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Model **Micro-ROS in Utilization of Sustainable Tourism** Diane Tangian*, Bernadain D. Polii, Seska M. H. Mengko Pariwisata Politeknik Negeri Manado Manado, Indonesia *dianetangian@yahoo.co.id Abstract — Manado City has a natural beauty and interesting art and culture that can be used as objects and tourist attractions. The natural beauty of Manado City can be seen in places such as Bunaken Island, Siladen Island and Manado Tua Island which are parts of Bunaken National Park.

The beauty of Bunaken National Park has been known to the world, and until now the tourism mainstay of Manado city. The development of tourism is now experiencing significant progress, where every year the number of tourist visits increases. It should be realized that in addition to providing positive impacts such as improving the welfare and economy, tourism can also bring negative impacts to the environment of tourism. Negative impact is the form of environmental degradation if the utilization and management are not done carefully. Tourism city of Manado can be an example.

Until now the mainstay of Manado City tour is Bunaken Island, Manado Tua and Siladen which are parts of Bunaken National Park but now there is environmental degradation due to the number of visits that exceeds the environmental carrying capacity. With the model Micro-ROS (Recreation Opportunity Spectrum) where small tourist areas with large tourist areas are considered equally important in providing tourism opportunities. With the enforced Micro-ROS model then the spike in the number of tourist visits will not be worrying because of the large selection of objects and attractions offered. Keywords — model, Micro-ROS, sustainable I.

INTRODUCTION Manado City has an interesting natural beauty, art and culture and can be used as a tourist object and attraction. The natural beauty that dominates the city of

Manado is Bunaken Island, Siladen Island, and Manado Tua Island which are parts of Bunaken National Park. The beauty of Bunaken National Park has been known to the world, and is currently a mainstay of the city of Manado. Tourism development is currently experiencing significant progress, where each year the number of tourist visits increases.

This has a positive impact on the progress of the economy and community welfare. Optimal utilization and management of all aspects related to the tourism industry starting from tourist objects and attractions, accommodation, travel, hospitality, restaurants, souvenirs, transportation, etc. will have an impact on social and economic life. Based on data from the Central Statistics Agency (BPS), in February 2014 there were 702.7 thousand foreign tourists visiting Indonesia, and in February 2015 reached 786.7 thousand visits, up 11.95 percent.

Furthermore, the number of foreign tourist visits in February 2016 reached 888.3 thousand visits, which rose 5.26 percent compared to February 2015 visits. It should be realized that tourism, besides providing positive impacts such as improving welfare and the economy, tourism can also have a negative impact on the tourism object environment. The negative impact is in the form of environmental degradation if the utilization and management are not carried out carefully.

Like what happened in Manado City tourism, until now the mainstay of Manado City is Bunaken Island which is part of Bunaken National Park, but currently there is environmental degradation due to the number of visits exceeding the carrying capacity of the environment. Management should pay attention to the balance between environment, socio-economic and socio-cultural, but in reality the environment is always far behind the economy. Stakeholders should pay attention to the sustainability of important dimensions of protected area governance [1]. If there is environmental damage, it will affect the number of tourist visits will be affected.

The number of tourist visits seems to have a relationship with the extent of coral cover, where the number of tourists increases, the extent of coral cover decreases, and in the end there will be a decline in coral cover and the number of tourist visits will also decrease [2]. This is consistent with research conducted by Supit which states that the number of tourists and coral cover have a correlation [3]. With the new LAC model approach, Micro-ROS (Recreation Opportunity Spectrum) where a small tourist area with a large tourism area is considered equally important in providing tourism opportunities.

With the adoption of the ROS model, the surge in the number of tourist visits will not be

worrying because of the large selection of objects and tourist attractions offered. A. Formulation of the Problem Bunaken is a tourism mainstay of Manado City which is currently experiencing environmental degradation because the number of tourist visits exceeds the carrying capacity limit. This is indicated by the decreasing area of coral cover.

