ACKNOWLEDGEMENT

Understanding The Determinants of Attitudes and Behaviours Of Communities at the Periphery of National Parks

[PILI]

[Strengthening The Resort Based Management and Partnership With The Buffer Village for The Mitigation of Wildlife Hunting and Forest Fire in Way Kambas National Park]

March – December

2020

Agreed,

Chair of Way Kambas National Park,

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[NIP. 19731011 199903 1 004]

Passion on The Edge of The Jungle

Understanding the Determinants of Attitudes and Behaviours of Communities at the Periphery of National Parks

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Cover Photo

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ISBN:

Quotation:

Veriasa, T.O., Indraswati, E. 2020. Passion on The Edge of The Jungle : Understanding the Determinants of Attitudes and Behaviors of Communities at the Periphery of National Parks. Jakarta: Asean Center for Biodiversity & Pusat Informasi Lingkungan Indonesia (PILI Green Network)

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Preface

Executive Summary

As a unique conservation area, the management of Way Kambas National Park (WKNP), Lampung Province has its challenges. The management of WKNP has a big challenge to maintain its forest area. This is because the area is not connected with other forest areas. Besides, WKNP also shares a direct border with the settlement and the sea. The landscape condition causes many accesses that can be used to enter the WKNP area.

One of the ways to overcome this is through collaboration between conservation areas and buffer village communities. WKNP has prepared a Collaborative Plan for the Management of the Way Kambas National Park 2018-2023. The ASEAN Center for Biodiversity (ACB) and the Ministry of Environment and Forestry (MoEF), provide support in the implementation of the WKNP collaborative action plan. For this reason, a preliminary study related to the social and economy can be used as a baseline for the preparation of the action plan.

The community perception study on threats in the WKNP is a series of activities to support the WKNP Office related to the development of community empowerment strategies and programs in collaboration with the threat of poaching, illegal fishing, and forest fires. The location of the study focused on Braja Harjosari and Rantau Jaya Udik II Village, which were the "pilot models" of the WKNP partnership with the community.

Studies conducted during June and July 2020, documented the community's knowledge, behavior, and practices related to positive matters in handling threats in WKNP. This study was conducted through a series of focus group discussions in Braja Harjosari and Rantau Jaya Udik II Village. Data collection on community perception was conducted using a standardized questionnaire method, involving 267 household respondents in the two villages using 4 (four) aspects of perception assessment, namely socio-economic, environmental, legitimacy, and acceptability aspects.

The analysis in this perception study "might" be different and has not been done much in the WKNP area and buffer villages, especially in the statistical modeling approach for analyzing perceptions and estimating factors that encourage people to act negatively in the WKNP area such as in illegal activities such as hunting, fishing, and burning of forests. Analysis in perception studies shows some important findings related to threats that occur in WKNP which later will be useful in designing handling strategies.

The dynamics of perception in four aspects, namely socio-economic, environmental, legitimacy, and acceptability, are reality and facts that occur in the field. These results can be a picture of the condition of the community and WKNP governance perceived by the community, especially in preparing plans for collaboration programs with the community.

An interesting finding in this perception study is that WKNP activities related to socio-economics have more positive responses and support from the community to WKNP in terms of handling illegal activities in the national park area. Also, more than 60% of the community respondents in the two study villages did not depend on the forest products in the WKNP for their economy. Other interesting findings are the existence of community

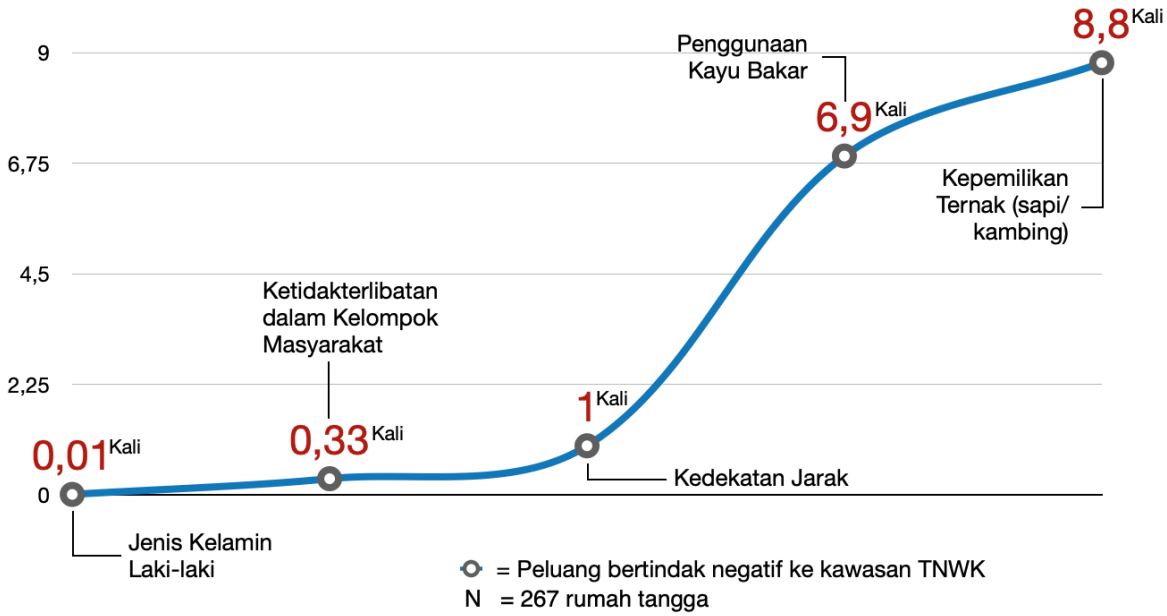
social capital support in groups and village governance towards the handling of threats in the WKNP, the existence of legitimacy or strong public recognition of the governance of the WKNP, and good public acceptance (acceptability) of WKNP activities such as communication, supervision (patrol) law enforcement officers and applications. Even though in Rantau Jaya Udik II Village, the communication and supervision (patrol) of officers still need to be increased in quantity and quality.

Somer's D correlation test results on 12 variables including socio-economic, environmental, legitimacy and acceptability aspects that have the potential to influence people's perceptions related to threats in the WKNP, finding 6 (six) variables that significantly influence shaping community perceptions. The six variables are (1) perception of the impact of illegal activities on the disruption of social and economic activities of the community; (2) perception of community social group activities related to handling threats; (3) perception of community economic activities that depend on WKNP areas; (4) perception of the impact of illegal activities on the preservation of forests and wildlife; (5) perception of the impact of illegal activities on the increasing number of pests that disturb plants and threaten the community, and (6) perception of the clarity of the rules of illegal acts in the WKNP. On the variable perception of community economic activity that depends on the WKNP area, the direction of negative relations (opposite direction) means that the higher the economic dependence on the WKNP area will decrease (negative) community perceptions that support the WKNP.

Statistical modeling with binary logistic regression in the context of the two study target villages showed that of the 11 independent variables (x) tested, there were 5 (five) variables that had a significant effect on the probability of community respondents to act negatively in the WKNP (Y) area. In the case of Braja Harjosari and Rantau Jaya Udik II Village, socio-demographic factors that had a significant effect on illegal actions in the WKNP area were gender, the distance of the house to WKNP, ownership of livestock, use of firewood, and the involvement of community groups working together with WKNP.

Factors of livestock ownership and the use of fuelwood are factors that are unrelated and can contribute greatly to encourage people to take negative (illegal) actions in the WKNP area. The results of the analysis are that people who have animals have 8.8 times the opportunity and those who use firewood have 6.9 times the opportunity to take negative (illegal) actions to the WKNP area.

Furthermore, gender, home distance to WKNP, and community involvement in social groups that work with WKNP are influence factors that are negatively associated or in the opposite direction. The results of this analysis show that respondents with "female" gender are significantly more likely to take positive action on the WKNP than a "male" gender. In this study, illegal activities in conservation areas are mostly carried out by men, due to high-risk factors and heavy physical workloads, such as hunting, wood harvesting, fishing, and searching for forest honey.



Gambar 1. The influence factor and the probability of the community's negative activity in the WKNP area

The significant distance of community houses to WKNP could take positive action to WKNP. The farther the distance, the more chance of acting positively. Conversely, the closer the house is to the WKNP, the more chance it will be to carry out negative (illegal) actions. In this study, most of the distance of community houses to the WKNP in the two villages was 4 - 3000 meters, even in Rantau Jaya Udik II village, 61.1% of respondents had a very close distance of 4-500 meters.

Another influencing factor that has a negative association or the opposite direction is community involvement in social groups that work with WKNP. Community involvement in social groups working with WKNP has a significant opportunity to encourage the community to act positively in the WKNP area. Conversely, people who are not involved in significant social groups have the opportunity to act negatively in the WKNP area.

This study recommends several things that need to be considered in building collaboration, developing threat management strategies, and strengthening supportive village communities to the WKNP.

First, efforts to increase public perception regarding the functions and rules of the WKNP need to be packaged in education that contains messages that are easily received by the community. The education is mainly in the form of illustrations about the short- and long-term impacts if the national park area is damaged and the effects can be felt by the community, both directly and indirectly on ecological, social, and economic aspects.

Second, maximizing the role of community social groups in supporting conservation and handling of hunting, fishing, and burning forests. One of them can be started by encouraging conservation issues and threats in WKNP to become an agenda of routine

discussion in these community groups through intensive interaction of WKNP managers at the community group level.

Third, economic dependence on the national park area needs to be pushed in a positive direction, not extractive and prioritizing the development of environmental services and being able to pressure the community to act negatively into the WKNP area. For example, tours, honey bee cultivation, fish farming, tree nurseries, the use of animal manure for compost, and biogas including environmental education for youth in the buffer village area.

Fourth, in designing community empowerment programs it needs to be gender-based (gender-based analysis), pay attention to the right proportion and suitability of activities between men and women, prioritize communities that live close to WKNP (0-2000 m), and prioritize target groups in communities that are carrying out illegal activities.

Fifth, encourage and facilitate cooperation with the local Village Government to participate in supporting the handling of illegal activities through the establishment of village regulations. Especially, it can be done on the initiative of proposing village regulations that have been running in Braja Harjosari Village.

Sixth, zonation revisions need to be made concerning promoting the development of conservation partnerships in Braja Harjosari and Rantau Jaya Udik II Village. Especially on facilitating spaces that are accessible to the community, to help to provide animal feed, developing forest rehabilitation, fish cultivation, forest honey cultivation, activities on environmental services (tourism), and other activities that support the sustainable management of WKNP.

Seventh, the results of this study can be baseline data for the development of further studies. Especially related to enlarging the scope of the study area to provide accurate information on the scale of the WKNP buffer zone. This is important so that WKNP managers can take appropriate policies and decisions on the management of conservation areas. To protect biodiversity and enlarge the socio-economic benefits of the WKNP area to buffer village communities.

Introduction

ASEAN Heritage Parks and Collaboration Management in Way Kambas National Park

Way Kambas National Park (WKNP) was officially designated as the 36th ASEAN Heritage Parks (AHP's) on July 27, 2016. Currently, there are 7 (seven) national parks in Indonesia which are designated as AHP's where other national parks are Gunung Leuser National Park, Kerinci Seblat National Park, Lorents National Park, Kepulauan Seribu National Park, Wakatobi National Park, and Bantimurung Bulusaraung National Park. The AHP's program is a follow-up to the signing of the ASEAN National Heritage Park Declaration by the Minister of Environment of ASEAN countries on December 18th, 2003. The purpose of the AHP Program is to harmonize the conservation of biodiversity and the livelihood systems of communities around the AHP's site with a collaborative management approach.

Recognition as an ASEAN national heritage park is a piece of evidence that the WKNP area has an important value for biodiversity conservation globally and has other universal values. Although the size of this area is relatively small (1,293 km2), it has a unique ecosystem type that is dominated by swamp forests and secondary lowland forests. The presence and activities of the Sumatran tiger, for example, are more often found in secondary lowland forests following the presence of prey animals such as wild boar, sambar deer, and deer (Subagyo et al., 2020).

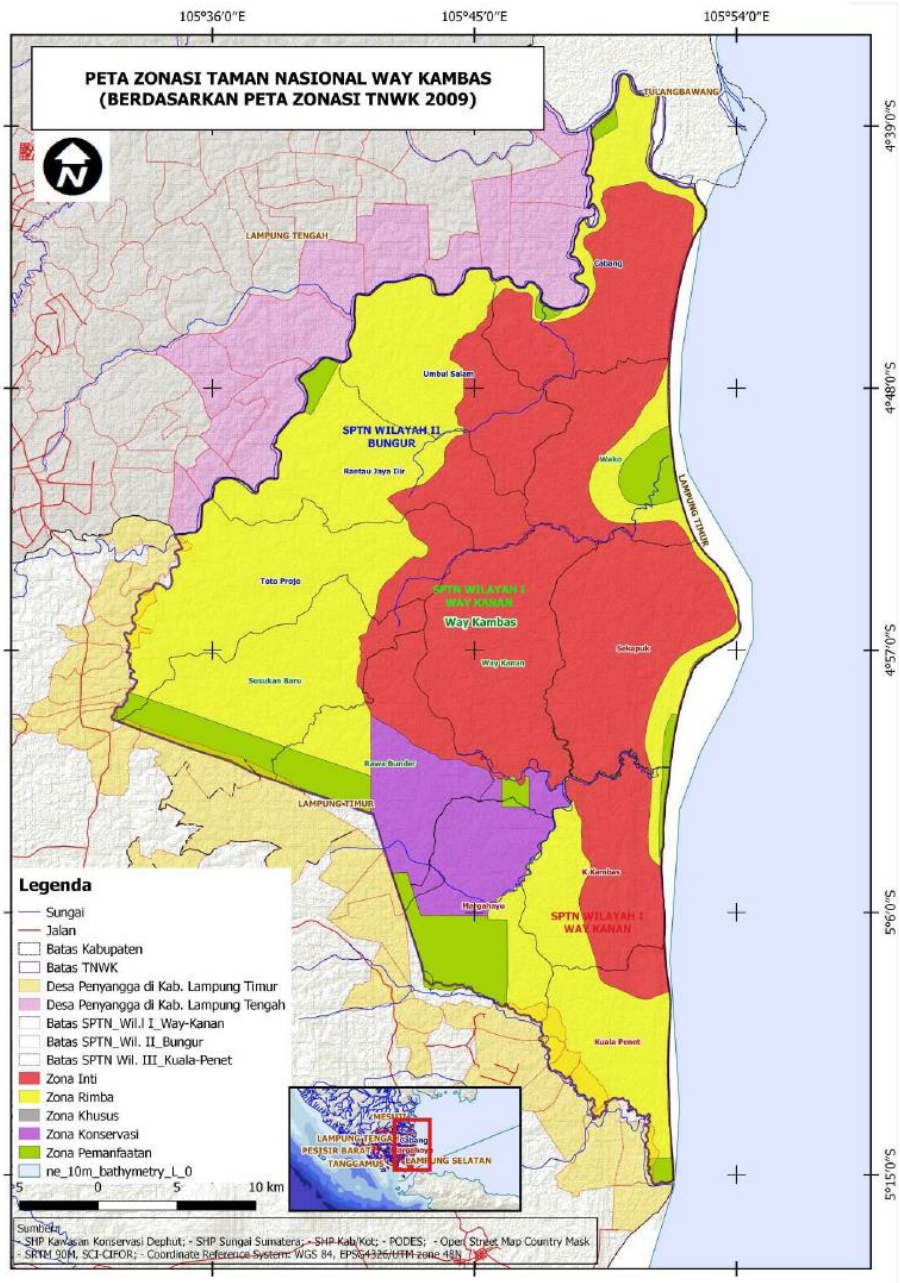


Figure 2. Zonation Map of Way Kambas National Park

Research conducted by Pusparini et al. (2015) estimated the Sumatran rhino[1] occupies 632 km^2 of the WKNP area and has the highest occurrence rate on the island of Sumatra. In 2010, Sumatran elephants that lived wild in the WKNP were estimated to have a population of around 247 individuals[2]. Therefore, it is very important to protect the exotic wildlife population because its status is critically endangered, even though its population size tends to remain small due to the limited area of the WKNP.

[1] Initially, Sumatran Rhino in WKNP considered extinct in the local area, however, this wildlife animal rediscovered in 1990.

[2] https://nasional.republika.co.id/berita/nasional/daerah/16/02/29/o3aatr282-gajah-di-way-kambas-hanya-tersisa-247-ekor

On the other hand, the area of WKNP is isolated from other forest areas. Also, it is directly bordering with 38 villages in East Lampung and Central Lampung. These villages can be both a problem and an opportunity for WKNP sustainability. Multi-stakeholder and cross-sector collaboration are important to be realized. Bearing in mind that WKNP managers cannot do it alone due to various resource limitations. To that end, in 2018, with the support of the ASEAN Center for Biodiversity (ACB), the Way Kambas National Park Office has completed the 2018-2023 WKNP Collaborative Management Plan document.

There are 2 (two) main objectives of WKNP Collaborative Management, namely (1) Protection of natural resources and ecosystems in the WKNP area as a support for living systems and; (2) Utilization of natural resources and the WKNP ecosystem for the independence and welfare of the surrounding community.

The document was prepared through a multi-tiered multilevel process and integrated existing national park management plans with various plans, aspirations, and commitments of relevant stakeholders. The aim is to ensure that WKNP management runs effectively with the support of stakeholders so that the sustainability of the national park can be guaranteed and at the same time provide optimal benefits to the surrounding village communities.

National Park Governance and Community Perception

Changes in geopolitics, social, economic, population growth, and the dynamics of development that occurred in several decades have an impact on the pressure on conservation areas (read: National Parks) are large and complex. In its management, it should not be limited to the territory but also pay attention to the dynamics of regional development, especially in the buffer zone, spatial aspects in the context of upstream-downstream connectivity, and socio-economic dynamics of the communities around the conservation area (Wiratno, 2018).

In the context of national parks, in the past, the process of determining and managing the area often did not consult with stakeholders and did not consider the existence of communities around the area as an important element that also needed to be protected (O'Riordan & Stoll-Kleemann, 2002; Moeliono et al. , 2010). The impact on national park management is the loss of biodiversity because of threats and pressure from surrounding communities (Abukari & Mwalyosi, 2020). The decision to involve and empower the buffer communities of the national park area often arises in response after the threat and pressure on the area (Roe et al., 2009).

The relationship between the surrounding community and the national park area, both in perception, attitude, and action, ideally can be improved together towards a better direction for the preservation of the area in the future. Public perception can provide new enlightenment about the role of national parks in socio-economic development and rural development (Bennett, 2016). The pattern of the relationship of community perceptions with regional governance in the WKNP context is illustrated in Figure 3.

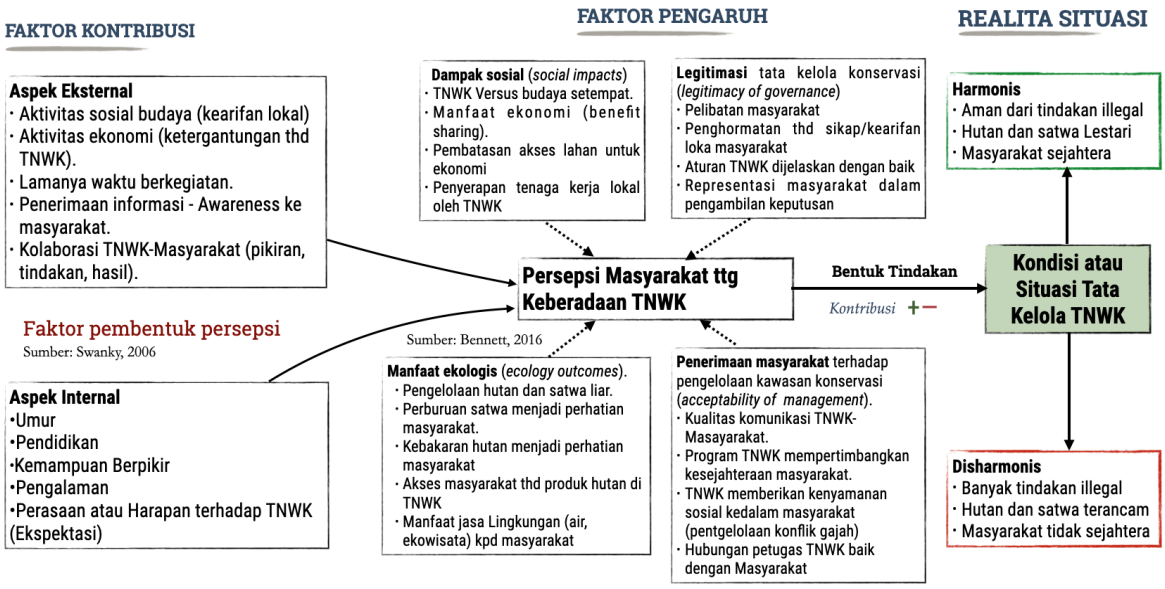


Figure 3. Relationship between community perception and WKNP's governance

In theory, a perception has understanding as a way for someone to see and judge an object or event. Someone will behave and act following the perceptions that are formed in them so that these perceptions have a very important role in influencing one's behavior (Chartrand & Bargh, 1999). A person's perception is influenced by internal and external factors. Internal factors are factors that exist in a person, such as experiences, feelings, thinking abilities, and motivations. External factors such as stimulus and environmental factors that influence perception (Swanky, 2006). Differences in perception can also be influenced by the level of intelligence and expectations of a person towards the object perceived (Pujiastuti, 2011), age, and livelihood typology (Twongyirwe et al., 2017).

