

Enabling sustainable community-based human-tiger conflict management in Seluma, Bengkulu, Indonesia

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Abstract. Ekarini DF, Setiawati S, Gawi JM. 2022. Enabling sustainable community-based human-tiger conflict management in Seluma, Bengkulu, Indonesia. *Biodiversitas* 23: 6404-6412. Human-wildlife conflict has emerged as one of the major threats to the global population of large carnivores. This condition applies to the endemic and Critically Endangered Sumatran tiger (*Panthera tigris sumatrae*). Although efforts to resolve conflict have been made from time to time, a sustainable solution is still very much needed, particularly given the unique characteristics of each case and area of conflict. A community-based approach to human-tiger conflict management can become a local-based solution towards a more sustainable management. This study aims to identify needs, gaps, and next steps related to collective action and sustainable community-based human-tiger conflict management in Seluma, Bengkulu, using a qualitative approach with literature review followed by semi-structure interview method. This study's findings show that in the context of community-based human-tiger conflict management, the needs and gaps are still identified, particularly in: training and capacity building, adaptive management and applied research, communication and information exchange, policy frameworks and legal instruments, as well as funding. To make community-based human-tiger conflict management sustainable, the strength and sustainability of: coherent legal instruments; commitment, involvement, active role, communication, and support from all stakeholders, and; comprehensive environmental, social and economic data-based planning; need to be ensured.

Keywords: Coexistence, community-based management, policy, stakeholder engagement, Sumatran tiger

INTRODUCTION

The Sumatran tiger (*Panthera tigris sumatrae*) is one of Indonesia's wildlife that has a role as a top predator, bioregulator, and ecosystem bioindicator (Linkie et al. 2008). The Sumatran tiger is designated nationally and internationally as a flag, key, endemic, and important conservation and cultural species, but is on the verge of extinction (Semiadi and Nugraha 2006; Linkie and Christie 2007; Soehartono et al. 2007; Ripple et al. 2014). Exploitative clearing of forest areas leads to degradation, fragmentation, and even habitat loss for Sumatran tiger (Soehartono et al. 2007; Linkie et al. 2008). The spatial analysis results show that >70% of Sumatran tiger habitats are likely found outside the conservation area (Wibisono and Pusparini 2010). Problem arises when tiger and human entities intersect and cause harm to one or both parties. This is often referred to as *conflict*. The intensity of conflict between humans and Sumatran tiger is increasing along with the narrowing of Sumatran tiger's natural habitat (Kholis et al. 2017). Problems regarding human-tiger conflict will not only impact the potential reduction of tiger populations in the wild, but also the community around the forest, such as livestock losses (Nyhus and Tilson 2004; Madden and McQuinn 2014) and even fatalities, both on the human and wildlife sides (Kholis et al. 2017; Dhungana et al. 2018; Gulati et al. 2021).

As long as there are humans and Sumatran tiger in an area, the potential of conflict between them will also continue

to exist. Although this conflict cannot be eliminated, its potential needs to be managed. In fact, efforts to manage conflict between humans and Sumatran tiger that have been running in potential tiger-conflict areas have yet to yield a sustainable solution. Although legal instruments regarding conflict management exist, the practices in the field have not gone as smoothly as expected. This is evidenced by the fact that Sumatran tiger deaths still occur from time to time, due to fear, retaliation, and even economic motives of communities surrounding Sumatran tiger's natural habitats (DetikNews 2009; Karokaro 2016; Kompas 2018; Tim Kompas Biro Sumatera 2020). The community, as the party directly affected at the field, is an essential element that should be considered.

Community-based efforts in environmental conservation is a form of decentralization with a bottom-up collaborative arrangement (Berkes 2004). These efforts are important for effective, sustainable, and equitable conservation (Hayes and Ostrom 2005). Several studies claim the success of implementing community-based efforts in environmental conservation and protection (Norris et al. 2018; Branco et al. 2020; Franco et al. 2021). Therefore, if it is reflected in the case of human-tiger conflict, the community-based approach in managing human-tiger conflict may become a local-based solution to a more appropriate, effective, comprehensive, integrated, and sustainable management.

