Community’s reliance on protected forest resources for livelihood: a case of villages in surrounding Sermo Wildlife Sanctuary

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Abstract. Sermo Wildlife Sanctuary (SWS) is a well-known protected area in Kulon Progo district, Indonesia that has unique plants, animals, and ecosystems. Different from common protected areas which usually have native plants, this area is mostly occupied by commercial trees such as teak (Tectona grandis) and Mahogany (Swietenia mahagony) since historically this area was a production forest. Although it was mostly covered by homogeneous forest, the area has rich biodiversity since it has become the habitat of various native animals such as brontok eagle (Spizaetus cirrhatus) and barking deer (Muntiacus muntjac). Therefore, in 2014 this area is officially appointed as a wildlife sanctuary with a total area of about 188.99 Ha. However, the change of forest status from production forest into the protected area has not been easily adopted by the local communities since they keep utilize forest resources inside the forest area. This research aims to assess the community’s reliance on the SWS resources for livelihood. We interviewed 174 respondents that were selected by the proportional purposive sampling technique to each hamlet in the two villages located near SWS namely Karangsari and Hargowilis villages. The result showed that only 11% of the total respondents have relied on forest resources in SWS with total of 16 respondents (9.2%) were at a low level of reliance and 4 respondents (2.3%) at a medium level of reliance. The main factors that influence the community’s reliance on forest resources in SWS consist of education level, activity frequency, and ages.

Keywords: community’s reliance, forest resources, forest livelihood, protected area.

1. Introduction

Sermo Wildlife Sanctuary (SWS) is a well-known protected area located in Kulon Progo district, Indonesia that was established in 2014 with the main purpose to preserve wildlife habitat. According to the flora inventory in 2015, SWS is mainly occupied by several commercial trees, such as teak, eucalyptus, acacia, pine, mahogany, and jabon. Commercial tress is dominant since the SWS area was appointed as a production forest before changing into a protected forest. However, although it was mostly covered by homogeneous forest, SWS is a habitat for various wild animals. In 2018, wildlife surveys were conducted throughout SWS and found that there are 28 species of birds of which 5 of them are protected species based on government regulations number 7 of 1999. In addition, it was found 13 species of reptiles, and 6 barking deer (Muntiacus muntjac) [1].

The location of SWS is surrounded by two villages, namely Hargowilis and Karangsari Villages, which existed before the establishment of Sermo Wildlife Sanctuary in 2014 [1]. A close location to the SWS has provided a great opportunity for the community in these villages to utilize forest resources in the SWS area. In addition, the former forest status as forest production that was managed with intercropping systems involving local communities to plant crops in between the main tree commodity has created a close relationship between the local communities and surrounding forest [1].
The interactions between forest and local communities are an indication of community reliance on the SWS area. However, Community’s reliance on forest areas usually occurs because of the strong relationship between forest communities and forest areas [2]. Communities that have lived side by side with forest areas generally have a very high reliance on forest products [3]. In SWS, several types of interactions are carried out by the local communities in the form of collecting firewood, utilizing cattlefeed grass, disposing garbage, and tourism [1].

It should be noted that interaction between communities and forest can be either positive or negative. A negative interaction can become a threat to forest sustainability [4]. This is that currently happen in SWS, a situation when the community's level of reliance on forest resources is very high but the interactions that occur are negative. This research aims to assess the level of local community’s reliance on forest resources in the SWS and the factors behind this reliance. The results of this study can be used as a basis to develop a plan-strategy for community development in the surrounding of SWS.

2. Methodology

2.1. Study area
Karangsari and Hargowilis villages are administratively located in Kulon Progo district, but different sub disctrict. Karangsari Village is located in the Pengasih sub-district and is geographically located at 110º13’32” BT – 7º83.84’33” LS, while Hargowilis Village is located in the Kokap sub-district and is geographically located at 7º50’16.40” – 7º47’21.20” LS dan 110º07’38.06” – 110º07’41.01” BT.

2.2. Methods
2.2.1. Data collection.
In this study, the data used to identify the level of community’s reliance is based on the community interaction with the SWS area and the amount of forest resource utilized by the community [5]. Data collection was done by interviewing respondents with a list of questions or often called a questionnaire. The questionnaire consists of a list of structured questions that are answered or filled out by the respondent [6]. The questionnaire includes questions about the respondents’ demographic data consisting of age, income, education, number of family dependents, and the frequency of activities in the area [2,7-8].

We interviewed 174 respondents that were selected by the proportional purposive sampling technique to each hamlet in the two villages located near SWS namely Karangsari and Hargowilis villages. The criteria of the respondents are 1) People with age more than 17 years old, 2) Community that lives nearest SWS, in this case, they live in Ringinardi dan Kedungtangkil Hamlets on Karangsari Village and Sremo Lor, Klepu, and Bibis Hamlets on Hargowilis Village.