Community perceptions and attitudes around the national park area need to be known and understood so that the area can be managed well, and conservation efforts are more effective (Lee & Zhang, 2008). By knowing people's perceptions and attitudes towards the national park area, it will be easier to design effective conservation and management strategies to keep the area sustainable and be able to meet the living needs of the local community (Dolisca et al., 2007).

About the Community Perception Study in WKNP

Previous studies on people's perceptions of the WKNP area describe perceptions on several aspects related to the management of WKNP. In human-elephant conflict, the majority of people have a negative perception of elephants as plant destroyers and plant eaters. However, on the other hand, the community also has a positive perception that regards elephants as endangered and potential tourist attractions; as a charismatic, beautiful animal, has a strong, and sensitive memory (Pratiwi et al., 2020). This research was conducted in Tegal Yoso Village, using a questionnaire and interview method with 30 respondents.

Furthermore, Oelrichs et al. (2016) in a perception study on forest burning and elephant conflict mitigation strategies in WKNP stated that there are 3 (three) mitigation

strategies that need to be developed, namely 1) increasing community resilience through improving economic security; 2) improve people's feelings regarding physical security through preventing elephants from leaving the WKNP area; 3) reduce the need for elephants to look for food on agricultural land by ensuring adequate habitat, food, and water from within the WKNP area. This perception study uses the method of focus group discussions and in-depth interviews involving 20 participants in which 15 participants represent affected communities and 5 (five) participants represent the managers of WKNP.

Another study related to community perceptions of ecotourism states that ecotourism in Braja Harjosari Village increases public awareness of ecotourism products strengthens sustainable agricultural practices, social, and culture for ecotourism services, group and individual-based income, and encourages the transfer of positive perceptions to communities related to animal conservation wild in WKNP (Rustiati et al., 2017). More broadly, Febriyanto (2015) conducted a study of community perceptions in Labuhan Ratu IX Village stating that WKNP has a role and has contributed to the improvement of the surrounding community's economy, especially in expanding employment opportunities, contributing to increasing community entrepreneurship also fostering community economic activity.

Currently, Way Kambas National Park has the support of ASEAN Conservation for Biodiversity (ACB) because it was chosen to be the model location for ASEAN Heritage Parks (AHP's) support. One of the supports is to develop conservation activities that contribute to the management of WKNP which can be a short-term solution to strengthen the collaborative management strategy of WKNP. Collaborative management itself is defined as a situation where one or more parties work together, establish and agree among themselves regarding the division of roles and responsibilities for the management of resources in an area and ensure an equitable distribution of benefits from these resources (Akamani & Hall, 2015). At a practical level, collaborative management is applied for reasons of effectiveness and efficiency in managing a conservation area, in this context, WKNP.

Studies related to community perceptions of threats in the WKNP area have not been done much especially on the study model that combines qualitative and quantitative analysis using statistical modeling. The adequacy of the sample is important to be considered for the accuracy of predictions or predictions in drawing general and broad conclusions. In general, this study analyses the dynamics of regional threats and the conditions of development of the buffer villages and focuses the perception analysis on 2 (two) priority villages in the development of the WKNP community empowerment program, Braja Harjosari Village and Rantau Jaya Udik II Village. Also, the study limits aspects of the WKNP area's threat to hunting, fishing, and burning forests.

Specifically, the objectives of this study are as follows:

1. Identifying community knowledge and practices in the WKNP area through descriptive research.
2. Analyzing public perception about threats in the WKNP area with non-parametric statistical analysis.

3. Analyzing socio-demographic factors that influence people to take illegal actions in the WKNP area by using binary logistic regression modeling.

The outputs from this perception study are as follows:

1. Documentation of knowledge and related community practices in the WKNP area.
2. The dynamics of community perception and the relationship between governance and threat management in the WKNP area are identified.
3. The identification of important socio-demographic factors that significantly increases the chances of people acting illegally in the WKNP area.

The results of this community perception study are baseline data that will support WKNP in preparing action plans related to the implementation of the 2018-2023 WKNP Collaborative Management Plan, especially in the initial stages in the two development priority villages. This study will also produce formulations of recommendations in designing short-term solutions that can be developed by WKNP managers in minimizing illegal poaching, fishing, and forest fires. WKNP management strategies recommendations that are more effective, in this case, WKNP mitigation and adaptation efforts are intended to maximize the impact of WKNP on the livelihood systems of the buffer village communities. Technically, the results of this study also provide input on the proposed WKNP zoning revision plan.

Who are the Users of this Document?

The results of this study are expected to provide benefits to readers, both practically and theoretically. The practical and theoretical benefits of this study aimed at parties include:

1. Policymakers in this case Way Kambas National Park Office, East Lampung Regency Government, Central Lampung Regency Government, Lampung Province Government, Directorate General of Natural Resources and Ecosystem Conservation (KSDAE), Ministry of Environment and Forestry, and Ministry of Villages and Regional Development Disadvantaged/Transmigration, can use as a reference for developing collaborative action plans for the management of WKNP and input for village development policy interventions, especially villages supporting the national park area.
2. The community and village government to better understand the importance of building positive perceptions with supporting the conservation of the WKNP ecosystem to provide economic benefits, increase social capital, and ecological sustainability.
3. Researchers and practitioners are expected to be able to use the results of this study as a basis for developing research on related problems and are expected to be a contribution of knowledge to the development of conservation area management in assessing people's perceptions of threats in conservation areas and the factors that influence them.

Study Framework and Methodology

Study Design

This perception study model was developed and constructed from the theory and concept of sustainable development (trickle bottom line) which includes the integration of economic, social, and environmental aspects as described in Figure 4. Good development, in addition to pursuing economic achievements, but still aims to improve the standard and quality of life of the community and simultaneously protect natural resources and increase social capital, including in the development and management of conservation areas.

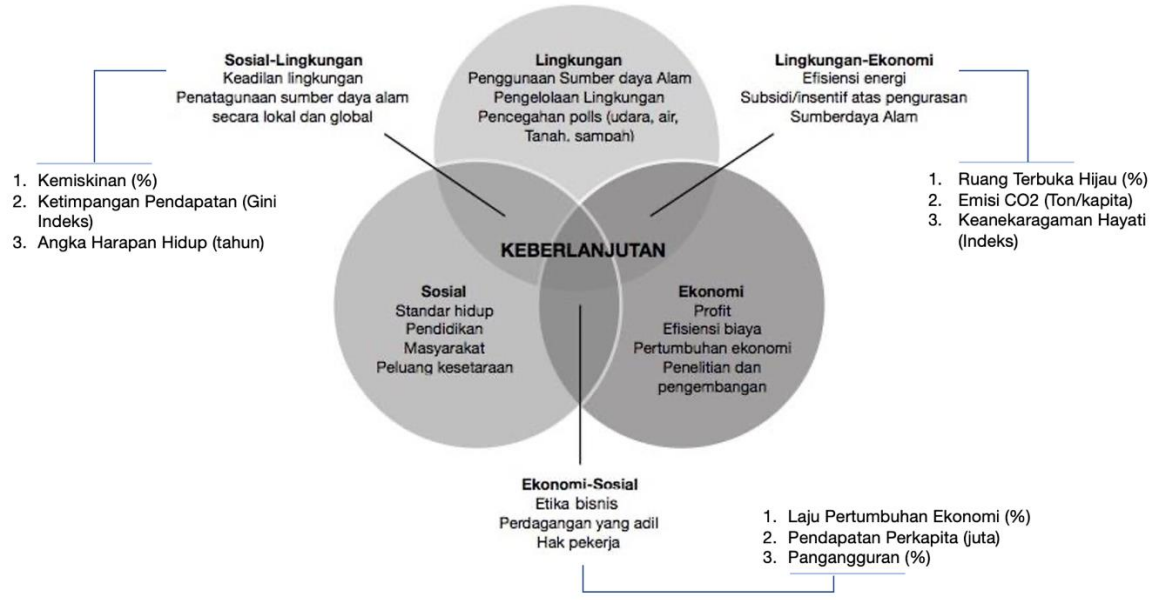


Figure 4. Three pillars of sustainable development (Zak, 2015)

Referring to the concept, measuring the community's perception of threats in the WKNP area, namely poaching and illegal fishing and forest fires, uses 4 (four) aspects developed by Bennett (2016), which categorizes local people's perceptions about conservation areas into aspects as following:

1. Social impacts;

2. Ecological benefits and impacts (ecology outcomes);
3. The legitimacy of governance of conservation areas;
4. Community acceptance of the management of conservation areas (acceptability of management).

These categorizations can help identify aspects of conservation policies and management actions that are acceptable or unacceptable for the local community. For example, when local communities consider the management of protected areas in the surroundings to be inclusive, they may show a positive attitude or react positively to decisions made to protect biodiversity in the conservation area (Bennett, 2016).

The approach and mindset (logical framework) of this study can be seen in Figure 5. There are 3 (three) various studies of community perceptions about threats in the WKNP area that are assessed and analyzed qualitatively and quantitatively, namely:

1. Knowledge, attitude & practices owned by the community towards WKNP;
2. Study on community perception about threats in WKNP and non-parametric statistical modeling to identify the relationship between perceptions;
3. Statistical modeling for estimating socio-demographic factors that can influence people to commit illegal actions in the WKNP area.

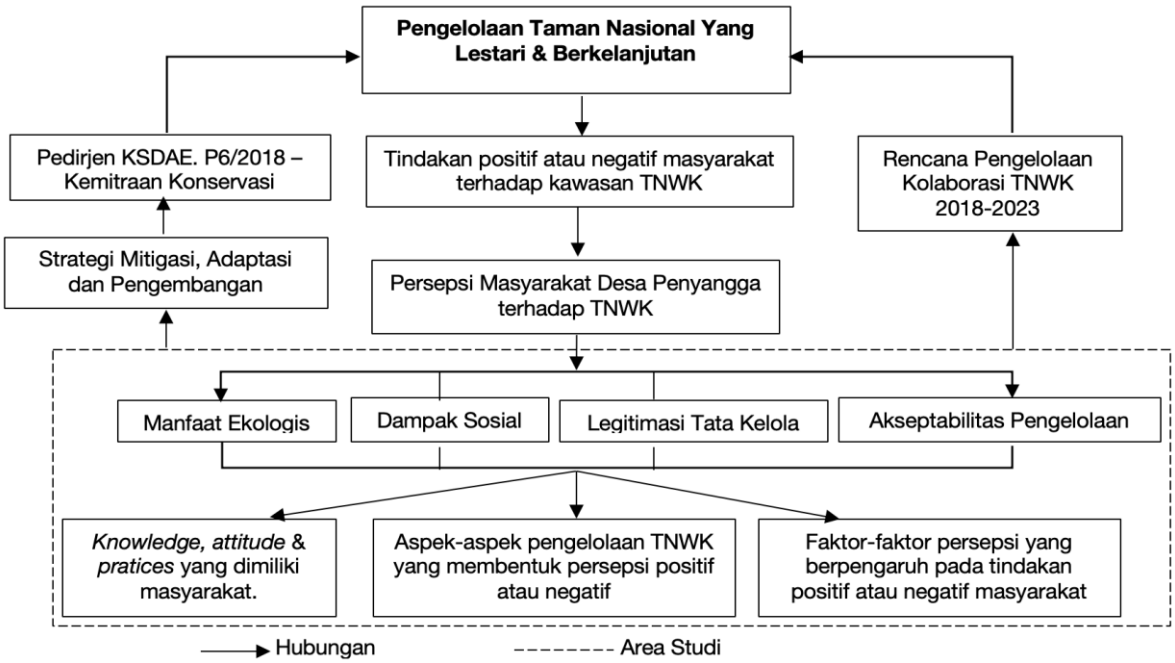


Figure 5. Logical framework of the study

These three studies resulted in a portrait of the community's knowledge, attitude & practices towards WKNP; the dynamics of the relationship between aspects of people's

perception of threats in the WKNP area; key factors that influence the community to take positive or negative action in WKNP area.

The results of the analysis of this study will be constructed to form complementary conclusions. This is done to provide a baseline of reference data that helps the community draft strategies and action interventions to reduce threats to the WKNP. Analysis of this study will also examine KSDAE Director-General Regulation Number P.06/2018 on the Technical Partnership for Conservation Partnerships in Nature Reserved Areas and Nature Conservation Areas and the WKNP Collaboration Management Plan 2018-2023, including also seeing the possibility of integration opportunities with village development plans in the context of a legal framework.

The Procedure for Selecting Informants and Respondents

The study was conducted in Braja Harjosari and Rantau Jaya Udik II Village in June-July 2020 by limiting the scope of the "threat in WKNP" study in the context of illegal hunting, fishing, and forest fires. The selection of informants for descriptive knowledge research, attitude, and community practices was done by purposive sampling. Informants chosen deliberately are respondents who have knowledge about the knowledge, attitudes, practices of the community related to conservation and can provide accurate information needed in this study.

In the study of community perceptions (social impacts, ecology outcomes, legitimacy of governance, acceptability of management) about threats in WKNP and the study of perception factors that influence people's actions to access WKNP, the selection of respondents using random sampling techniques (random sampling). Determination of the number of respondents using a method that refers to the Slovin formula (Juliandi et al., 2014) which determines the number of samples in a population that has known the number, namely as follows:

$$n = \frac{N}{1 + Ne^2}$$

Note:

n : Household sample sizes

N : Household population size in an area

E : error (10%)

The number of samples in Braja Harjosari Village was 118 households (population 1,601 households) and in Rantau Jaya Udik II Village were 149 households (population of 1,650 households). Respondents and informants are family heads or family members representing at least 18 years old who understand the context of the interview material, questionnaires, and focus group discussions. The selection of respondents in this study will consider gender representation and community groups that include the Village Government

officials, the Village Representative Body, community institutions/groups, community leaders, business groups, vulnerable groups (women, parents/elderly, disability), wildlife hunter groups, fishing hobby groups that often enter the area, Community Forestry Partners Group (MMP), Elephant Task Force, Fire Care Society (MPA) and other community groups related to this study.

Data Collection

Data collection was carried out by observation, semi-structured interviews, and focus group discussions (FGD) with the Rapid Rural Appraisal (RRA) approach, which is a rapid assessment of village conditions. Rapid assessment of village conditions means that the search and collection of data and information must be done in a short time through various sources. To achieve this, local cadres need to be identified who will assist the assessment process and link with various key informants in information gathering (Chamber, 1992). In this study, several enumerators were trained online to conduct surveys and collect questionnaire data with open-ended questions. The data collected includes the following aspects:

1) Knowledge; The community's knowledge that was explored covers various issues including a) the function of the forest for the community around the area; b) hunting activities in WKNP; c) forest fires; d) rivers and the use of fish poisons and fish stun devices; e) fishing in the area; f) the contribution of WKNP to the community; g) the actions of officers on hunting, fishing, and land fires; h) community contribution to WKNP.
2) Practices; The behavior and actions of the community that were explored included issues of a) community practices in the WKNP area; b) local/cultural wisdom that supports the conservation of WKNP; c) Good agriculture practices (agriculture/fisheries/plantations); d) community conservation actions (e.g. restoration, nurseries, environmental education, etc.); e) Formal/informal regulations in the village that support the conservation of WKNP; f) zero waste/recycle in community businesses (biogas, compost, etc.).

Several RRA techniques are used to complete data and information such as historical tracking techniques; regional and environmental change trends; sketch maps of illegal hunting and fishing and forest fires. These techniques are used in focus group discussions, semi-structured interviews, and observations by prioritizing the process of triangulating data and information.

Data for the community perception study of threats in WKNP and the study of perception factors were collected by the questionnaire method with closed-ended questions. The questionnaire was used to obtain complete basic data and information from each household as in-depth survey material and to provide a description of the local demographic characteristics of the village scale (Malleson et al., 2008). The questionnaire sheet is presented in Appendix 1.

Data Analysis

Qualitative descriptive research with a case study approach is used in analysing the study of community perception as a whole. All data is presented in the form of frequency tables and graphs. Descriptive method of telling, analysing, and classifying; investigate the case study test techniques. This method also tells and interprets existing data, about the conditions experienced, the pattern of relationships, activities, views/points of view, attitudes that appear, or processes that are taking place, irregularities that emerge, tendencies that appear, contradictions that are tapered. In this study, cases that were observed and analysed were limited by time and activity and the researchers completed the information search using various data collection procedures based on predetermined time (Crewell, 2016).

The Connection between Community Perception and Illegal Actions in WKNP

Quantitative research on community perceptions was carried out with Somer's D correlation test to find out the relationship between variables in the perception questionnaire.

The testing process uses the SPSS application tool with the Cross-tabulation analysis method to test all samples of respondents simultaneously in the two study location villages (N = 267). Somer's D test results can be seen in Appendix 2.

Socio-demographic Factors that Influence the Community to Act Negatively in the Area of WKNP

Analysis of the factors that influence society is done by modeling binary logistic regression statistics. Quantitative research with a binary logistic regression test was developed to analyze the opportunities for various factors that can influence the community to act positively or negatively in the WKNP area. The testing process uses the SPSS application tool. The results of the binary logistic regression analysis can be seen in Appendix 3.

Portrait of the Threat of WKNP and the Condition of the Buffer Villages

Illegal Hunting, Illegal Fishing, and Forest Fire Events in the WKNP Area

Way Kambas National Park (1050 33'-1050 54 'East Longitude and 40 37'- 50 16' LS) was declared as the Way Kambas National Park Area based on the Decree of the Minister of Forestry Number 444 / Menhut-II / 1989 dated 1st of April 1989 with an area of 130,000 Ha. Then in 1991 based on the Decree of the Minister of Forestry number 144 / Kpts / II / 1991 dated March 13, 1991, it was declared the Way Kambas National Park, where its management was carried out by the Way Kambas Natural Resources Conservation Sub-Center which is directly responsible to the Natural Resources Conservation Center. II Tanjung Karang.

On March 31st, 1997, Way Kambas National Park was established by the Government in Indonesia through the Decree of the Minister of Forestry Number 185/KPTS-II/1997. The status of WKNP then was strengthened again with SK Number 670/Kpts-II/1999 concerning the determination of the WKNP area on August 26th, 1999 with an area of 125.621,30 Ha. This area borders directly with 38 villages within the administrative area of East Lampung Regency and Central Lampung Regency, Lampung Province.

However, the history of Way Kambas as a nature conservation area has been started in 1936. Way Kambas was founded by the Resident of Lampung, Mr. Rookmaker. After that, followed by the Decree of the Governor of the Netherlands dated January 26th, 1937, Stbl 1937 Number 38. In 1978, the Way Kambas Wildlife Reserve was converted into a Nature Conservation Area (KPA) by the Minister of Agriculture with the Decree of the Minister of Agriculture Number 429 / Kpts-7/1978 July 10th, 1978, and managed by the Sub Regional Conservation Area (SBKPA)[3].

The main livelihoods of the WKNP supporting village communities are

[3] http://waykambas.org/sejarah-taman-nasional-way-kambas/

farmers/planters and only a few have livelihoods as fishermen/farmers. The majority of fishermen and fishers are in Labuhan Maringgai District, East Lampung, and Cabang Village, Central Lampung, which are directly adjacent to the coastal and marine areas. The main types of agriculture are paddy fields, dryland agriculture, and plantations, which are cultivated on marginal land soils [4] with common commodity types are rice, cassava, corn, cocoa, pepper, and other crops such as bananas and coconuts.

As with other conservation areas in Indonesia, the existence of the WKNP area is inseparable from the interaction of the community with the area. In addition to easy access and short distance, the community's need for fulfilment of life has pushed some people to enter the WKNP. Various pressures and disturbances in the national park area on a small and large scale also occur, such as wildlife hunting activities, illegal fishing, and forest fires because of land burning (Hidayat, 2001). This issue is outside the problem of human and wildlife conflicts such as the elephant conflict which is still occurring in WKNP.

