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## **Social, Economic, Cultural and Community Perception on Sumatran Elephant (*Elephas maximus sumatranus*) Conflict Areas in Aceh Province**

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### **Abstract**

Social, economic, and cultural conditions have several roles on community perception in human-elephant conflict areas. Community perception of Sumatran Elephant conservation is considered to be very important because their understanding on elephant existence is expected to support elephants conservation in their habitat. Research on social, economic, and cultural conditions as well as community perception was conducted from Agustus 2013 to April 2014. The location was decided through *purposive sampling* by focusing on areas that were affected by human-elephant conflict. The area covers five districts in Aceh: Cot Girek, Mane, Meureudu, Sampoiniet, and Pantai Ceureumen. Data collection on social, economic, and cultural conditions of local community, as well as their efforts and roles on over coming human-elephant conflict and perception on elephant conservation were derived from 150 respondents.

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The parameters that were definitely linked to the perception on elephant conservation were level of education and length of settlement within the conflict areas. Collective participation among community, government, related institutions, and civil society organizations are needed to lessen the conflicts. Perception or knowledge of farmers who live around the human-elephant conflict areas are considered to be strong due to their decent understanding about elephant conservation. It is proved by the community awareness of elephant habitat loss due to forest conversion to agriculture/plantations/settlement areas (68.93%), understanding about elephant protection and its habitat under specific Act (74.93%), and acknowledgement that elephant belongs to endangered species of which existence is very important for ecological balance (80.4%).

**Keywords:** social; economical; cultural conditions; community perception; conflict; elephant conservation.

## 1. Introduction

Wild animals play essential role in human life, either for the balance of ecosystem, economy, or socio-cultural life [1]. Sumatran Elephant (*Elephas maximus sumatranus*) is one of those protected endangered animals that plays aforementioned role. However, rate of expansion of agricultural land, plantations, settlements, and industry has direct impact on elephant habitat loss, resulting on human-elephant conflict [2,3,4]. Conflicts between human and elephant have become major threat for Sumatran Elephant survival. Thus, the conflict of interest between the social, economic, and cultural needs and the conservation programs potentially endangers elephant, eliminates the source of economy, as well as threatens human health and life [5,6,7].

Human-elephant conflict is closely related to a value that is understood by society about their environment. These values are guided by their understanding of either the ecology or short-term economic comprehension [8]. It causes diverse perception preceded by the process of selecting, organizing and interpreting information to create an image of categorization and selective interpretation [9]. Factors affecting perception was perceived characteristic and situational factors. Conflicts tend to cause negative attitudes from community towards elephants which diminish the appreciation of the elephant existence and damage the conservation efforts. Moreover, according to [10] there are two different community attitudes in facing human-elephant conflicts throughout elephant population habitats in Riau Province. First, those who do not concern with the human-elephant conflict and consider this disruption as annually common problems. They tend to be unresponsive to the elephants. They conduct conflict prevention by a group-work forest conversion, perform night patrols, and make a bonfire, noise, and torch to dispel the elephants. Second, those who are responsive to the elephant attacks. In this case, elephants are eventually seen as the only party being blamed for whole disruption.

The second group of community exists due to the increase of the disruption by elephants every year, both in terms of frequency and distribution of areas, as well as financial losses. The elephants shall be eliminated by any means is probably the only thinkable way out, hence it is quite common that the elephant is found dead, whether intentional or not. On the other hand, this conflict is boosted at a particular point of issue by certain parties to gain advantages, such as getting rid of remaining elephant populations so that the forest areas could be converted to plantations.

Human-elephant conflict mitigation varies widely depending on various components taking part in a conflict. The parameters include the population of the elephants, the conditions of the remaining habitats, the socio-economic and the cultural conditions of the local community. Nonetheless, for human-elephant conflict mitigation one needs to pay attention to some principles that have been adopted in the document of Conflict Mitigation Protocol stated in the Forestry Minister Regulation No. 48/2008 [11]. Therefore, the elephant conservation activities should be considered as important as the efforts of developing the agriculture and plantation.

