Post office (ii) Clinical Community Health Center (iii) Drinking water network (iv) Electricity network (v) Telephone/internet network (vi) Mooring Pier with a weight of 3 values 30 then the total score of 90. (3) Accommodation: (i) Hotels (ii) Cottage/Bungalow (iii) Guest house (iv) Home stay (v) Campground. With a weight of 3, Value 30, the total score is 90. (4) Total Amenity Score = 90 + 90 + 90 = 270.

  Based on the results of the analysis, the elements of Attraction, Amenities included in the category of very potential with each score of 870, 270. But based on the results of the elements of Accessibility (Accessability) included in the potential category with a score of 375. Following are the results of an assessment of the potential of the Tourism Object of Krueng Raya Coastal Area, see Table 2.

| Assessment with ADO-ODTWA | Highest score | Lowest score | Less Potential | Potential | Very Potential |
|---------------------------|---------------|--------------|----------------|-----------|---------------|
| Attraction                | 900           | 300          | 300-500        | 501-700   | 701-900       |
| Accessability             | 450           | 225          | 225-300        | 301-375   | 376-450       |
| Amenity                   | 270           | 90           | 90-150         | 151-210   | 211-270       |

Table 1. Development classification of each element.

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Table 2. Feasibility level of development.

| Criteria         | Weight | Score | Total Score | Highest Score | Index (%) | Information       |
|------------------|--------|-------|-------------|---------------|-----------|-------------------|
| Attraction       | 6      | 145   | 870         | 900           | 96.67     | feasible to develop |
| Accessibility    | 5      | 75    | 375         | 450           | 83.33     | feasible to develop |
| Amenity          | 3      | 90    | 270         | 270           | 100       | feasible to develop |
| Feasibility Level|        |       |             |               |           | feasible to develop |

From the assessment results it is known that the Gampong Krueng Raya coastal area is feasible to be developed as a tourism area, especially the marine tourisme. To develop it, the concept of infrastructure development and development is needed as follows:

- The wastewater treatment plant (WWTP), is a structure designed to remove biological and chemical waste from water so that it can be used for other activities. The functions of WWTP in Krueng Raya include: Treatment of urban wastewater to dispose of human waste and other wastes
- Klah Island Bridge
- Disaster Evacuation Gathering Points: Availability of adequate open space, easily accessible to disaster victims and helpers, Protected from direct danger, Availability of temporary space for the elderly
- Temporary evacuation: (i) Ease of mobilization access (ii) Availability of evacuation route maps. Temporary evacuation space if there is no disaster can be used as a community gathering place, can be for the promotion of fishing villages in Krueng Raya, can also be used for, can also be a temporary market.
- Sea water desalinity: Minimum land area of 5 meters x 5 meters. Close to salt water and brackish water and free from heavy metals and heavy waste (B3).
- Road (Already available) Collector roads: public roads that serve the transport of collectors or dividers, with the characteristics of moderate travel distances, average speeds and the number of access roads limited. Primary collector road: connects efficiently between national activity centers and local activity centers, between activity centers or between activity centers between regions and local activity centers. Sekuder collector road: connecting the second secondary area with the second and third centers.

3.3. Proposed Infrastructure Sector Design

The location of Gampong Krueng Raya is in Sabang City which has a tropical climate so that many buildings are designed to follow the rules of tropical buildings. With these calculations and some concepts, the concept of structuring the Gampong Krueng Raya Area can be divided into several centers, namely: Main Center, Second Center, Third Center. Infrastructure development as a Proposed Infrastructure Sector Design as follows.
Figure 1. The building concept at Prime Center I.