Several cases of illegal hunting and fishing involving local communities were recorded, for example, in 2017 there were 11 cases in WKNP. In the same year, Susukan Baru Resort Forest Ranger officers discovered and confiscated 97 animal snares in their work area (YOSL/OIC-PILI, 2018). In the latest case on April 3rd, 2019, the Forest Ranger and Rhino Protection Unit (RPU) WKNP patrol team arrested 2 (two) poachers along with 4 (four) deer and 4 (four) napu (*Tragulus napu*) in the Rawa Bunder Resort, SPTN I Way Kanan[5].

In the context of the Sumatran elephant, simulation models and scenarios for the impact of elephant hunting in WKNP using elephant hunting data in 2000-2002, predicting that if hunting data in that period were duplicated, the elephant population could decline dramatically with the extinction coefficient significantly increased to around 75 % (Sitompul et al., 2008). This analysis does not include habitat degradation factors in and around the WKNP area.

Illegal hunting and fishing activities involving local communities, generally hunting wild boar, napu, deer, and birds, as well as freshwater fishing in the WKNP area. Beyond that, illegal hunting of protected and endangered wildlife, such as the Sumatran rhinoceros, Sumatran tiger, Sumatran elephant, and tapir involves professional groups from outside the WKNP buffer zone, and illegal trade syndicates on a national and international scale. Hunting for trade or not, is one of the main factors determining population stability and places wildlife at the greatest risk of extinction (Risdianto et al., 2016).

In the case of forest fires that are faced every year by WKNP, it is almost certainly caused by human disturbance. The community burns forest land to increase hunting yields and grow grass as animal feed. Freshly grown grass will attract hunted wildlife to come and

[4] Marginal land is a sub-optimum soil that has the potential for agriculture, either for garden crops, forests, or food. But naturally, this marginal soil fertility is classified as low as indicated by the high acidity level, low nutrient availability, saturation, and low exchangeable base.

[5] http://ksdae.menlhk.go.id/info/5776/dua-pemburu-liar-bersenjata-gejluk-ditangkap-tim-patroli-tn-way-kambas.html

this practice is still being used by hunters because it is considered quite successful and effective (Oelrichs et al., 2016).

In addition to human disturbance, the WKNP area also has a high level of vulnerability to forest fires due to land cover mostly grasslands and thatch, and easy access to the area. Grass and weeds are a combustible material and can cause fires to spread rapidly. This fact is reinforced by the case of forest fires in WKNP throughout 2019 which covers 2,349 hectares[6]. These forest fires generally occur in areas that are overgrown with grass and weeds. The most recent case, forest fires in WKNP occurred on April 12th, 2020, which covered 100 hectares[7].

Analysis and mapping of the level of forest fire vulnerability in WKNP conducted by Amalina *et.al.* by including biophysical factor such as land cover, Normalized Difference Vegetation Index (NDVI), Normalized Difference Moisture Index (NDMI) also including distance to settlements, roads, rivers, and community cultivation land, stated that 34% of WKNP area has a high vulnerability level of forest fires, 52% of the area has medium vulnerability level of forest fires, and 13% of areas with a low vulnerability of forest fires.

There are 4 (four) resorts with high fire vulnerability namely Umbul Salam, Rantau Jaya, Toto Projo, and Susukan Baru Resorts. Resorts with a high level of fire vulnerability are generally dominated by grasslands. Data on the level of vulnerability of forest fires in the WKNP resorts are presented in Table 1.

[6] https://www.lampost.co/berita-kebakaran-hutan-selama-kemarau-2019-capai-2-607-ha.html
[7] https://betahita.id/news/lipsus/5181/luas-karhutla-di-taman-nasional-way-kambas-mencapai-100-hektare.html?v=1591647344

Table 1. Resort Characteristic and Vulnerability Level of Forest Fires in WKNP

Resort	Vulnerability Level	Characteristics of the Dominant Area
SPTN I Way Kanan		
Wako	Medium	Dryland forest, surface temperature 20-25^{0}C, NDMI 0,25-035, NDVI>0,35
Way Kanan	Medium	Dryland forest, surface temperature <20^{0}C, NDMI 0,25-035, NDVI>0,35
Rawa Bunder	Medium	Dryland forest, surface temperature <20^{0}C, NDMI 0,25-035, NDVI>0,35
Susukan Baru	High	Meadow, surface temperature <20^{0}C, NDMI 0,15, NDVI 0,25-0,35
SPTN II Bungur		
Cabang	Medium	Peat Forest, surface temperature 20-25^{0}C, NDMI 0,25-035, NDVI>0,35
Umbul Salam	High	Meadow, surface temperature 20-25^{0}C, NDMI ≤0,15, NDVI >0,35
Rantau Jaya	High	Meadow, surface temperature 20-25^{0}C, NDMI ≤0,15, NDVI >0,35
Toto Projo	High	Meadow, surface temperature 20-25^{0}C, NDMI ≤0,15, NDVI >0,35
SPTN III Kuala Penet		
Sekapuk	Medium	Dryland forest, surface temperature 20-25^{0}C, NDMI 0,25-035, NDVI>0,35
Kuala Kambas	Medium	Dryland forest, surface temperature <20^{0}C, NDMI 0,25-035, NDVI>0,35
Kuala Penet	Medium	Peat Forest, surface temperature 20-25^{0}C, NDMI 0,15-025, NDVI>0,35
Margahayu	Medium	Dryland forest, surface temperature <20^{0}C, NDMI 0,25-035, NDVI>0,35

NDVI=Normalized Difference Vegetation Index, NDMI=Normalized Difference Moisture Index
Source: Amalina *et al.*, 2016

The Dynamics of WKNP's Buffer Village Development

The villages bordering the WKNP area reaches 38 villages which are included in 7 (seven) subdistrict areas in East Lampung Regency and 4 (four) subdistrict areas in Central Lampung Regency. Most of the villages are new expansion areas (WKNP, 2016). It is important to pay attention to the development of the WKNP's buffer villages concerning the sustainability of WKNP management and the handling of the threats.

Significant development of villages will experience an increase in the quality of basic services such as health and education; government administration; varied economic sector growth; improvement of community work skills with more diverse livelihood options; better environmental quality improvement. With developed villages and a growing community economy, dependence on the WKNP area will be significantly reduced.

To measure the achievement of village development, the Ministry of Villages and Disadvantaged Regions/Transmigration (Ministry of Villages/PDTT) has compiled a set of

indicators for the "Village Build Index (IDM)" with an approach of 3 (three) dimensions of sustainable development, namely the social, economic and ecological dimensions. This measurement aid has been established through the Minister of Village Regulation/PDTT No. 2 of 2016 concerning the Village Development Index, as a standard for measuring the performance of village development in Indonesia. The results of the IDM assessment help direct the accuracy of government development policy interventions with community participation (social capital) following the characteristics of village areas.

The IDM indicator set specifically measures the progress and development of village development using measurement variables contained in the Composite Index, namely the Social Resilience Index (IKS), the Economic Resilience Index (IKE), and the Ecological/environmental Resilience Index (IKL)[8]. The government periodically updates the status of the village's progress and independence data at the Ministry of Villages/PDTT [9] IDM online database that can be accessed by the public.

The development of 38 buffer villages of WKNP by comparing IDM figures in 2019 and 2020, presented in Table 2. There are only 3 (three) buffer villages which are categorized as “developed” villages: Braja Harjosari Village in East Lampung Regency; and Surabaya Ilir Village and Sidodadi Village in Central Lampung Regency. Also, there are still 3 (three) villages with “underdeveloped” status in 2020, namely Raja Basa Lama Satu and Sukorahayu Village in East Lampung Regency and Rawa Betik Village in Central Lampung Regency (Table 2).

[8] Penjelasan lengkap mengenai Indeks Desa Membangun dapat dilihat pada tautan laman: http://perpustakaan.bappenas.go.id/lontar/file?file=digital/199004-[_Konten_]-Konten%20E3364.pdf

[9] Laman pangkalan data IDM Kementerian Desa PDTT: http://idm.kemendesa.go.id/index.php/idm_data

Table 2. The development status of WKNP's buffer villages 2019-2020

No	Sub-District	Village	IDM 2019	Status	IDM 2020	Status
	East Lampung Sub-District					
1	Labuhan Maringgai	Margasari	0,6316	Developing	0,6370	Developing
2	Labuhan Maringgai	Sukorahayu	0,5807	Lagging	0,5698	Lagging
3	Labuhan Maringgai	Karang Anyar	0,6760	Developing	0,6687	Developing
4	Way Jepara	Braja Asri	0,5832	Lagging	0,6346	Developing
5	Braja Selebah	Braja Luhur	0,5913	Lagging	0,6290	Developing
6	Braja Selebah	Braja Kencana	0,6018	Developing	0,6259	Developing
7	Braja Selebah	Braja Harjosari	0,7062	Developed	0,7563	Developed
8	Braja Selebah	Braja Yekti	0,6667	Developing	0,6460	Developing
9	Labuhan Ratu	Labuhan Ratu VII	0,6073	Developing	0,6584	Developing
10	Labuhan Ratu	Labuhan Ratu Enam	0,6390	Developing	0,6651	Developing
11	Labuhan Ratu	Raja Basa Lama Satu	0,5460	Lagging	0,5457	Lagging
12	Labuhan Ratu	Labuhan Ratu IX	0,5933	Lagging	0,6124	Developing
13	Sukadana	Sukadana	0,6199	Developing	0,6556	Developing
14	Sukadana	Rantau Jaya Udik II	0,5341	Lagging	0,7041	Developing
15	Sukadana	Muara Jaya	0,6648	Developing	0,6724	Developing
16	Purbolinggo	Tambah Dadi	0,6888	Developing	0,6849	Developing
17	Purbolinggo	Taman Endah	0,6611	Developing	0,6965	Developing
18	Purbolinggo	Taman Fajar	0,6792	Developing	0,7044	Developing
19	Purbolinggo	Tegal Yoso	0,6252	Developing	0,6795	Developing
20	Purbolinggo	Tanjung Kesuma	0,6784	Developing	0,6895	Developing
21	Way Bungur	Tegal Ombo	0,6867	Developing	0,6576	Developing
22	Way Bungur	Toto Projo	0,6646	Developing	0,6852	Developing
23	Way Bungur	Tanjung Tirto	0,6611	Developing	0,6627	Developing
24	Way Bungur	Kali Pasir	0,6443	Developing	0,6592	Developing
	Central Lampung Sub-District					
1	Rumbia	Bina Karya Buana	0,6175	Developing	0,6513	Developing
2	Putra Rumbia	Joharan	0,6894	Developing	0,6962	Developing
3	Putra Rumbia	Rantau Jaya Ilir	0,6851	Developing	0,7073	Developing
4	Putra Rumbia	Rantau Jaya Baru	0,6794	Developing	0,7071	Developing
5	Putra Rumbia	Meranggi Jaya	0,6868	Developing	0,7040	Developing
6	Putra Rumbia	Rantau Jaya Makmur	0,6495	Developing	0,6571	Developing
7	Seputih Surabaya	Rawa Betik	0,5776	Lagging	0,5887	Lagging
8	Bandar Surabaya	Rajawali	0,6965	Developing	0,7021	Developing
9	Bandar Surabaya	Surabaya Ilir	0,7976	Developed	0,7995	Developed
10	Bandar Surabaya	Beringin Jaya	0,6441	Developing	0,6721	Developing
11	Bandar Surabaya	Cempaka Putih	0,6384	Developing	0,6517	Developing
12	Bandar Surabaya	Sidodadi	0,7482	Developed	0,7689	Developed
13	Bandar Surabaya	Cabang	0,6848	Developing	0,6903	Developing
14	Bandar Surabaya	Surabaya Baru	0,6875	Developing	0,6968	Developing

Source: Kementrian Desa/PDTT, 2020 (processed)

Furthermore, in 2019-2020 there are 4 (four) villages which in 2019 have the status of "lagging", then it increased to "developing" villages in 2020, namely Braja Asri, Braja Luhur, Labuhan Ratu IX, and Rantau Jaya Udik II Village, in East Lampung Regency. This certainly shows the performance of four good and serious village governments to bring changes to the social, economic, and ecological aspects of their region so that they can escape

the status of underdeveloped villages. However, in the same period, several villages experienced a decline in village development performance in which the IDM value in 2020 was lower than in 2019 namely Sukorahayu, Karang Anyar, Braja Yekti, Raja Basa Lama Satu, Tambah Dadi, and Tegal Ombo Village, all of which are located in East Lampung Regency (Figure 6).

The status of underdeveloped villages is generally characterized by low levels of education and community income and minimal quality and basic service facilities. Low income and family welfare and limited livelihood options can be a driving factor in increasing illegal community access to the WKNP area to meet family needs.

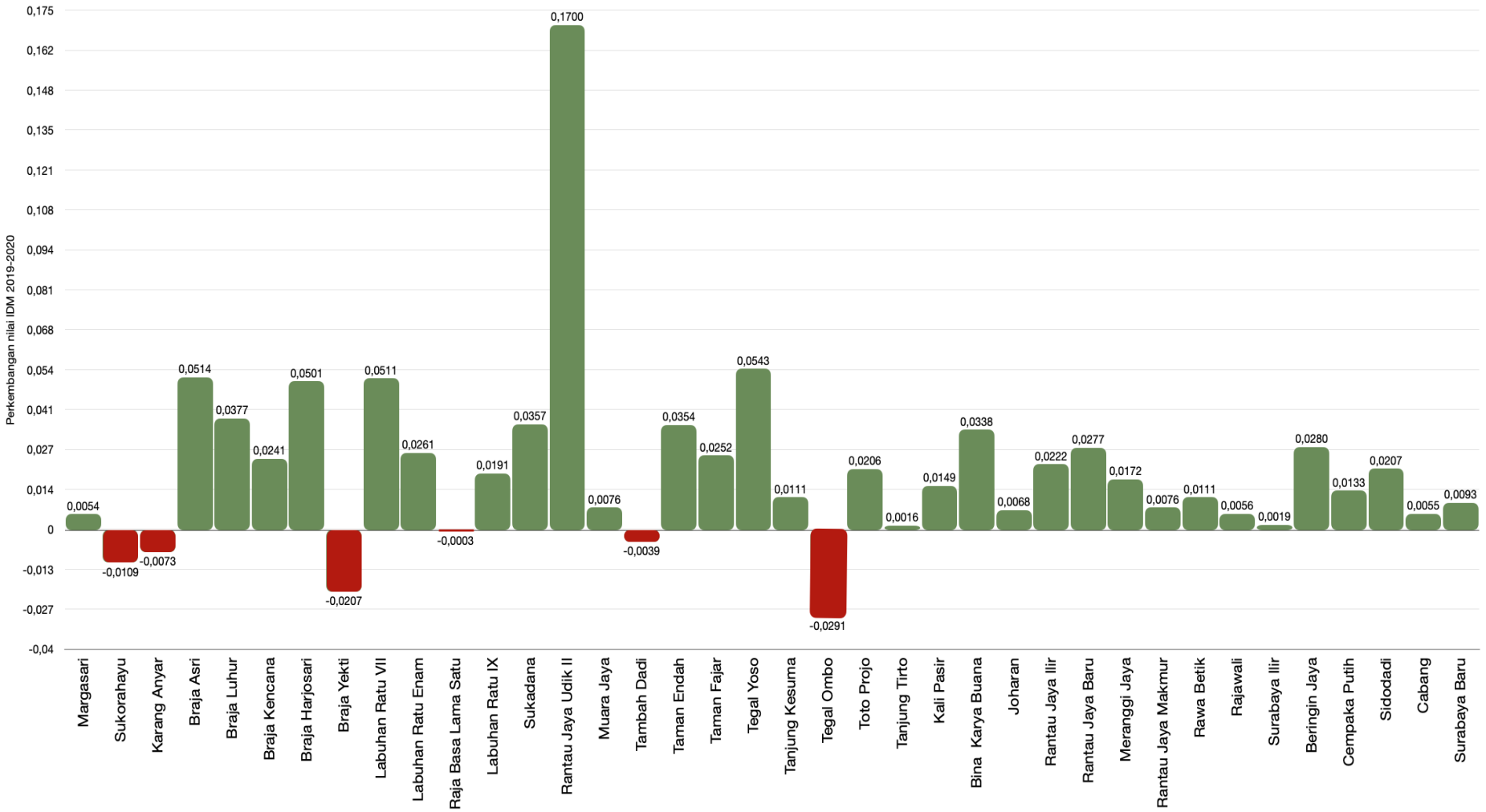


Figure 6. Graph of IDM value development 2019-2020

Braja Harjosari Village

Braja Harjosari Village, Braja Selebah Subdistrict, East Lampung Regency has an area of around 30.77 km2 or 12.45% of the total area of Braja Slebah Subdistrict which is divided into 8 (eight) hamlets and 33 RT. Referring to the profile of Braja Harjosari Village in 2019, this village has a population of 5,707 people or 1,734 heads of households (KK). The population growth rate is 3.01% per year and the population density is 197 people/km^2 (BPS, 2019). The majority of people's livelihoods have varied from farmers, breeders, entrepreneurs, employees, teachers, and livelihoods related to other services. This is because the Braja Harjosari Village is the capital of the Braja Selebah sub-district so that the growth of infrastructure and social service facilities, health, and education is quite good.

Braja Harjo Village has an area of around 436.75 hectares of paddy fields, 299 hectares of non-paddy agriculture, 339.25 hectares of non-agricultural land (BPS, 2019). There are 1 (one) farmer group union and 33 farmer groups in this village. The number of livestock population in Braja Harjosari Village is quite high because some of the people are breeders where the number of cows reaches 896, buffaloes 27, goats/sheep 640, 70 pigs, 2500 broilers, and 526 ducks.

As the subdistrict capital, Braja Harjosari Village, whose status is "Developed Village"[10], has a fairly complete educational facility ranging from kindergarten to high school/vocational school (Table 3). In fact, as a sub-district economic center, there are 4 units of microfinance services in the form of Savings and Credit Cooperatives and Islamic Financial Institutions (BMT).

[10] Based on Indeks Desa Membangun 2020, Ministry of Villages/PDTT value IDM 0,7563 with the category status "Developed Village"

In the regional financial system of East Lampung Regency, Braja Harjosari Village has budgets from various resources to carry out its development. The sources of this village income in 2018 are Village Original Income of IDR 10.000.000,-, Village Fund (APBN) of IDR 851.391.000,-, Revenue Sharing Taxes and Regional Retribution of IDR 18.360.000,-, Village Fund Allocation (APBD) of IDR 468.699.000,-, Provincial APBD Assistance of IDR 7.000.000,-, and Assistance from the Regional of East Lampung of IDR 46.600.000,-.

Table 3. Educational, processing industry and economic facilities in Braja Harjosari Village in 2018.

Facility	Total	Information
Education		
TK/RA	2 unit TK, 1 unit RA	Private
SD/MI	3 unit SD, 3unit MI	State
SMP/MTS	2 unit SMP, 3 unit MTS	Private
SMA/SMK/MA	2 unit SMA, 3 unit SMK, 2 unit MA	Private
Islamic boarding school	2 unit	Private
Processing Industry		
Wood processing	21 unit	Small and Medium Scale
Food processing	24 unit	Small and Medium Scale
Other industries	16 unit	Small and Medium Scale
Economic Facilities		
Shopping complex	1 unit	
Traditional market	1 unit	
Mini Market/Supermarkets	3 unit	
Grocery Stalls	127 unit	
Food Stalls	25 unit	
Financial institutions	4 unit	Cooperatives and BMT

Catatan: RA: Raudhatul Athfal, MI: Madrasah Ibtidaiyah, MTS: Madrasah Tsanawiyah, MA: Madrasah Aliyah

Community collaboration in Braja Harjosari Village and WKNP started a long time ago through community empowerment and environmental awareness programs. Furthermore, the cooperation expanded to a wider range of parties such as related agencies, extension agents, BPDAS, DPD RI, universities (UNILA, Polinela, IPB), and WKNP partners (KHS, Alert, WCS, PILI). From this relationship with various parties, social groups have grown and developed to developing the economy and conservation actions that support WKNP such as Tourism Awareness Group (Pokdarwis), Forest Farmer Group, Forgotten Family youth group, Kesuma Purba Art Group, women's business group, Community Forestry Partners (MMP), Fire Concerned Community (MPA), Youth Organization, and "Mapan Sejahtera" BUMDes.

