Empowerment effort for surrounding forest community living in the buffer zone and traditional zone at Bukit Tigapuluh National Park (BTNP)

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Abstract. The current condition of Bukit Tigapuluh National Park (BTNP) is far from the standard function of a national park, as defined in Law no 5/1990, regarding biodiversity conservation and its ecosystem. The condition influences all organisms (flora and fauna) and surrounding forest communities who depend on the existence of BTNP. One solution that can be offered to tackle the situation is by providing empowerment programs for the local community who live near the national park to optimize the use of their local wisdom. Methods used in this study is an in-depth interview. The result of this study shows that area near the national park has a high potential to develop Non-Timber Forest Products (NTFPs) commodity, especially for honey bee cultivation. As a result, in 4 months of honey bee development program, the community could harvest 14.95 kg of honey from 57 boxes of species *Trigona sp*. Honey bee produced in the traditional zone is more productive than that in the buffer zone area. The government needs to prepare sustainable programs of community empowerment by improving the productivity of NTFPs. The increasing community involvement in forest management and revitalization is needed to restore the function of the forest area.

1. Introduction

A national park is an area designated to protect natural ecosystems and managed by using a system of spatial zoning. The national park is to be used for research, education, cultural needs, tourism, and recreation [1]. One of the national parks in Indonesia is Bukit Tigapuluh National Park (BTNP), which is located in the area belongs to two provinces, i.e., Riau and Jambi. The park was established based on the Decree of Ministry of Forestry no 6407/Kpts-II/2002, dated 21 June 2002, consisting of a total area of 144,233 hectares, in which 111,223 hectares are located in Riau, and 33,000 hectares is located in Jambi Province.

Currently, BTNP condition is very apprehensive because it has only approximately 40% of the remaining forest from the total established area [2]. Most of the destruction is caused by encroachment done by communities for settlement, cultivation area as well as illegal logging activities. This issue was strengthened by the evidence that the officer can arrest some log transporters that were coming from the BTNP area.
These conditions have resulted in an enormous impact on the population that depends on and have direct interaction with the BTNP area, not only local people but also floras and faunas living inside the park. Forest resources play an important role for its surrounding community. They utilize the forest not only for energy resources but also as a place to live [3].

To prevent continuous conflict regarding forest management, and to give an understanding to the local community regarding the importance of maintaining a sustainable environment, it needs an empowerment program for the local community. Empowerment is needed because the local community will be the first party to protect and maintain the environment.

The empowerment program is needed to determine a proper model. That program must see the available potency in that area. Based on this background, the objective of this study is a) to understand the habits of the local community; b) to determine the empowerment model based on the potency and interest of the local community; and c) to monitor the result of an empowerment program for the local community around the BTNP area, in both traditional and buffer zones.

2. Methodology
2.1. Location and Time
This research was conducted in the BTNP area in Indragiri Hulu and Indragiri Hilir districts. Rantau Langsat, Keritang and Selensen villages were the areas that are included in the buffer zone of BTNP. Nunusan, Sadan, Air Bomban, Bengayauan and Siambul were the villages that are in the traditional zone of the BTNP. The location was chosen because BTNP has created farmers groups in those villages.

![Figure 1. Map of BTNP work area](image)
2.2. Data analysis
This study was conducted using a descriptive and qualitative approach with a field observation method and in-depth interview. This study used both primary and secondary data, in which the primary data is obtained from the respondents by conducting an in-depth interview with a total of 189 respondents. The data consist of the local knowledge related to NTFP products in the BTNP, community knowledge and interest, and honey bee feed sources. The method to determine the number of respondents was using purposive sampling, and the respondents are a member of farmer groups in both areas.

Secondary data is obtained from related parties and from the village monography record as well as from literature that can support this research. The data collected were buffer zone community, traditional zone community, BTNP officers, and village officers in the study location.