Several published studies have tried to understand the dimensions of the interaction between human and

Sumatran tiger using socio-ecological perspectives in several Indonesia's protected areas, such as the local and spiritual perspectives on human-tiger conflict of rural community (McKay et al. 2018) and the socio-ecological approach integrating in spatial models of encounter risk with wildlife perception (Struebig et al. 2018) around Kerinci Seblat National Park, also the development of predictive spatially explicit model of human-tiger conflict around Leuser Ecosystem (Lubis et al. 2020), but not particularly in Bengkulu which has three important habitat patches of Sumatran tiger (Kerinci Seblat National Park, Bukit Balai Rejang Selatan Landscape, and Bukit Barisan Selatan National Park) (Wibisono et al. 2011; Global Tiger Initiative Secretariat 2012). On the other hand, there is a potential to implement sustainable community-based human-tiger conflict management in Bengkulu, reflected in the existence of community-based initiatives in several areas that have high risk of human-tiger conflict, specifically in Seluma Regency (Forum HarimauKita 2019; Carminanda 2020). This study aims to identify needs, gaps, and next steps related to collective action and sustainable community-based human-tiger conflict management in Seluma, Bengkulu. Furthermore, this study seeks to provide input on scenarios that can enable and empower the role of communities in sustainable human-tiger conflict management in Bengkulu.

MATERIALS AND METHODS

This study used a qualitative approach with a literature review followed by semi-structured interviews method, similar to the approach used in Mulyani and Jepson (2013), Mavhura and Mushure (2019), and Randimbiharirinirina et al. (2021). Literature in the form of existing legal instruments and documents at the national and regional levels related to community-based human-tiger conflict management in Indonesia, specifically in Bengkulu, as well as relevant publications (popular and scientific) in human-tiger (or human-wildlife) conflict were reviewed in this study. The legal instruments reviewed were regulations related to the conservation of the Sumatran tiger and its habitat, disaster management, and multilevel governance in the form of decentralized government. Documents reviewed were guidelines related to Sumatran tiger conservation and human-tiger conflict management issued by the Ministry of Environment and Forestry (KLHK). Other publications (popular and scientific) reviewed were publications with topics related to the human-tiger conflict and its management which available in the form of articles on the internet or books.

Semi-structured interviews were conducted between September-December 2021 with 21 interviewees in eight villages which have been affected by human-tiger conflict within Seluma Regency, Bengkulu, Indonesia (Figure 1). Four of these villages have received assistance in human-wildlife conflict management from conservation NGO (hereinafter referred to as the "assisted villages") and had a human-wildlife conflict task force team at the village level. A purposive sampling method was used to select the

interviewees with the following criteria: (i) is a community leader and/or village level stakeholder; (ii) have lived in the village for more than 20 years; (iii) understand the intricacies and history of the village; (iv) understand the role of relevant stakeholders in managing human-tiger conflict at the village level, and; (v) willing to be the resource person. The potential interviewees were initially identified based on recommendations from the local village head. The criteria above were determined to obtain specific information related to collective action and community-based human-tiger conflict management from the perspective of the community as one of the main stakeholders at the local level. Nineteen of the interviewees were males, while the remaining two were females. The interviewees included six village heads, five ex-village heads, four custom leaders, and six other village level stakeholders.

The interview format was based on the main questions: "*What kind of collective action has the community taken in managing or mitigating the human-tiger conflict in the village?*", including its form, impact, and potential constraints. A consistent question format was applied to all interviewees. The questions were left open-ended to allow the interviewees to express their personal experiences and perspectives on the issues. The interviews lasted in 45 to 60 minutes. All of the interviews were recorded after having been granted verbal consent to do so by the interviewees and manually transcribed (because the majority of interviewees' responses were given in a combination of Indonesian and the local language (Serawai, Javanese, etc.)). Interviewees' quotes or statements are referenced in a logical and consistent system (interviewees 1-21) to ensure anonymity while gaining meaningful insights in the context of sustainable community-based human-tiger conflict management in Bengkulu.

