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# Conservation of Salt Lick Locations Utilized by Sumatran Elephant (*Elephas Maximus-Sumatranus*) in Tangkahan, North Sumatra

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**Abstract.** Community perception towards salt lick behaviour by Sumatran Elephant (*Elephas maximus sumatranus*) is an important element for investigation to support the wildlife conservation in a Conservation Response Unit (CRU) area. The aims of this study were to identify the analyze the community perception and understanding on the importance of salt licks to Sumatran Elephant and to analyze the relationship between demographic element (social, economy, culture) of the local community and salt lick behavior by the elephants. This study was conducted in Kuala Buluh and Kuala Gemoh Hamlet, Tangkahan, Langkat Regency, North Sumatra, Indonesia. The community was chosen purposively as they reside in the conservation area. Data were collected through interviews with 100 respondents and analyzed by Spearman's correlation test. The results showed that community perceptions towards salt lick behavior were varied, ranging from moderate, strong to very strong relationship. The education factor has a positive relationship with perceptions of salt lick behavior and elephant conservation ( $\rho = 0.228$ ;  $p = 0.022$ ), the higher the level of education, the better the understanding. While the distance from the settlement to the salting location was significantly negative ( $\rho = -0.537$ ;  $p = 0.000$ ), the closer the settlement to the elephant salting location, the better the perception. Duration of residence was negatively related to perception ( $\rho = -0.145$ ;  $p = 0.151$ ), the longer they resided, the less understanding by the community towards the salt behavior and elephant conservation. It was suspected that the longer they resided will increase their participation to the ecotourism site, hence they were less likely to enter the forest. In general, the community nearby CRU Tangkahan supported the existence of salt licks location by maintaining, while not changing the form of the authenticity and not damaging the location from ecotourism activities.

**Keywords:** Sumatran Elephant; Demographic Element; Spearman's Correlation Test

## 1 Introduction

The salt lick location of the Sumatran elephant is a location that produces natural mineral salts contained in water, mud, soil and on rock surfaces. This location plays an important role

in providing mineral salts for Sumatran elephants and other wildlife in the forest. The utilization of natural mineral salts is known when elephants exhibit salting behavior. The expression or attempt to accept or adapt to different internal or external conditions is characterized as animal behavior [1]. As a result, the Sumatran elephant will exhibit salting behavior when his body requires mineral salts for metabolic activities and when food digestion begins.

The purpose of salting is to strengthen bones, teeth, and/or tusks [2]. Salt lick behavior on Sumatran elephants in Tangkahan is seen when elephants are following a grazing program to find food carried out by Conservation Response Unit (CRU) management into the forests of Gunung Leuser National Park, as well as when traveling back to the elephant enclosure around the riverbank. As a result, the demand for this mineral salt is critical for the physiological balance of elephant. The extent to which local knowledge can be appreciated and utilized in building a good conservation area management system determines the community's participation in managing biological resources. Furthermore, this local knowledge encourages the community to participate in the preservation of the natural salt location because it provides benefits (both material and non-material) that can be obtained by the community from conservation activities, ensuring that its continued existence benefits them.

## 2 Materials and Method

### 2.1. Study site

This research was conducted from March to September 2021. The selection of research locations was based on the hamlet closest to the Conservation Response Unit (CRU) Tangkahan, namely Kuala Buluh and Kuala Gemoh Hamlet, Namo Sialang, Batang Serangan District, Langkat Regency, North Sumatra. Tangkahan is a buffer zone area of Gunung Leuser National Park (TNGL).

### 2.2. Sampling methodology

The community who reside in the area around the Tangkahan Conservation Response Unit (CRU) were the primary focus of this study. The location of data collection was determined by purposive sampling by taking into account the proximity of the community housing distance to the location of elephant salting. Interviews were conducted by means of purposive sampling directly to the community owners of ecotourism businesses, traditional leaders and local government officials. The total number of respondents was 100 respondents in 2 hamlets. Information on data collected regarding gender, age, education level, settlement history, settlement distance, income level, community knowledge about elephant salting and participation in protecting salting sites for elephants was obtained through interviews and filling out questionnaires by community respondents.