3. Result and Discussion
3.1. Local communities living in traditional and buffer zones
3.1.1. Traditional zone
Traditional zone, as written in Permen LHK no P.76/2015, is the nature conservation area that is established as traditional use interest by local communities that has a dependency on the natural resources from generation to generation [5].

The community that lives in the traditional zone consists of the original forest tribe such as Talang Mamak tribe, Kubu tribe (Anak Rimba) and Melayu Tua tribe. Talang Mamak is included in the tribe of Melayu Tua (Proto Melayu), the origin tribe in the Indragiri area. Talang Mamak differentiates themselves with Malays by religion. If one of Talang Mamak, who has animism or syncretism catholic converted to Islam, then the identity of the person will become Malays ("Melayu"). The difference between Orang Rimba and Talang Mamak tribes is, Orang Rimba are nomads, they move from one place to other places to survive. Meanwhile, the Talang Mamak tribe has settled their life and lives in the river flow of the Batang Gansal river.

There are 8 villages inhabited by Talang Mamak tribe and Melayu tribe, i.e. Tanah Datar, Dusun Tua, Suit, Sadan, Air Bomban, Nunusan, Siham, Rantau Langsat villages (Riau Province); Semerantihan and Suo-Suo villages (Jambi Province). Melayu tribe lives in Dusun Sadan, Air Bomban and Nunusan, while Talang Mamak tribe live in Dusun Tanah Datar, Dusun Tua, Suit, Siham and Semerantihan. Kubu tribe (Anak Rimba) is also depend on BTNP resource because most of the Bukit Duabelas National Park area has also been damaged.

The communities who live in the traditional zone have some habits like wildlife hunting, concocting food, collecting forest resources and farming. Besides farming, they were also searching Non-Timber Forest Products (NTFPs) such as Jernang Rattan and "Klukup," Pinang, Durian, Honey, Birds, Labi-labi turtles, etc. The hunting habits, concocting food and farming showed that the community in the traditional zone has a high dependency on the forest. The source income of this community is from rubber, collecting NTFPs, especially "Jernang" and other activities such as trading.

3.1.2. Buffer zone
A buffer zone is an area located between the conservation area and cultivation area or the settlement area that has been developed to be able to protect conservation and natural resources. There are 24 buffer zones in the BTNP spread across Riau and Jambi Province. There are in Indragiri Hulu, Indragiri Hilir, Tebo and Tanjung Jabung Barat districts.

Based on the satellite imagery analysis, it can be known that areas around BTNP are ex-logging concession areas, which show the decrease of land cover rapidly due to the impact of illegal logging done by the local community [6]. Most of the areas have been converted to be cultivation area by local
community and newcomers, especially in the ex-logging concession area and in the logged-over area. Growth rate of community residing around buffer zone is relatively high, which is caused by many newcomers coming in that area, especially from Aceh and North Sumatera. This issue is also triggered by good accessibility, convenience, and the condition that allowed new comer to have permission to cultivate the land as well as migration patterns.

Previous study, [7], has obtained data related to the community perception to BTNP area who expect sustainable conditions in the BTNP area even though they do not have any alternative source for fulfilling their needs except converting forest area to be agriculture area. The primary income of the original local people in the buffer zone is from the agriculture sector by converting forest to a rubber plantation, which is not intensively managed. Meanwhile, the newcomer community, who are generally good in the capital, prefer to have oil palm plantation. However, the main agricultural activity for both community types (local and newcomer) is oil palm cultivation; an only minority of the community who managed rubber plantation [8]

3.2. The form of community empowerment
The community empowerment applied in the BTNP should be straight forwarded to whom who has direct interaction with the forest resources. The purpose of the empowerment program is to reduce the intensity of community interaction with conservation areas and to protect the sustainability of conservation areas. Community empowerment should be well implemented in order to cut the rate of land conversion due to shifting cultivation done by the local community. In conducting empowerment programs, it needs to be adjusted with the available condition, potency, and resources in the community, such as the improvement of NTFP production.

