Relationship Management and Fireflies Conservation in Klias and Weston, Beaufort, Sabah

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Abstract. Fireflies from the genus Pteroptyx have drawn a lot of attention from humans due to their congregating behaviour and provided local communities with lucrative business opportunity. However, it is believed that the adjacent communities pose a threat of encroachment to the Klias and Weston – the hotspots for fireflies’ population mangrove ecosystem. Relationship Management has strategies and tactics to engage in sentiments, emotions, and then provide the best remedies. It has strategic power to connect hosts and guests as it emphasizes on "give back and take away tourism" through incorporating guest-hosts both in the process of conservation and utilization of various resources and skills available to them. Our study has tried to find out the economic importance (use value) of the fireflies and culture for the benefits of fireflies, nature, environment, and local communities of the area where they exist in the real habitat situation. The study attempts to provide solution of the critical problems and situations that have been created by human beings for a long time for the sake of feeding our ego and gaining dominancy (temporary value) in their areas because of unethical education and lack of awareness about socio-economic benefits through current ecotourism developments. The highlighted significance of Relationship Management in fireflies’ conservation and ecotourism development may help in tackling the conflicts between human and fireflies, human and human, as well as in fireflies watching activities. About 423 respondents were involved and the data was then processed with content analysis in which 84.4% of them are willing to protect the fireflies, 66.2% volunteered in firefly conservation program, while 40.7% of them are aware that both village development and firefly conservation are important and only 32.4% agree to pay for firefly conservation which is between USD0.23-USD6.92. Meanwhile, spider web analysis shows that locals are lacking knowledge of firefly’s ecology. Lastly, a blueprint for firefly conservation should be developed to help focus preservation in the places with the highest need to slow the rate of firefly habitat loss due to development.

1. Introduction

Tourism is the fastest growing industry in the world and has become the world’s most significant source of employment and GDP contributor for many developing countries [13, 14]. Malaysia is one of the most vibrant and developed economies in Southeast Asia, highlighting its potential contribution to local, national, and global economy. The tourism development has reached such a level that it is currently the third major contributor to the country’s revenue. It contributed USD40.4 billion, 13.7% of Malaysia’s GDP in 2016. It has also marked a 43.0% rise from USD26.97 billion in 2001, a 6.5% jump from USD36.20 billion in 2015, and is forecasted to increase to USD68.02 billion or 15.2% in 2027, while
the total contribution of travel & tourism to employment, including jobs indirectly supported by the industry was 12.0% of total employment (1.7005 million jobs). This is expected to rise by 4.0% to 2.564 million jobs in 2027 (14.5%) [15].

Sabah is located in the northern part of Malaysian Borneo, where tourism has grown steadily from infancy stage into an industry that has made significant contribution to the state and national economies after agriculture and manufacturing. Sabah offers diverse tourism activities and destinations for tourists with various inclinations. Total tourist arrivals in 2016 were 3,427.9 million [12] with more than a million visitors from China alone. This shows a booming growth (209.00%) within 15 years, expanding from 1.107 million in 2002 [11] which is a significant contribution to Sabah’s economy. Sabah is rich in biodiversity and heritage which makes it ideal in becoming one of Asia’s ecotourism hotspot [4]. Ecotourism was developed from tourism, which is one of the fastest growing industries in Malaysia.

Ecotourism takes advantage of the attractiveness of adventure by offering the enticement and wonder of nature in an exotic setting. Entotourism, an insect conservation strategy also provides tourist attractions, and perhaps the best example involves the genus Pteroptyx, a popular insect in Klias and Weston regions which are places of the richest and incomparable zone in Beaufort in terms of its fireflies’ population mangrove ecosystem [5]. Ecotourism is a conservation tool in and around sustainable development which is high potential for any community within economic, social, cultural, ecologic and physical constraints [2]. Today’s protected areas are focused on conserving biodiversity and large-scale natural ecosystems. However, these protected areas are still facing a major challenge to secure effective conservation and social outcomes [8].