Data analysis

The analysis in this study was conducted descriptively, focusing on: (i) determining the current state of community-based human-tiger conflict management in Seluma, Bengkulu, and; (ii) identifying existing needs and gaps in community-based human-tiger conflict management in Seluma, Bengkulu. Based on these findings, a recommendation was developed in order to enable and empower sustainable community-based human-tiger conflict management in Bengkulu.

RESULTS AND DISCUSSION

Current state of community-based human-tiger conflict management in Seluma, Bengkulu

Considering the unique ecological, socio-cultural, physical, economical, and political characteristics of each area and case of conflict, there should be involvement and support from local stakeholders in human-tiger conflict management (IUCN (International Union for Conservation Nature) SSC (Species Survival Commission) on HWC Task Forces 2020), especially from the local communities (Madden 2004; McKay et al. 2018).

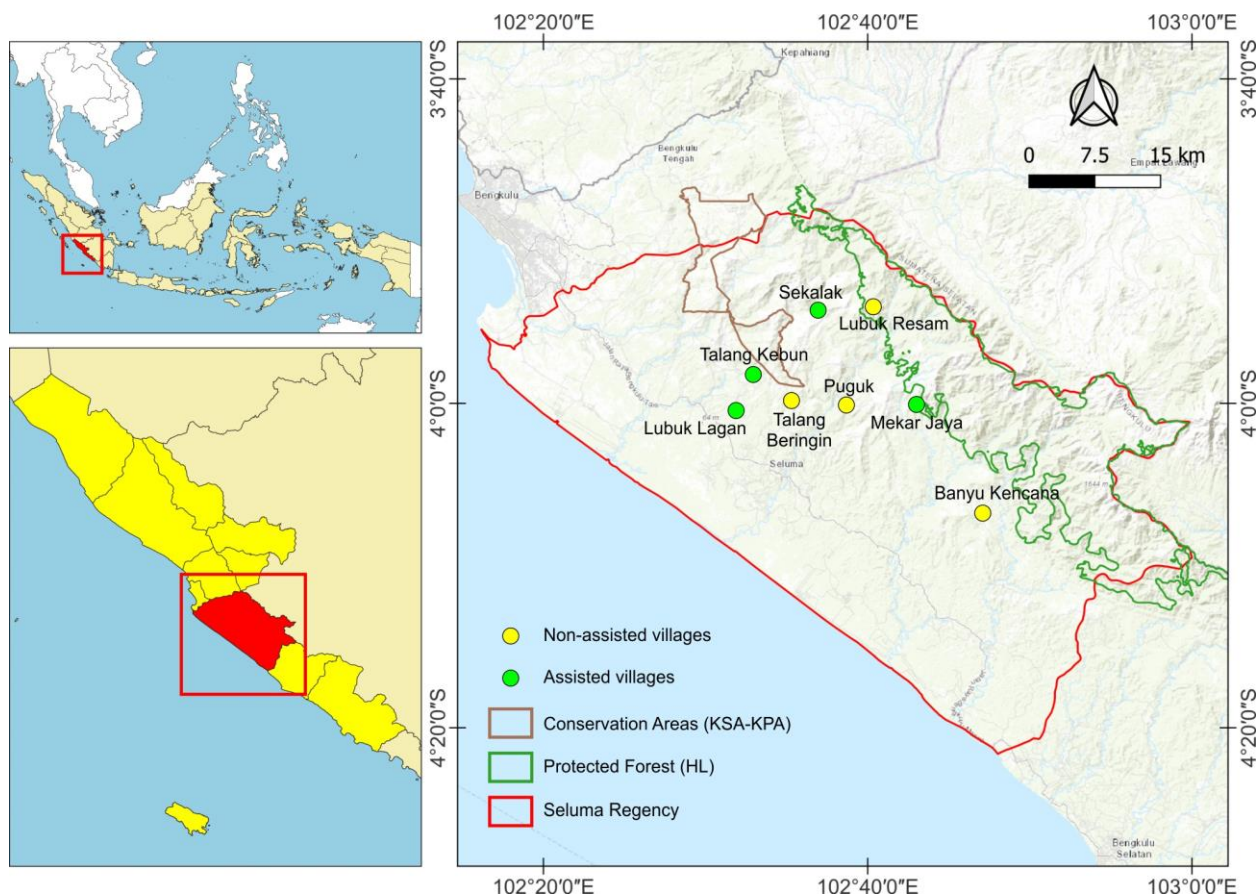


Figure 1. Study location map in Seluma Regency, Bengkulu Province in the buffer area of one of the important habitat patches for Sumatran tiger, Bukit Balai Rejang Selatan (BBRS) landscape. (Source: Authors' preparation)