### 2.3. Data analysis

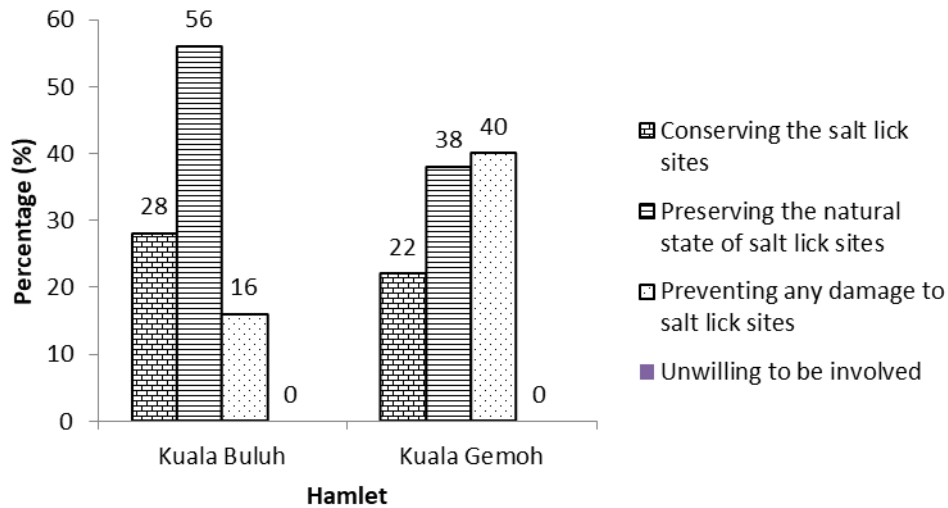
The information gathered during the interviews was evaluated descriptively. Furthermore, data on community understanding about salting elephants and their participation in conserving elephant salting sites were evaluated using a Likert scale to turn the data into quantitative data. Likert scale was employed in the adjustment system [3]. The relationship between the socio-economic culture of the community and the community's impression of the salt elephant in Tangkahan was then examined using the Spearman correlation [4].

### 3 Results and Discussion

The community's perspective of the behavior of Sumatran elephants salt licking and elephant conservation in the region close to the salting place is deemed very significant because the community perception will help elephant conservation at CRU run properly. Public perceptions of the salt lick behavior of Sumatran elephants in Tangkahan are varied, ranging from moderate to very strong. According to data analysis, there is a public knowledge about elephant salt lick behavior (54.2%), elephants feeling the presence of mineral salt (56%), elephants consuming mineral salt (57.6%), elephants using tusks/legs to obtain mineral salts (59.2%), elephants consuming bark when minerals are lacking (64.8%), and knowledge of Sumatran elephants as herbivores (90%).

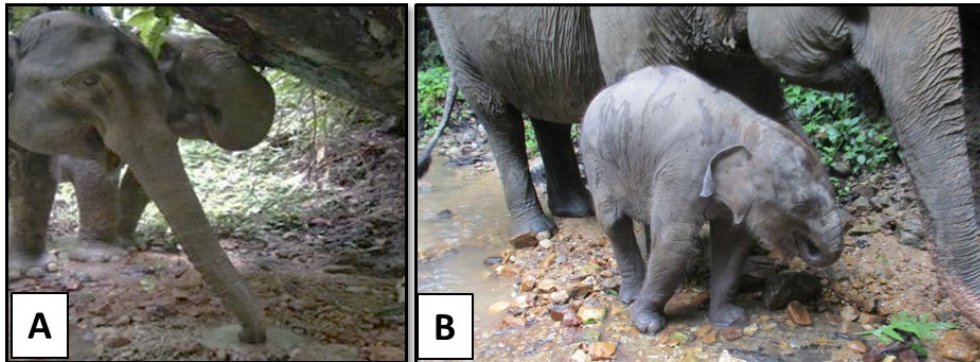
Furthermore, public perceptions of elephant conservation in Tangkahan also varied, ranging from strong to very strong. This is demonstrated by a 66.4% of understanding of the elephant protection as regulated by law and the diminishing elephant habitat, 75.8% of understanding the Sumatran elephant in Tangkahan as educational objects, 91.6% of understanding the Sumatran elephant in Tangkahan as a tourist attraction, 94.2% of understanding the Sumatran elephants in Tangkahan as a source of economic income, and 96.4% of understanding that elephants are rare animals (96.4%).

