Mitigation of Human-Orangutan Conflict in Orangutan Reintroduction Area at Suo-suo Village, Buffer Zone of Bukit Tigapuluh National Park

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Abstract. Indonesia develops rehabilitation and reintroduction programs of Sumatran Orangutan (Pongo abelli) to increase its population. This study was aimed to determine the potential of human-orangutan conflicts within the rehabilitation and reintroduction program in Bukit Tigapuluh National Park. Data collection was carried out using questionnaires, structured interviews, and Participatory Rural Appraisal (PRA) from August to November 2016 at Suo-suo village which is located around the releasing site in the buffer zone area of the park. We used frequency tables to determine the socio-economic characteristics of the community, such as education, livelihoods, gender, and income. We also depicted potential conflicts such as social and economic disturbances due to orangutan release. This study recorded that Suo-suo village is inhabited by a 2,887 population in 2016. According to the education level, the majority population (57.74%) has not completed elementary school due to limited education facilities. The primary livelihood in Suo-suo Village is shifting farming and also harvesting forest products from that surrounding park. This condition contributed to the potential conflict of human-orangutan because of an unsocialized rehabilitation program to the communities, competition in utilizing forest edible fruits, and the unintended entrance of orangutans in the community’s cultivated lands. We suggest the authority of the orangutan rehabilitation program to extend the socialization of its program to the local community, to prevent orangutans disturbing the community’s farming, to compensate community’s damaged crops, and to develop alternative livelihoods for a community that reduces their dependency on forest resources.

1. Introduction
The Sumatran orangutan (Pongo abelli) is on the verge of extinction due to fragmentation and hunting which is still difficult to stop [1], [2]. Orangutans are widely hunted for trade or as pets [3], [4]. Sumatran orangutans are designated as protected animals based on Regulation of the Minister of Environment and Forestry Number P. 92/MENLHK/SETJEN/KUM.1/8/2018 regarding the Types of Protected Plants and Animals. The International Union for Conservation of Nature’s (IUCN) Red List of Threatened Species in 2002 has classified orangutans as critically endangered [2], [3].

The government has carried out many conservation programs for orangutans [5], [6]. One way to do this is through rehabilitation and reintroduction programs (reintroduction to nature), such as in Bukit
Tigapuluh National Park (BTNP) [7]. Through the release program, it is projected that new populations can breed in nature. Also, learning from case studies of conservation of Bornean orangutans which are also threatened with extinction, conservation efforts are carried out through the identification of environmental protection areas by integrating bioclimatic models with projected deforestation and the suitability of oil palm agriculture from the 1950's to 2080's, so that it will become increasingly important for the conservation of orangutans and other threatened species, especially in the context of extensive land cover and climate change that occurred in this century [8], [9].

Research related to orangutans in the reintroduction area at Bukit Tigapuluh National Park is currently lacking. One of them was carried out by [10] which stated that only 65% of individuals can survive in new habitats and others have difficulty adapting and even death. The main problems that exist are the large costs to meet the needs of food during the adaptation process and the conflict with residents because the previous release site (BTNP) was the residence of traditional communities, such as the Talang Mamak tribe.

Conflicts between humans and wildlife can occur as a result of many interactions between humans and wildlife, especially due to the use of the same food and space sources [11]. Besides, a form of interaction between humans and wildlife that can lead to conflict is the practice of cutting trees, because orang-utan food sources are significantly affected through secondary damage, such as thinning, clearance (i.e. removal of climbers) which must be minimized, and commercial trees with tree trunks and or climbers’ large plants should not be cut [12]. Another form of interaction between humans and wildlife is that socio-ecological factors are closely related to conflict and non-conflict killing [1].

The difference in interests in the use of the same forest resources results in open conflicts between humans and wildlife [13]. The Ministry of Forestry stated that human and wildlife conflicts are all interactions between humans and wild animals that have negative effects on human social life, economy, culture, and the conservation of wildlife and the environment. Human and wildlife conflict management is a process and effort or activity to resolve or reduce conflicts between humans and wildlife by prioritizing the interests and safety of humans without sacrificing the interests and safety of wildlife. For example, the handling of human and wildlife conflicts in the country of India is carried out to help focus the allocation of conservation efforts and funds directed at conflict prevention and mitigation, where high population and wildlife densities occur simultaneously [14]. The lesson we can learn from dealing with human and wildlife conflict in India is that it can easily be extended to other landscapes where humans and wildlife can coexist so that the allocation of physical efforts and funds is more effectively targeted at conflict prevention and mitigation [14].