2.2.2. Data analysis.
The level of community’s reliance can be determined by investigating the interactions or products utilized by respondents [5]. We classified the results based on the Sturges formula into three classes such as low, medium, and high [9]. The results are then analyzed descriptively. The factors that influence the community’s reliance on forest resources were analyzed using logistic regression analysis techniques. Logistic regression analysis aims to describe the relationship between the dependent variable and the independent variable on a continuous or categorical scale [10]. The Wald test was then carried out to investigate the significance of the independent variables on people's dependence. If the p-value is less than 0.05 then the independent variable has a significant effect on the dependent variable [11]. We used SPSS software to analyse the statistics.

3. Results and discussion
3.1. Level of community’s reliance on protected forest resources
Table 1 shows the results of the level of the community’s reliance on forest resources on SWS. It was observed that community’s reliance in SWS is mainly at the low level, where only 16 respondents
of 174 respondents (9%) have 1 activity inside the SWS area. In addition, it was observed 4 respondents of 174 respondents (2%) have 2 or 3 activities inside the SWS area, indicating a medium level of reliance. We did not find a high level of community reliance in the SWS area. According to the domicile, there were only four hamlets in Karangsari and Hargowilis Villages whom the locals still have a reliance on the forest resources in SWS. The most were found in Ringinardi Hamlet (i.e., 7 respondents) and the least is in Bibis Hamlet (i.e., 2 respondents). Figure 1 shows the distribution of respondent’s domiciles who still rely on the forest resources in SWS.

### Table 1. The level of community’s reliance on protected forest resources in Sermo Wildlife Sanctuary (SWS).

| Level   | Number of activities inside SWS type | Number of Respondents |
|---------|-------------------------------------|------------------------|
| Low     | 1                                   | 16                     |
| Medium  | 2 – 3                               | 4                      |
| High    | 4 – 5                               | 0                      |

![Figure 1. Distribution of respondent’s domicile who still rely on the forest resources in Sermo Wildlife Sanctuary](image)

3.2. Factors that influence community’s reliance on forest resources in Sermo Wildlife Sanctuary

Table 2 shows the results of the Wald test, which indicates that the level of education, the frequency of activities in the area, and the age of the respondent were the main factors affecting the community’s reliance on the forest resources in SWS. With a negative coefficient value, it means that the lower the level of education, the greater the opportunity for the community to have reliance on forest resources. Meanwhile, with a positive coefficient value, the higher the frequency of activities in the area and the older the age of a person, the greater the chance of community to have reliance on forest resources in SWS.

### Table 2. The results of Wald Test

|                        | B       | Sig. | Exp (B) |
|------------------------|---------|------|---------|
| Frequency of activities| .999    | .000 | 2.715   |
| Age                    | .249    | .009 | 1.283   |
| Total income           | -.000002| .152 | 1.000   |
| Level of education     | -2.526  | .028 | .080    |
3.3. Discussion

The results of our observation show that most of the communities in the villages surrounding Sermo Wildlife Sanctuary do not have reliance on forest resources in SWS, but some locals (i.e., 11.5%) are still utilizing forest resources by conducting activities such as grazing, taking firewood, planting rubber cassava plants, and disposing of garbage. However, this reliance is mainly classified at a low level. The small number of people who still have reliance on forest resources indicates that currently, the local communities start to understand the do and don’t activities inside the protected forest. However, the remaining activities in particular disposing of garbage inside the forest will negatively affect the environment of the Sermo Wildlife Reserve area. Waste will result in ecological damage which later causes soil degradation and pollution [12].

It was also observed that the main factor affecting the community’s reliance on the forest resources are the level of education, the frequency of activities in the area, and the age of the respondent. The low level of education of a person will affect the perception of the forest resources in particular when they do not know the difference between production forest and protected forest [8]. In addition, the more frequency of community activities inside the forest area will affect to increase community’s reliance [9].

It is widely known that the key success of conservation management actually depends on the support of the surrounding community [13]. Thus, it is important to empower the communities in the surrounding forest area as well as to increase awareness to the community about the importance of forest conservation. Community empowerment must adapt to local culture with the focus to increase social welfare so that their dependence on the land-based forest resources in SWS can be reduced [14].

4. Conclusion

Based on the results of the study, it was found that only 11% of the total respondents still have reliance on forest resources in the Sermo Wildlife Sanctuary (SWS) area, which 16 respondents (9.2%) were at a low level of reliance and 4 respondents (2.3%) at a medium level of reliance. The factors that influence the community's reliance on forest resources in SWS consist of education level, activity frequency, and respondent's age. The education level is negatively correlated, while the frequency of activities in the area and the age of a person are positively correlated with the level of the community’s reliance on forest resources in SWS.

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