It is an important source of income, employment, and wealth in many countries where international tourism accounts for a larger share of foreign exchange and export earnings than any other industries in the world. Tourism tax is an important tax based for governments and would help financing investments in infrastructure which triggers positive externalities in other sectors, making it the most promising driving force for the economic development of the less developed countries and in regions endowed with areas of natural beauty. This paper seeks to find out the economic importance (use value) of the fireflies and culture for the benefits of fireflies, nature, environment, and local communities of the area where they exist in real habitat situation. The study is also attempting to provide solution of the critical problems and situations that has been created by human beings for a long time just for the sake of huge ego and gaining dominancy (temporary value) in their areas due to unethical education and lack of awareness about socio-economic benefits through current ecotourism developments.

1.1 Statement of the problem
Firefly-watching activity has provided nearby communities in Klias and Weston, Beaufort, with lucrative business opportunity. It serves as an alternative income-generating activity and environmental conservation strategy among the existing stakeholders. However, it is anticipated that adjacent communities are believed to pose a threat of encroachment to Klias and Weston where the mangrove forests are located. This shows the extent in which unsustainable development affects flora and fauna.

One of the most vital but problematic area within ecotourism seems to be relationship management among the stakeholders. Ecotourism industry is related to numerous sectors, so it requires a close cooperation between stakeholders for its development. Relationship Management has strategies and tactics to engage in sentiments, emotions, and then provide the best remedies. It has strategic power to connect host and guest as it emphasizes on "give back and take away tourism” through incorporating guest-hosts both in the process of conservation and utilization of various resources and skills available to them.

1.2 Research Objective
The objective of this study is to highlight the significance of Relationship Management in fireflies’ conservation and ecotourism development that may help in tackling the conflicts between human and fireflies, human and human, as well as in fireflies watching activities. These comprise: i. significant impact to the livelihood of the local communities with the emergence of firefly tourism activity; ii.
Stakeholders’ threats to the firefly ecosystem; iii. Issues and conflict among stakeholders; and finally, iv. villagers’ perceptions.

1.3 Methodology
The sample size for this study was determined by using “Small Sample Techniques” to support the credibility of the sample size at the desired confidence level of 95% [9]. By using formula, the most ideal number of respondents was 344 respectively with the confident level of 95%. However, in this study, a total of 423 respondents were collected in this study which their data was then analyzed with content analysis. The survey focused on existing stakeholders - local community, business operators of firefly tourism, and tourists. It consists of both open and closed ended questions.

A total of 145 households served as a representative respondent from four nearby villages. The researchers met with the heads of villages or community representatives to discuss about the research with a letter of consent from the authority before conducting an interview to gather feedbacks and overviews of the current situation and issues regarding the ecotourism. Likewise, the ocular inspection paved the way for the researchers to establish rapport with the community and provided an opportunity for a closer look on the living conditions of the residents and observation of the typical way of life of the locality. Meanwhile, about 278 respondents were from tourists that visited the nearby lodges that provide firefly watching tourism.

Primarily, the researchers conducted a pilot test field interviews where ten sets of questions were distributed and major correction was done followed by 60 sets of survey was distributed for the respective respondents as pilot test before the actual survey. The feedback was positive and minimal correction was made. The pre-testing was supervised by the researchers to remove any ambiguous questions which were subsequently improved and corrected accordingly. Upon completing of 60 sets of survey, Cronbach’s Alpha Test was conducted to improve and eliminate any poor quality or contradicting questions by using Statistical Package for Social Sciences (SPSS). The Cronbach’s Alpha is a measure of internal consistency. It is commonly used to determine whether the scales in a questionnaire are reliable. The result of reliability test showed the Cronbach’s Alpha value of local community set is 0.796 (>0.70), while for tourist set is 0.889 (>0.70), both results showed high reliability or consistency.

During the actual survey, an initiated one-on-one survey was employed. The first household or first person served as the first respondent and starting point for the stratified random sampling. From the first house, the researchers counted from one (1) to two (2) premises in order to identify the next household or tour lodge operator to interview. This continued until the researchers reached the last house/respondent and completed the sample size. To validate answers that were not elaborated in the questionnaire, key informant interview was employed.

Meanwhile, content analysis which is Leximancer was used to align the key themes and concepts of respondents’ knowledge, perception and eagerness towards the firefly-watching tour in Sabah. This was done by gathering the Leximancer output map and mapping the key elements. Moreover, as the term ‘concept' in Leximancer referred to a collection of a similar linguistics 'themes', this investigation used the two terms alternately to streamline the interpretations of the analyses.