Success stories of community-based approach in human-wildlife conflict management can be heard from several countries using specific schemes, such as: (i) the community camera trapping program around Ruaha National Park, Tanzania which has succeeded in providing data on the wildlife populations present on village land as well as involving and providing benefits to the community through conservation incentives (FAO and IUCN SSC on HWC Task Forces 2022a); (ii) the citizen science project in Sanjay Gandhi National Park, India which was aimed to achieve a greater communal acceptance of leopards, led and run sustainably through a communal organization with very little external supports (FAO and IUCN SSC on HWC Task Forces 2022b), and; (iii) the participatory research in Rupununi Region, Guyana which has involved the community as co-researchers to reduce the retaliatory killing of jaguars (FAO and IUCN SSC on HWC Task Forces 2022c). Specific scheme needs to be formulated in accordance with the characteristics of each area. In Indonesia, one of the entry points for a community-based approach is to empower and strengthen the role of villages as the “spearhead” or the smallest unit of government. According to Law No. 6/2014 concerning Villages, villages are given the authority to regulate and manage government affairs as well as the interests of the local community based on community initiatives, origin rights, customs, and socio-

cultural values.

According to the findings of the interviews, the form of community collective efforts in managing human-tiger conflict varies by village. The most noticeable difference is that the community's collective efforts in managing human-tiger conflict are relatively well-organized in the assisted village groups. Each assisted village already has an '*official institution*' in the form of a specific team or group in charge of mitigating human-wildlife conflict at the village level, hereinafter referred to as the '*village task force team*'. This task force team is a group that can be established by the village in response to the issuance of the Minister of Forestry Regulation P.48/Menhut-II/2008 jo Ministry of Forestry Regulation P.53/Menhut-II/2014 concerning Human-Wildlife Conflict Management and/or related legal instruments issued at regional level based on the Minister of Forestry Regulation. Meanwhile, there is no such special institution in non-assisted village groups. However, there are similarities between assisted and non-assisted village communities in terms of seeking to realize collective efforts at the village level, such as the existence of initiatives and a culture of *gotong royong* (mutual and reciprocal assistance in Indonesian) that is still very strong in the village community. This is revealed by the following statements from several interviewees:

“... (Before there was a village task force team) There was a community initiative to work together, check tigers' trails, and also make night patrols after the conflict occurred.” (15)

“... When the incident happened (the sound of a tiger was heard around the village area), there was also an initiative from the community here to carry out patrols or night vigils.” (16)

“... In 2007, there was a massive logging (around the village area). The tiger came and caused a commotion (there was a human victim). Following that incident, if we (the community) wanted to go to the plantation, we went together so we could take care of each other. For example, if today's harvest is in Mr. A's plantation, we all go there. Tomorrow, we all move to help the harvest in Mr. B's plantation, and so on, until the conditions are considered safe and conducive.” (8)

The initiative and *gotong-royong* culture (mutual and reciprocal assistance) of the village community is a component of good social capital. This could be one of the factors that contribute to the success of a collective action (Auer et al. 2020).