According to [15], [16], to reduce the potential for human-wildlife conflict, one of the information needed is the socio-economic conditions in the community so that it can be used to formulate mitigation strategies. For this reason, this study aims to determine the economic conditions and potential conflicts between village communities with reintroduced orangutans in Bukit Tigapuluh National Park, Riau. One village that is already in conflict is Suo-su Village, which borders the orangutan release site in Tebo Regency.

2. Materials and method
2.1. Materials
Materials that are the objects of this research are the community and related institutions around the orangutan release site in Bukit Tigapuluh National Park. The research tool was a 1: 50,000 scale work map, a questionnaire, writing instruments, and other research tools.

2.2. Research Design
Research on Mitigation of Human-Orangutan Conflict in Orangutan Reintroduction Area at Suo-su Village, Buffer Zone of Bukit Tigapuluh National Park was conducted through questionnaires, interviews, and PRA method as well as descriptive observations of the social and economic activities of the community [17]. Interview activities were carried out with informants who were selected as respondents, namely, village heads, village secretaries, community leaders, and other parties related to
this research. Interviews were conducted with open-ended questions to gather in-depth information regarding the experiences and impacts felt by the human-orangutan conflict in the orangutan reintroduction area in Suo-suo Village.

The PRA method was carried out by tracing the history of the village, namely the technique of re-revealing the history of the community in a certain location based on the community's narrative, which was arranged in a sequence and chronologically starting from past events to the present. The types of information include the origin of the village, humans, resources, the environment, economic conditions, cultivation, social, political conditions, and important events in the past [17]. The research location is focused on the buffer village around the release site in Bukit Tigapuluh National Park, namely Suo-suo Village. The informants were selected by a snowball, namely identifying cases through many people contacted sequentially. The number of respondents in each village was determined proportionally based on the number of family heads as the unit of analysis in this study.

Furthermore, a Focus Group Discussion (FGD) was conducted to identify perceptions [18], [19] and the main tasks and functions of various institutions in identifying potential conflicts with the orangutan release program in Bukit Tigapuluh National Park. The institutions that would be involved in the FGD process were selected by purposive sampling. FGDs were conducted in various institutions at the sub-district level, namely in Batang Gangsal District, Indragiri Hulu Regency.

3. Result and discussion
3.1. Description of Suo-suo Village, Sumay District, Tebo Regency.

The results of interviews and PRA using historical analysis [17], (Table 1). Table 1 shows the history of Suo-suo Village, Sumay District, Tebo Regency, which contains a sequence of years of important events regarding the formation of Suo-suo Village, Sumay District, Tebo Regency.

| Year     | Important Events                                                                 |
|----------|----------------------------------------------------------------------------------|
| 1911     | The relocation of residents from four hamlets (Kampung Tengah, Dusun Simpang Tigo, Dusun Seno and Dusun Rambahan by the Dutch troops to Bidaro Rampak Village, Tebo Tengah District. |
| 1918     | People from the four hamlets (Kampung Tengah, Dusun Simpang Tigo, Dusun Seno and Dusun Rambahan) had moved back to their respective villages. |
| 1919     | An agreement was formed between the people of the four hamlets to create a new settlement and was chaired by a Depati, namely Depati Tumpul. |
| 1940     | Belimbing Hamlet was led by a Depati, namely Depati Abdul Majid. |
| 1983     | Dusun Belimbing and Dusun Simpang Tiga were split. |
| 1983-1988 | Suo-suo Village was led by the Village Head Sulaiman Majid, Simpang Tiga Suo-suo Village is led by the Village Head Nurdin Samad, with a term of five years. |
| 1988 to Present | Suo-suo Village, Simpang Tiga Village Suo-suo was reunited including Simerantihan Village, which was commonly referred to as the Talang Mamak Tribe. The reunification of Suo-suo Villages and Suo-suo Simpang Tiga Villages based on the Decree of the Governor of the First Level Regions of Jambi Province Number 501 of 1988 concerning Unification and Abolition of Villages within the Province. |

Source: Primary Data (2015)

The term Depati means District Head. At first, Depati were small kings in the interior [20]. They were the heads of the free people. They had no obligation to pay tribute to the sultan. However, later on, as a sign and relationship with the sultan, they were required to pay tiban. Depati served in the Sindang area or the border area with the kepungutan area. They were obliged to protect the borders of the Sultanate from invading outsiders [20].