Following the alignment of the Leximancer concepts and themes, the data were tabulated, and significant findings were summarised. This data was finalized in a formed of the concept map. There might be one theme, or more however they are all highly correlated to. These concept maps illustrated the position of concepts and themes as a whole. Each data was coded as a case in Word document. Finally, total reviews items were collected, and then, computed to total words [3]. As such, results of the Leximancer Analysis (conceptual maps) generated entailed a high level of reliability and highly stable [10]. Due to the language skills of the researcher and the ability of Leximancer in analysing certain languages, those rich-contents reviews selected would be translated first if the review was not in English.
2. Study Area

2.1 Description of study area
Beaufort District is located on the west coast south of Sabah with coordinates of latitude of (05°20'0" N) and longitude of (115°45'0" E) from top-left to bottom-right (Figure 1). Beaufort was established on 1st February 1898 and was named after the highest officer in the British North Borneo Company, Mr. Liecester. P. Beaufort who later became the Governor of British North Borneo [1]. It is situated approximately 97 km from Kota Kinabalu, 40 km from Kuala Penyu, and 45 km from Sipitang [6]. The district is bordered by Papar to the north and Tenom and Sipitang to the southeast. It occupies an area of about 1,735 km2 or approximately 29% of the interior division (18,298 sq. km) which is inclusive of the Membakut sub-district 388 sq.km. The main towns in the Interior Division are Beaufort, Kuala Penyu, Sipitang, Tenom, Nabawan, Keningau and Tambunan. Beaufort district marks a total of 2.4% of Sabah’s territory. Beaufort district is known as an agriculture and tourism district. Mangrove forests dominate the district’s southern coastline, whereas sand beaches can be found in the northern coastal areas. The foot of the Crocker Ranges lies in the eastern part of the district, while Sungai Padas which flows through the ranges from the interior, is found in the western portion of the district. Besides the Sungai Padas which is the longest river in the district, the other major river is Sungai Klias. According to Department of Statistic’s (2010) census, Beaufort District has an approximate population of 66,406. The district has eight subdivisions, namely, Klias, Limbawang, Montenior, I, II, III, IV and mukim V. The population of Beaufort is composed mainly of Bisaya, Brunei Malays, Kadazan-Dusuns, Lun Bawang/Lun Dayeh, Muruts, and Chinese (mainly Hakkas). Bisaya are the majority ethnic, and the population which scattered around the town. Beaufort receives an annual mean rainfall of 3000-4000 mm placing the study area as the highest rainfall receiver compared to the other districts. The rainfall distribution is bimodal with peaks of long rains in August. The flood here is closely related to the north-eastern monsoon that runs between November to March, annually. RM1 million has been allocated to repair the infrastructure due to the flood in Beaufort in year 2009. The community in this district is dependent upon natural resources as a mean of sustaining livelihood. Three main forms of land use activities are agriculture, wildlife conservation (eco-tourism), and fishing. Despite suffering severe environmental degradation (forest burning) in the past decades, Beaufort is home to populations of several wildlife species, making the area good for ecotourism business.

2.2 Research design
The study used a survey design with the purpose of generating and analyzing data on the Relationship Management in fireflies’ conservation and ecotourism development in both Klias and Weston, Beaufort. The study sites are selected for being tourism destinations with some facilities owned and managed by the community. The study targeted local communities and stakeholders in the tourism business within study area (tour operators and tourists). Data was collected from both primary and secondary sources and analyzed using both qualitative and quantitative techniques.

2.2.1 Data collection
Two sets of questionnaires were provided to collect the data from the local communities and tourists. The questionnaires highlighted the profile of respondents, perception of existing ecotourism development within the study area, and items that were designed to gain an understanding of their attitude and knowledge of the firefly and its ecology, shared value of firefly, and to study the extent in which respondents are willing to conserve the firefly ecosystem, as well as the recommendation to improve the current development. In addition, current problems and issues related to the firefly-watching tour were also gathered. A tourist survey was also carried out to estimate the ecotourism value of the firefly. The study was concentrated on villages located within the area where fireflies are found. Information of this survey has helped determine the carrying capacity both in social and psychological aspects. These self-administered questionnaires were written in multi-language; namely, Bahasa Melayu
for local community while English, Chinese, Japanese, and Korean were added for tourist respondents. Items in the questionnaire were both open-ended and closed-response type.