A Advances in Social Science, Education and Humanities Research, volume 298 Proceedings of the First International Conference on Applied Science and Technology (iCAST 2018) Copyright © 2020 The Authors. Published by Atlantis Press SARL. This is an open access article distributed under the CC BY-NC 4.0 license -<http://creativecommons.org/licenses/by-nc/4.0/>. 181 decrease in the area of coral cover automatically will also have a negative impact on the number of tourist visits. Not optimal management and utilization of all potential objects and tourist attractions that exist in the city of Manado both natural, artificial, arts and cultural tourism causes the pressure of the Bunaken neighborhood to increase.

The problem occurs because: ? Lack of information obtained by tourists on tourist objects and attractions. ? Manado City Tourism is imaged as a "capsule image" namely Bunaken. ? Optimal management and utilization of all potential objects and tourist attractions that exist. B. Special Purpose Based on the problems mentioned above, the purpose of this research is: To analyze all the potential objects and attractions of Manado City. II.

RESEARCH METHOD The model built in this study refers to the Micro-ROS Model which utilizes all the recreational opportunities that exist both small and large. This research was conducted through several stages which can be seen in Figure 1 flowchart of the research stage and process. Fig. 1. Research stage and proces flow chart. III. RESULTS AND DISCUSSION A. Socio-Economic Conditions The population of Manado City in 2012-2017 on average each year has increased by 1%. This can be seen in Table 1. TABLE I. NUMBER OF RESIDENTS OF MANADO CITY (SOUL) Year Number of residents (souls) 2012 417.640 2013 420.401 2014 423.257 2015 425.634 2016 427.906 2017 430.133 Source: Central bureau of statistics (2018).

The number of schools in the city of Manado in 2015-2016 experienced an increase for high school and vocational schools, while for madrasah Aliyah decreased from 6 to 5 (Table 2). TABLE II. NUMBER OF SCHOOLS BASED ON LEVELS Year TK SD Madrasah SLTP Madrasah SLTA Madrasah Aliyah SMK 2015 129 263 13 89 11 45 6 32 2016 129 263 13 89 11 46 5 35 Source: Central bureau of statistics (2018). The number of workforce who have worked in 2015 is 85.72% while the number of unemployed is 14.28%. In 2017 the number of unemployed decreased to 9.35 and the number of workforce that had

worked increased to 90.65% (Table 3). TABLE III.

NUMBER OF LABOR FORCE Year Number of workforce Number of worked Number of unemployed 2015 193134 165561 27573 2017 194713 176510 18203 Source: Central bureau of statistics (2018). Manado City's economy in 2014 decreased compared to that of 2013, from 7.16% to 6.69%. In 2016, there was an increase again compared to 2015, which was 6.39% to 7.19% (Table 4). TABLE IV. ECONOMIC GROWTH OF MANADO CITY Year Economic Growth (%) 2012 7,11 2013 7,16 2014 6,69 2015 6,39 2016 7,19 Table 3 and Table 4 show that the economy in 2015 experienced a decline but the number of workforce that had worked increased.

One of the factors that influence the increase in the number of workers is the tourism industry. This can be seen in Table 5 where the number of tourist visits in the city of Manado had increased since 2013-2017. Advances in Social Science, Education and Humanities Research, volume 298 182 TABLE V. NUMBER OF MANADO CITY TOURIST VISIT Year Foreign tourist Wisnus 2013 25.753 584.269 2014 34.443 832.015 2015 32.400 1.070.681 2016 47.103 1.484.402 2017 87.976 1.698.523 The number of visits the country has increased so the number of workers in the tourism industry has also increased. One of the tourism industry sectors that absorbs employment is the hospitality industry.

As for the number of star-rated, non- star hotels and restructures in the city of Manado can be seen in Table 6. TABLE VI. NUMBER OF HOTELS AND RESTAURANT Hotel Classification Number of Restaurant Star/Non Star Number of Hotel Number of Room Bintang 22 2.556 472 Non Bintang 94 2.339 B. Potential Objects and Tourist Attractions Utilizing the tourism potential of Manado City from the results of the micro-ROS method will provide information and direction regarding land use based on needs that can be used sustainably.