In 1940, Belimbing Hamlet was led by a Depati, namely Depati Abdul Majid. Forty-three years later, the Dusun Belimbing and Dusun Simpang Tiga occurred. After that, from 1983 to 1988, Suo-suo Village was led by the Village Head Sulaiman Majid, while Simpang Tiga Suo-suo Village was led by the
Village Head Nurdin Samad, with a term of five years. Then, from 1988 to the present, *Suo-suo* Village, and *Simpang* Tiga *Suo-suo* Village had been reunited, including Simerantihan Village, which was commonly referred to as the *Talang Mamak* Tribe. The reunification of *Suo-suo* Village and *Suo-suo* Simpang Tiga Village was based on the Decree of the Governor of the First Level Region of Jambi Province Number: 501 of 1988 concerning Unification and Abolition of Villages within the Province.

### Table 2. Land Allocation in *Suo-suo* Village, 2014.

| No. | Land Allocation | Area (ha) |
|-----|-----------------|-----------|
| 1.  | Moor            | 235       |
| 2.  | Garden          | 8.422     |
| 3.  | Pasture         | 20        |
| 4.  | Bare land       | 31        |
| 5.  | Settlement      | 69        |
| 6.  | State Forest    | 10.741    |
| 7.  | Swamp           | 8         |
| 8.  | Others          | 275       |

Source: [21].

Based on Table 2, it can be seen that the land use in *Suo-suo* Village in 2014 is quite large, especially land use of the State Forest area which is in the first place with an area of 10,741 hectares. The second place is the plantation area, especially oil palm and rubber covering an area of 8,422 hectares. The oil palm cultivation is expanding year by year, reducing other utilization surrounding the national park [22], [23]. Likewise, land designations in other areas occupy the third position covering 275 hectares and the fourth position is the *Tegalan* area covering 235 hectares. Then, in the next position is a residential area of 69 hectares, 31 hectares of bare land, 20 hectares of grazing land, and the allotment of land in a swamp area as the lowest width with an area of 8 hectares.

### Table 3. Problems and Institutional Potentials in *Suo-suo* Village.

| No. | Institution                  | Problem                                      | Potency                                      |
|-----|------------------------------|----------------------------------------------|----------------------------------------------|
| 1.  | PEMDES (village government)  | Village officials are not good at serving the community | Complete village apparatus and facilities available |
|     | and BPD                      |                                              |                                              |
| 2.  | Farmers Group                | Farmer Group activities in Hamlet 1 to V stalled | Organizational management structure exists |
| 3.  | Savings and Loans Group      | Lack of capital and understanding of the management with the members about SPP | There is a group, with business capital and complete management |
| 4.  | Youth                        | Youth activities are neglected due to a lack of facilities and infrastructure, such as sports and arts facilities | Complete caretaker youth |

Source: Primary Data, (2015)

Based on the results of field observations on the people of *Suo-suo* Village, it is known that there are 4 (four) institutions in *Suo-suo* Village that have both problems and potentials, namely the Village Government (PEMDES) and the Village Consultative Body (BPD). The problem with PEMDES and BPD is that these two instruments are lacking in providing services to the community even though there is a potentially available facility. Farmer Group Institution was established in *Dusun* I to *Dusun* V. For supporting the economic system in this village, there was Savings and Loan Group Institution, though lack of capital and capabilities in another potential is the existence of Youth Institutions, yet the problem is the lack of facilities and infrastructure such as sports and arts facilities. The minimum capacity and capability in organization and institution make this village a lack in land use and forest governance, social interactions, and economic developments [24], [25].
Table 4. Potential Conflict on Orangutan Release

| Aspects    | Problem                                                                 |
|------------|--------------------------------------------------------------------------|
| Social     | 1. Population growth                                                   |
|            | 2. Domicile of the original inhabitants (*ulayat* rights)                |
|            | 3. Customary rights (from generation to generation to land)              |
|            | 4. The *Talang Mamak* tribe cannot penetrate the forest but outsiders can penetrate |
|            | 5. Conservation group institutional, economic and other social institutions are not sustain |
| Economy    | 1. Shifting agriculture                                                 |
|            | 2. Agriculture/oil palm commodity                                      |
|            | 3. The unclear rights and/obligations of smallholders in oil palm company partnerships |
|            | 4. Forestry product trading system (rubber and *jernang*) that does not take sides with farmers |
|            | 5. The forest has not directly benefited the communities around the Bukit Tigapuluh National Park |
| Law        | 1. Plantation and mining permits                                        |
|            | 2. Area permit/forest boundary layout                                   |
|            | 3. Illegal logging (chainsaw noise disturbs Orangutans)                 |
|            | 4. Law enforcement against criminal acts killing of protected orangutans |
| Cultivation| 1. Farmers accidentally encroached on the area                            |
|            | 2. Limited choice of land cultivation systems (oil palm and rubber)      |
|            | 3. Cultivated plants are preferred by orangutans, such as *petai*, *durian*, and *jengkol*. |
| Coordination| 1. Coordination with other stakeholders has not been going well (smoothly) |
|            | 2. The community does not know Orangutans                               |

Source: Primary Data, (2015).