2.2 Data Analysis Techniques

The relationship management of the stakeholders was analyzed using descriptive statistic, spider web configuration, and content analysis using Leximancer and correlation tests. A conceptual map assisted the researchers to demonstrate and consider which are the people, groups, or organizations that act as social bridges between isolated clusters of stakeholders and allow the related groups to act accordingly to their roles in the preservation of firefly’s habitat and population. Meanwhile, Leximancer was used to investigate the relationship between variables.

Figure 1. Study Area
3. Results and Discussion

A total of 145 sets of questionnaires were collected from the local community of selected villages through household sampling while a total of 278 sets of questionnaires were collected from tourists that visited the nearby firefly watching lodges in both Klias and Weston. The sets of the questionnaires from the study area were validated using Cronbach’s Alpha Test in order to get the result based on the research objectives. The reliability test results were as shown in following Table 1 and Table 2. In addition, spider web analysis shows that the locals are lacking in sustainable management knowledge of firefly-watching activity due to the disharmonious relationship between the business players and authorities. Hence, a conservation strategy must incorporate material gain, if full support from the local people is desired. Collected revenue could be invested on facilities and infrastructures of importance to local interests in developing their own business such as providing some fund for them to start their business that would then facilitate the economic growth in the villages.

Table 1. Reliability test results for local community

| Reliability Statistics | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------------|---------------------------------------------|-----------|
| Cronbach's Alpha       | .796                                       | .774      | 7         |

Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|------|----------|----------------|------------|
| 10.2250 | 4.640   | 2.15416        | 7          |

Table 2. Reliability test results for tourist

| Reliability Statistics | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------------|---------------------------------------------|-----------|
| Cronbach's Alpha       | .889                                       | .891      | 16        |

Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|------|----------|----------------|------------|
| 68.3672 | 62.822  | 7.92600        | 16         |

3.1 Demographic Information

Table 3. Demographic profile of local community

| Variables          | Categories | N   | Percentage (%) |
|--------------------|------------|-----|----------------|
| Gender             | Male       | 81  | 55.9           |
|                    | Female     | 64  | 44.1           |
| Age (years old)    | Under 24   | 37  | 25.5           |
|                    | 25-44      | 74  | 51.0           |
| Variables               | Categories                        | N   | Percentage (%) |
|-------------------------|-----------------------------------|-----|----------------|
| Ethnicity               | 45-64                             | 28  | 19.3           |
|                         | Over 65                           | 6   | 4.1            |
|                         | Brunei/Kedayan                    | 93  | 64.1           |
|                         | Bisaya                            | 43  | 29.7           |
| Educational Level       | Other                             | 9   | 6.2            |
|                         | No formal education               | 3   | 2.1            |
|                         | Primary School                    | 9   | 6.2            |
|                         | Secondary School                  | 84  | 57.9           |
|                         | Diploma/Degree                    | 48  | 33.1           |
|                         | Msc/phD                           | 1   | 0.7            |
| Occupation              | Private                           | 30  | 20.7           |
|                         | Government                        | 38  | 26.2           |
|                         | Self-employed                     | 38  | 26.2           |
|                         | Other                             | 37  | 25.5           |
| Household income        | <RM1, 000                         | 69  | 47.6           |
|                         | 1001 – 2999.00                    | 50  | 34.5           |
|                         | >3000.00                          | 20  | 13.8           |