From the interview results, it is confirmed that the village task force team has been formed in several villages in Seluma Regency, Bengkulu (four of them were used as data collection locations). The members of the village task force team are appointed by a decree issued by the village head. Members of the village task force team are communities who are prepared to mitigate human-wildlife conflicts (particularly the human-tiger conflict). The village task force team functions as the “frontliners” in human-wildlife conflict management at the village level, to reduce risks and losses due to human-wildlife conflict. The existence of the village task force team is generally welcomed and responded positively by the village community. The following are the roles of the village task force team: (i) as an ‘institution’ to which the community reports everything related to wildlife (e.g., the community can report findings related to wildlife signs to the village task force team to be followed up); (ii) as a ‘frontliner’ who plays an active role in managing human-wildlife conflict in the village (when human-tiger conflict occurs, the village task force team is the first to act, understands who to contact or what to do, e.g.: when it is known that tigers are roaming around the village area, the village task force team will contact the related authorities (such as Natural Resource Conservation Agency (BKSDA)), carry out active guarding until the conditions are conducive, and make sure that the community are safe); (iii) monitoring the occurrence or potential of human-wildlife conflict in the village (e.g., by conducting routine checks on tiger trails); (iv) as a ‘liaison’ between the village community and relevant stakeholders in human-wildlife conflict management, and; (v) as an ‘extension’ of the conservation agency in an effort to raise forest and wildlife conservation awareness in the village. This is also supported by the following interviewees’ statements:

“... Before there was a village task force team, the community were generally unconcerned about the existence of tigers. Not well-coordinated. Not yet organized. If there is a problem related to wildlife, there is no place for the community to directly report it. Since there was a task force team, the community have become more concerned about tigers. The community also has a place to report if there is anything related to tigers or wildlife sightings around the village.” (5)

“... (Community's response regarding the village task force team) The communities are welcome, especially the young people in the village. The team has activities, such as install camera traps, check wildlife trails, etc.” (6)

“... (Community's response regarding the village task force team) It's actually a good thing, because there is a place for community to report regarding forests and wildlife. The community feels more relaxed. If wildlife conflict occurs, the community will not be confused about where to report it.” (12)

Needs and gaps of community-based human-tiger conflict management in Seluma, Bengkulu

The continuity factor of village empowerment in managing human-tiger conflict is essential to consider so that efforts to manage human-tiger conflict at the field level can run sustainably. This village empowerment requires integrated and sustainable support as well as active roles from related stakeholders, such as governments, academics, NGOs, private sectors, etc. Based on Madden (2004), there are several things that need to be underlined in relation to the needs and gaps in efforts to manage human-tiger conflict at the local level. The points in this section will be reflected on the study findings, especially for the assisted villages which are known to have initiated efforts to overcome human-tiger conflict independently.

Training and capacity building

The key to implementing a community-based effort is to raise awareness, sense of needs, and sense of belonging from the community (Ostermann-Miyashita et al. 2021). The sense of belonging from the community towards wildlife can only be achieved if there is some kind of connection that involves positive feelings or emotions (Sponarski et al. 2015; Dheer et al. 2021), followed by an awareness that there is a need for the community to coexist with wildlife. Thus, community members who are aware of the need to coexist with forest and wildlife, including the Sumatran tiger, will be easier to be more empowered in human-tiger conflict management at the village level. This is also recognized by several interviewees, as evidenced by the following statement:

“... Actually, the main party who has the biggest role in “changing” community awareness (related to nature and wildlife conservation) is the community itself. If they don't have their own desire to change for the better, it's difficult. The main initiative must come from the community (in order to run sustainably).” (12)

Parties outside the village can contribute by providing support in the form of awareness activities, training, and/or outreach to the community so that the community understands the importance and long-term non-economic benefits of protecting forests, nature, and wildlife and will voluntarily do it. It is known that the support was provided by several parties (particularly conservation NGOs) to the village task force team and village communities, both in the form of dissemination and socialization through awareness media (e.g., posters, leaflets, books), as well as relevant training activities (e.g., training on human-tiger conflict mitigation techniques, training on the use of GPS and cameras, alternative economy training (to improve community's livelihoods so that the community will not fully dependent on plantation or livestock production), etc). This kind of support should also be replicated for other villages in forest buffer zones, especially in areas with high-risk potential of conflict.