General information from the local people and several reports of researches indicate that social, economic, and cultural conditions of communities present distinct perception to elephant conservation. Nevertheless, there is no specific data and comprehensive information about social, economic, and cultural conditions of communities in human-elephant conflict areas and there is no information of community perception on elephant conservation so far. Therefore, we conducted the research that aims (1) to identify social, economic, and cultural conditions of local community affected by human-elephant conflict, (2) to analyse community perception on elephant conservation in human-elephant conflict areas.

## 2. Method

This research was conducted in August 2013 to April 2014. Surveys on conflict between human and elephant in various areas in Aceh province were carried out from December 2012 to May 2013. The location was chosen based on the intensity of human-elephant conflicts reported by the local people in five districts in Aceh Province: Cot Girek, Mane, Meureudu, Sampoiniet, and Pante Ceureumen (Figure 1) and by the mass media

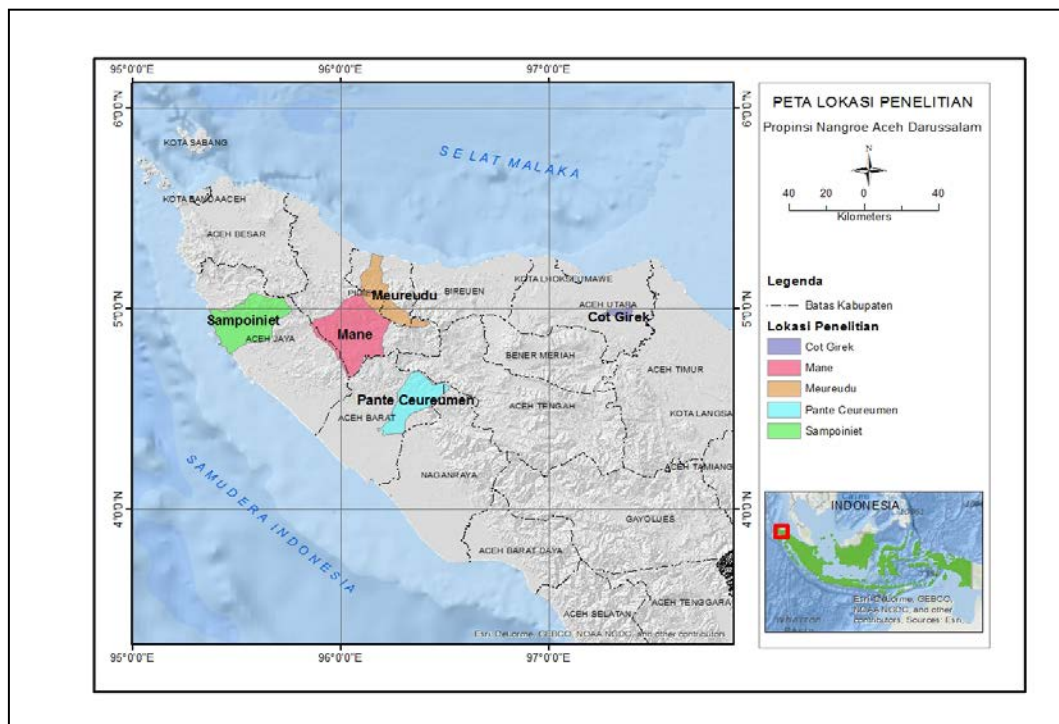


Figure 1: The map of research location

The information of the social, economy, and cultural backgrounds of the local respondents in the conflict areas including sex, age, level of education, length of settlement, acreage, and level of income were acquired through the interview and the questionnaire [12]. The local people perception on elephants, was obtained from the analysis of the interview and questionnaire results. The variables included in the survey include (1) the knowledge of the local community that their agricultural lands were previously the elephant habitats, (2) the knowledge of the local community of the decrease of because of the conversion of forest to agricultural lands, (3) the knowledge of elephant conservation and its habitats are regulated by the government, and (4) the understanding of the local people toward the importance of the elephant conservation to the ecological balance. The survey was carried out by using *purposive sampling* to the owners of the land that live in the human-elephant conflict areas, traditional figures, and local government officials. There were 30 respondents of each district [13] and they comprised of 150 people in total of the observed districts.