Currently, tourism activities in Braja Harjosari Village are sufficiently developed and integrated with several package attractions developed by community groups such as Balinese and Lampung arts, agrotourism (dragon fruit, crystal guava, and orchid cultivation), horse tours, river tours, and homestays. Tourism development has been supported by the East Lampung Regency Government by prioritizing Braja Harjosari Village in 2016 as a model for a tourism and food independent village in East Lampung. Village Government support is also manifested in the Village Medium Term Development Plan (RPJMDes) for 2018-2023, where the priority of the tourism program is allocated in the form of a tourism

cottage development plan, development of green open spaces, procurement of village internet networks, improvement of village road infrastructure, community training for formation and development of the community economy and appropriate technology training.

Rantau Jaya Udik II Village

Rantau Jaya Udik II Village, Sukadana District, East Lampung Regency has an area of approximately 30 km^2 or 3,97% of the total area of Braja Slebah District. This village was a division from Rantau Jaya Village in 1996 and became the definitive village in 1997. In 2018, Rantau Jaya Udik II Village had a population of 4.418 people or 1.542 heads of families (KK), with a population growth rate of 0,57% per year and a population density of 148 people/km^2 (BPS, 2019). Most people's livelihoods are farmers and ranchers with an area of about 38 hectares of paddy fields, 508,47 hectares of non-paddy farming, 6,9 hectares of plantations, 508,5 hectares of livestock (BPS, 2019). There are 1 (one) Gapoktan and 38 Farmer Groups (KT) in this village. The number of livestock population in Braja Harjosari Village is quite high because most of the people are breeders where there are 1.139 cows, 1.189 goats/sheep, and 108 ducks.

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In 2019, Rantau Jaya Udik II Village has a status of Disadvantaged Village with an IDM value of 0,5341, but in 2020 the status changed to "Developing" Village with an IDM value of 0,7041 or an increase of 0,17 points. The improvement of village status is usually shown by the increase of basic service facilities such as education and health including the increasing dynamics of social capital. As an illustration of the village infrastructure in Rantau Jaya Udik II Village, it is presented in Table 4.

In the regional financial system of Lampung Regency, Braja Harjosari Village has budgets from various sources to carry out its development. In 2018, the budget was realized in several sectors of development, including the following:

1. Village Administration Sector IDR 362.905.000,-
2. Development Implementation Sector IDR 1.078.465.000,-
3. Community Empowerment Sector IDR 147.087.000,-
4. Community Development Sector IDR 86.800.000,-
5. Other IDR 1.800.000,-
6.

Table 4. Educational, processing industry, and economic facilities in Rantau Jaya Udik II Village in 2018.

Facility	Total	Information
Education		
TK/RA	None	
SD/MI	2 unit SD	State
SMP/MTS	1 unit SMP	Private
SMA/SMK/MA	None	
Islamic boarding school	None	
Processing Industry		
Wood processing	6 unit	Household Scale
Food processing	None	
Other industries	None	
Economic Facilities	None	
Shopping complex		
Traditional market	None	
Mini	None	
Market/Supermarkets		
Grocery Stalls	None	
Food Stalls	57 unit	
Financial institutions	10 unit	
Education	None	

Catatan: RA: Raudhatul Athfal, MI: Madrasah Ibtidaiyah, MTS: Madrasah Tsanawiyah, MA: Madrasah Aliyah

The support of the village government in managing the area already exists in the form of providing land for environmental education and tourism facilities. It is located close to the Susukan Baru RPTN office. These activities are currently managed by the Gambas Student Community (Kompag). Another support is seen in the 2014 RPJMDes, where the Village Government of Rantau Jaya Udik II included plans for the development of the Way Kambas recreation park, strengthening the art of kuda lumping culture and training in the household scale food industry as support for the village tourism.

Furthermore, the collaboration expanded to a broad range of parties such as the Agriculture Office, Animal Husbandry Service, PT NTF (GGP), and TNWK partners (Alert, WCS, PILI). From this relationship with outsiders then social groups grow and develop in order to advance the economy and conservation actions that support TNWK such as the Forest Farmers Group, the Honey Farmer Group, the Gambas Student Community (Kompag), the Kuda Lumping Art Group, the women's business group, Forestry Police

Partners Community (MMP), Fire Concern Community (MPA), Youth Organization and BUMDes.

Currently, tourism activities in Rantau Jaya Udik II Village, which are utterly developed and integrated, are environmental education and forest restoration activities by Kompag and TNWK as well as honey cultivation activities as a result of the cooperation between WKNP and forest farmer groups.

The Knowledge and Community Practices in the WKNP Area

The history and development of community activities inside the area of WKNP

The community around WKNP had existed long before this area was declared as a conservation area in 1978[11]. The community around WKNP had existed before this area was declared as a conservation area by Minister in 1978. Previously, a segment of the Way Kambas forest area was opened by the government for Forest Concession Rights (HPH) in mid-1968-1974. The history of the community's existence in this area began with the colonization program under the Dutch Government in 1905. At that time, 155 families were transported from Kedu, Central Java to Gedong Tatan, Lampung Province. In 1932-1941, the Dutch colonization program began placing people from Central Java and East Java in the Sukadana area, East Lampung. Subsequently, the transmigration program to this area began to be formally developed by the Indonesian government in 1955 (Kemendesa PDTT, 2015).

Braja Harjosari Village

Illegal hunting, Illegal Fishing and Poaching.

The history of the people of Braja Harjosari Village entering the Way Kambas forest area began at the end of 1964, before the G30s PKI incident. At that time, people called it a famine, so that many people entered the forest area to look for forest products. There were 5 (five) villages standing in the Way Kambas forest area, namely Karang Sari Village, Sidodadi, Gajah Field, Mbotol, and Kapi Village. In 1980-1983, the government issued the five villages and moved them to the Tulang Bawang area. (Figure 7).

Hunting, fishing, and illegal logging activities have been carried out since 1964 and continued to be carried out massively until the 1980s. In that era, fishing and hunting activities were still carried out by people traditionally, namely hunting using spears and fishing with bamboo rods or tajur. Generally, the animals obtained are deer, pigs, and other types of local fish from within the WKNP area. In 1979, hunting activities using firearms began and involved people from outside the village.

Illegal fishing activities inside the WKNP area can last for 3 (three) days involving the surrounding village community and from outside the buffer zone. This activity was done

[11] Suaka Margasatwa Way Kambas

because of economic needs at that time. The busy fishing season is before the dry season until the end of the dry season or until the beginning of the rainy season. Usually, people fish in the WKNP area in groups, namely 3-5 people per group, and may get yields up to 50 Kg.

In mid-1980-1990, gaharu encroachment was rampant in the WKNP area. The method used to trick the officers was to use a truck and then lower the encroachers one by one at the location. The encroachers then dived to enter the forest. After that, the encroachers were picked up again in a different car. Usually, gaharu is harvested by a villager from the middle of the tree right on the broken branch.

Since 1980, hunting involving the people of Braja Harjosari Village has started to decrease, and currently, there are no more people who go hunting. However, several people become guides or porter for hunters from outside. In 2018, the community canceled hunting activity from the hunter outside the village and secured one box of ammunition or bullets for hunting.

Similar to hunting, fishing activities in the area began to decrease significantly. Fishing activities were carried out by villagers on the edge of the WKNP area, namely in rivers or canals and in fishing ponds or ponds. In the last 5 (five) years, fishing activity has decreased drastically, and the use of poison in rivers has ceased to exist. However, there are still some people who use electric shocks to catch fish in the river up until now.

Forest fire, illegal logging, and grass harvest

Fire incidents are an indicator to be related to illegal hunting activities. The people suspect that during the dry season and before the rainy season, hunters deliberately burn the forest to make hunting easier. After the fires and grass started growing, the deer, sambar deer, and tigers came out. When the animals in a vulnerable state, that's when the hunters got into action. Other indications of forest fires are cigarette butts as well as reasons for resentment. The revenge motive from the community because of arrest and elephant conflicts are suspected to be the cause of the forest fires.

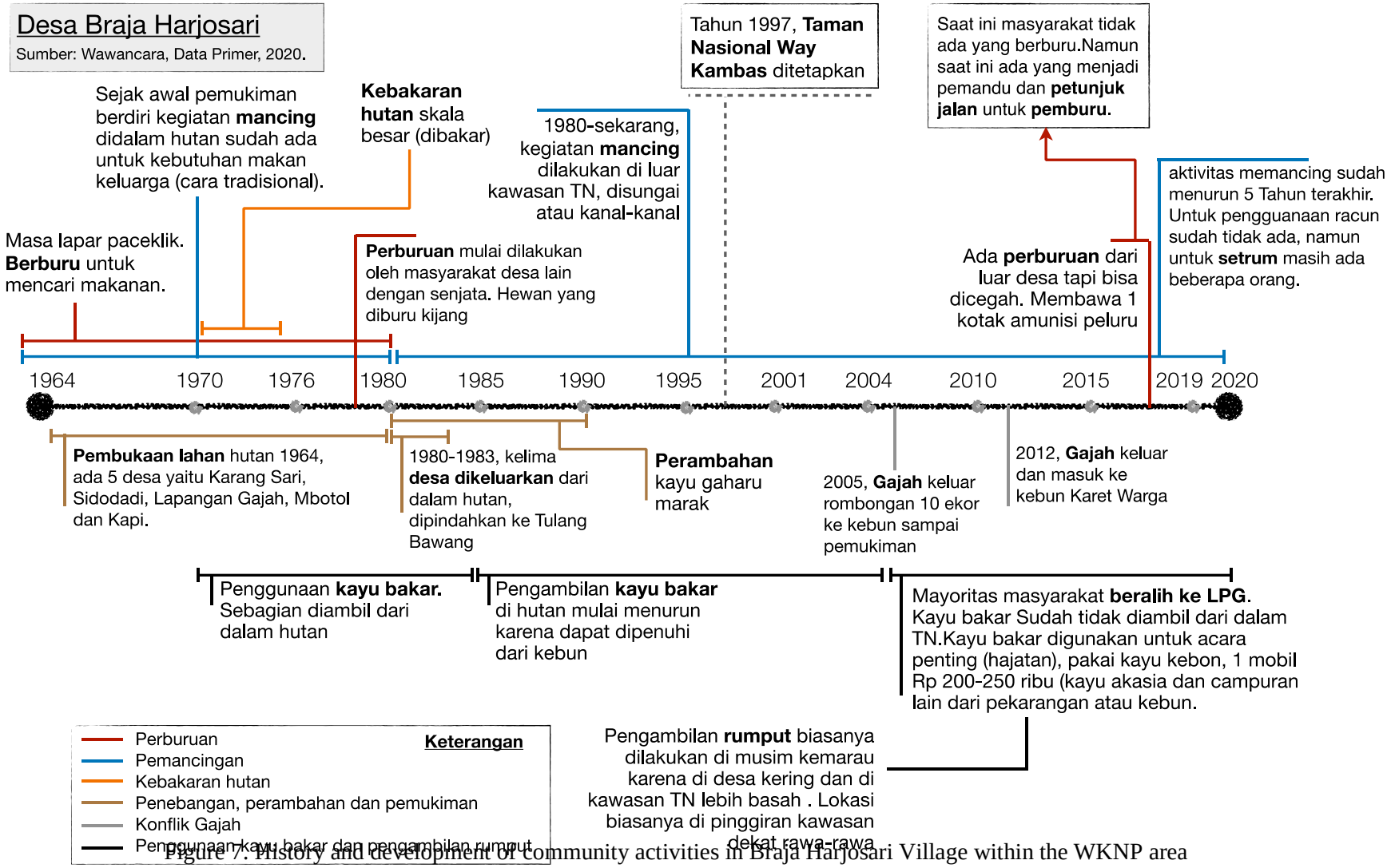


Figure 7. History and development of community activities in Braja Harjosari Village within the WKNP area

Furthermore, firewood and grass harvesting activities indicators were not found in the WKNP area. Since 1980, the collection of firewood has been carried out by villager in community gardens or yards through buying. Currently, the use of firewood is only carried out during intrinsic events, such as celebrations, because most of the people have switched to Liquid Petroleum Gas (LPG) for household needs. For activities such as a celebration, the need for firewood is up to 1 car containing acacia wood and other mixtures from the yard for the price Rp. 200,000 to Rp. 250,000.

Grass harvesting is generally carried out in the swamps and edges of the WKNP area during the dry season because the land around WKNP is wetter during the dry season. If it is not the dry season, villagers will harvest grass from the community gardens, and some people also plant their grass. Once, a villager harvest the grass in the savanna, then cross the river and took it to the edge of the area (it belong to the WKNP area).

A complete history of the community development and activities in Braja Harjosari Village within the WKNP area can be seen in Picture 7.

Rantau Jaya Udik II Village

Illegal hunting, Illegal Fishing and Poaching.

The history of the people of Rantau Jaya Udik II Village entering the Way Kambas forest area began at the end of 1964. At that time, there was a famine, which caused many people to enter the forest area to look for forest products. In 1974, there was a village that stood in the Way Kambas forest area with a population of 750 households. In 1985, the villagers were transported to Menggala or the so-called Resettlement Unit (SP) 7. Land clearing activities occurred again in the WKNP area in the middle of 2001-2004, but in that era, it was for cultivation activities covering an area of 6,000 hectares. In 2008, WKNP was finally successful in expelling all communities in collaboration with the government.

Hunting and fishing activities involving the people of Rantau Jaya Udik II Village have been carried out since 1964 and have continued to be carried out massively until the 1990s. In that era, fishing and hunting activities were still carried out by villagers traditionally, namely hunting using spears and fishing with bamboo rods or tajur. From 2000 to 2003, hunting activities using firearms began and involved people from outside the village using the community as guides or guides. Meanwhile, in 1998, fishing activities using poison (potas) in rivers began to exist in Desa Rantau Jaya Udik II.

Since 1990, hunting and fishing involving the people of Rantau Jaya Udik II Village have begun to decrease, although currently, some people are still hunting for hobbies instead of economic motives. Likewise, fishing activities in the area have begun to decrease. There is no longer fishing in the Way Kanan area which involves group and community anglers from outside the village until now.

Forest encroachment activities or so-called wood scraping in 1969-1985 in the WKNP area, but after that, this activity was no longer there.

Forest fire, illegal logging, and grass harvest

Forest fire incidents in Rantau Jaya Udik II Village are the indicator related to illegal hunting and grass harvesting activities. The people suspect that during the dry season, hunters and farmers deliberately burn the forest, so at the start of the rainy season, there will be lots of grass and animals in the area. At a distance of 0-500 meters into the WKNP area, it is usually used for "pengaritan" or collecting grass during the rainy season for 2 (two) months. Fires usually occur at this location. When the fire started to burn further into the WKNP area, it was suspected of hunting and harvesting the grass.

Furthermore, the firewood harvesting activity is currently not found inside the WKNP area. Since 2004, the majority of people have switched to Liquid Petroleum Gas (LPG) for household needs. The use of firewood is currently only done during important activities (celebration) and a complete history of the community activities and development in Rantau Jaya Udik II Village within the WKNP area can be seen Figure 8.

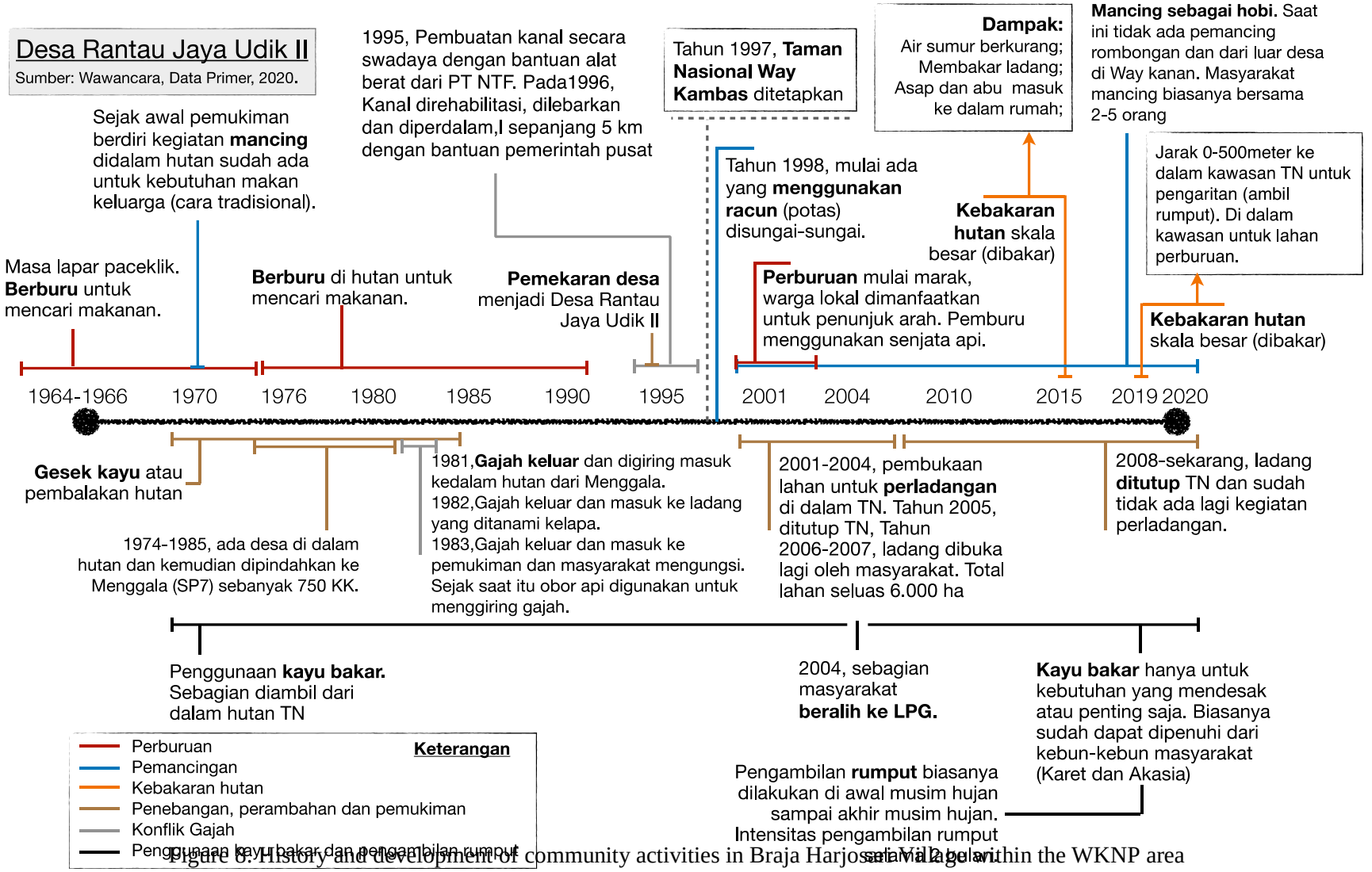


Figure 8. History and development of community activities in Braja Harjosari Village within the WKNP area

Community Knowledge of WKNP Function and Regulation

To find out the understanding of the community, this study uses an interview method with open-ended questions that guide respondents to explain their understanding of the functions and rules in WKNP. The results show that 71% of respondents in Braja Harjosari (BJ) Village understand the functions and rules of WKNP, and 29% of other respondents do not understand. In the village of Rantau Jaya Udik II (RJU), 73% of respondents understood the functions and regulations in WKNP, and 27% of other respondents did not understand (Figure 8). The function of WKNP is generally understood by respondents as follow:

1) Preservation place for protected wildlife (BJ 10%, RJU 8%);
2) Forest and ecosystem preservation (BJ 11%, RJU 2%);
3) Water resource and disaster prevention such as flooding and extremely hot weather (BJ 7%, RJU 7%);
4) Give economic benefits for the surrounding community (BJ 3%, RJU 0%).

Meanwhile, for the regulations that apply in WKNP, 40% of respondents in Braja Harjosari Village and 56% of respondents in Rantau Jaya Udik II Village already know and understand well. Understanding these rules is generally more about things that are prohibited, namely prohibition of hunting, the prohibition of fishing, the prohibition of burning, or destroying forests.

Community Practices in WKNP Area

The interaction between the two villages and WKNP can be seen from the community activities within the WKNP area which are grouped into two, namely positive activities and negative activities (breaking the rules). Figure 9 shows that 12% of respondents in Braja Harjosari Village access the WKNP area and 88% of other respondents do not. A different thing happened in Rantau Jaya Udik II Village where 77% of respondents accessed the WKNP area and 33% of other respondents did not.