Adaptive management and applied research

Adaptation of recent knowledge and lessons learned into local-based management can be applied to develop best practices which fit to the characteristics of the area (IUCN SSC on HWC Task Forces 2020). Based on the interview results, the assisted village communities are known to be willing to adopt some scientifically based human-tiger conflict prevention techniques. For example, adoption of tiger-proof enclosures (TPEs), which are livestock enclosures protected with barbed wires, by the communities. This technique was developed by a conservation NGO and proven to be effective in preventing tiger predation towards livestock in several areas within Sumatra (Wibisono and Pusparini 2010; Forum HarimauKita 2019; Lubis et al. 2020). Some livestock owners in the assisted village who have received socialization or information about this technique are known to have applied it to their livestock enclosures. Other techniques and innovations that are scientifically proven to be effective in preventing conflict and *can be accepted and implemented by the community* needs to be further explored by relevant parties, including academics, practitioners, etc. Besides, socialization and dissemination related to this matter should also be done in other villages with high-risk potential of conflict.

Communication and information exchange

Good communication and information exchange between the involved stakeholders are required in human-wildlife conflict management to ensure uniform understanding and empowerment in accordance with each capacity and role (Salvatori et al. 2020). This can be reflected in the active involvement of relevant stakeholders in human-wildlife conflict management activities and planning. In the current situation, where a few villages in Seluma, Bengkulu are known to have formed village task force teams, there is still no visible and active involvement of the village task force in planning at higher levels, such as regency or province. Networks between the village task force team, as an 'institution' for human-wildlife conflict management at the site level, and other stakeholders should

be built for integrated and comprehensive communication and information exchange.

Policy and legal supports

Policy frameworks and legal instruments need to be designed to empower and strengthen local authorities and stakeholders in order to ensure sustainable community-based human-wildlife conflict management (Kothari et al. 2013). Certain legal instruments can underlie the community-based human-tiger conflict management in Bengkulu. These legal instruments were chosen because they are the applicable legal instruments in Indonesia, particularly in Bengkulu Province, relating to: the conservation of the Sumatran tiger and its habitat; disaster management (because human-wildlife conflict can be classified as a type of disaster), and; multilevel governance in the form of government decentralization. Table 1 describes the legal instruments related to community-based human-tiger conflict management in Bengkulu.

In general, the contents of the legal instruments listed in Table 1 are relatively coherent and can be used in conjunction with one another in the context of community-based human-tiger conflict management. On the other hand, it appears that the majority of existing legal instruments related to community-based human-tiger conflict management are the national-level regulations (*regeling*). Due to the broad scope of implementation, implementing these legal instruments at the field level is not guaranteed to be effective. Given the decentralized system and multilevel governance implemented by the Indonesian government, existing legal instruments at the national level need to be strengthened at the regional level. Furthermore, while guidelines related to Sumatran tiger conservation (in the form of "Strategy and Action Plan (SRAG) for Sumatran Tiger Conservation Year 2007-2017" document (Soehartono et al. 2007)) as well as human-tiger conflict management (in the form of "Guideline for Human-Tiger Conflict Management" document (Kholis et al. 2017)) are available, it is not guaranteed that these documents are fully understood and implemented by related stakeholders. This is revealed from the following statement from one of the interviewees:

"... *There has been no specific socialization from the government agencies (regarding guidelines for human-tiger conflict management). Until recently, when there was a collaborative event with conservation NGOs.*" (5)

Efforts to implement collaborative human-wildlife conflict management in Bengkulu can be seen from the provincial government's policy (in the form of Bengkulu Governor's Decree) to form a Coordination and Task Force (SATGAS or *Satuan Tugas*) Team at the provincial level in 2014. However, several gaps in the implementation of the legal instruments have been identified, including: (i) the lack of follow-ups of the Bengkulu Governor's Decree, such as the development of a strategic plan or roadmap, the identification of areas at high-risk of conflict, and stakeholder mapping for integrated human-tiger conflict management; (ii) the lack of legal instrument derivatives or

policies in human-tiger (or human-wildlife) conflict management at the regency, district, to village levels (up to 2021, it is known that only the Lebong Regent has declared a decree concerning the human-wildlife conflict task force at the regency level (Alexander 2020), as well as several initiatives of the village task force team); (iii) the lack of financing provisions for the technical aspect of human-tiger conflict management, and; (iv) the lack of active involvement of related stakeholders of human-wildlife conflict management in the field.