*Suosuo* Village is laid on a low altitude, which ranges from 60-100 meters above sea level. It is a part of Sumay District, Tebo Regency, Jambi Province. It covers 231.89 hectares, with a distance of 50 km from the capital of Sumay District.

At the beginning of its establishment, *Suosuo* Village consisted of 4 (four) hamlets, namely Central Village, Simpang Tigo Hamlet, Seno Hamlet, and Rambahan Dusun. Then, in 1911, residents from the four villages were moved by the Dutch army to Bidaro Rampak Village, Tebo Tengah District, so that the four villages were not inhabited. During the six years of living in Bidaro Rampak Village, the community felt very badly due to economic factors, so that in 1918 the people decided to return to their original hamlets. In 1919, the community formed an agreement to make a new settlement headed by a *Depati*, namely *Depati Tumpul*. At that time, the settlement was inhabited by 47 families, but the settlement did not yet get a name.

The origin of the name *Belimbing* Hamlet came from a resident who was very arrogant and stingy. These residents had a hobby of fishing for *Bedegung* fish, so because of their arrogance, the fish that
they got were often covered by star fruit. Since then, the settlement was given the name *Dusun Belimbing*. Simultaneously with the formation of the *Sumay* clan area which was led by the head of the clan, namely, *Pasirah*. *Pasirah* leads several villages, namely: Sungai Alai, Bidaro Rampak, Jati Belarik, Tambun Arang, Teluk Langap, Punti Kalo, Tuo *Sumay*, Teriti, Muaro Sekalo, Belimbing, Pemayungan, and Semambu.

Then, in 1940, *Dusun Belimbing* was led by a *Depati*, namely *Depati* Abdul Majid, who was appointed directly by the Head of the Clan. *Depati* Abdul Majid led *Dusun Belimbing* for about eighteen years, from 1940 to 1968, and was continued by several *Depati*, including from 1969-1975 led by *Depati* Dahlân and from 1976-1982 led by *Depati* Jai Jabuah. One year later, *Dusun Belimbing* and *Dusun Simpang Tiga* were expanded, and after the division of *Dusun Belimbing* and *Dusun Simpang Tiga*, Belimbing Hamlet became *Suo-suo* Village, Simpang Tiga Hamlet became Simpang Tiga *Suo-suo* Village. The inhabitants of *Suo-suo* Village were heterogeneous, consisting of the Malays, Javanese, and Batak ethnics.

### 3.2. Economic and Social Potentials of the Community

In 2014 (Central Statistics Agency of Tebo Regency, 2017), the total population of *Suo-suo* Village was 2,887 (1,401 men and 1,486 women), so that with an area of 231.89 km², the average population was 12 people/km². The number of families was 684 households, so the average number of family members was 4.2 per family. Of these families, all were classified as pre-prosperous. The majority of the population was not graduating from elementary school, (57.74%).

The low level of education [26] was due to the scarcity of educational facilities available in this village. For social and health facilities, *Suo-suo* Village only had a supporting *puskesmas* (health facility in a district level) with motherhood facility and religious facilities in the form of a mosque and a prayer room. The economic level of *Suo-suo* villagers was still low. It was related to its remote accessibility. There was only a 2 hours car trip crossing a dirt road from the Sumatra main road. The people generally live by relying on forest products around their villages, including from the Bukit Tigapuluh National Park area. The community, especially from the Talang Mamak tribe, often enter the forest area to collect fruit, hunt animals, and collect *jernang*.

The settlement conditions in their area were often flooded. The conditions of agricultural land (rice fields) and fields were not productive because they were not fertilized and there were many pests and diseases. The condition in this village was commonly found in other surrounding forest villages where vital infrastructure, such as health and education facilities are very minimal so that social and economic life has not yet developed [24], [27].