Community activities within the WKNP area identified in this study are as follows:

1) Positive activities consist of handling elephant conflicts, handling forest fire, and tree planting;
2) Negative activities consist of hunting, fishing, collecting forest honey, collecting firewood, and grass for animal feed.

Regarding the negative activities in the WKNP area, the people of Rantau Jaya Udik II Village have a higher dependence on the WKNP forest, higher than the people of Braja Harjosari Village, for example collecting firewood and grass for animal feed by 25% of respondents, fishing 19% and hunting 9% of respondents.

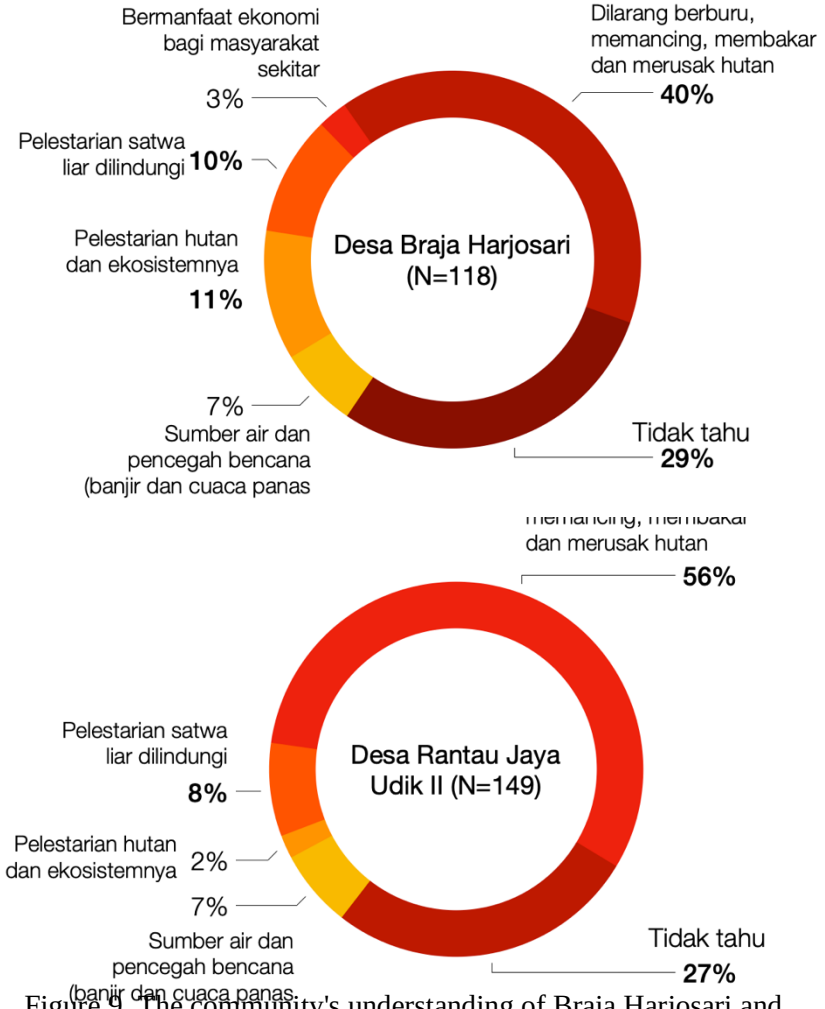


Figure 9. The community's understanding of Braja Harjosari and Rantau Jaya Udik II Villages about the functions and rules of

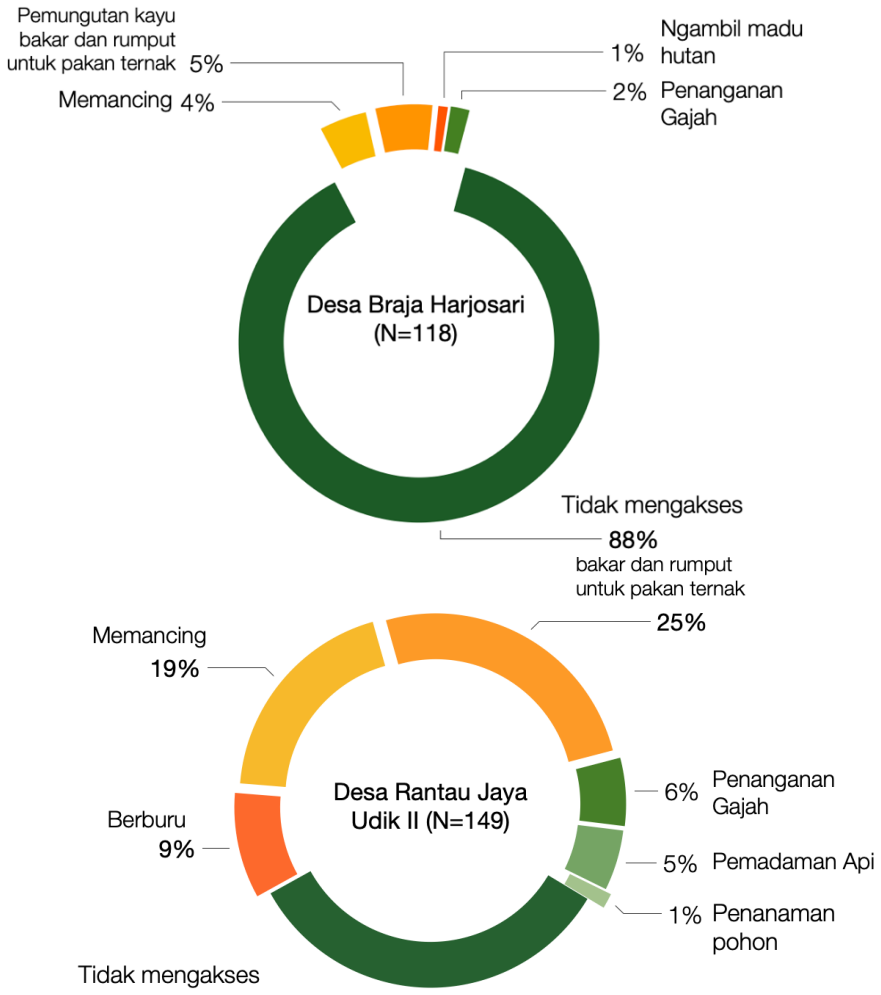


Figure 10. Community activities of Braja Harjosari and Rantau Jaya Udik II Village within the WKNP area.

Table 5. Summary of Community Practices and Knowledge in Conservation Areas.

Aspect	Study Location	
	Braja Harjosari Village	**Rantau Jaya Udik II Village**
Action		
Illegal Fishing and Harvesting Grass	There are still people who enter the WKNP area; Many from outside the local village; Utilization of snakehead fish outside the area from outside the village; no fish bomb was found; There are still some fish stun; Fishing is not for basic needs in the community.	Some people still enter the edge of the area; No one has stunned the fish anymore; Looking for grass only on the edge of the area except in the dry season may enter the WKNP area.
Illegal Hunting	There is a need for meat during a celebration event It is cheaper and still available in the forest Some people are still hunting in the area Most types of deer	There is still a lot of hunting for consumption meat, especially during celebrations; You can burn the weeds to grow young bushes to get prey; This activity is done by a few people because some villager already has job as laborers
Forest Fire	Natural factors during the dry season Cheating factor from other people	More cheating factor from other people Natural factors during the dry season
Feedback		
Expectation	Assistance is provided from WKNP, Provided legal access to harvest grass.	Additional funding for MPAs that support fires (incentives and adequate tools); There is a use zone that can be accessed by the community for livestock pasture land; There is the cleaning of canals and installing fences to keep elephants and pigs out of residents' farms
Participatory work	Firefighting activities Drive elephants as they approach the settlement.	Firefighting activities Drive elephants and pigs as they approach the settlement.
Perception		
WKNP area existence	Government areas that can be accessed by the public; Areas with lots of restrictions; Areas that can be accessed discreetly;	Area boundaries are not clear; Lack of socialization to residents about the importance of conservation areas and what can and cannot be done in these conservation areas.

Community Perception about Threats in the Area of WKNP

Characteristics of community household respondents

The perception study in Braja Harjosari Village was conducted on 118 community household respondents with a composition of 77,1% male respondents and 22,9% female respondents. The age range of respondents is generally between 20 years and over 60 years (the oldest is 75 years) with the level of education evenly distributed from primary to high school. Most respondents have a job as a farmer (83,2%) as their main source of livelihood with an average of working 5-10 hours a day. The average household income of the respondents was IDR 1.602.437,-/month/household.

In particular, this study also collects information on house distance to WKNP, the use of firewood, and ownership of cattle/goats for the further analysis described in the next chapter of this report. Information on the socio-demographic characteristics of community respondents in Braja Harjosari Village is explained in Table 6.

Meanwhile, in Rantau Jaya Udik II Village, a perception study was conducted on 149 community household respondents with a composition of 87,9% male respondents and 12,1% female respondents. The age range of the majority of respondents was between 31 years and 60 years with the oldest age being 82 years. The majority of education levels are at primary school education (51%) and the rest are at higher education levels. The average household income of the respondents was IDR 1.338.848,-/month/household. The majority of respondents have jobs as farmers (86%) as the main source of livelihood with an average of working 5-7 hours a day. Some of the respondents have the main job as laborers at PT Great Giant Pineapple (GGP) (7,4%) and farming is a side job. In Table 7, the location effect shows a significant difference, especially in the distance from the house to WKNP, the use of firewood, and ownership of cattle/goats. In contrast to Braja Harjosari Village, the people of Rantau Jaya Udik II Village live very close to the national park (61,1%), still use firewood in their daily activities (94%), and have livestock (55%) as family savings.

Table 6. Karakteristik responden di Desa Braja Harjosari

DESCRIPTION	TOTAL RESPONDENT	%	DESCRIPTION	TOTAL RESPONDENT	%

Sex			Number of work hours		
Male	91	77,1	in a day		
Female	27	22,9	2-4 hours	9	7,6
Age Group			5-7 hours	60	50,9
20-30 years old	7	5,9	8-10 hours	47	39,8
31-40 years old	28	23,7	Over 10 hours	2	1,7
41-50 years old	40	33,9	Distance from house to		
51-60 years old	29	24,6	WKNP		
Over 60 years old	14	11,9	0-500 m	7	5,9
Education			501-1000 m	9	7,6
SD	44	37,3	1001-2000 m	34	28,8
SMP	25	21,2	2001-3000 m	22	18,7
SMA	47	39,8	3001-4000 m	38	32,2
College	2	1,7	4001-5000 m	8	6,8
Main job			Use of firewood		
Farmer	98	83			
Daily Labor	4	3,4	Yes	77	65,3
Entrepreneur/trader	9	7,6	No	41	34,7
Housewife	6	5,1	Ownership of livestock		
Government employees	1	0,9	(cow/goat)		
Average Income			Yes	35	29,7
IDR 1.602.437,-/month	118	100%	No	83	70,3

Sumber: Data Primer, 2020

Tabel 7. Karakteristik responden di Desa Rantau Jaya Udik II

DESKRIPSI	JUMLAH RESPONDEN	%	DESKRIPSI	JUMLAH RESPONDEN	%
Jenis kelamin			Jumlah jam kerja		
Laki-laki	131	87,9	dalam sehari		
Perempuan	18	12,1	2-4 jam	8	5,4
Kelompok umur			5-7 jam	92	61,7
20-30 tahun	7	4,7	8-10 jam	49	32,9
31-40 tahun	32	21,5	Diatas 10 jam	0	0
41-50 tahun	55	36,9	Jarak rumah ke TNWK		
51-60 tahun	40	26,8			
Diatas 60 tahun	15	10,1	0-500 m	91	61,1
Pendidikan			501-1000 m	25	16,8
SD	76	51	1001-2000 m	28	18,8
SMP	39	26,2	2001-3000 m	2	1,3
SMA	32	21,5	3001-4000 m	2	1,3
Perguruan Tinggi	2	1,3	4001-5000 m	1	0,7
Pekerjaan utama			Penggunaan Kayu		
Petani	128	86	Bakar		
Buruh harian/tani	2	1,3	Ya	140	94
Wirausaha/dagang	1	0,7	Tidak	9	6
Ibu Rumah Tangga	5	3,4	Kepemilikan ternak		
Guru	2	1,3	(sapi/kambing)		
Buruh Perusahaan	11	7,4	Ya	82	55
Pendapatan rata-rata			Tidak	67	45
Rp 1.338.848,-/bulan	149	100%			

Source: Data Primer, 2020

The dynamics of community perception

The community's perceptions of the threats in WKNP are focused on several threat activities, namely hunting, fishing, collecting grass, and firewood inside the WKNP area and burning forests. This illegal activity is then assessed based on perceptions and field facts by

providing statements that must be answered by the respondent. These statements include 1 (one) general public perception of the threat in WKNP and 12 perceptions that have the potential to form a general public perception which is divided into 4 (four) aspects, namely socio-economic, environmental, legitimacy and acceptability.

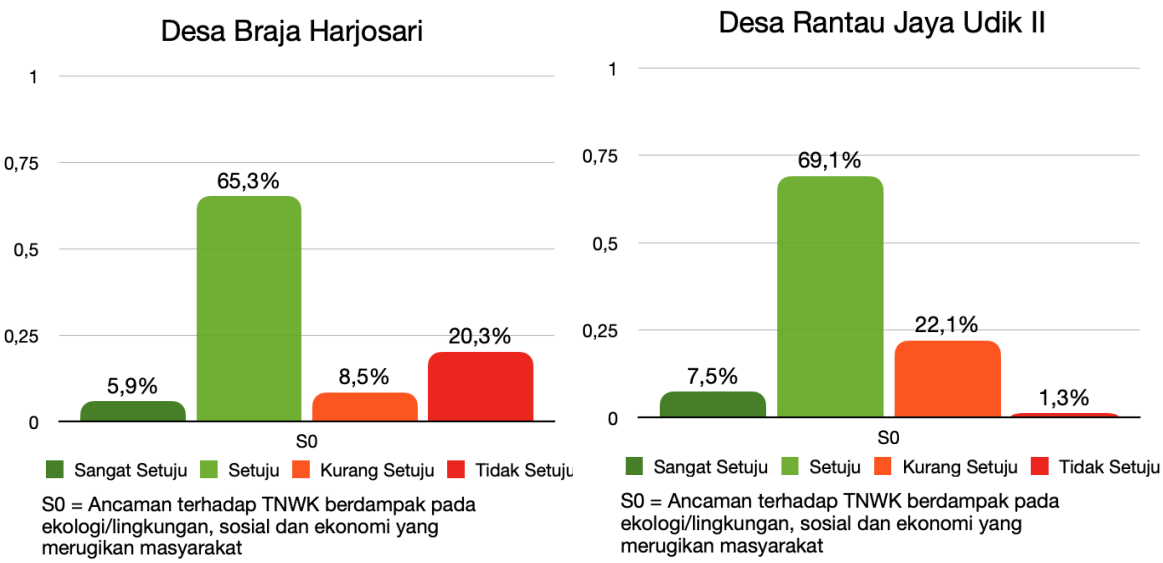


Figure 11. General public perception regarding WKNP threats

The general public perception of "Threats to WKNP has an impact on ecology/environment, social and economic disadvantages to society" as shown in Figure 11 is as follows:

1. Braja Harjosari Village (N = 118), 65,3% of community respondents agreed (S) and 5,9% of the community responded strongly (SS). On the other hand, 20,3% of respondents disagreed (KS) and 8,5% of respondents disagreed (TS) on the perception statement.
2. Rantau Jaya Udik II Village (N = 149), 69,1% of community respondents agreed (S) and 7,5% responded strongly (SS). The remaining 22,1% of respondents disagreed (KS) and 1,3% of respondents disagreed (TS) with the perception statement.

In the socio-economic aspect, in general, the public response regarding the S1 and S2 statements agreed and strongly agreed, namely in Braja Harjosari Village (BJ) starting from 75,4% of respondents and in Rantau Jaya Udik II Village (RJU) starting at 77,9% of respondents (Figure 12a). Whereas in the S3 statement, the community agreed and strongly agreed with 33% in Braja Harjosari Village and 28,2% in Rantau Jaya Udik II Village.

In the S1 statement, namely in the context of forest destruction and decreasing wildlife/fish populations, most of the community respondents in Braja Harjosari and Rantau Jaya Udik II Village understand and think that the consequences of hunting, fishing, and forest burning have disturbed and disrupted community social activities such as people are

more likely to deal with forest fires and keep elephants from returning to national parks. This is not yet added to the health effects arising from fire fumes.

The above statement is also related to the S2 statement, namely the activities of community social groups discussing the handling of hunting, fishing, and forest fires, which received a response that agreed and strongly agreed in Braja Harjosari Village of 93,2%, while in Rantau Jaya Udik II Village received a community response amounted to 96,7%. This shows that the problem of hunting, fishing, and forest burning has been troubling and encourages the community to be involved in its handling.

Furthermore, the community felt that they still had an economic dependence on WKNP (S3) forest products, 33% in Braja Harjosari Village, and 28,2% in Rantau Jaya Udik II Village. Common economic dependencies in the two villages are gathering grass for animal feed, collecting firewood, fishing, and extracting forest honey.

In the environmental aspect, in general, the public response related to statements S4, S5, S6 agreed and strongly agreed, namely in Braja Harjosari Village (BJ) starting from 66.1% of respondents and in Rantau Jaya Udik II (RJU) Village starting from 96% of respondents (Figure 12b). The majority of the community (BJ 89,8%; RJU 96%) understand that the sustainability of forests and wildlife has decreased as a result of hunting, fishing, and forest burning. Then, the majority of the community agreed and strongly agreed (BJ 80,5%; RJU 100%) that the impact of the fires had increased water dryness in the two villages. Furthermore, the impact of illegal activities will be able to increase the number of pests that disturb crops and threaten people's lives (BJ 66,1%; RJU 96,6%).

In the context of water drought and increased plant pests, almost all of the people in Rantau Jaya Udik II Village agreed and strongly agreed. This is due to frequent forest fires and cases of elephants leaving the national park and entering agricultural land in the village area.