It can be said that the conflict management institutions have been “formally formed” at the regional or provincial level. However, there is no guarantee that the work of the provincial level Coordination and Task Force team can run properly and thoroughly down to the site level. Therefore, it is important to develop bottom-up innovations for managing human-tiger conflict by empowering the parties involved and/or directly affected at the site level.

Funding

Sustainable local funding is essential to ensure that best practices are developed and implemented in a sound and effective manner. There is an opportunity owned by villages to allocate the Village Fund (*Dana Desa*). As a

source of village income, the use of the Village Fund should be based on village authorities’ consideration and decision (Ministry of Finance 2019). According to the Minister of Villages, Development of Disadvantaged Regions, and Transmigration Regulation No. 7/2021, activities related to environmental conservation and disaster mitigation can be included in the list of village priority activities. As long as the village government include the human-tiger conflict management activity as priority, and it can be approved at the Development Planning Deliberation (*Musrenbang*) stage at the hamlet, village, district, and regency levels, Village Fund can be allocated for conflict management activities. This scheme has been implemented by several conflict-affected villages in the buffer area of Bukit Barisan Selatan National Park (Lampung) (Muslihah and Karokaro 2018; Forum HarimauKita 2019) and the buffer area of Gunung Leuser National Park (Aceh) (Majni 2020), with support from multi-stakeholders. This scheme has also been implemented by assisted villages that have a village task force team in the buffer area of BBRS landscape, Seluma Regency, Bengkulu. This is revealed through the following statements from the interviewees:

Table 1. Legal instruments related to community-based human-tiger conflict management in Bengkulu, Indonesia

	Legal instrument	Scope
Conservation of biological natural resources and environmental protection		
1	Law 5/1990 concerning Conservation of Biological Natural Resources and Ecosystems	National
2	Government Regulation 7/1999 concerning Preservation of Wild Plant and Animal Species	National
3	Government Regulation 28/2011 jo Government Regulation 108/2015 concerning Management of Nature Reserve Areas (KSA) and Nature Conservation Areas (KPA)	National
4	Minister of Forestry Regulation P.48/Menhut-II/2008 jo Ministry of Forestry Regulation P.53/Menhut-II/2014 concerning Human-Wildlife Conflict Management	National
5	Minister of Environment and Forestry Regulation P.20/MenLHK/SETJEN/KUM.1/6/2018 jo Minister of Environment and Forestry Regulation P.92/MenLHK/SETJEN/KUM.1/8/2018 jo Minister of Environment and Forestry Regulation P.106/MenLHK/SETJEN/KUM.1/12/2018 concerning Protected Plant and Animal Species	National
6	Bengkulu Governor Decree N.122.XXIII/2014 concerning the Coordination and Task Force Team for Human-Wildlife Conflict Management in Bengkulu Province	Regional (Provincial)
7	Law 5/1994 concerning Ratification of the UN Convention on Biological Diversity	National
8	Law 41/1999 jo Law 19/2004 concerning Forestry	National
9	Government Regulation 45/2004 jo Government Regulation 60/2009 concerning Forest Protection	National
10	Law 32/2009 concerning Environmental Protection and Management	National
11	Law 18/2013 concerning Prevention and Eradication of Forest Destruction	National
Disaster management		
12	Law 24/2007 concerning Disaster Management	National
13	Government Regulation 21/2008 concerning Disaster Management Implementation	National
Government decentralization		
14	Law 23/2014 jo Law 9/2015 concerning Regional Government	National
15	Government Regulation 38/2007 concerning the Division of Government Affairs between the Central Government, Provincial Governments and Regency or City Governments	National
16	Law 6/2014 concerning Village	National
17	Government Regulation 60/2014 jo Government Regulation 8/2016 concerning Village Funds Sourced from the State Revenue and Expenditure Budget	National
18	Minister of Villages, Development of Disadvantaged Regions, and Transmigration Regulation 7/2021 concerning the Priority Use of Village Funds in 2022	National

"... The Village Fund allocation for supporting the village task force team activity was realized in 2020." (4)

"... There is already a budget from the Village Fund (for village task force team). The realization is planned for the procurement of village task force team's equipment." (6)