Evaluation of tourism potential biophysically is carried out by looking at the natural potential of the region, access to the area and the availability of supporting facilities. The evaluation results show that the Malalayang Beach and Boulevard Regions have the highest values on a scale of 5. This is influenced by the ease of access where the area is included in urban areas and is a residential area and has excellent supporting facilities (Table 7). TABLE VII.

RESULTS OF EVALUATION OF THE POTENTIAL OF BIOPHYSICAL TOURISM AREAS Areas Scales 1 2 3 4 5 Bunaken Island OPQ Siladen Island OPQ Manado Tua Island OPQ Malalayang Beach Zone OPQ Boulevard Zone OPQ Mangrove Forest Tongkaina POQ Mount Tumpa OPQ Description: O = access, P = naturalness, Q = facility The results of evaluating the potential of tourism areas in a social manner are carried out by looking at

the designation of the area, community, and tourists that are found. The results of the evaluation show that the Malayang Beach area and Boulevard Area have the highest value on a scale of 5.

This is influenced by the designation of the area where the area has been managed and entered in urban areas and there are many tourists (Table 8). TABLE VIII. RESULTS OF EVALUATION OF THE POTENTIAL OF SOCIAL TOURISM AREAS Areas Scales 1 2 3 4 5 Pulau Bunaken CDE Pulau Siladen CDE Pulau Manado Tua CDE Kawasan Pantai Malayang CDE Kawasan Boulevard CDE Hutan Mangrove Tongkaina CDE Gunung Tumpa CDE Description: C = Area designation, D = Community E = tourists found 1 = Dense forest, no, less 2 = Production forest, some local residents, often visited by tourists 3 = Areas that have been managed, often found by the community, often visited by tourists 4 = The area has been managed, the village, there is 5 = The area has been managed, the city, there is Furthermore, the evaluation of the potential for managerial tourism areas where the Boulevard Area has a very good value is on a scale of 5.

This is influenced by service facilities that are managed professionally, there is an entrance fee and there is control from the manager. The Gunung Tumpa area is included on a scale of 5, which is very good for service facilities and managerial control, while the Malayang Beach area is on a scale of 5 for the availability of service facilities (Table 9). TABLE IX. RESULTS OF EVALUATION OF THE POTENTIAL OF TOURISM AREAS IN A MANAGERIAL MANNER Areas Scales 1 2 3 4 5 Pulau Bunaken HIJ Pulau Siladen HIJ Pulau Manado Tua HIJ Kawasan Pantai Malayang J H Kawasan Boulevard HIJ Hutan Mangrove Tongkaina HIJ Gunung Tumpa HIJ Description: H = Service facility, I = Entrance fee, J = Management control 1 = none, none, uncontrolled 2 = exist, none, uncontrolled 3 = traditionally, nothing, uncontrolled 4 = traditionally, depends on tourists, is not controlled 5 = professional, determined, good Based on the micro-ROS method (Table 10) the tourist area of Manado City is made zoning area which includes the Zone area of Bunaken Island (A), the zone of Siladen Island Region (B), the zone of Manado Tua Island (C), the Malayang Beach Zone (D), Zone of Boulevard area (E), Mangrove Forest Zone of Bahowo Tongkaina (F), and zone of Gunung Tumpa Forest Area (G). Advances in Social Science, Education and Humanities Research, volume 298 183 TABLE X.

ZONA AREAS AND TOURISM ACTIVITY OPPORTUNITIES No Zone Area Tourism Opportunities 1 Zone A Tourism activities that can be carried out include snorkeling, diving, underwater photography, and for tourists who want to enjoy the beauty of the underwater panorama but cannot swim, they can enjoy it by using a glass boat (catamaran). 2 Zone B Tourism activities that can be carried out in this area are, in the form of snorkeling, diving, underwater photography, and for tourists who want to enjoy

the beauty of the underwater panorama but can not swim can enjoy it by using a glass boat (catamaran). This activity can be carried out at two dive points namely Siladen one and Siladen two. 3 Zone C Tourists who like of hiking can visit this area.