4 Based on the results of the study, the Tangkahan community supports the existence of the Sumatran elephant salt location by maintaining, not changing the shape of the authenticity and not damaging the location from ecotourism activities. Figure 1 shows that 56% of respondents from Kuala Buluh stated that they did not change the shape and authenticity of the salt location, while 40% from Kuala Gemoh promised not to damage the salt location from ecotourism activities. It is characterized as diversified, ranging from moderate to very strong, in terms of the community's viewpoint of salt lick behavior and Sumatran elephant conservation in Tangkahan. A person's perception varies due to the influence of several elements such as experience, background, the environment in which he lives, motivation, and others. The factors that influence a person will lead to varied interpretations of things, such as the location of elephant salting and the behavior of adult and cub elephants salting at natural salt sites (Figure 2). These statements and perceptions imply that all respondents have sufficient social capital to participate in and support the success of CRU's conservation efforts. Furthermore, the Tangkahan community has a positive attitude toward elephants, which give economic benefits to the local population.

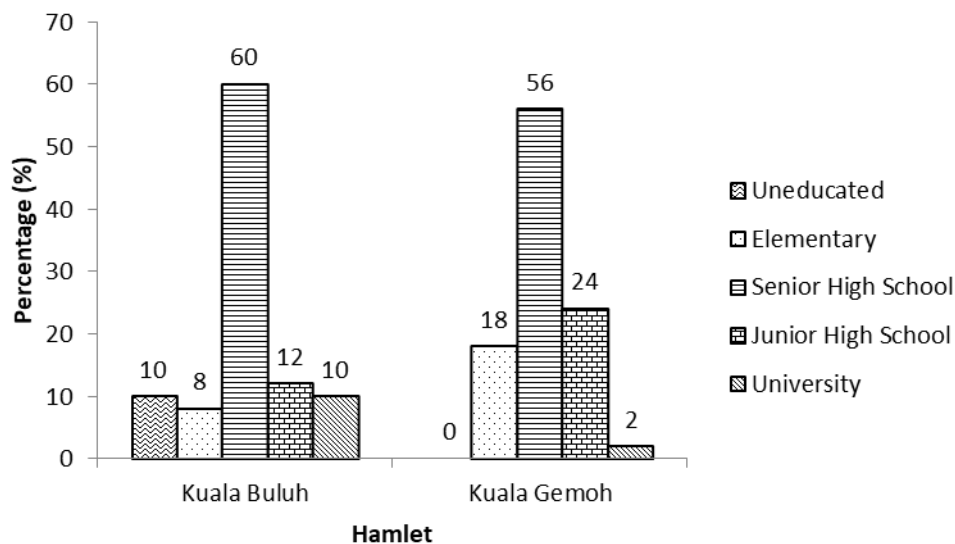


**Figure 1.** Perception (%) of community towards Sumatran Elephant's salt lick sites.

On the education aspect in general, there is a favorable association between perceptions of elephant conservation and education ( $\rho = 0.228$ ;  $p = 0.022$ ). As a result, the greater the Tangkahan community's educational level, the better their awareness of salt lick behavior and Sumatran elephant conservation. When evaluated from the perspective of the community's educational attainment in Tangkahan (Figure 3), the