The interview results of social, economic, and cultural aspects as well as the roles and the efforts made by the community to mitigate the conflict were analysed descriptively. Furthermore, the data of the public perception of the elephant conservation were analyzed quantitatively by using the Likert scale. The adjustment system of Likert scale was similar to that used by [14]. The Spearman correlation [15] to SPSS were also analysed to find correlations between social, economy, and culture to the community perception.

### **3. Result and Discussion**

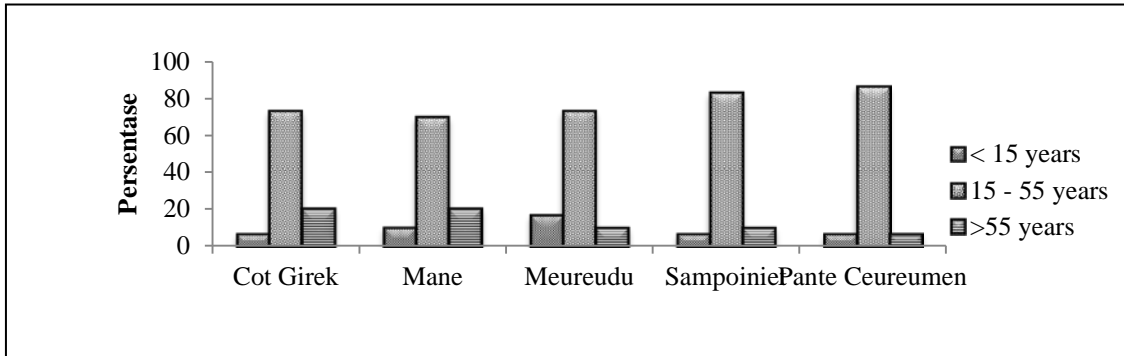
#### ***3.1 Social, Economic, and Cultural Aspects in Human-Elephant Conflict Areas***

The farming activities in the human-elephant conflict areas are mostly managed by men. It was observed in Cot Girek (80%), Meureudu (93.33%), Sampoiniet (90%) and Pante Ceuremen (86.66%) districts where the workers in the agricultural lands were generally men. However; women also involved in other parts of farming. There was ascertain distribution of work between men and women in the land processing. Men worked in land preparation and crops transportation while women involved in planting and harvesting the crops. In addition there were community concerns that the disruption by the elephants could happen anytime, so people assumed that men has better ability to to escape from elephant threat. But in the Mane District most women (66.67%) were responsible for the land cultivation. We believe that men in the Mane district choose to work in the gold mining because it is more beneficial than to work in agricultures.

There is no clear work distribution between men and women in a farmer family. The pattern of the work distribution work of farmers in those five districts shows that there is no gender equalities. There is also no standardized values for gender role that similar to the common society. Similarly, reference [16] argued that gender roles distinguished by these communities have dynamic nature. It changes continuously either in forms of the strata or the variation of the social conditions in the society.

Based on age distribution, farmers in those five locations are among productive classes. It corresponds to population age based on the level of productivity according to [17]. Farmers with ages between 15 and 55 years old are considered as productive while people younger than 15 years old and older than 55 years old are

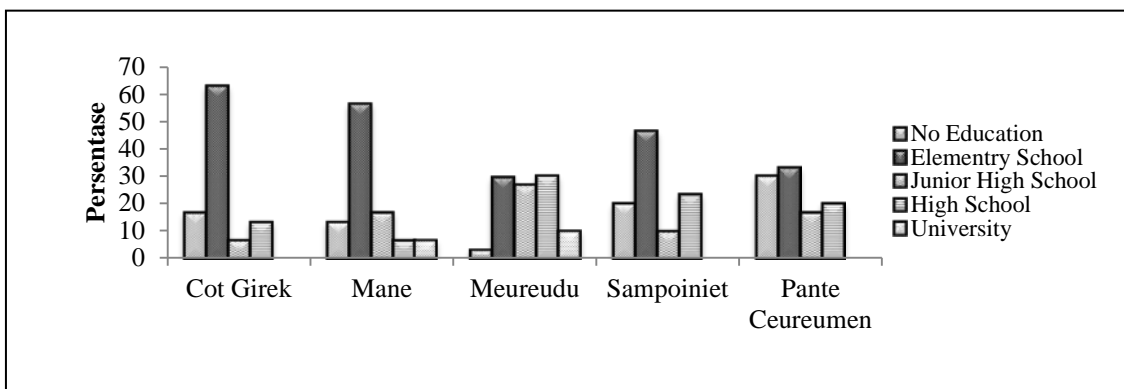
unproductive. The productive group of farmers in Pante Ceureumen was 86.67%, in Sampoiniet was 83.33%, Cot Girek was 73.33%, Meureudu was 73.33% and Mane was 70%. The workers with age <15 years could be found consecutively in the District of Meureudu by 16.67%, Mane by 10%, Cot Girek by(6.67%, Sampoiniet by 6.67% and Pante Ceureumen by 6.67%. Finally, the percentages of those of  $\geq 55$  years old are between 6.67% and 20% (See Figure 2).