The peak of Manado Tua Mountain is a protected forest, which is rich in various types of flora (coconut, palm, sago, silar, and woka), and fauna (Sulawesi black monkey "yaki" and cuscus). In addition, in Tanjung Raja there is a Portuguese anchor ship anchor, while in Tanjung Kopi there is the nesting place for Taturuga (Turtle) on the full moon so that it has its own charm. 4 Zone D Tourism activities that can be done on Malalayang beach are culinary tours, sunbathing, swimming, enjoying the views of Bunaken Island, Manado Tua and Siladen, as well as sports and boating.

5 Zone E Enjoying the beauty of the beach, fishing, snorkeling, diving, canoeing, enjoying culinary tours, shopping, cycling, and enjoying the beauty of Manado City. 6 Zone F Enjoying the beauty of mangrove forest, snorkeling, diving, canoeing, fishing, bathing, enjoying typical food such as rica-rica grilled fish with sambal dabu-dabu lilang, fried banana with sambal roa, gohu, enjoying the beauty by using a raft. 7 Zone G Enjoying the beauty of the beach with a variety of views of Bunaken, Siladen and Manado Tua Island, the beauty of forests and plantations, local culture, and enjoying the views of the people in farming.

The assessment of the potential of Objects and Attraction (ODTW) in Manado City as well as the socio-cultural and economic potentials are discussed in three categories of tourism objects, namely: coastal tourism objects, sea-shaped tourist objects, and land-shaped tourism objects (Table 11-13). TABLE XI. ASSASMENT POTENTIAL OF ODTW BEACH No Zone Beauty Coast Security Sand Difference of activity Clearness Coastal Width Comforting 1 D 4 5 1 4 4 5 4 2 E 4 5 1 4 4 5 4 TABLE XII. ASSASMENT POTENTIAL OF MARINE ODTW No Zones Beauty Diversity Uniqueness and Beauty Stability Clearness Several of Same Point Comforting Not Interference 1 A 5 5 5 5 5 4 4 5 2 B 5 5 4 5 5 4 4 5 3 C 5 5 4 5 5 4 4 5 4 F 5 5 5 5 5 4 4 5 TABLE XIII.

ASSASMENT POTENTIAL ON SHORE ODTW No Zones Beauty Uniqueness Manny Potential Stability SDA Sensitivity SDA Types of Nature Tourism Activities Air Cleanliness and Location Regional Insecurity 1 C 5 2 3 3 3 4 4 5 2 G 5 2 3 3 3 4 4 5 Furthermore, assessment of the socio-cultural and economic potential assessment criteria used are socio- economic environmental conditions, community services, accessibility, accommodation, facilities and infrastructure, availability of clean water, object relations with other tourist objects, climatic and security conditions. Value 5 shows very good, value 4 is good, value 3 is moderate, value 2 is less, and value 1 is very lacking (Table 14). TABLE XIV.

ASSESSMENT OF SOCIAL CULTURAL AND ECONOMIC POTENTIAL No Zone Sosek
 Environmental Conditions Society service Access Accommodation Infrastructure Clean
 water Object Relations Climate Conditions Security 1 A 5 4 5 5 5 5 5 5 2 B 5 4 5 5 5 5
 5 5 3 C 5 4 5 5 5 5 5 5 4 D 5 4 5 5 5 5 5 5 5 E 5 5 5 5 5 5 5 6 F 5 4 5 5 5 5 5 7
 G 5 4 5 5 5 5 5 5 5 **Advances in Social Science, Education and Humanities Research,**
volume 298 184 Based on the table above it can be seen that the socio- cultural and
 economic conditions of all zones fall into the "very good" category with a total value of
 4.90. Furthermore, for the assessment of the natural tourism potential of the beach is
 included in the category of "good" with a total value of 3.86, marine tourism potential is
 in the "good" category with a total value of 4.30. The highest value of all ODTW
 potential assessments is land natural tourism potential which is in the "very good"
 category with a total value of 4.99. IV.

CONCLUSION With the model Micro-ROS (Recreation Opportunity Spectrum) where
 small tourist areas with large tourist areas are considered equally important in providing
 tourism opportunities. With the enforced Micro-ROS model then the spike in the
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