highest level of education is Senior High School (SMA) with 60% in Kuala Buluh and 56% in Kuala Gemoh, respectively. Communities in both hamlets try to send their children to high school, even though the school is far from their hamlet. In addition, the community uses the government road to the school, which is quite easy to navigate despite being made up of a mix of soil, stone and sand with several holes. Tangkahan's high school education could be explained in this way. In terms of the percentage of people who are not in school, only 10% of Kuala Buluh Hamlet is out of school, whereas there are no such persons in Kuala Gemoh Hamlet. When it comes to welfare, education levels below elementary school fall into the "not prosperous" category [5]. In general, Tangkahan people whose education is at the elementary level and below were estimated to be 18%. In addition, the level of education is very influential on the mindset of the community [6]. People with a higher education will have broader perspectives, higher aspirations, and desires, and will strive to attain their goals. People with a poor level of education, on the other hand, will be satisfied with what they own.



**Figure 2.** Documentation of elephants' salt licking behaviour. (a) mature elephant, (b) calf.

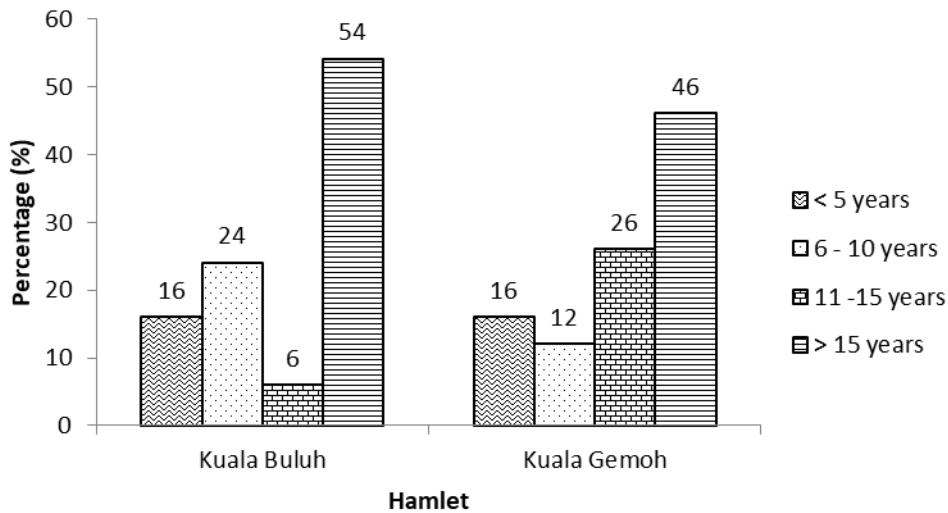


**Figure 3.** Education profile of the community in two hamlets.

Each hamlet has a different history of settlement depending on how long it has been inhabited and whether or not it has a tourism-related business. Figure 4 reveals that 54 percent of respondents who have resided in Kuala Buluh Hamlet for more than 15 years and 46 percent in Kuala Gemoh Hamlet have lived there for more than 15 years. When compared to Kuala Gemoh Hamlet, which has a population of 26 percent, only 6% of them in Kuala Buluh Hamlet have lived for 11 to 15 years.