**Figure 2:** The age distribution of the farmers in five districts

Generally, someone who was in productive age of group would gain more income than others. Age structure will affect economic activities run by community. Accordingly, productive class in the five districts is potential to enhance the production of the farming and the plantation.

The education levels of the farmers in the human-elephant conflict areas were considerably low. In general, the farmers were merely elementary school graduates marked by the following percentages: District of Cot Girek (63.33%), Mane (56.67%), Sampoiniet (46.67%), Pante Ceureumen (33.33%) and Meureudu (30%). The percentages of farmers who have never attended primary school education in Pante Ceureumen are higher (30%) than in Meureudu (3.33%). Indeed, the levels of education of the farmers in Meureudu were considered to be better than other districts. The farmers in Meureudu graduated from Junior High School graduates (26.67%), High School (30%), and university levels (10%) (Figure 3).

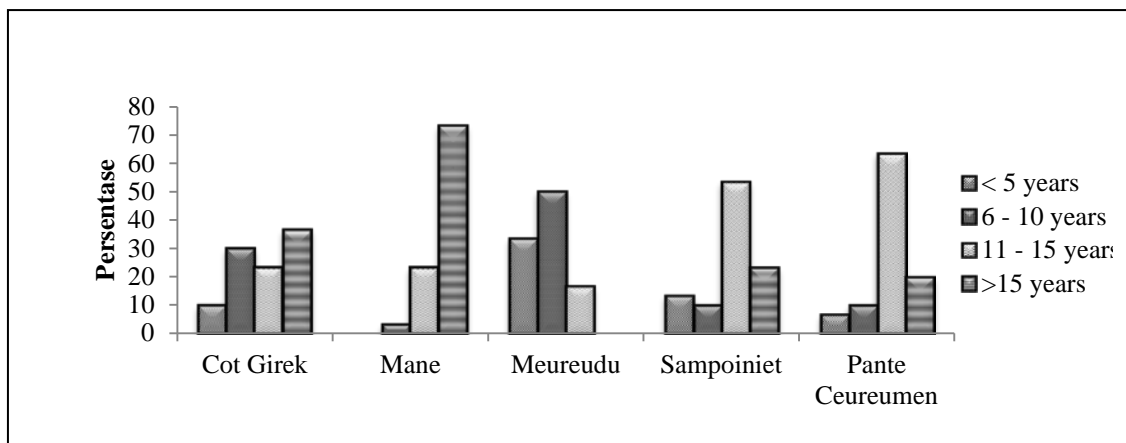


**Figure 3:** The distribution of the education levels of the farmers

Low level of education of farmers was caused by the lack of education facilities in the region and the need of

helping parents in agriculture works. Consequently, the young farmers have no choice but to work as the farmers, the fruit pickers, or the labour at oil palms, coffee, cocoa, rubber rod wrenching, paddy and other plantations. Low educational levels also led to have poor standard of living far from prosperous category. According to [18], people with primary educational level is categorized as unprosperous. In addition, according to [19] level of education influences the way of thinking. People with higher level of education will have broader horizon, higher idealism and needs and also tend to always strive to achieve the needs. Otherwise, less educated people will be satisfied with the surrounding environment. Like [20] suggested that low level of education influences the way of thinking or understanding of people toward the importance of farming, maintaining environmental sustainability and resolving current problems at the same time. Reference [21] added that the level of education affects farmer decisions of the land conversion. If the education level of people is substantially low, people is easily influenced by others in making a decision. On the contrary, if ones have higher educational levels, they can think more rationally in making decisions toward their lands.