Table 4. Demographic profile of tourists

| Variables               | Categories                        | N   | Percentage |
|-------------------------|-----------------------------------|-----|------------|
| Gender                  | Male                              | 133 | 47.8       |
|                         | Female                            | 145 | 52.1       |
| Age (years old)         | Under 24                          | 65  | 23.4       |
|                         | 25-44                             | 151 | 54.3       |
|                         | 45-64                             | 51  | 18.3       |
|                         | Over 65                           | 11  | 4.0        |
| Nationality             | European/USA                      | 49  | 19.2       |
|                         | China/Taiwan                      | 157 | 61.6       |
|                         | Korea                             | 4   | 1.6        |
|                         | Japan                             | 12  | 4.7        |
|                         | Peninsular Malaysia               | 4   | 1.6        |
|                         | Sabah                             | 19  | 7.5        |
|                         | Other                             | 10  | 3.9        |
| Educational Level       | Primary School                    | 1   | 0.4        |
|                         | Secondary School                  | 55  | 20.1       |
|                         | Dip/Degree                        | 164 | 60.1       |
|                         | Msc/phD                           | 53  | 19.4       |
| Occupation              | Private                           | 83  | 30.9       |
|                         | Government                        | 26  | 9.7        |
|                         | Self-employed                     | 103 | 38.3       |
|                         | Other                             | 57  | 21.2       |
| Household Income        | <RM1,000                          | 11  | 3.95       |
|                         | RM1001 -2999.00                   | 57  | 20.5       |
|                         | RM3000.00-4,999.00                | 106 | 38.6       |
|                         | Over RM5,000.00                   | 104 | 37.4       |
3.2 Attitudes and Perception of local communities towards ecotourism

3.2.1 Willingness Factors to Conserve Sabah’s Firefly

Figure 2 shows the connectivity of the top four of willingness factors to conserve Sabah’s firefly themes by locals. The top prominent theme is ‘fireflies’. This theme consists of concepts including ‘generations’ and ‘existence’. Additionally, the theme ‘fireflies’ is linked to theme ‘privilege’. This shows the high correlation between these two themes. Meanwhile, the second most prominent theme is ‘loss’. It consisted of concept ‘yes’ which linked to the theme ‘protected’. Theme ‘yes’ indicates that most of the respondents are willing to conserve the fireflies. Subsequently, the third most prominent theme is ‘protected’ which is linked to ‘privilege’ and ‘loss’. Based on the result, it shows that the majority of respondents are willing to conserve fireflies since it is an added value to the generations’ existence. It is vital and necessary to be protected so that the next generation will be able to cherish and gaze upon the uniqueness of this insect. Moreover, it is one of the locals’ native privilege which is not available in many other countries.

3.2.2 Willingness Factors to Participate in Sabah’s Firefly Conservation Activity

Figure 3 shows the connectivity of the top five of local community willingness to participate in Sabah’s firefly conservation activity themes. The most prominent theme is ‘generation’. This theme consists of concepts like ‘importance and ‘protecting’. Additionally, theme ‘generation’ is linked to two others theme which are ‘habitat’ and ‘income’. Meanwhile, the second most prominent theme is ‘habitat’. Theme ‘habitat’ is linked to the other two themes, which are ‘yes’ and ‘conserve’. Theme ‘yes’ indicates that most of the respondents are willing to participate in firefly conservation activity. Subsequently, the third most prominent theme is ‘yes’ that consists of concepts such as ‘extinct’ and ‘population’. It is unsurprising to find that both of this concepts share the same theme due to declination of firefly population. The theme ‘yes’ is linked to the themes ‘habitat’ and ‘conserve’.

Based on the analysis, it shows that the majority of respondents are willing to get involved in firefly conservation activity since it is important to protect and conserve them and their habitat or the future generation will not be able to experience the firefly existence. At the same time, being as one of the tourism attraction products, it gives an alternative economic benefit to the nearby local community over the years with the continuity of firefly-watching industry. A well protecting habitat will ensure a breeding ground for firefly population. Thus, the habitat and ecosystem must be protected in order to conserve firefly before it keeps on declining and extinct.

![Figure 2. Willingness Factors to Conserve Sabah’s Firefly](image-url)
Figure 3. Willingness Factor to Participate in Sabah’s Firefly Conservation Activity

3.3 Respondents’ Knowledge of Fireflies

3.3.1 Local Community’s Knowledge of Firefly

Figure 4 shows the connectivity of the top five of local community’s knowledge of firefly themes. Based on the concept map, the connectivity scores indicate the relative importance of the themes, where the most prominent theme is ‘insect’ (see the darkest red circle). This single word was mentioned most frequently in the statement review counts. In addition, theme ‘insect’ is linked to two other themes which are ‘fly’ and ‘light’. The linked themes demonstrate the co-occurrence of these themes in the interview comments. Meanwhile, the second most prominent theme is ‘light’ which is attached to theme ‘night’ and ‘body’, indicating that fireflies emit wonderful light from their body during the night. The third most prominent theme is ‘body’ which is linked to the theme ‘light’. Based on the content analysis, it shows that the majority of the respondents know and understand that fireflies is specifically a flying insect. They also acknowledge that these flying insects emit light from their body during the night time. This statement could be based on the respondents’ observation towards the presence of the firefly in their surroundings.