The form of empowerment carried out in the BTNP should be based on the sustainability of the area, as well as the economic development and local wisdom, i.e., the cultivation of “Jernang” sap and the cultivation of honey bee. The cultivation of honey bee has significant potency because there are a lot of bee species and the hive of Trigona Sp., which can be found in the BTNP area. The existence of the bee is also supported by the availability of feed sources in that area.

| No. | Local name | Plant species | Part of the plant that is visited |
|-----|------------|---------------|---------------------------------|
|     |            | Scientific name | Nectar | Pollen | Sap |
| 1   | Sungkai    | Peronema cenescens | - | - | - |
| 2   | Gaharu     | Aquilaria malaccensis | - | - | - |
| 3   | Durian     | Dario zibethinus | v | v | - |
| 4   | Petai      | Parkia speciosa | v | v | - |
| 5   | Kasai      | Pometia pinnata | v | v | - |
| 6   | Pulai      | Alstonia scholaris | v | v | v |
| 7   | Jernang    | Daemonorops draco | - | - | - |
| 8   | Pinang     | Areca catechu | v | v | - |
| 9   | Mahang     | Macaranga | v | - | - |
| 10  | Nilam      | Pogostemon cabilin | - | - | - |
| 11  | Kulim      | Scorodocarpus borneensis | - | - | - |
| 12  | Kempas     | Koompassia malaccensis | - | - | - |
| 13  | Bayur      | Pterospermum | - | - | - |
| 14  | Anggrek    | Dipodium pictum | v | - | - |
| 15  | Keruing    | Dipterocarpus | v | - | v |
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Based on data in Table 1, the cultivation of honey bee is the potential to be developed in this area because most of the plant species in BTNP are honey feed sources. Besides that, based on the interview with the respondents in each village, represented by a member of farmer groups, it can be obtained the community interest of honey bee cultivation program. The details of the result are presented in Table 2.

Table 2. The community interest to honey bee cultivation program.

| No. | Village       | Zone   | Number of respondents | Interest (person) | Introduction type | Experience & Knowledge | Expectation |
|-----|---------------|--------|-----------------------|-------------------|-------------------|------------------------|-------------|
| 1   | Rantau Langsat| Buffer | 30                    | 28                | 2                 | 30                     |             |
| 2   | Bengayauan    | Traditional | 30              | 27                | 2                 | 30                     |             |
| 3   | Tualang       | Traditional | 15              | 13                | 1                 | 15                     |             |
| 4   | Nunusan       | Traditional | 26              | 24                | 1                 | 26                     |             |
| 5   | Sadan         | Traditional | 19              | 15                | 1                 | 19                     |             |
| 6   | Air Bomban    | Traditional | 19              | 14                | 1                 | 19                     |             |
| 7   | Selensen      | Buffer  | 25                    | 23                | 3                 | 25                     |             |
| 8   | Keritang      | Buffer  | 25                    | 22                | 2                 | 25                     |             |

Sources: Result of data analysis

Based on data in Table 2, most respondents know the bee species in their neighborhood. However, they still lack experience and knowledge with regards to honey bee cultivation. All respondents want to join the honey bee with the expectation that honey bee cultivation can improve their economic
condition. Therefore, education and training with regard to honey bee cultivation should be conducted for these communities.

3.3. The result of community empowerment

In 2018, BTNP had conducted coaching, education, and empowerment program to the community who lives near the BTNP area, especially for honey bee cultivation for "Kelulut" species (Trigona Sp.). This was based on observation in the area that honey bee cultivation can be developed in the area of "SPTN Wil.II Belilas" by conducting coaching and education for 8 (eight) Forest Farmer Groups ("Kelompok Tani Hutan (KTH)") coached by BTNP. These groups are located in traditional zones (Tualang, Bengayauan, Nunusan, Air Bomban, Sadan villages) and in the outside of the buffer zone area (Rantau langsat, Selensen, Keritang villages).