The community sold their crops, such as latex, *jernang* and palm oil if there were buyers who came to their village at a relatively low price. Based on statistical data for Sumay District, in 2014 [21], land-use in *Suo-suo* Village was mainly allocated for state forests, then gardens, as presented in Table 2. The forest was, belonging to the Tebo Regency government. The garden was utilized in a shifting system. This affects potential land-use conflicts with wildlife living in the forest.

### 3.3. Institutional

Based on the results of the Participatory Rural Appraisal (PRA), which was attended by 35 villagers, there were several potential problems related to the institutional development efforts of *Suo-suo* Village. They were the lack of facilities, idled Farmer Group activities, and inadequate institutional facilities to develop youth potential. The potential of village institutions, such as the Village Government, BPD, Farmer Groups, and Youths had not developed optimally due to the lack of counseling and understanding of the community in managing village institutions.

From the PRA activity, information was obtained that basically all members of the community in *Suo-suo* Village had a high awareness of getting involved and joining organizations or institutions in their village. However, the high awareness that existed in the people of *Suo-suo* Village, was not supported by a strong institution [28]. To illustrate the problems and institutional potentials in *Suo-suo* Village, it can be seen in Table 3.
3.4. Potential of Human-Orangutans Conflicts

Based on the results of interviews and PRA, information was obtained that the potential for conflict with orangutans already exists, because according to the community, they feel disadvantaged by the presence of release locations in the area. Some cases according to their admission that can be a source of conflict include [22], [29], [30]:

1. The community feels excluded by the existence of a land tenure permit by the Frankfurt Zoological Society (FZS) and other partners to be used as an orangutan release location around the village, so there is often misunderstood in land use;
2. The community finds it increasingly difficult to find durian, jengkol, petai, and jernang after the release of orangutans in the area where they live;
3. The community considers that the Government and FZS care is more focused on protecting orangutans than on channeling the budget for their economy;
4. The boundaries of the area are not clear, the community is often considered as encroachers, while orangutans who enter the community's fields are left alone.

The results of the FGD meeting regarding social, economic, legal, and land cultivation characteristics to formulate solutions to potential conflicts resulting from the orangutan release program are presented in Table 4. All problems are also related to the absence or lack of coordination between agencies. Based on the results of the analysis of PRA activities in Suo-suo Village which showed the potential for conflict due to the orangutan release program with the community, especially with the Talak Mamak Tribe people who are scattered in and around the Bukit Tigapuluh National Park (TNBT) area, it is considered that the TNBT area is lacking suitable as an orangutan release location, considering the habits of orangutan [19].

Likewise, with community activities in shifting cultivation areas and the increasingly widespread opening of oil palm and rubber plantations around TNBT, it is necessary to have an integrated strategy and institution (starting at the hamlet level) if this program is to be continued [22]. Based on the analysis of PRA activities in Suo-suo Village, it shows that the potential for conflict has a close correlation with orangutan conservation activities in the Bukit Tigapuluh National Park (BTNP).

4. Conclusion

Based on the results of the research, it can be concluded that the people in Suo-suo Village, Tebo Regency, are indigenous people who still rely on forest products around their village, including from the Bukit Tigapuluh National Park (TNBT) area. The economic life of the people of Suo-suo Village, which is still classified as low due to the remote accessibility from Jalan Lintas Jambi Province, the education of the Suo-suo Village community (57.74%) is not graduating from elementary school and all the people of Suo-suo Village are still classified as family pre-prosperous, resulting in high dependence on the allocation of land resources and forest products around the village, so that it can become a source of conflict in resource use with orangutans. Also, the allocation and utilization of land in the state forest area covering an area of 10,741 hectares and the frequent use of village communities, especially from the Talang Mamak Tribe, who collect fruits and jernang from the forest and hunt animals, are indicators that the high level of dependence of the people of Suo-suo Village land resources and forest products.

5. Recommendations

The local government in collaboration with the Bukit Tigapuluh National Park Office and the Center for Natural Resources Conservation needs to develop alternative economic programs for the people of Suo-suo Village who are practicing shifting farming so that the frequency of villagers entering the conservation forest area can be reduced. They also need to build field school facilities to improve the quality of formal community education, adequate access road infrastructure, village infrastructure such as health and education facilities, so that the social and economic life of the community can develop well. Collaborating with forest area managers, they can establish sustainable conservation, economic, and social group institutions. The central and local government of Tebo Regency need to immediately
undertake efforts to mitigate conflicts between communities and orangutans, because these conflicts can lead to worse conditions or even death.

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