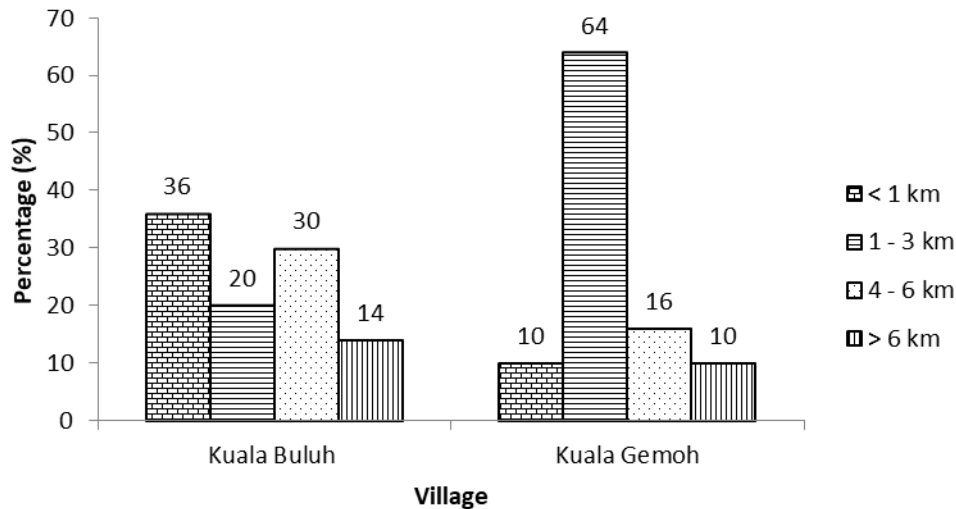
However, people who have lived for about 6 to 10 years are 24% more in Kuala Buluh than in Kuala Gemoh about 12%. People who have lived for less than 5 years in the hamlets of Kuala Buluh and Kuala Gemoh are around 16%. Furthermore, based on data analysis, length of stay in the community was negatively related to perceptions of salt lick behavior and Sumatran

elephant conservation ( $\rho = -0.145$ ;  $p = 0.151$ ). It is thought that the longer they live, the more ecotourism service activities they engage in, making them less likely to visit the forest.



**Figure 4.** Duration of living by the community in two hamlets.

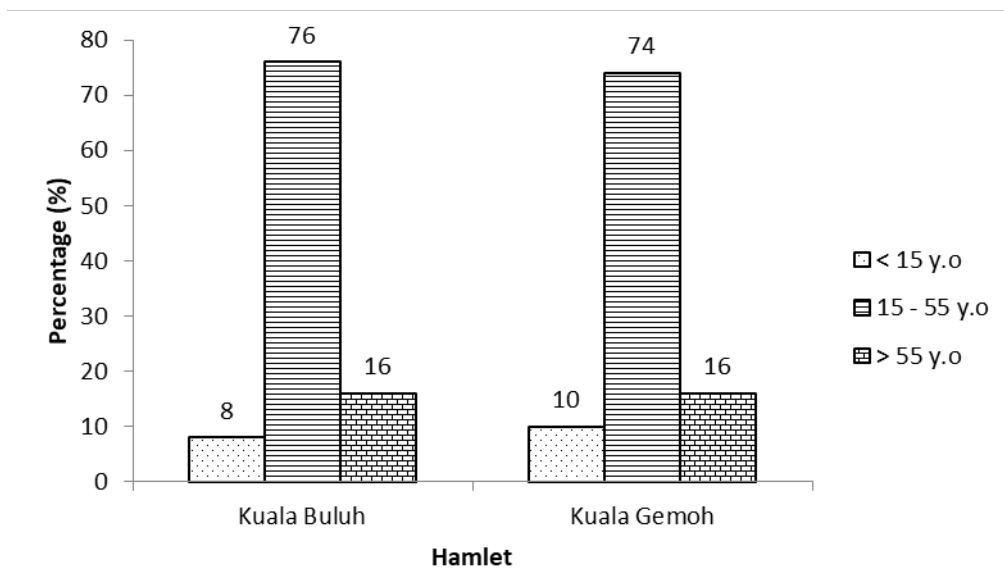
The distance between where the Tangkahan people live and the salt licks on the elephants varies. The distance starts from less than 1 km to more than 6 km. In Figure 5, it is known that 36% of the people of Dusun Kuala Buluh are located less than 1 km away and 14% are at a distance of more than 6 km from the salting location for elephants. Furthermore, the majority of the people in the hamlet of Kuala Gemoh (64%) live at a distance of more than 1 km to 3 km. In addition, 10% of the community live at a distance of less than 1 km and more than 6 km from a mineral salt source for elephants. When viewed from the overall Tangkahan ecotourism activities, the people of Kuala Buluh hamlet are also closer to the center of tourist destinations than Kuala Gemoh hamlet. Furthermore, based on the results of data analysis, it turns out that the distance from which people live has a very significant negative correlation with perceptions of salt lick behavior and Sumatran elephant conservation ( $\rho = -0.537$ ;  $p = 0.000$ ). Because of this relationship, the closer individuals live, the better they understand salt lick behavior and Sumatran elephant conservation. The mahouts in charge of caring for the elephants or the CRU management are thought to be the main sources of knowledge for the general population concerning Sumatran elephant conservation. This expands their understanding of some of the activities of elephants in mahouts' care, such as elephant salting, the location of salting in the jungle, and the protection of these wildlife species.