Based on the survey, there are a variation of the length of the agricultural land uses in the conflict zones as shown in Figure 4. In the Mane District, 73.33% of the farmers have been working over 15 years in the human-elephant conflict areas. There is no farmers has worked less than five years in the conflict zones in the Mane District. In PanteCeureumen, 63.33% of farmers have worked in the conflict zones for 11 to 15 years. In Meureudu, 33.33% of farmers have worked in the conflict areas less than five years.



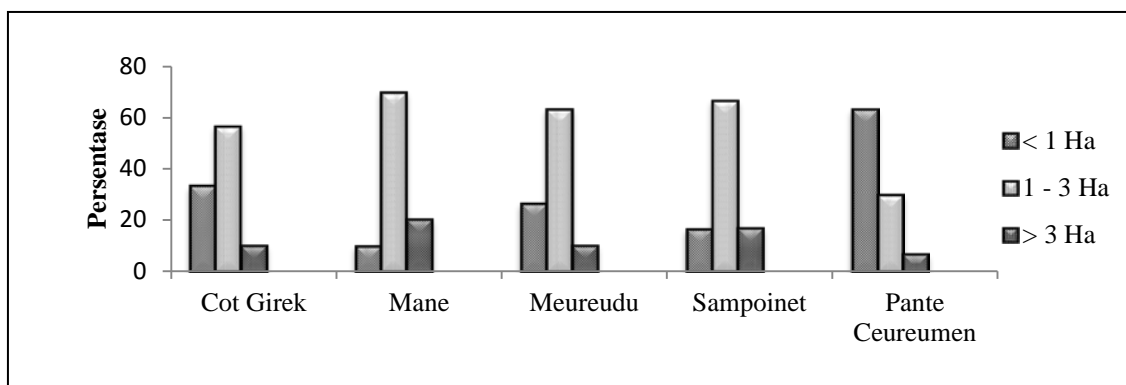
**Figure 4:** The length of settlement of farmers in the human-elephant conflict zones

The farmers who have lived and worked in agriculture/plantations in the human-elephant conflict areas for more than 15 years were indigenous people. Their lands were inherited and managed by planting common crops following the types crops planted by previous generation. On the other hand, farmers who worked in agricultural lands for less than five years was migrants coming to the conflict areas. The converted lands are generally planted by new types of crops that had never been planted previously by the local community.

For example, they planted oil palm trees which is previously had not been planted in the conflict areas. Reference [22] argued that there are five social factors affecting land conversions: (1) shifting of attitudes, (2) the ownership of the lands, (2) land splitting, decision making process, and government appreciation to community aspirations. In addition, economic factors have the most significant impact. People could change

from traditional farmers become the labour of the palm oil company. Thus, social, economic and cultural dynamics still affect community concern to the cultivated plants.

The size of the farms or plantations in each human-elephant area was varied widely from less than 1 to more than 3 Ha. People that has land from 1 to 3 hectares, are mostly in the District of Mane (70%), Sampoiniet (66.67%), Meureudu (63.33%), Cot Girek (56.67%) and Pante Ceuremen (30%) (Figure 5). Therefore, the size of land of 1 to 3 Ha owned by local community is categorized as a medium size. The products of the middle size agricultural lands normally could meet the basic needs of the owners. This category refers to [23]who stated that the size of the land area of less than 1 hectare is considered as small, 1 to 3 hectares as medium, and more than 3 hectares as large areas. From the size of the land areas larger than 3 Ha, there is 20% of the land categorized as large areas located in the Mane District compared to the other 4 districts.