The figure 1 shows, building concept at Prime Center I uses the concept of tropical and Acehnese architecture. Prime Center I has many buildings that use tropical and Acehnese architectural concepts, such as: (i) LIPI-Technopark as a marine and educational tour, located in the Teupin Ciriek region. The building has a wave-like shape, because the function in it is related to research on oceanography and education as well as marine tourism. (ii) The Tourism Pier in Krueng Raya has a waiting room that is not too large, because it is used as a transit pier with a bumpy shape that matches the LIPI-Technopark. (iii) A fishing dock, a fish auction place, in the longitudinal shape with an open space and a sloped roof. (iv) Home industry located in this fisherman village is spread in its residential area. It is an ordinary house and has a fish processing and handicraft business with local residents as entrepreneurs in Small and Medium Enterprises (UKM). (v) Krueng Raya View Point has been established and become an artificial tourist attraction to enjoy the beauty of Krueng Raya from the hill. (vi) The hotel in Krueng Raya is on the main road and its position is on a hill so it has a concept to enjoy the views of Sabang Bay and Teluk Krueng Raya from its accommodation. (vii) Restaurant and shop are food sellers and by specialists from Krueng Raya, located on the main road in the hilly area so that existing shops can open a chilli business, offering beautiful views of Krueng Raya. Food and handicrafts sold are also the result of processed home-based industries located in fishing village settlements. (viii) Evacuation Gathering Point, close to the center of activities and settlements so that it is easy to reach during an earthquake and tsunami. Shaped like a hall with a typical Aceh roof so it can accommodate many people and protect it from heat and rain. If there is no disaster, this building can be used for community gatherings of fishing villages and also as a place to introduce the culture of fishing villages as new tourism for fishermen outside Krueng Raya.

The figure 2 shows, building concept at Prime Center II as an International Trade & Promotion Center using concept of Islamic and tropical architecture is also unique to Aceh.
Figure 2. Prime Center II as an International Trade & Promotion Center.

The Main Center II as the International Trade & Promotion Center, has buildings with Islamic, tropical and Aceh architecture, such as: (i) Krueng Raya Hall, as a place for MICE (Meeting, Incentive, Convention and Exhibition) which means Meetings, Incentives, Conventions, and Exhibitions. (ii) Floating Restaurant close to the Klah Island pier, offering Krueng cuisine with a beautiful view of Krueng Raya Bay. The shape of tropical architecture is cool and comfortable on the beach. (iii) Wastewater treatment plant/ WWTP, so that the Klah Island area is not polluted by waste pollution. (iv) Water desalination, in line with the planned development of the Krueng Raya Area as a coastal tourism area, for the availability of clean water. (v) Yacht Club, for yachter to park ships and use their facilities. Equipped with cafes, restaurants, ship maintenance workshops and resorts if anyone wants to stay. (vi) Resort that offers a private beach and is at the end of Krueng Raya, can be used by yachter or domestic tourists who want to stay at this resort.

(C) Center II The historical/natural/man-made tourism uses the concept of Islamic architecture and Center III Nest Resort, lodging in Krueng Raya, has a tropical architecture. Figure 3 shows, the Center II & III has buildings using Islamic architectural concepts, such as:
Figure 3. Center II and Center III.

(i) Fishermen's dock and Ujung Seukondo beach as natural tourist attractions, (ii) 'Sacred Tombs', using Islamic architecture, (iii) Magnificent and large Krueng Raya substation at the end of Krueng with Islamic architecture building which is the main characteristic and point of interest. (iv) The bridge that connects the islands of Klah and We, can be passed by a small boat underneath so that it does not break the flow of fishermen and tourist boats in and out of Krueng Raya. Then, the Third Center is Nest Resort, the only lodging in Krueng raya, with a tropical architecture building and water attractions in it.

3.4. Proposed Tour Package from the Engineering Team

By using a water bus with a capacity of about 100 passengers, tourists will be spoiled by the panoramic beauty of the coastal area of Gampong Krueng Raya. The LIPI-Oceanography Research Station in the future will be built as one of the largest educational and marine tourism destinations in Aceh.