**Figure 5.** Distance of residential area to salt lick sites.

When observed in each hamlet, the community in the research location is included in the productive class based on age class. This corresponds to the age of the population based on the level of productivity, namely 15 years (not productive), 15 to 55 years (productive), and >55 years (unproductive) [7]. The age group under 15 years is 8% in the Kuala Buluh hamlet community and 10% in the Kuala Gemoh hamlet community. Figure 6 shows that the age group 15 to 55 years old has the highest percentage, with the hamlets of Kuala Buluh (76%) and Kuala Gemoh (74%) respectively. Furthermore, the citizens of Kuala Buluh and Kuala Gemoh each account for 16% of the population over the age of 55 (Figure 6). According to [8] that a person's productivity at work is strongly influenced by age. Generally, someone who is in the productive age will earn more income than someone who is in the non-productive age. The age structure will affect the economic activities carried out by the community. Thus, the productive age class in the hamlet physically has the potential to increase their income in the tourism sector. This is in accordance with the results of the Spearman correlation analysis that the relationship between the age of the people in Tangkahan and the level of income shows the value of the rho coefficient ( $\rho = 0.253$ ,  $p = 0.011$ ) and there is a significant positive relationship between the two variables. So, the older you get, the more people's income in Tangkahan increases. This is thought to have something to do with knowledge of the economic value obtained from the use of Sumatran elephants as a tourist attraction. Meanwhile, community age has a negative correlation with knowledge of Sumatran elephant salt locations ( $\rho = -0.247$ ;  $p = 0.013$ ). This association indicates that the older the respondent, the less information they have regarding where to salt the Sumatran elephant. This could be due to the fact that they have rarely been deep into the forest, thus their knowledge of where to find salt elephants is dwindling. Despite the fact that people over the age of 55 have less understanding about elephants, they nonetheless support elephant conservation by ensuring the presence of natural salt places for elephants.