**Figure 5:** The distribution of the size of land Areas in the human-elephant conflict areas

In addition, the income of the farmers can be classified into 3 groups of incomes: (a) between IDR. 1,000,000 and IDR 3,000,000, and (b) between IDR 3,000,000 and IDR 5,000,000 per month. The percentage of farmers having incomes between IDR 1,000,000 and IDR 3,000,000 are the following: 76.67% in PanteCeuremen, 60% in Cot Girek, 50% in Mane, 50% in Meuredu and 46.67% in Sampoiniet.

The sources of the incomes are generally obtained from the farming. . A farmer could gain approximately IDR. 1.000.000 to IDR. 3.000.000 a month. According to the regional minimum salary (minimum IDR 1,550,000), the incomes of the farmers are categorized as middle level of incomes. When farming or plantation productivity decline, the incomes of farmers would also decrease. According to [24], the size of land areas is related to the amount of the farmer incomes. If the size of the area is small then the amount of the incomes is also small and vice versa. Therefore, the size of the farming areas and incomes of the farmers should have positive correlation. However, according to the data, farmers who owned large agricultural lands do not always gain high incomes.. According to research analysis, we found that the size of the farming areas do not correlate to the incomes of the local people ( $r = 0.200$ ;  $p = 0.747$ ) if the lands were not utilized optimally. Reference [25] suggested that limited utilization of the farming land affects to the decrease of the incomes of farmers. In addition, the elephant attacks to the agricultural farms also caused the economical loss of the community.

The distance between agricultural land and elephant habitats were different in each human-elephant conflict

areas. The farms-elephant habitats distance is from less than 1 km to more than 15 km. In the Mane District there were 60% of the agricultural land located less than 1 km from the elephant habitats and 10% of the agriculture was at a distance of 15 km from the elephant habitats. Although the agricultural lands are quite far from the elephant habitats, the plantation could still be destroyed by the elephants because it is located along the pathway of the elephants. The agricultural lands located closer to the elephant habitats are destroyed more often than the land located more than 15 km from the elephant habitats. The frequency of the disruption of the farms in Mane is around 60% because the farms are located less than 1 km from the elephant habitats. On the other hand, the frequency of the damages of the farming located more than 15 km from the elephant habitats by the elephants is only 10%. Therefore, we conclude that the agricultural areas at the distance of more than 15 km could also be damaged by elephants if the lands are located along the travel paths of elephants.

### ***3.2 Community Perception on Elephant Conservation***

Community perception on the understanding of forest-to-land converted areas in the five districts of human-elephant conflicts was relatively strong (68.93%). From the survey results, 40% respondents were very aware that their agricultural lands were previously elephant habitats while 24% respondents were not aware. From the survey analysis we found that the community perceptions were relatively strong in the District of Meureudu (95.33%), Cot Girek (74.67%), and Pante Ceureumen (66%) respectively and just quite so in Sampoiniet (58%) and Mane (43.33%).

Community perception on the decline of the elephant habitats due to the conversion of forest to agricultural lands/plantations/settlement in the human-elephant conflict areas is relatively strong (68.93%). This perception is relatively the same for other districts which as 83.33% in Cot Girek, 77.33% in Sampoiniet, 72.67% in Meureudu and 71.33% in Mane Districts. The Pante Ceureumen District was the only exception because local people have relatively weak understanding about the decrease of the elephant habitats with the perception level of 39.33%.

The community perception on elephant conservation and its habitat protection that was regulated under the Wildlife Protection Act was classified as high (74.93%) in general where it is strongly proven in Sampoiniet (88%), Meureudu (86%), Cot Girek (85.33%) and Mane (77.33%). The community perception of elephant conservation is lower which around 46%.

Only people in Sampoiniet have middle perception of elephant conservation (60.67%) that elephant is endangered species and the existence of the elephants is very important for ecological balance. People in the other four districts have relatively high level of perception as the following: Cot Girek (89.33%), Mane (86.67%), Meureudu (84%) and Pante Ceureumen (81.33%). Therefore, overall community perception on elephant extinction and the needs for ecological balance is very high (80.4%).

Community perception in the human-elephant conflict areas on elephant conservation was apparently high due to (1) their awareness of elephant habitat loss caused by forest conversion to agriculture/plantations/settlement areas (68.93%), (2) understanding about elephant protection and its habitat under specific Act (74.93%), and (3)



acknowledgement that elephant belongs to endangered species of which existence is very important for ecological balance (80.4%).