Figure 4. Local Community’s Knowledge of Firefly
3.4 Respondents’ Perception of Fireflies

3.4.1 Respondents’ Perception on Threats to Fireflies
Respondents were also tested on their knowledge of firefly biology, lifecycle, and threats via a series of questions (Figure 5). Table 5 shows the lists of their observation of the fireflies, and Table 6 lists their responses on threats to fireflies. It is obvious that the respondents have only general, not specialist knowledge of firefly biology, lifecycle, and threats to their survival. For instance, they correctly noted that firefly is an insect that emit a flashing light during night time over the trees near the river bank, but they were wrong that the fireflies live in orchard areas, not on the berembang trees.

Table 5. Local’s Observation of the Fireflies

| Statements | Increased (%) | No Opinion (%) | Lesser (%) |
|------------|---------------|----------------|------------|
| Is the firefly population within my area getting lesser or increased? (awareness) | 18.6 | 51.0 | 29.0 |

On the threats to fireflies, the respondents were generally right that a large crowd of tourist has not pose threats to fireflies, but they could not agree whether speed boat could erode the riverbank which eventually will pose a threat to the firefly ecosystem. Meanwhile, most of them acknowledged that tree cutting and river pollution were main contributors to the decline of firefly population in term of habitat destruction, followed by development on the riverbank areas as shown in Figure 6.

Figure 5. Perception on the Threats to Firefly

The conclusion from this series of questions is that public awareness and education are important. In addition, greater awareness will aid in conservation efforts. Local residents and visitors need to know the facts about the fireflies, in particular, their lifecycle, the special characteristics of fireflies in Klias and Weston tributaries, the fragility of the surrounding ecosystem, and the very short lead time between a decline and the decimation of the firefly population. Hence, it is vital to build up an information center, or continuous awareness campaign which will be providing the appropriate information to visitors and locals specifically about firefly ecosystem. A craft shop together with a stall also could be set up for tourist attraction and spending.

Table 6. Local’s Perception on Threats to Fireflies

| Statements | Disagree (%) | Agree (%) |
|------------|--------------|-----------|
| Development on the river bank (house/jetty etc.) | 46.9 | 53.1 |
| Cut down the berembang tree near the river bank | 22.76 | 77.24 |
| A huge number of tourists watching the fireflies | 97.94 | 2.06 |
| The light from the house /road is too bright | 63.5 | 36.5 |
| Statements                     | Disagree (%) | Agree (%) |
|-------------------------------|--------------|-----------|
| River pollution               | 34.5         | 65.5      |
| Noise                         | 73.1         | 26.9      |
| Erosions at the river bank    | 74.5         | 25.5      |
| Use of pesticide near the riverbank | 61.4     | 38.6      |
| Speed boat                    | 80.7         | 19.3      |
| Fishing with poison           | 71           | 29.0      |

3.5 Relationship Management

3.5.1 Relationship Management Among the Stakeholders

Based on the findings, most of the locals stated that they are willing to be involved in firefly conservation (WTC) activity as illustrated in Figure 6, since they are getting aware of the importance in protecting and conserving firefly and its habitat so that the future generation could experience the firefly existence. At the same time, protecting firefly will serve their mutual interest – being one of the tourism attraction products, the fireflies give alternative economic benefits to the nearby local communities and tour operators over the years from the continuity of firefly-watching industry. Moreover, firefly is one of the native privileges which is not available in many other countries. Thus, it would become a huge loss if such privilege is taken for granted and is without any proper measure for conservation and law enforcement.

However, of those not willing to join the conservation program, the majority of them do not enjoy any benefit from fireflies or are just not interested. It is also evident that as time elapses, communities begin to realize benefits from ecotourism and more people get formal education, and more community members develop positive attitude and perception towards ecotourism in the area. This is an indicator that the success of ecotourism in the area depend on the education and awareness levels of the community members. This may not be the only component to success since the other stakeholders and the government have to do their part in promoting and supporting community ecotourism establishments. Meanwhile, the majority of the respondents were not willing to pay for firefly conservation since to them, there are agencies that are already responsible to protect those areas. For instance, the Forestry Department.