From the Port of Krueng Raya Tourists can continue their overland journey to the City of Sabang, Point 0 km and the Iboih tourist area. This area is also equipped with various facilities. Starting from Kedai Panorama with view of Sabang Bay, Krueng Raya specialty food and craft shops, Tourist Information Center, star hotels and View Point Krueng Raya. The development of Krueng Raya Tourism is also supported by the presence of a home industry that also functions as a driving wheel for the local economy. The majority of the kruengraya residents make a living as fishermen. At this time the existing dock has not been used optimally because of the limitations (lack of) supporting facilities. In the future fishermen can take advantage of TPI's facilities to sell their catch and can be used as a tourist visiting place with attractions from fishing villages. It could be a group of tourists join the fishermen to fish or fish with fishermen.

As one of the disaster-prone areas, evacuation points are provided which are adjacent to the multipurpose building which can be used as a place for residents' activities and tourist attractions. On the west side of the Krueng Raya Zone there are also several existing buildings, such as NEST Resort with a beach view, a floating fishing pier around Jurong Ilham. The Sacred Tomb of Krueng Raya will also be renovated. To pamper tourists to enjoy the charm of coastal and island Klah Krueng Raya, it will be built substation of View Krueng Raya.

Weh Island and Klah Island will be connected by the bridge. In the future, Klah Island will be a new tourist destination in the city of Sabang with facilities to be offered are as follows: Klah Island pier, fishing spot, floating restaurant which is also equipped with sanitation and waste treatment facilities, yacht pier, yacht club building, resort and Krueng Raya hall center with Islamic architecture
3.5. Human Resources Development

From the results of the literature study, it is obtained data and information that the occupation conditions in Gampong Krueng Raya are still found to be some limitations, both in quantity and quality. In addition to the small number of residents in Gruong Krueng Raya (very low population density), the quality also needs to be improved. The existence of a lack of and limited level of education causes the average level of education of the human resources in Gampong Krueng Raya to be still low, still requiring improvement through both formal and non-formal education. Some of the development of human resources also needs to be considered, considering HR is the key to successful development. Besides the great potential available, there are problems in preparing its human resources.

As in general, in Gampong Krueng Raya, the tourism problems also occur: (1) Tour Guide: communication, tour & travel, laggage & baggage, healthy, losses and shopping, (2) Drivers: there are lack of language skills and lack of practice in language are problems that must be improved, (3) Tourism Licensing, some tourism objects in Indonesia have quite difficult licensing. Different from the other countries licensing which is easier. (4) Criminal, the effect of social media if there are a few criminal events at the same time has the potential to change people's behavior. So, it is necessary to increase the security of tourist destinations. (5) Waste Management, need to prepare waste management before the places are crowded by travelers. (6) Tourism, the government, tourists and citizens must be able to adapt tourists to local cultural conditions.

The human resources of Gampong Krueng Raya must also catch up with the progress in advancing knowledge and capabilities in the management of marine tourism. Therefore, the development of human resources must be adjusted to the needs in the management of infrastructure that will be built. Through various education and training, institutions, it is expected to be able to materialize an increase in knowledge, ability and willingness to develop and manage tourism as a reliable sector. Do not let the local human resources just become spectators or even marginalized, and opportunities for development will be taken by migrants. Community welfare is the main goal of development. There must be a balance between the development of infrastructure in marine tourism with the development of existing human resources, so as to maintain balance and environmental sustainability.

4. Conclusion

- From the assessment results it is known that the Gampong Krueng Raya coastal area is feasible to be developed as a tourism area, especially the marine tourisme. With these calculations and concepts, the Krueng Raya Area structuring concept can be divided into several centers: Main Center, Second Center, Third Center.
- There is great potential in the field of marine tourism in Gampong Krueng Raya, as seen from the studies conducted which are worth developing. However, a large amount of capital is needed to build the infrastructure.
- Despite the great potential for the development of existing marine tourism, there are still some problems: accessibility, amenities and attractions that are always needed creativity. Requires careful thought and calculation to develop and develop marine tourism, both for infrastructure and human resources available in Krueng raya so that environmental sustainability occurs.
- If actually built, there will be a multiplier effect as it will drive the various parties and groups
- There must be a balance between the development of infrastructure in marine tourism with the development.

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