The perception on elephant conservation is considered to be very important to support sustainable conservation efforts within their natural habitat. According to the analysis, there is a significant correlation between the educational level and the community perception as shown by *rho* coefficient values ( $r = 0.217$ ;  $p = 0.008$ ). It means that the higher educational level, the better possibility of information acceptance and the higher awareness on conservation efforts. The farmers with higher educational levels have broader way of thinking and insight thus the farmers are more rational in problem solving and decision making ([20,21,19]). Thus, level of education played a very important role in understanding conservation efforts. Several farmers have some empathy for elephant conservation even though they do not understand about the Wildlife Protection Act. The reason could be because elephants are considered as well-behaved animals and also as the signs of the glory of God during The Alaidin Ri'ayah Shah Sultan Al-Kadar Kingdom [26]. The presumption continues until now and becomes a local wisdom that is useful for elephant conservation management in accordance to the locally cultural conditions. Reference [27] defined a local wisdom as a policy that relies on the philosophy, values, ethics, and traditionally institutionalized behavior to manage resources (natural, human, and cultural) sustainably. Therefore, the local wisdom resulted from the combination of the commandment of God and the inherited values is accepted as the truth by the Acehnese society.

Based on analysis on the length of the settlement and the community perception on elephant conservation, negative correlation had been found ( $r = -0.214$ ;  $p = 0.009$ ). We previously presumed that the farmers with longer settlement in the human-elephant conflict areas have better perception on elephant conservation. However, the data shows that the longer settlement of the farms, the worse perception of the farmers on the elephant conservation. The experiences of the damages, the financial loss, and the threat of human's life caused by the increase of the human-elephant conflict results the decline of the community perception in the areas. Similarly, the economical loss and damages caused by the elephants in Kahalle, Srilanka have brought psychological impact to the local people who assume that the elephants are an obstacle to the agricultural productivity. Human-elephant conflict could gradually damage the values of respect of the local people to the elephants in the Asian socio-cultural backgrounds [28]. Someone who always deals with the human-elephant conflicts will consider elephants as an agricultural pest, unwanted burden, and life threat. Reference [29] argued that one's perception differs due to various factors including his/her experiences, social background, and their original environment. If people do not accept the human-elephant conflict people will be against elephants without considering the elephant conservation. Conversely, if someone has good perception on the human-elephant conflict, he/she would be able to take advantages from elephants for the ecosystem balance. In correspond to [30], these circumstances is beneficial for local people who live nearby the human-elephant conflict areas.

The role of local people is very essential in maintaining elephant conservation because they live close to the elephant habitat. According to [31], community role in managing biological resources is determined by the extent to which local people can appreciate and utilize a conservation area. Moreover, the community perception is influenced by the concern of the local community about ecological resources leading to the efforts of preserving and managing biological diversity. Furthermore, the community perception is also determined by

both economical and non-economical benefits that is possibly gained from the conservation areas. Positive perception on the existence of elephants itself provides benefits for conservation efforts. Participation from local communities is essential for elephant conservation because the local communities live close to the elephant habitats.

#### **4. Conclusion**

The social, economic, and cultural conditions of the community living in the human-elephant conflict areas including sex, age, level of education, length of settlement, acreage, level of income, and distance from settlement areas to the elephant habitats varied in each district. The locals who have experience of elephant disruption have several methods to dispel the elephants and to protect the crops. Generally, people dispelled the wild elephants by torch, fireworks, and bamboo cannon. The involvement of the communities, the government, and non-governmental organisation is important in order to reduce the conflict between human and elephants.

The community perception on elephant conservation is considered as high indicated by (1) the knowledge of the local people that the elephant habitats have been converted to agricultural lands (68.93%) (2) the knowledge of elephant conservation and its habitats is regulated by the government (74.93%) (3) the understanding of the local people toward the importance of the elephant conservation to the ecological balance (80.4%). Level of education and length of settlement of the agricultural lands are among the conditions of social, economic, culture that have positive correlation with the perception on elephant conservation in the human-elephant conflict areas.

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