Moreover, according to the community, the business operators should contribute since they are the ones that are making profit out of the firefly tourism tour. For those who are willing to pay, the minimum price they are willing to pay is USD0.23 while the highest would be USD6.92. Previously, the average price that should be paid per head which is being authorized by the Forestry Department is USD1.15 while the new charge has been increased to USD3.46. This is not only a burden the tour agency, but also to the community. A drastic number of tourists had declined prior to the new price implementation since the tourist preferred a much cheaper place compared to Klias. Since the bombardment of new firefly watching place is available closely to Kota Kinabalu, less tourists are coming to Beaufort these days according to the tour operator’s staff. Based on the survey conducted, tour operators feel that it would be a waste to pay for natural attraction if the stakeholders would still disrupt the firefly ecosystem. The authority of tourism must evaluate current pricing scheme in order to set fees that reflect the market demand and that show how much users value the services offered by the protected area. There are several methods that can be used for this purpose such as market evaluation, survey of tourist demand, demand curve analysis, and market based reactive management [7]. Proper education and awareness must also be given for the stakeholders so that the master plan to conserve the fireflies could be achieved.
3.6 Issues and challenges in Beaufort’s ecotourism

3.6.1 Issues of Firefly-Watching Tourism in Sabah

The result shows the issues that arise from Firefly-Watching Tourism in Sabah vary from environmental, economic, social, management, and local authorities’ issue as in Figure 7. Majority of the respondents believe that the challenges that will be probably encountered in developing Beaufort as an international ecotourism site is capital or budget restriction. In tourism industry, in order to ensure the growth of economy in the existing site, the locals should provide their own tourism product and tourism attraction must be explored and diversified so that tourists would spend more time or could stay overnight since there are a lot of attractions to look for in one place. Besides that, interviewees also stated that lack of commitment and enforcement from the local authorities are also among the typical ecotourism problems that happen in Beaufort.

Meanwhile, in operator’s perspective, the rivalry among the operators in attracting tourist is very intense between local and external operators which makes the locals operation difficult to sustain and unable to compete healthily due to non-global network promotion. Moreover, since the locals are living within the nearby river, an anthropogenic action has been deteriorating the water quality of the river which forcing the fireflies to migrate or diminish in a long run. This could be explained as there are toxic and domestic wastes that are thrown directly into the river and affecting firefly habitat ecosystem. The safety of existing jetty is also important as is in the night as a tourist have fallen into the river. Finally, the train could serve as a mean of transportation for the locals to go to ecotourism site in Beaufort which also requires a good maintenance.
Figure 7. Issues of Firefly-Watching Tourism in Sabah

4. Conclusion and Recommendation
Greater local community involvement in tourism opportunities may change their attitude towards firefly conservation. Most of them are also willing to conserve firefly (84.8%) since it is an added value to the generation’s existence and for the next generation to cherish. Meanwhile, the local are willing to get involved in firefly conservation activities (66.2%) as it aids as their alternative income benefit from the firefly-watching tour and as well to preserve the species from extinction. The majority are willing to spend about 2 hours per month for conservation programmes and preferred it to be on weekend. However, only 32.4% of them are agreeing to pay some conservation fee as they said there are related agencies responsible for it. On the threats to fireflies, local are aware that cutting mangrove trees lead to firefly’s decline but they could not agree that speed boat also could eroding the riverbank which eventually pose a threat to the firefly ecosystem. In order to keep the tourist, keep coming, a diversified tourism attraction and products must be created. The collaboration between the government, travel agency and local operators should be developed to promote Beaufort as an international destination through comprehensive advertisement, master plan and worldwide link. A well trained staff and sustainable practice should be further strengthened with the aid of concerned agencies. The local could be trained a citizen scientist to make sure the firefly habitat remains untouched for a long run. Lastly, a blueprint specifically for firefly conservation should be developed to help focus preservation in the places with the highest need to slow the rate of firefly habitat loss due to development.

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