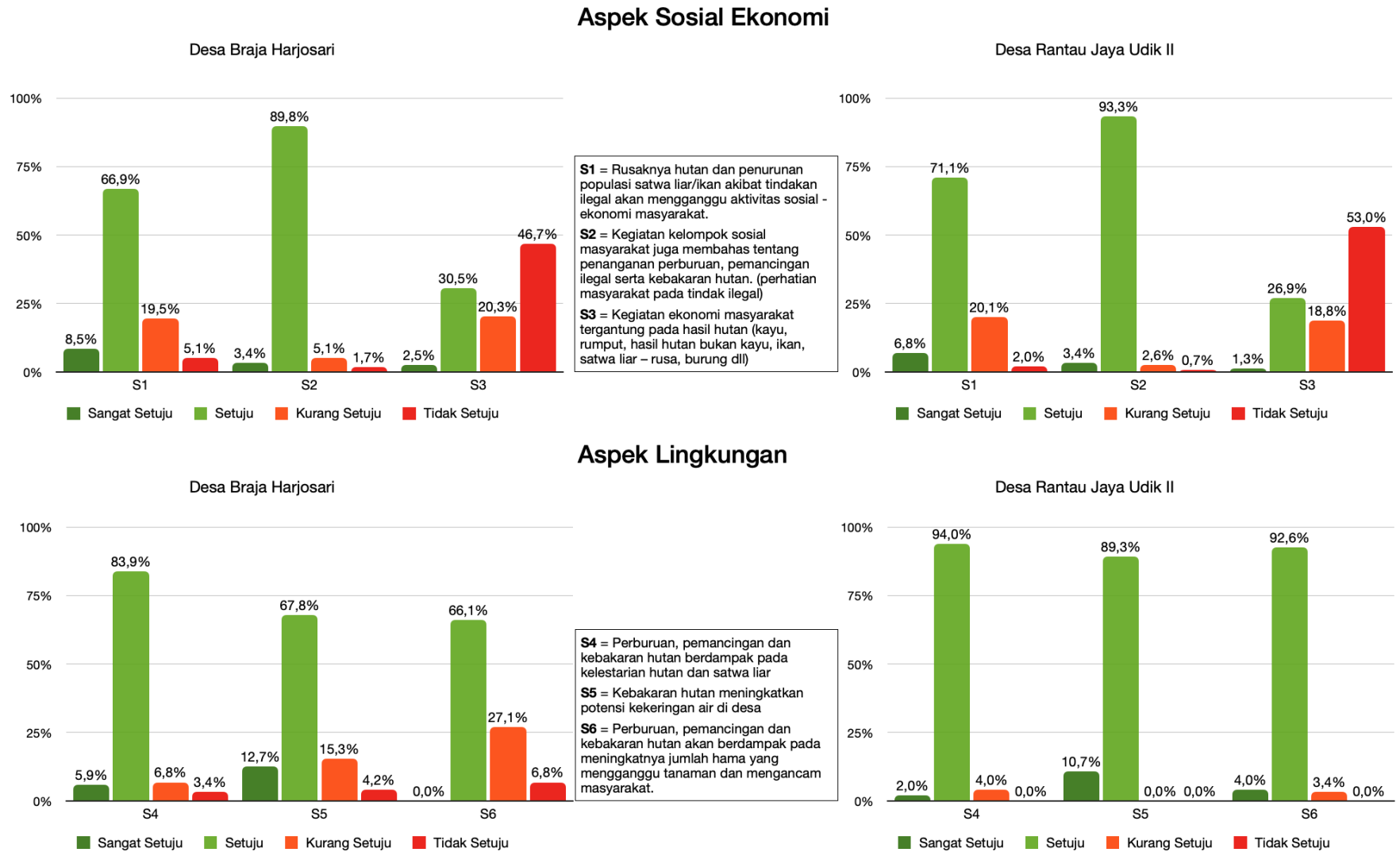
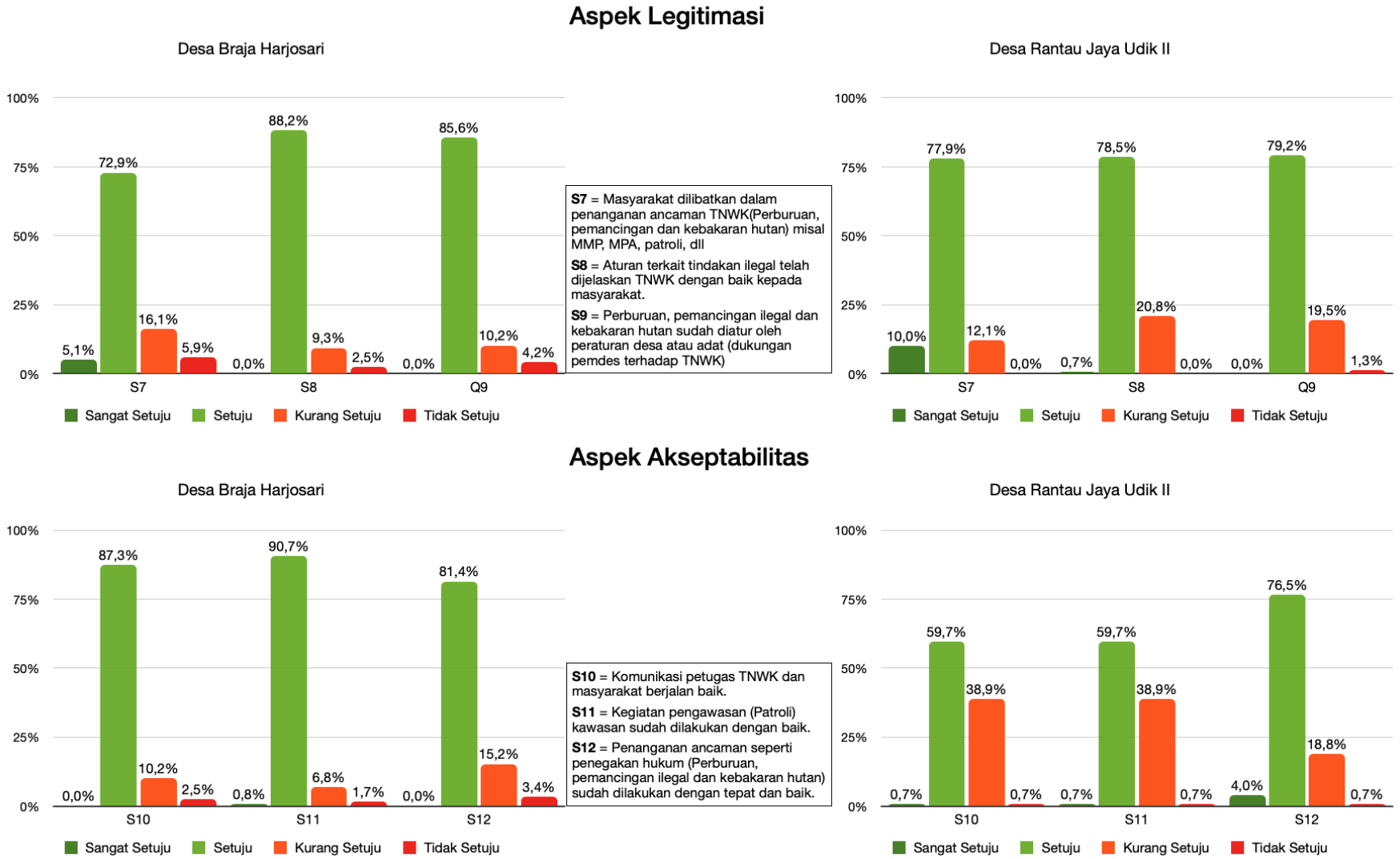


Figure 12. Perceptions of the people of Braja Harjosari Village (N = 118) and Rantau Jaya Udik II Village (N = 149) on the socio-economic and environmental

aspects.



Gambar 13. Perceptions of the people of Braja Harjosari Village (N = 118) and Desa Rantau Jaya Udik II (N = 149) on the aspects of legitimacy and acceptability.

In the aspect of legitimacy, in general, the public response regarding the statement S7, S8, S9 states agree and strongly agree, namely in Braja Harjosari Village (BJ) starting from 78% of respondents and in Rantau Jaya Udik II Village (RJU) starting from 79,2% of respondents (Gambar 13a). This shows the legitimacy or community recognition of the good governance of WKNP.

The majority of the community (BJ 78%; RJU 87,9%) admit that they were involved in handling threats at WKNP (S7) such as involvement in the activities of the Community Forestry Partners (MMP) group, the Fire Concern Community, and the elephant task force. Then also the majority of the community (BJ 88,2%; RJU 79,2%) acknowledged that the rules relating to illegal acts had been well explained by TNWK officers to the community (S8). At the village level, illegal activities such as hunting, fishing, and forest burning have been regulated both (S9) through the initiation of formal village regulations and non-formal rules based on customs and local wisdom (BJ 85,6%; RJU 79,2%). Non-formal rules are regulated through social institutions that develop in social groups. While the initiation of village regulations related to hunting, fishing, and burning forest activities, has been initiated by residents of hamlets 8 and 2 of Braja Harjosari Village and is being discussed at the village level by the Village Head and BPD. This regulation is a form of support from the community and village government to WKNP to maintain the sustainability of the forest and its contents in the national park area which will benefit future generations.

In the aspects of acceptability, acceptance, and community perspectives towards WKNP is a form of support and social capital that WKNP has to build collaborations with the community in the future (Gambar 13b). In general, the communication between the WKNP officers (S10) and the people of Braja Harjosari Village is considered to have been running well (S: 87,3%), the monitoring activities (patrol) of the area (S11) have also been carried out well by WKNP officers (S: 90,7%, SS: 0,8%), and the handling of threats by law enforcement (S12) is considered appropriate by the community (S: 81,4%). Meanwhile, in Rantau Jaya Udik II Village, WKNP officers' communication with the community and area monitoring (patrol) activities was just considered to be running quite well (S: 59,7%; SS: 0,7%) and needs to be improved again. While handling threats by law enforcement is considered appropriate by the people of Rantau Jaya Udik II Village (S: 80,5%).

Synthesis

The dynamics of perception in four aspects, namely socio-economic, environmental, legitimacy, and acceptability are realities and facts that occur in the field. This result can be an illustration of the community's condition and management of WKNP that is perceived by the community, especially in preparing collaborative program plans with the community.

Interesting findings from the perception study are, first, things related to the direct impact of the damage to the WKNP area on socio-economic activities, getting more positive responses and support for WKNP in handling illegal activities in the national park area.

Second, 67% of community respondents in Braja Harjosari Village and 78,1% in Rantau Jaya Udik II Village, **do not depend** their economy on forest products in WKNP. This shows that WKNP managers can focus on community empowerment on groups that do have a high economic dependence on WKNP by creating alternative activities to supplement household income. To pursue the achievement of success, the social dimension in this case human resources needs to be the focus of attention in developing conservation strategies in national parks (Muhumuza & Balkwill, 2013).

Third, the support of community social capital in groups and village governance for handling threats in WKNP, and the existence of legitimacy or strong community recognition of WKNP governance and good community **acceptance** of WKNP activities such as communication, monitoring (patrol) officers, and law enforcement. Even though in Rantau Jaya Udik II Village, the communication and monitoring activities (patrol) of officers still need to be improved in quantity and quality. Referring to Tanner (2007), legitimacy is not a static perception because the way legitimacy is conceptualized in people's perceptions depends on the dynamics of conservation area management. The legitimacy and acceptability of conservation area management must be monitored and evaluated regularly.

The Relationship between Community Perceptions with the Management and Threat Handling in WKNP

Correlation test and the significance of community perception factors

In analyzing the relationship between community perceptions regarding governance and threat management in WKNP, testing with non-parametric statistical analysis methods was carried out on the results of the community perception survey in Braja Harjosari and Rantau Jaya Udik II Village. Somer's D correlation test was chosen because the independent variable (X) and the dependent variable (Y) in the questionnaire had ordinal-scale data and a large enough sample of respondents, namely 267 respondents. Somer's D correlation testing using the SPSS application was carried out on the survey results to determine the significance of the relationship/influence, the strength, and direction of the influence of the variables of public perception (De Vaus, 2002).

There are 13 statement variables where one variable is the general public perception of threats in WKNP which is the dependent variable (Y) and 12 other perception variables are independent variables (X) which have the potential to influence people's perceptions. The twelve independent variables (X) are grouped into four perceptual aspects according to Bennett (2016), namely socio-economic, environmental, legitimacy, and acceptability. The following is Somer's D test formula:

$$d_{YX} = \frac{2(C - D)}{N^2 - \sum_{j=1}^{k} C_j^2}$$

Note:
C : Concordance value
D : Discordian value
N : Number of observational data
C_j : Total observations to-j from X variable

The hypothesis of Somer's D correlation testing in this study is that if the approximate significance value is smaller than 0,05 (5%) then there is a significant relationship between the independent variable (X) and the dependent variable (Y). The strength of the relationship between variables X and Y is measured by referring to De Vaus (2002) who divides the level of strength of the relationship using the correlation coefficient value as described in Table 8.

The direction of influence is seen from the value of the correlation coefficient, whether positive or negative. If the coefficient value is positive, the direction of the relationship is "unidirectional" where every positive change in variable X will affect the positive change in variable Y. If the coefficient value is negative then the direction of the relationship is "opposite" where every positive change in variable X affects negative changes in variable Y.

Table 8. The level of relationship strength based on the correlation coefficient value

Correlation Coefficient	Relationship Strength
0,00	Tidak ada hubungan
0,01-0,09	Hubungan kurang berarti
0,10-0,29	Hubungan lemah
0,30-0,49	Hubungan moderat/cukup
0,50-0,69	Hubungan kuat
0,70-0,89	Hubungan sangat kuat
>0,90	Hubungan mendekati sempurna

Source: De Vaus, 2002.

1. Somer's D correlation test results on 267 household respondents in Braja Harjosari Village (N = 118) and Rantau Jaya Udik II Village (N = 149) explained that the variables X_1, X_2, X_3, X_4, X_6, X_8 correlated (relationship) that significant (Sig. < 0,05) at the 99% confidence level (Sig. 0,01) on variable Y (Forest destruction and decline in wildlife/fish populations due to illegal actions, disrupting the socio-economic activities of the community (X1, Sig. 0,000);
2. Community social group activities also discuss handling hunting, illegal fishing and forest fires (X_2, Sig. 0,007);
3. The community's economic activities depend on forest products such as wood, grass, non-timber forest products, fish, wildlife-deer, birds, etc. (X_3, Sig. 0,000);
4. Hunting, fishing and forest fires have an impact on forest and wildlife sustainability (X_4, Sig. 0,001);
5. Hunting, fishing and forest fires will increase the number of pests that disturb crops and threaten the community (X_6, Sig. 0,007);
6. WKNP has explained the rules related to illegal actions to the community (X_8, Sig. 0,000).

Table 9). The six X variables are:

7. Forest destruction and decline in wildlife/fish populations due to illegal actions, disrupting the socio-economic activities of the community (X1, Sig. 0,000);
8. Community social group activities also discuss handling hunting, illegal fishing and forest fires (X_2, Sig. 0,007);
9. The community's economic activities depend on forest products such as wood, grass, non-timber forest products, fish, wildlife-deer, birds, etc. (X_3, Sig. 0,000);
10. Hunting, fishing and forest fires have an impact on forest and wildlife sustainability (X_4, Sig. 0,001);
11. Hunting, fishing and forest fires will increase the number of pests that disturb crops and threaten the community (X_6, Sig. 0,007);
12. WKNP has explained the rules related to illegal actions to the community (X_8, Sig. 0,000).

Table 9. Result of Somer's D Test

No	STATEMENT	Correlation Coefficient	Approximate Significance (Sig.)	Relationship Strength
S0	Threats to WKNP have impacts on ecology/environment, social, and economy which adversely affect the community. (Y)			
SOCIAL ECONOMIC				
S1	Forest destruction and decrease in the population of wild animals/fish due to illegal actions disrupt the socio-economic activities of the community. (X_1)	.674**	.000	Strong
S2	Community social group activities also discuss handling of hunting, illegal fishing, and forest fires. (X_2)	.411**	.007	Moderate/ fair
S3	Community economic activities depend on forest products (wood, grass, non-timber forest products, fish, wildlife-deer, birds, etc.). – (X_3)	-.247**	.000	Weak
ENVIRONMENT				
S4	Hunting, fishing, and forest fires have an impact on the preservation of forests and wildlife. (X_4)	.376**	.001	Moderate/ fair
S5	Forest fires increase the potential for water dryness in the village. (X_5)	.016	.869	-
S6	Hunting, fishing, and forest fires will increase the number of pests that disturb crops and threaten the community. (X_6)	.252**	.007	Weak
LEGITIMACY				
S7	The community is involved in handling WKNP threats (hunting, fishing, and forest fires), for example, MMP, MPA, patrols, etc. (X_7)	.070	.360	-
S8	WKNP has explained the rules related to illegal actions to the community. (X_8)	.307**	.000	Moderate/ fair
S9	Hunting, illegal fishing, and forest fires are regulated by village or customary regulations (village government support for WKNP).– (X_9)	-.100	.165	-

ACCEPTABILITY				
S10	Communication between WKNP officers and the community is going well. (X_{10})	.096	.124	-
S11	Area surveillance (patrol) activities have been carried out well. (X_{11})	.099	.111	-
S12	Handling of threats such as law enforcement (hunting, illegal fishing, and forest fires) has been carried out appropriately and properly. (X_{12})	.030	.646	-

**. Significant at 0.01 level or 99%

The relationship between variables X_1, X_2, X_4, X_6 and X_8, and Y is "unidirectional" (positive correlation coefficient), except for X_3 which is "opposite direction" (negative correlation coefficient) to Y. On variables X_1, X_2, X_4, X_6, and X_8 have a "significant unidirectional relationship" to Y with the explanation that any increase in positive changes in community perceptions is: (1) the impact of forest destruction and decreasing wildlife populations in WKNP on disruptions to socio-economic activities in the community (X_1); (2) the interests of community social groups in handling threats in WKNP (X_2); (3) the impact of hunting, illegal fishing and burning of forests on the preservation of forests and wildlife in WKNP (X_4); (4) the impact of hunting, illegal fishing and forest burning on increasing the number of pests that disturb crops and threaten the community (X_6); (5) regulations related to illegal actions in WKNP (X_8), will provide an increase in **positive changes** in people's perceptions about "the impact of threats in WKNP on ecology/environment, social and economic disadvantages to the community" (Y).

In contrast to other free variables, in variable X_3 there is a "significant relationship in the opposite direction" (coefficient value -0,74) where any increase in **positive changes** in people's perceptions about "community economic activities depend on forest products in WKNP", will increase **negative changes** (decrease) public perceptions about "The impact of threats in WKNP on ecology/environment, social and economic disadvantages to society" (Y). Vice versa.

Of the six free variables (X) which have a significant effect, variable X_1 is a variable that has a strong relationship (value: 0,674) on forming community perception about “Threats to WKNP have an impact on ecology/environment, social and economy which gives a disadvantage to the community (Y).” Meanwhile for other variables (X_2, X_3, X_4, X_6, X_8) have varying strength degrees of relationship namely “weak” and “moderate” (Forest destruction and decline in wildlife/fish populations due to illegal actions, disrupting the socio-economic activities of the community (X1, Sig. 0,000);

13. Community social group activities also discuss handling hunting, illegal fishing and forest fires (X2, Sig. 0,007);
14. The community's economic activities depend on forest products such as wood, grass, non-timber forest products, fish, wildlife-deer, birds, etc. (X3, Sig. 0,000);
15. Hunting, fishing and forest fires have an impact on forest and wildlife sustainability (X4, Sig. 0,001);

16. Hunting, fishing and forest fires will increase the number of pests that disturb crops and threaten the community (X6, Sig. 0,007);
17. WKNP has explained the rules related to illegal actions to the community (X8, Sig. 0,000).

Table 9). But these five variables have a significant relationship (meaningful) and contribute to forming community perception about "Threats to WKNP have an impact on ecology/environment, social and economy which gives a disadvantage to the community." Therefore, all X variables have a significant relationship to Y, it is important to make it as a reference in decision making.

Aspects that form community perception which supports the management of WKNP

WKNP area management, cannot be separated from the relationship with the buffer village community. Apart from the proximity of WKNP's access to the buffer villages, the two of them have mutual relations which have implications for the sustainability of WKNP and the buffer villages. What is felt by the community will form their perceptions and actions (Chartrand & Bargh, 1999) to support or not support the management of the area (Bennett, 2016).

Somer's D correlation analysis in the context of Braja Harjosari and Rantau Jaya Udik II Village, explains that of the 4 (four) perceptual aspects tested (Forest destruction and decline in wildlife/fish populations due to illegal actions, disrupting the socio-economic activities of the community (X1, Sig. 0,000);

18. Community social group activities also discuss handling hunting, illegal fishing and forest fires (X2, Sig. 0,007);
19. The community's economic activities depend on forest products such as wood, grass, non-timber forest products, fish, wildlife-deer, birds, etc. (X3, Sig. 0,000);
20. Hunting, fishing and forest fires have an impact on forest and wildlife sustainability (X4, Sig. 0,001);
21. Hunting, fishing and forest fires will increase the number of pests that disturb crops and threaten the community (X6, Sig. 0,007);
22. WKNP has explained the rules related to illegal actions to the community (X8, Sig. 0,000).

Table 9), only three aspects have a significant effect in forming community perceptions about hunting, fishing and forest burning activities. In WKNP, those are socio-economic aspects, environmental aspects, and aspects of legitimacy. These three aspects are explained by 6 (six) factors that are significantly related and have an effect, namely: 1) The impact of forest destruction and decreasing wildlife populations on the disruption of

community socio-economic activities; 2) The interests of social groups in dealing with threats in WKNP; 3) Community's economic dependence on forest products in WKNP; 4) Impact of illegal activities on forest and wildlife conservation; 5) The impact of illegal activities on increasing the number of pests that disturb crops and threaten the community; 6) Legitimacy and community recognition of the rules related to illegal actions in WKNP;

The Aspect of Social Economy

The condition of forest destruction and decreasing wildlife population has formed the socio-economic perception of the community that the consequences of hunting, fishing, and forest burning activities are related to disturbances in the socio-economic activities of the community. This condition then increased community support for WKNP. First, illegal activities need to be handled according to WKNP regulations and this is well explained by WKNP managers to the community (Gambar 13). Second, it needs community support and involvement in helping to deal with these illegal activities. If illegal activities in the village environment and WKNP are not handled, it will have an impact on environmental sustainability and harm the community socially and economically.

Community support and involvement in helping to deal with illegal activities in WKNP can be seen in the activities of community social groups where the issue of conservation and handling illegal activities is also a routine discussion agenda such as forest farmer groups, environmental groups, MMP and MPA. Another example is the initiative to make Braja Harjosari Village regulations on the use of poison and fish stun, also the use of air guns to hunt wildlife in the village environment, which started in 2015 by the people in Hamlet 8 and Hamlet 2. This idea has been conveyed to the head of the village in June 2020 to be followed up with the Village Consultative Body (BPD).