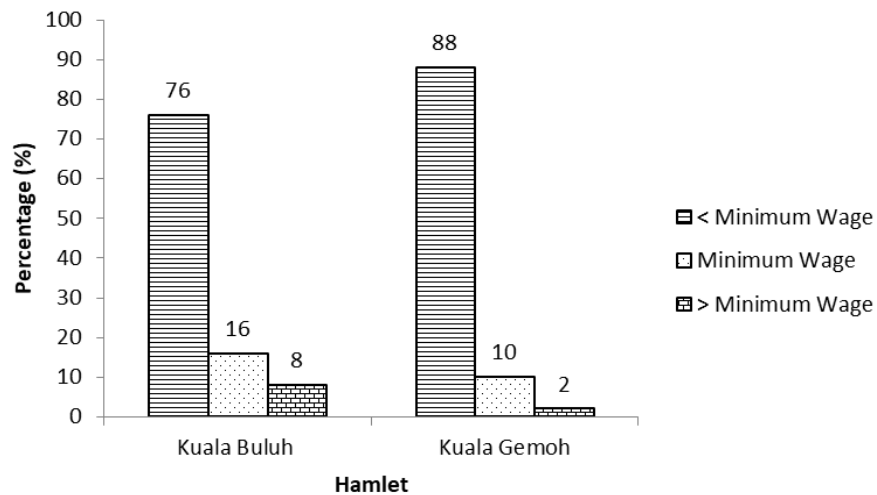


**Figure 6.** Age class of community in two hamlets.

The level of community income in Tangkahan generally comes from tourism sector activities. As seen in Figure 19, it is the current condition of the income of the Tangkahan community. The income of the people of Kuala Buluh hamlet is around 76% and Kuala Gemoh about 88% is below the district minimum wage (UMK) (Figure 7). Thus, the level of community income is included in the low category because many people have income below the Langkat district minimum wage in 2021, which is Rp. 2,710,988,-. From observations with the community, that if the current tourism sector activities decline, the community's income will also decrease. This low level of community income is due to the COVID-19 pandemic that has hit the world, including Indonesia. The government is making various efforts to overcome the pandemic, one of which is large-scale social restrictions (PSBB) to reduce community activities outside the home if not necessary. This factual condition causes the entire community to be affected, including people who carry out activities in the tourism sector in Tangkahan.

Since the government has imposed restrictions on activities in public facilities, flight restrictions, and the closure of the Tangkahan tourism destination, this has resulted in a decrease in visits by foreign tourists and domestic tourists, whose impact is chained by the decline in people's income. According to [9] stated that foreign tourist visits to Indonesia also decreased cumulatively in the period January to June 2020 by 59.96% (3.09 million people) compared to the number of foreign tourist arrivals in 2019 (7.72 million visits). The tourism sector is a source of foreign exchange for the country and has an important contribution to strategic employment. Based on the results of interviews, the Tangkahan community has difficulty in operating costs and maintaining building facilities because they do not have the costs due to the impact of the pandemic. Furthermore, according to [10] that 62.1% of small businesses had difficulty financing business operations during the pandemic. The same thing happened in several regions in the archipelago, for example in North Sulawesi, indicating that entrepreneurs have difficulty covering operational costs when the destination is closed [11]. This also happens on a global scale, according to [12,13] that the specific problems experienced by destinations during the

pandemic are insufficient and even inadequate operational and maintenance costs. Therefore, the impact of this pandemic has resulted in Tangkahan community groups that were previously not included in the income below the UMK eventually become below the UMK due to the wide-scale restrictions.



**Figure 7.** Profile of income of the community based on the district minimum wage in two hamlets.

However, based on the value of the rho coefficient between people's income levels and perceptions of salt lick behavior and Sumatran elephant conservation, the relationship is very low, even meaningless and insignificant ( $\rho = 0.076$  ;  $p = 0.452$ ). Thus, although the Covid 19 pandemic is still causing a decrease in the income of the Tangkahan community, this does not affect their perception and does not become a limiting factor in conserving Sumatran elephants.

Positive public perceptions of elephant salt sites conservation are beneficial to elephant conservation outside of their natural environment. Because local communities are the closest to elephant habitat, their engagement in elephant conservation management is critical. The extent to which local knowledge can be appreciated and utilized in building a good conservation area management system determines the community's participation in managing biological resources. Then, how concerned are local populations about their environment, so that they may encourage efforts to preserve and manage biodiversity both within and outside the area? Furthermore, how many advantages (both material and non-material) can the community derive through conservation initiatives in order for its existence to continue to be beneficial? These questions remained to be answered in further deeper investigation in the future.

#### 4 Conclusion

15 in the forest of Gunung Leuser National Park, the location of the Sumatran elephant's salt lick (salt lick) is crucial for the Sumatran elephant as a supply of natural mineral salt. As a result,

this place must be safeguarded against harm. The CRU and the Tangkahan people worked together to safeguard the site of the salt. This is based on the community's understanding of elephant conservation and the socioeconomic conditions of the community's culture, which are described as diversified, ranging from moderate to strong.

## 5 Acknowledgments

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