This training was conducted for all farmer groups, and they also got a beehive and honey bee colony to be maintained and developed by each group. A team has done accompaniment, monitoring, and evaluation. They do it to ensure that those groups are not experienced any difficulty in practicing honey bee cultivation. Table 3 represents the result of production data from the honey colony during the 4 (four) months period of January – April 2019 in each farmer group location.

| No. | Forest Farmer Group name | Location  | Production (bottle 200 ml) | Honey weight  | Number of harvesting colony |
|-----|--------------------------|-----------|---------------------------|---------------|---------------------------|
| 1.  | Tualang Sejahtera        | Tualang   | 3.5                       | 7 ons         | 4                         |
| 2.  | Jelemu Bengayauan        | Bengayauan| 6                         | 1 kg 2 ons    | 9                         |
| 3.  | Kasih Alam               | Nunusan   | 23                        | 4 kg 6 ons    | 9                         |
| 4.  | Bomban Berduri           | Air Bomban| 9                         | 1 kg 8 ons    | 8                         |
| 5.  | Batu Berduri             | Sadan     | 20                        | 4 kg          | 14                        |
| Total|                         |           | 61.5                      | 10.65 kg      | 44                        |

Sources: BTNP monitoring team (2019)

Based on data (Table 3), it can be known that the number of harvesting colony in the traditional zone are 44 colonies from the given 75 colonies. Therefore, 31 colonies are not ready to be harvested/not productive. From 44 colonies, the total honey production is 61.5 bottles, with a total weight of 10.65 kg. Whereas in the buffer zone, the data is shown below (Table 4).

| No. | Forest Farmer Group name | Location  | Production (bottle 200 ml) | Honey weight  | Number of harvesting colony |
|-----|--------------------------|-----------|---------------------------|---------------|---------------------------|
| 1.  | Tunas Harapan            | Rantau    | 7                         | 1 kg 4 ons    | 5                         |
|     |                           | Langsat   |                           |               |                           |
| 2.  | Tunggal Warga            | Selensen  | 2                         | 4 ons         | 3                         |
| 3.  | Bina Tani Sejahtera      | Keritang  | 16                        | 3 kg 2 ons    | 5                         |
|     |                           |           | 25                        | 4.3 kg        | 13                        |

Sources: BTNP monitoring team (2019)

Based on data on Table 4, it shows that the number of colonies that can be harvested is 13 colonies from the given 71 colonies, in which 58 colonies are not ready to be harvested/not productive. From 13 colonies, it produced 25 bottles of honey with a total weight of 4.3 kg. The comparison results from the honey bee cultivation program in two zones of BTNP (both traditional and buffer zones) can be seen in Figure 2.
Total honey production for both areas is 14.95 kg resulted from 57 productive colonies. There are 89 colonies which are the potential to be a productive colony. BTNP field officers still facilitate the marketing of honey. They are actively promoting the honey bee via offline and online promotion to help the community. However, this effort seemed to be still ineffective. The financial value from this honey bee sales is about Rp. 2,620,000,- (@Rp. 60,000 200 gr⁻¹ bottle⁻¹ in the traditional zone, and Rp. 50,000 200 gr⁻¹ bottle⁻¹ in the buffer zone).

4. Conclusion & Recommendation

4.1. Conclusion

The development of honey bee cultivation has a strong possibility in the area of BTNP. Many honey bee species and feed sources, as well as the high interest of the community. The result of the empowerment program for four months period (January - April 2019) shows that honey bee produced in the traditional zone is more productive than that in the buffer zone area. From 44 colonies, the total honey production is 61.5 bottles, with a total weight of 10.65 kg.

4.2. Recommendation

The government, through BTNP, needs to conduct more local empowerment programs to increase community awareness and livelihood those forest sustainability can be reached in the same time.

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