Strengthening the social capital of the community in the two study location villages occurred because of common issues and interests that required collective work to achieve its goals (Coleman, 1999). Social capital[12] in society can optimize participation, strengthen motivation and reduce poverty through a series of positive benefits from group activities such as exchange of information and knowledge, sharing roles and responsibilities, increasing skills among the community which can impact productivity and improves family income (Maryudi & Krott, 2012; Asmin *et al*., 2019).

On the other hand, there are still people who have economic dependence on the WKNP area, especially forest products, which is a factor that increases the **significance of the negative relationship** on the perception of the community that supports the communities in these two villages. The community's dependence on WKNP forest products to fulfill their daily needs is due to the relatively low level of household income in the two villages, namely an average of around IDR 1.338.848 to IDR 1.602.437/month/household (Table 6 dan Table 7), far below the 2020 East Lampung Regency Minimum Wage of IDR 2.432.150,-/month.

[12] Social capital is signified in the division of roles, powers, responsibilities, reward systems, and other attachments that result in collective action. There are three vital elements in social capital, which are trust, values or norms, and networks.

In villages with limited livelihood options and unequal income distribution, communities will develop a livelihood strategy to survive and respond to deprived conditions (Scoones, 1998; Zid & Alkhudri, 2016). Several studies stated that 90% of the poor in rural areas depend on forests to meet their daily needs (Bakkegaard *et al*., 2017). In the context of this study, one way is to access the WKNP area illegally.

The Aspect of Environment (Ecology)

The impact of hunting, fishing, forest burning, and other illegal activities has caused forest destruction and decreased wildlife population in WKNP. Maullana & Darmawan (2014) states that the forest area of WKNP has changed into shrubs of 4,454.02 hectares in 1996-2002. Furthermore, in 1990-2010, WKNP experienced a decline in primary forest area by 51.3% or a rate of forest loss of 2.6% per year (Andyono *et al*., 2018). Apart from illegal logging, forest loss in WKNP is also suspected to be caused by forest fires (Amalina *et al*., 2016). In the case of fires, apart from natural factors where the WKNP area is dominated by bushes that are prone to burn, the incidence of fire is generally a case of intentional (burning) for hunting purposes (Oelrichs *et al*., 2016).

This condition is believed by the community to be related to the increasing number of pests that disturb agriculture crops and threaten people's lives, especially in the case of human-elephant conflict. Poachers in the forest can push elephants out of the national park and into nearby agricultural land and settlements (Nchanji, 2005). This understanding strengthens and forms the perception of the community's environment that supports the enforcement of WKNP regulations along with the frequency of forest fires and cases of elephants leaving the national park and entering agricultural land and residential areas that occur every year.

The Aspects of Legitimacy of Area Governance

The legitimacy of the WKNP area management has been recognized, especially from the explanation and application of WKNP regulations related to the protection of biodiversity in the area. This is evidenced by the responses from the community who "agree" and "strongly agree" to the statement, namely 88,2% of respondents in Braja Harjosari Village and 79,2% of respondents in Rantau Jaya Udik II Village (Gambar 13a). The support of the surrounding community for WKNP management is important to achieve the goals of conserving biodiversity.

However, even though the community understands the rules in the national park, their economic needs generally encourage some people to ignore the rules and enter into conservation areas to carry out illegal activities (Abukari & Mwalyosi, 2020). This survey data found that out of 267 respondents in the two villages, 30,7% of respondents accessed the area negatively in the form of hunting, fishing, seeking forest honey, collecting grass and wood for household fuel (Figure 10). While 53% of respondents in Rantau Jaya Udik II Village (N = 149) engaged in negative activities in the WKNP area, higher than 10% of respondents in Braja Harjosari Village (N = 118). This is due to different village conditions (location effect) where Braja Harjosari Village is a village with an "advanced" status since the last five years, while Rantau Jaya Udik II Village has an "underdeveloped" status in 2019 and has only increased to become a "developed" village in 2020 (Table 2).

Furthermore, the historical relationship between the national park and local communities has also significantly contributed to forming perceptions of community legitimacy (Tanner, 2007). In discussions (FGD) that were conducted with the community, this study also found the fact that in addition to fulfilling their daily needs, the negative actions of some communities to the WKNP area were based on an element of "revenge" against the national park manager, especially in forest burning activities. The findings of this study are consistent with research by Oelrichs *et al.*, 2016 which stated that forest burning in WKNP occurred, one of which was due to reasons of revenge related to handling elephant disturbance.

In this case, the polarization of relationships and distrust causes hostility between parties (Fisher, 2001), which is marked by openly expressed opposition and anger (revenge) (Kinseng, 2014), namely by burning forests. This conflict can become latent and continue to be a problem in WKNP if there is no initiative to resolve it. For this purpose, Andyono (2018b) recommends the importance of a collaborative management model in WKNP to mitigate conflict between parties and synergize the interests and influence of each party on the WKNP area, especially in cases of human-elephant conflict.

Influencing Factors that Encourage Community to do Illegal Actions in WKNP

Factors that increase the chances of community to do illegal actions in the WKNP area

Mathematical modeling using binary logistic regression quantitative analysis aims to analyze what socio-demographic factors have a significant effect on increasing people's chances of acting positively or negatively in the WKNP area. The number of sample respondents tested was 267 households in Braja Harjosari and Rantau Jaya Udik II Village. The logistic regression equation model is as follows:

$$\text{Ln}\left(\frac{\text{p}}{1-\text{p}}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11}$$

Where, Ln – Log natural; p – the probability of acting negative (1) or positive (0) in the WKNP area; X_1_Jk– Gender; X_2_Umr – Age; X_3_Pdd – Education; X_4_Jak– Number of family members; X_5_Prt – Household income; X_6_Jjb – number of work hours; X_7_Jjp– Number of types of work; X_8_Jrk– Distance from house to WKNP; **X_9_Kt** – Livestock ownership; X_{10}_Kb – Use of household firewood; X_{11}_Kms– Cooperative involvement in community groups with WKNP; $\boldsymbol{\beta_0}$ – Constant; $\boldsymbol{\beta_1}$–$\boldsymbol{\beta_5}$ – Regression Coefficient. The complete description of the variables is described in A binary logistic regression test was conducted to determine whether the effect of each independent variable (X) on the dependent variable (Y) was significant or not. The test was carried out by comparing the significance value (Sig.) And the odd ratio (Exp.B) on the regression test results with the degree of error used in this model, namely 5% (α=0,05). The criteria for this model are if the significance value (Sig.) < 0,05 then the independent variable (X) has a significant effect on the dependent variable (Y).

Table 10.

A binary logistic regression test was conducted to determine whether the effect of each independent variable (X) on the dependent variable (Y) was significant or not. The test was carried out by comparing the significance value (Sig.) And the odd ratio (Exp.B) on the regression test results with the degree of error used in this model, namely 5% (α=0,05). The criteria for this model are if the significance value (Sig.) < 0,05 then the independent variable (X) has a significant effect on the dependent variable (Y).

Table 10. Description of analysis variable

Variable	Description	Minimum	Maximum	Mean	Std. Dev
Y (p) – probabilitas peluang bertindak positif atau negarif di kawasan TNWK	The community takes positive or negative actions on an ordinal scale, namely 1 = acting negatively (hunting, fishing, taking grass, firewood, NTFPs in the WKNP area) and 0 = acting positively (supporting by not entering the area and or doing activities that are in line with WKNP, for example, travel, MMP, MPA).	.00	1.00	.3446	.4761
X_1_Jk –Gender	Gender response on a nominal scale, namely 1 = male and 2 = female.	1.00	2.00	1.1685	.3751
X_2_Umr –Age	Respondent's age in years.	21.00	82.00	47.6292	10.7333
X_3_Pdd – Education	Respondent education with category 1 = graduated from elementary school or not graduated from elementary school (SD), 2 = graduated from junior high school (SMP), 3 = graduated from high school (SMA), and/or College.	1.00	3.00	1.8614	.8625
X_4_Jak – Number of family members	The number of family members including the head of the family in units of people.	1.00	8.00	3.9438	1.0902
X_5_Prt – Household income	Household income in rupiah per year (IDR/year)	2400000.00	96000000.00	17477567.8	12325905.2
X_6_Jjb – Number of work hours	The number of work hours in a day is measured in units of number of hours (hours/day)	2	13	7.0412	1.4387
X_7_Jjp –Number of types of works	The number of types of work is calculated by adding up the number of main and side jobs, in units of the number of types.	1	2	1.2622	.4406
X_8_Jrk – Distance from house to WKNP	The distance between the respondent's residence and the closest boundary of the WKNP area is calculated in meters.	4.00	5000.00	1592.27	1430.8
X_9_Kt – Livestock ownership	Ownership of cattle/goats is calculated using the Dummy variable, namely 1 = owning livestock and 0 = owning no livestock.	0	1	.4382	.4971
X_{10}_Kb – Use of household firewood	The use of firewood is calculated using the dummy variable, namely 1 = using firewood and 0 = not using firewood.	.00	1.00	.8127	.3909
X_{11}_Kms – Cooperative involvement in community groups with WKNP	Involvement of respondents in social group activities in collaboration with WKNP, for example, empowerment of forest farmer groups, tourism, MMP, MPA, reforestation and others measured by dummy variables, namely 1 = involved and 0 = not involved	.00	1.00	.2846	.4521

The test of the binary logistic regression statistical model developed in this study is described in the SPSS results in Table 11. In the Omnibus Tests of Model Coefficients, the significance value (Sig.) Is 0,000 < 0,05 meaning the model is "fit" or the independent variable (X) which is used jointly affects the dependent variable (Y). Furthermore, the Hosmer and Lemeshow Test is a Goodness of Fit test, which is a test to determine whether the model being developed is correct or not. In this test, the significance value (Sig.) 0,887 > 0,05 means that the model can be accepted, and hypothesis testing can be done.

Table 11. Description of Model Tests

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	162.886	12	.000
	Block	162.886	12	.000
	Model	162.886	12	.000

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	3.653	8	.887

In Table 12, the Nagelkerke R Square value of 0,631 indicates that the ability of the independent variables (X) to explain the dependent variable (Y) is 0,631 or 63,1%, where the remaining 36,9% is influenced by variables or other unused factors in the model in this study.

Table 12. *Pseduo R Square* on the model

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	181.020[a]	.457	.631

The results of the binary logistic regression test (Table 13), show that of the 11 independent variables (X) tested, there are 5 (five) variables that have a significant effect on the probability of community respondents to act negatively in the WKNP area (Y), namely:

1. X_1_Jk (1) – Female gender, significance value (Sig.) 0,000.
2. X_8_Jrk – Distance from house to WKNP, significance value (Sig.) 0,000.
3. X_9_Kt (1) – Livestock ownership, significance value (Sig.) 0,000.
4. X_{10}_Kb (1) – Use of firewood, significance value (Sig.) 0,023.
5. X_{11}_Kms (1) – Cooperative involvement in community groups with WKNP, significance value (Sig.) 0,013.

Variable X_1_Jk (1) - "female" gender has a significance value (Sig.) of ,000, the odds ratio value (Exp. B) is 0,009 and natural logarithm (B) **-4,731** means that respondents with significant female gender have a significant chance of 0,009 times to act positively in WKNP area (negative impact direction - opposite direction). Or respondents with male gender have a significant opportunity to act negatively in the WKNP area.

Variable X_8_Jrk – distance from house to WKNP has a significance value (Sig.) ,000, the odds ratio value (Exp. B) 0,999, and natural logarithm (B) -0,001 means the farther the distance between the respondent's house and the WKNP area, the more significant the chance to act positively in the WKNP area is 1,001 times (negative influence - opposite direction). Or, the closer the respondent's house is to the WKNP area, the more likely it is to act negatively in the WKNP area.

Table 13. Binary logistic regression test results

Variables in the Equation

							95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	X_1_Jk(1)	-4.731	1.130	17.539	1	.000	.009	.001	.081
	X_2_Umr	-.019	.023	.710	1	.399	.981	.938	1.026
	X_3_Pdd			1.718	2	.424			
	X_3_Pdd(1)	-.661	.521	1.609	1	.205	.516	.186	1.434
	X_3_Pdd(2)	-.179	.572	.098	1	.754	.836	.272	2.565
	X_4_Jak	.066	.189	.122	1	.727	1.068	.738	1.546
	X_5_Prt	.000	.000	.133	1	.715	1.000	1.000	1.000
	X_6_Jjb	.067	.134	.250	1	.617	1.069	.822	1.391
	X_7_Jjp	-.238	.457	.270	1	.603	.788	.322	1.932
	X_8_Jrk	-.001	.000	36.916	1	.000	.999	.998	.999
	X_9_Kt (1)	2.175	.441	24.314	1	.000	8.802	3.708	20.895
	X_{10}_Kb (1)	1.935	.852	5.161	1	.023	6.925	1.304	36.767
	X_{11}_Kms (1)	-1.112	.449	6.133	1	.013	.329	.136	.793
	Constant	-.349	2.010	.030	1	.862	.706		

a. Variable(s) entered on step 1: X_1_Jk, X_2_Umr, X_3_Pdd, X_4_Jak, X_5_Prt, X_6_Jjb, X_7_Work_Jjp, X_8_Jrk, X_9_Kt, X_{10}_Kb, X_{11}_Kms

Variable X_9_Kt (1) - livestock ownership has a significance value (Sig.) ,000, odd ratio value (Exp. B) 8,802, and natural logarithm (B) 2,175 means that respondents who have livestock have a significant chance of 8,802 times to act negatively in the WKNP area (direction of positive influence - unidirectional).

Variable X_{10}_Kb (1) - the use of household firewood has a significance value (Sig.) of 0,023, an odds ratio value (Exp. B) of 6,925, and a natural logarithm (B) of 1,935, meaning that respondents who use firewood have a significant chance of 6.925 times to act negatively in WKNP area (direction of positive influence - unidirectional).

Variable X_{11}_Kms (1) - involvement in community groups has a significance value (Sig.) of 0,013, an odds ratio value (Exp. B) of 0,329, and a natural logarithm (B) -1,112 means that respondents who are involved in social groups working with WKNP are significant 0,329 times chance to act positively in the WKNP area (direction of negative influence - opposite direction). Or, respondents who are not involved in community groups working with WKNP have a significant opportunity to act negatively in the WKNP area.

The influence of socio-demographic on the illegal act by the community in WKNP area

Statistical modeling with cases in Braja Harjosari and Rantau Jaya Udik II Village has identified socio-demographic factors that have a significant effect on illegal acts in the WKNP area, namely gender, distance from the house to WKNP, livestock ownership, use of firewood, and involvement in community groups who collaborate with WKNP.

The factors of livestock ownership and the use of firewood are factors that are unidirectional associations and can greatly contribute to encouraging the community to take negative (illegal) actions in the WKNP area. The results of this analysis show that people who have livestock have a chance (8,8 times) and people who use firewood have a chance (6,9 times) to commit negative (illegal) actions to the WKNP area.

Currently, the ownership of cattle, buffalo, goats/sheep in Braja Harjosari Village reaches 1563 individuals and in Rantau Jaya Udik II Village the population reaches 2328 individuals (BPS, 2019). The data of this study shows that 29,7% of respondents in Braja Harjosari Village and 55% of respondents in Rantau Jaya Udik II Village own livestock. Meanwhile, the observed scale of firewood use in Braja Harjosari Village averaged 88,6 kg/month/household (65,3% of respondents) and Rantau Jaya Udik II Village reached an average of 137,4 kg/month per household (94% of respondents). The total use of firewood in these two villages is still relatively smaller than the results of the study conducted by Rakatama (2016) in Labuhan Ratu VI Village, namely 487 kg/household/month or around 5,840 kg/household/year, which is estimated to be 35% of this need is met from WKNP area. Although currently, the scale of the use of firewood and the need for grass for animal feed in the two villages is not too large because some can still be fulfilled from the backyard and community gardens, however, along with the economic growth of the village, this may become a potential problem if not anticipated.

In Braja Harjosari Village, the use of firewood has decreased significantly and is only used for essential activities. Currently, most people have switched to subsidized Liquid Petroleum Gas (LPG). On the other hand, livestock population growth is predicted to increase as the village advances and community welfare increases. This could harm the WKNP area because the need for grass for animal feed will automatically be met from the WKNP area due to limited land in Braja Harjosari Village.

In Rantau Jaya Udik II Village, the demand for firewood is predicted to continue to increase in the next few years because it will still be considered a cheap household fuel. Its status as a newly developing village requires time and development infrastructure so that

this village can grow its economy and improve the welfare of its people so that the community can substitute household fuel for subsidized Liquid Petroleum Gas (LPG). However, this village has livestock potential which can be used to reduce household use of firewood through the development of alternative energy such as household-scale Biogas ($4m^3$) which can be fulfilled from the dung of 3-4 cows.

Furthermore, gender factors, house distance to WKNP, and community involvement in social groups working with WKNP are factors of influence that are negatively associated or in opposite directions. The results of this analysis showed that “female” respondents had a significant chance of taking positive action at WKNP compared to the "male" respondents. In this study, illegal activities in the conservation area were mostly carried out by men, due to high-risk factors and heavy physical workloads, such as hunting, harvesting wood, fishing, and looking for forest honey.

The distance between the community's house to the WKNP area has a significant opportunity to take positive action in WKNP, namely the farther the distance the more likely it is to act positively. Conversely, the closer the house is to the WKNP area, the more likely it is to commit negative (illegal) actions. In this study, the majority of the distance between the community houses to the WKNP area in the two villages is between 0–3000 meters, even in the village of Rantau Jaya Udik II, 61,1% of respondents had a very close distance of 0-500 meters. In the case of forest fires, the proximity of the forest to settlements with intensive activities can increase the risk of fire (Amalina *et al*., 2016). Erten *et al*. (2004), describe forest distances below 1000m and between 1000-2000m to settlement as having a vulnerability to “very high” and “high” fires.

Another influencing factor that has negative or opposite directions is community involvement in social groups that work with WKNP. Community involvement in social groups in collaboration with WKNP has a significant opportunity to encourage people to act positively in the WKNP area. On the other hand, people who are not involved in significant social groups have the opportunity to act negatively in the WKNP area. Oldekop *et al.* (2016) in a global study of social and conservation benefits of protected areas, reported that protected areas (read: national parks) that empower local communities and/or provide socio-economic benefits to communities are more likely to achieve positive conservation outcomes such as conservation. biodiversity and climate change mitigation.

The national park area management model should promote sustainable resource use rather than focus on enforcing more stringent protection of biological resources (Oldekop *et al.*, 2016). Psychologically, the enforcement of regulations carried out on the community has two impacts, namely that the community will deter and stop doing negative (illegal) actions or the community will even have a grudge against officers and do not stop taking negative actions in the WKNP area. Wiratno (2018) states that one of the new ways to manage conservation areas in Indonesia is to place the community as the main subject or actor in various models of conservation area management, such as economic empowerment of buffer villages, utilization of non-timber forest products (NTFP), environmental services, water, area patrol, area guarding, restoring the area, controlling fire, cultivating and breeding animals, handling animal conflicts, preventing hunting and animal trade.

For this purpose, collaboration can be a better choice, apart from reducing conflict between the parties (Conley & Moote, 2003), the collaboration also allows the parties to jointly share roles and responsibilities for resource management in conservation areas (Santosa & Setyowati, 2016). Also, the application of collaboration is a form of recognition of the rights of local communities whose access is increasingly limited by the presence of conservation areas in their environment (Fisher, 2001). On a practical level, collaboration in national parks has been supported by a national scale policy, namely the Regulation of the Director-General of KSDAE number P.06/2018 concerning Technical Guidelines for Conservation Partnerships in Nature Reserve Areas and Nature Conservation Areas.

Conclusions and Recommendations

Conclusions

This perception study has identified the dynamics of community perceptions about threats in WKNP into 4 (four) aspects, namely socio-economy, environment, legitimacy, and acceptability. In general, the public's perception of "Threats to WKNP impact on ecology/environment, social and economic disadvantages to society" is quite good, because more than half of the respondents gave a positive response.

The results of the correlation test of perceptual aspects of 13 statement variables representing socio-economic, environmental, legitimacy and acceptability aspects found 6 (six) variables or factors that have a significant relationship or influence with people's perceptions about “Threats to WKNP impact on ecology/environment, social and economic disadvantages to society" namely as follows:

1) Impact of forest destruction and decreasing wildlife population on the disruption of community socio-economic activities;
2) The interests of social groups in handling threats in WKNP;
3) The community's economic dependence on forest products in WKNP;
4) Impact of illegal activities on forest and wildlife sustainability;
5) Impact of illegal activities on the increase of pests that disturb crops and threaten communities; and
6) Legitimacy and community recognition of regulations related to illegal actions in WKNP.