"... There has been both moral and material support from the village government (for the village task force team), in the form of a budget allocation from the Village Fund." (13)

"... The Village Fund has been budgeted for the activities of village task force team, including the purchase of camera and boots. It will also be budgeted for this year. It has been included in the Village Fund Budget for 2022." (2)

There are several forms of Village Fund allocation for human-tiger conflict management activities, including: (i) procurement of field tools needed in human-tiger conflict management (e.g., flashlights, boots, raincoats, camera, GPS); (ii) financing the implementation of activities related to human-tiger conflict mitigation (e.g., logistics during monitoring, dispelling, or herding activities, making conflict mitigation tools), and; (iii) allocation for alternative economic vested interests for the village task force team.

In addition to specific Village Fund allocations, funding for conflict management activities can also be sought from other sources, such as private sectors whose work areas are in the buffer area of the forests. Nonetheless, not many conflict-affected villages are aware of this opportunity. The role and cooperation of the stakeholders for intensive socialization and dissemination of information related to this matter is very much needed.

Steps to enable and empower sustainable community-based human-tiger conflict management in bengkulu

The human-wildlife conflict management is best accomplished by sustained, collaborative, and process-driven efforts, aided by the technical support of interdisciplinary expertise (IUCN SSC on HWC Task Forces 2020). In general, it can be concluded that there are several important elements of sustainable community-based human-tiger conflict management, namely: (i) Coherent legal instruments, both concept and implementation; (ii) Commitment, active involvement, communication, and support from all stakeholders (in accordance with their respective role and capacity), and; (iii) Comprehensive environmental, social and economic data-based planning (in short, medium and long terms). Relevant stakeholders need to ensure the strength and sustainability of the three elements above. This principle is also relevant to be applied in other areas with potential for human-wildlife conflict.

Based on the explanation above, it may be possible to enable and empower sustainable community-based management of human-tiger conflict in Bengkulu,

considering the following steps done by related stakeholders: (i) Revitalize the Bengkulu Governor's Decree (concerning the Coordination and Task Force Team), considering that the old decree was issued in 2014 and has not been updated until now. (ii) Arrange legal instrument derivatives or policies in accordance with the implementation of Bengkulu Governor's Decree, e.g., the legal instruments at the regency to village level. (iii) Arrange a comprehensive strategic plan or roadmap (short, medium, and long terms) based on the environmental, social, and economic conditions of the area (e.g., the National Human-Wildlife Conflict Management Strategy prepared by the Tanzanian government (Ministry of Natural Resources and Tourism 2020). (iv) Identify and map high-risk areas of human-tiger conflict on each Sumatran tiger habitat patches in Bengkulu based on the data of environmental, social, and economic characteristics as the basis for determining priority areas (e.g., Struebig et al. 2018)). (v) Identify and map stakeholders at the regional level (up to village level) related to (or affected by) human-tiger conflict in Bengkulu. (vi) Engage and involve related stakeholders (up to village level) in human-tiger conflict management planning and activities. (vii) Provide support for community empowerment in human-tiger conflict management in terms of: training and capacity building, adaptive management and applied research, communication and information exchange, policy and legal supports, also funding. (viii) Establish specific financing provisions to ensure sustainable funding for conflict management activities (including the enabling conditions for conflict-affected villages or villages at high risk of conflict to allocate Village Fund for conflict management activities). (ix) Ensure optimal support, shared understanding, uniform perception, and effective communication between related stakeholders.

Based on the results of this study, it is known that community-based initiatives in human-tiger conflict management are currently underway in Seluma Regency, Bengkulu, especially in the assisted villages, and tend to have a positive impact on the community. Such initiatives can be replicated in other villages with high-risk potential of human-tiger conflict. However, there are still several needs and gaps that must be addressed. For the sake of sustainable community-based human-wildlife conflict management, the strength and sustainability of three important elements need to be ensured by multi-stakeholders, including: coherent legal instruments, both concept and implementation; commitment, involvement, active role, communication, and support from all stakeholders (in accordance with their respective role and capacity), and; comprehensive environmental, social and economic data-based planning (covering short, medium and long term).

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