All of the factors that have a significant effect are positively unidirectional except for the factor of community economic dependence on forest products in WKNP which has a negative (opposite direction) relationship, which means that the higher the community's economic dependence on the WKNP area (forest products) has a significant effect on decreasing community perceptions. regarding " Threats to WKNP impact on ecology/environment, social and economic disadvantages to society". Of course, this will encourage the community to act negatively and not support WKNP management.

Statistical modeling of 11 socio-demographic factors identified 5 (five) variables that significantly influence the community to act negatively in WKNP, namely:

1) gender;

2) distance from house to WKNP area;
3) livestock ownership;
4) use of firewood; and
5) involvement in community groups working with WKNP.

Livestock ownership and use of firewood are factors that are unidirectional associations and have the opportunity to greatly contribute to encouraging the community to take negative (illegal) actions in the WKNP area. While gender, distance from house to WKNP, and community involvement in social groups working with WKNP are factors of influence that are negatively associated or in the opposite direction, namely increasing changes in these factors, will have the opportunity to contribute to encouraging people to take positive (legal) actions and support WKNP.

After the observation and in-depth interviews in two villages (Braja Harjosari and Rantau Jaya Udik II), it is concluded that changes in the dynamics of perceptions, attitudes, and behavior of the people in each village were influenced by social, cultural, and environmental adaptation. The dynamics of perceptions of the community about the existence of the WKNP area associated with illegal hunting, fishing, and forest fires. Initially, the community usually hunting and fishing as a source of food and income, but gradually the motive turned into a hobby which was carried on by certain people only.

The hope of the community to be able to synergize with WKNP is quite strong, in this case, related to the management of Non-Timber Forest Products (HHBK), the provision of utilization zones especially for livestock grass needs in the two villages, and the community's active participation in handling elephant conflicts. Furthermore, the collaboration between WKNP and the village is needed for joint management in accommodating fishing activities as well as part of the handling of illegal actions in WKNP. The fishing location and guard post on the edge of the area directly adjacent to the two villages are expected to become a management area between the community and the TNWK manager and minimize illegal actions in the WKNP area through joint monitoring and supervision.

Recommendations

Based on the results of this perception study, to build collaboration, develop threat management strategies, and strengthen support from the buffer village community for WKNP it is necessary to pay attention and consider several things.

First, efforts to increase community perceptions regarding WKNP functions and regulations need to be packaged in education that contains messages that are easily accepted by the community, especially illustrations about the short and long term impacts if the national park area is damaged and the consequences that can be felt by the community, either directly or indirectly. on ecological, social, and economic aspects.

Second, maximizing the role of community social groups in supporting conservation efforts and handling forest hunting, fishing, and burning. One of them can be started by encouraging conservation issues and threats in WKNP to become a routine discussion

agenda in these community groups through intensive interaction with WKNP managers at the community group level.

Third, economic dependence on the national park area needs to be pushed in a positive, non-extractive direction and prioritizes the development of environmental services from the WKNP area. For example, developing economic activities that can pressure people to act negatively in the WKNP area such as tourism, honey bee cultivation, fish cultivation, tree nurseries, utilization of animal manure for compost, and biogas including conducting environmental education for the younger generation in the buffer village area.

Fourth, in designing community empowerment programs, it is necessary to be gender-based, pay attention to the right proportion and suitability of activities between men and women, prioritize people living near WKNP (0 – 2000 m) and prioritize target groups in people who carry out illegal activities.

Fifth, mitigation or prevention efforts need to be put forward to be able to significantly reduce threats such as collaborating with the village government to encourage village regulations related to hunting, fishing, and forest burning, in this case facilitating collaboration with the local Village Government especially, can be started on the initiative to propose village regulations that have walked in the village of Braja Harjosari.

Sixth, it is necessary to revise zoning to encouraging the development of conservation partnerships in Braja Harjosari and Rantau Jaya Udik II Village, especially facilitating spaces that can be accessed by the community, especially helping to provide animal feed, developing forest rehabilitation, fish farming, forest honey cultivation, activities environmental services (tourism) and other activities that support the sustainable management of WKNP.

Seventh, the results of this study can be used as baseline data for the development of related follow-up studies, especially to enlarge the coverage of the study area to provide accurate information at the WKNP buffer area scale. This is important so that WKNP managers can take appropriate policies and decisions on conservation area management, be able to protect biodiversity, and increase the socio-economic benefits of the WKNP area for the buffer village communities.

Closing

Community perception is not something that is established and static. This is very much influenced by the relationship and dynamics of national park governance. The relationship between the surrounding community and the national park area, both in terms of perceptions, attitudes, and actions, ideally can be monitored, evaluated, and improved together towards a better direction for the preservation of the area in the future.

This study at least has provided an initial description of the dynamics of community perceptions in Braja Harjosari and Rantau Jaya Udik II Village regarding the impact of illegal activities that are detrimental to the environment and socio-economic community. The perceptual and socio-demographic factors of the community that have been identified in this study can be used as consideration for forming positive perceptions and reducing illegal actions by the community in the WKNP area.

Furthermore, the findings of this study emphasize the importance of focusing on the social, cultural, and economic dimensions of the community around the WKNP area so that the objectives of developing collaborative management of the WKNP area can be achieved. Hopefully, the collaboration between WKNP and the community can become a common necessity and be able to realize more effective and sustainable management of the national park area.

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Appendices

Appendix 1. Questionnaire

Kepada Yth.
Bapak/Ibu/Saudara
Di tempat

Dengan Hormat,

Perkenalkan kami peneliti dari Pusat Informasi Lingkungan Indonesia (PILI-Green Network), bermaksud melakukan penelitian tentang **"Persepsi masyarakat terhadap ancaman ke kawasan Taman Nasional Way Kambas, Lampung"** dengan fokus lokasi studi di Desa Braja Harjosari dan Desa Rantau Jaya Udik II. Tujuan dari penelitian ini adalah mengumpulkan data dan mengetahui persepsi masyarakat terhadap aktivitas yang mengancam kawasan Taman Nasional sebagai bahan untuk mengembangkan program bersama antara Taman Nasional dan desa-desa penyangganya.

Kami mengharapkan kesediaan bapak/ibu/saudara untuk meluangkan waktu sejenak guna mengisi/menjawab pertanyaan-pertanyaan kuesioner penelitian ini. Kami berharap, bapak/ibu/saudara dapat memberikan jawaban sesuai dengan pikiran, perasaan, pengetahuan dan keadaan yang terjadi sebenar-benarnya.

Untuk menjaga keadilan dan kewajaran informasi serta kenyaman responden maka kami menjamin kerahasiaan atas identitas dan akan menggunakan kode-kode untuk menggantikan nama-nama responden.

Atas waktu dan kesediaannya untuk berpartisipasi dalam penelitian ini, kami ucapkan terima kasih.

Peneliti

Thomas Oni Veriasa, SE, M.Si

A. INFORMASI UMUM RESPONDEN

Nama enemurator : ……..

Kode Responden : .....(Braja Harjosari: **Bj** 00x; Rantau Jaya Udik II: **Ru** 00x)

Dukuh/RT/RW :……DESA:…….

Jenis Kelamin : Laki-laki / Perempuan (*lingkari jawaban yang sesuai*)

Umur : .....tahun

Pendidikan terakhir: ……(*sebutkan jenjang kelas terakhir yang ditempuh jika tidak tamat*)

Jumlah total anggota keluarga yang tinggal serumah: ……..…orang (satu keluarga)

Pekerjaan (jenis) utama: .....Sampingan:.…….

.....(boleh lebih dari 1 pekerjaan sampingan)

Pendapatan rata-rata per bulan: Rp……./bulan/tahun.

Jumlah jam kerja (pekerjaan utama): …….jam/hari (rata-rata)

Kepemilikan ternak: Kambing:……..ekor; Sapi/kerbau:……..…ekor..

Penggunaan Kayu Bakar (rata-rata): ……..…mKubik/Kg/batang..

Jarak rumah ke kawasan TNWK: ……..Meter/Km .. (Jarak terdekat)

---

*Isilah pertanyaan dibawah ini dengan **melingkari jawaban** yang sesuai dengan pendapat bapak/ibu/saudara. Jawaban boleh diisi lebih dari satu dan disediakan alternatif isian jika jawaban tidak ada.*

1. Apakah bapak/ibu/saudara memahami aturan dan fungsi TNWK ?
   a. Ya b. Tidak
   c. Jika **Ya**, jelaskan scr ringkas pemahaman Anda
   .....
   .....
2. Darimana bapak/ibu/saudara mengetahui informasi tentang aturan dan fungsi TNWK (Pilih salah satu atau lebih jawaban berikut)
   a. Staff TNWK/polhut b. Tokoh Masyarakat/Adat c. Tetangga
   d. Staff Desa e. LSM f. Kelompok masyarakat (MMP, MPA) g. Media (Koran,radio, TV, Internet) **h.** Lainnya: .....
3. Apakah bapak/ibu/saudara terlibat dalam kegiatan bersama TNWK misal: pemberdayaan kelompok, wisata, kesenian, MMP, MPA, patroli bersama atau kegiatan lain yang tidak berhubungan langsung tetapi mendukung TNWK?
   a. Ya b. Tidak
   Jika **Ya**, jelaskan scr ringkas jenis/bentuk kegiatannya atau kelompok yang diikuti…
   .....
   .....

4. Apakah bapak/ibu/saudara pernah menghadiri atau sekedar mengetahui/melihat (tapi tidak hadir/ikut) tentang kegiatan sosialisasi, kegiatan patroli dan penegakan hukum yang dilakukan oleh staff TNWK/polhut di sekitar kawasan desa ?

   a. Ya b. Tidak

   Jika **Ya**, jelaskan seberapa sering menghadiri/melihat/mengamati kegiatan tsb…

   Sosialisasi:.....Kali/tahun;

   Patroli Polhut:.....Kali/tahun;

   Penegakan hukum (oleh TNWK/Polisi): ……Kali/tahun.

5. Apakah Bapak/ibu/saudara, memiliki atau pernah memiliki kegiatan yang memasuki ke Kawasan TNWK?

   a. b. Tidak

   Jika **Ya**, (Pilih salah satu atau lebih jawaban berikut)

   1. Berburu 2. Mancing 3. Ngambil rumput 4. Ngambil kayu bakar

   5. Ngambil madu atau hasil hutan bukan kayu lainnya 6. Ngambil kayu untuk bangunan; 7. Lain-lain.. sebutkan……

   …….

6. Sejak kapan Bapak/ibu/saudara, memiliki kegiatan tersebut di atas ?

   a. 1 terakhir terakhir b. 2 tahun terakhir

   c. 3 tahun terakhir d. Lebih dari 3 tahun, Berapa lama? …

   d. Sudah tidak lagi/sudah berhenti.

7. Apa saran Bapak/ibu/saudara agar kawasan TNWK dapat berdampak maksimal bagi masyarakat dan lingkungan desa penyangga ?

   .....

   .....

   .....

   .....

   .....

   .....

PENILAIAN PERSEPSI MASYARAKAT TERHADAP ANCAMAN KAWASAN TNWK.

Berilah penilaian terhadap pernyataan dibawah ini dengan memberikan tanda silang (X) pada jawaban yang sesuai menurut pendapat atau apa yang dirasakan bapak/ibu/saudara.

Keterangan:
SS : Sangat Setuju
S : Setuju
KS : Kurang Setuju
STS : Sangat Tidak Setuju

No	PERYATAAN	SS	S	KS	STS
Q0	Ancaman terhadap TNWK berdampak pada ekologi/lingkungan, sosial dan ekonomi yang merugikan masyarakat				
SOSIAL					
Q1	Rusaknya hutan dan penurunan populasi satwa liar/ikan akibat tindakan ilegal akan mengganggu aktivitas sosial - ekonomi masyarakat.				
Q2	Kegiatan kelompok sosial masyarakat juga membahas tentang penanganan perburuan, pemancingan ilegal serta kebakaran hutan. (perhatian masyarakat pada tindak ilegal)				
Q3	Kegiatan ekonomi masyarakat tergantung pada hasil hutan (kayu, rumput, hasil hutan bukan kayu, ikan, satwa liar – rusa, burung dll)				
EKOLOGI/LINGKUNGAN					
Q4	Perburuan, pemancingan dan kebakaran hutan berdampak pada kelestarian hutan dan satwa liar				
Q5	Kebakaran hutan meningkatkan potensi kekeringan air di desa				
Q6	Perburuan, pemancingan dan kebakaran hutan akan berdampak pada meningkatnya jumlah hama yang mengganggu tanaman dan mengancam masyarakat.				
LEGITIMASI					
Q7	Masyarakat dilibatkan dalam penanganan ancaman TNWK(Perburuan, pemancingan dan kebakaran hutan) misal MMP, MPA, patroli, dll				
Q8	Aturan terkait tindakan ilegal telah dijelaskan TNWK dengan baik kepada masyarakat.				
Q9	Perburuan, pemancingan ilegal dan kebakaran hutan sudah diatur oleh peraturan desa atau adat (dukungan pemdes terhadap TNWK)				
AKSEPTABILITAS					
Q10	Komunikasi petugas TNWK dan masyarakat berjalan baik.				
Q11	Kegiatan pengawasan (Patroli) kawasan sudah dilakukan dengan baik.				
Q12	Penanganan ancaman seperti penegakan hukum (Perburuan, pemancingan ilegal dan kebakaran hutan) sudah dilakukan dengan tepat dan baik.				

Appendix 2. Somer's D Correlation Test Results

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
S1 * S0	267	100.0%	0	0.0%	267	100.0%
S2 * S0	267	100.0%	0	0.0%	267	100.0%
S3 * S0	267	100.0%	0	0.0%	267	100.0%
S4 * S0	267	100.0%	0	0.0%	267	100.0%
S5 * S0	267	100.0%	0	0.0%	267	100.0%
S6 * S0	267	100.0%	0	0.0%	267	100.0%
S7 * S0	267	100.0%	0	0.0%	267	100.0%
S8 * S0	267	100.0%	0	0.0%	267	100.0%
S9 * S0	267	100.0%	0	0.0%	267	100.0%
S10 * S0	267	100.0%	0	0.0%	267	100.0%
S11 * S0	267	100.0%	0	0.0%	267	100.0%
S12 * S0	267	100.0%	0	0.0%	267	100.0%

S1 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S1	1.00	7	1	1	0	9
	2.00	15	26	11	1	53
	3.00	3	16	161	5	185
	4.00	1	0	7	12	20
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.652	.049	9.663	.000
		S1 Dependent	.632	.052	9.663	.000
		S0 Dependent	.674	.053	9.663	.000

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S2 * S0

Crosstab

Count

		S0				Total
		1.00	2.00	3.00	4.00	
S2	1.00	2	0	1	0	3
	2.00	3	0	7	0	10
	3.00	20	43	171	11	245
	4.00	1	0	1	7	9
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.193	.063	2.674	.007
		S2 Dependent	.126	.046	2.674	.007
		S0 Dependent	.411	.131	2.674	.007

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S3 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S3	1.00	14	40	73	7	134
	2.00	9	3	36	4	52
	3.00	1	0	70	5	76
	4.00	2	0	1	2	5
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.275	.049	5.440	.000
		S3 Dependent	.308	.055	5.440	.000
		S0 Dependent	.248	.046	5.440	.000

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S4 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S4	1.00	4	0	0	0	4
	2.00	3	3	8	0	14
	3.00	19	39	166	15	239
	4.00	0	1	6	3	10
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.209	.055	3.260	.001
		S4 Dependent	.145	.043	3.260	.001
		S0 Dependent	.376	.096	3.260	.001

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S5 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S5	1.00	3	0	2	0	5
	2.00	8	1	7	2	18
	3.00	13	28	159	13	213
	4.00	2	14	12	3	31
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.013	.076	.166	.869
		S5 Dependent	.011	.064	.166	.869
		S0 Dependent	.016	.094	.166	.869

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S6 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S6	1.00	4	1	3	0	8
	2.00	11	7	16	3	37
	3.00	11	31	160	14	216
	4.00	0	4	1	1	6
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.197	.070	2.691	.007
		S6 Dependent	.162	.059	2.691	.007
		S0 Dependent	.252	.090	2.691	.007

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S7 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S7	1.00	5	1	1	0	7
	2.00	7	2	28	0	37
	3.00	13	29	145	15	202
	4.00	1	11	6	3	21
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.062	.068	.915	.360
		S7 Dependent	.056	.061	.915	.360
		S0 Dependent	.070	.077	.915	.360

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S8 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S8	1.00	2	0	1	0	3
	2.00	2	19	20	1	42
	3.00	22	24	159	16	221
	4.00	0	0	0	1	1
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.224	.058	3.605	.000
		S8 Dependent	.176	.048	3.605	.000
		S0 Dependent	.307	.078	3.605	.000

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S9 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S9	1.00	4	0	2	1	7
	2.00	0	3	36	2	41
	3.00	22	40	142	15	219
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	-.075	.054	-1.390	.165
		S9 Dependent	-.060	.043	-1.390	.165
		S0 Dependent	-.100	.072	-1.390	.165

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S10 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S10	1.00	2	0	2	0	4
	2.00	1	19	49	1	70
	3.00	23	24	129	16	192
	4.00	0	0	0	1	1
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.086	.056	1.537	.124
		S10 Dependent	.079	.051	1.537	.124
		S0 Dependent	.096	.062	1.537	.124

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S11 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S11	1.00	1	0	2	0	3
	2.00	2	18	45	1	66
	3.00	23	25	132	16	196
	4.00	0	0	1	1	2
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.087	.054	1.593	.111
		S11 Dependent	.078	.049	1.593	.111
		S0 Dependent	.099	.062	1.593	.111

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

S12 * S0

Crosstab

Count

		S0				
		1.00	2.00	3.00	4.00	Total
S12	1.00	2	0	3	0	5
	2.00	0	12	34	0	46
	3.00	23	28	141	17	209
	4.00	1	3	1	1	6
	5.00	0	0	1	0	1
Total		26	43	180	18	267

Directional Measures

			Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal	Somers' d	Symmetric	.025	.055	.459	.646
		S12 Dependent	.021	.047	.459	.646
		S0 Dependent	.030	.066	.459	.646

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix 3. Binary Logistic Regression's Test Results

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	267	100.0
	Missing Cases	0	.0
	Total	267	100.0
Unselected Cases		0	.0
Total		267	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Tindakan Positif	0
Tindakan Negatif	1

Categorical Variables Codings

			Parameter coding	
		Frequency	(1)	(2)
X_edu	SD	120	.000	.000
	SMP	64	1.000	.000
	SMA dan PT	83	.000	1.000
X_ComGroup	tidak terlibat kelompok	191	.000	
	terlibat dalam kelompok	76	1.000	
X_Livestock	tidak memiliki ternak	150	.000	
	memiliki ternak	117	1.000	
X_fuelwood	tidak menggunakan kayu bakar	50	.000	
	Menggunakan kayu bakar	217	1.000	
X_gender	1.00	222	.000	
	2.00	45	1.000	

Block 0: Beginning Block

Classification Table[a,b]

			Predicted		
			Y		Percentage Correct
	Observed		Tindakan Positif	Tindakan Negatif	
Step 0	Y	Tindakan Positif	175	0	100.0
		Tindakan Negatif	92	0	.0
	Overall Percentage				65.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.643	.129	24.931	1	.000	.526

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	X_gender(1)	24.901	1	.000
		X_age	3.567	1	.059
		X_edu	11.467	2	.003
		X_edu(1)	.848	1	.357
		X_edu(2)	7.133	1	.008
		X_Famsize	.206	1	.650
		X_income	2.170	1	.141
		X_Worktime	.418	1	.518
		X_Work_Variance	.066	1	.797
		X_distance	64.048	1	.000
		X_Livestock(1)	44.443	1	.000
		X_fuelwood(1)	25.269	1	.000
		X_ComGroup(1)	1.184	1	.277

a. Residual Chi-Squares are not computed because of redundancies.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	162.886	12	.000
	Block	162.886	12	.000
	Model	162.886	12	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	181.020[a]	.457	.631

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.653	8	.887

Contingency Table for Hosmer and Lemeshow Test

		Y = Tindakan Positif		Y = Tindakan Negatif		Total
		Observed	Expected	Observed	Expected	
Step 1	1	27	26.995	0	.005	27
	2	27	26.925	0	.075	27
	3	26	26.591	1	.409	27
	4	25	24.947	2	2.053	27
	5	23	22.872	4	4.128	27
	6	20	18.930	7	8.070	27
	7	14	13.274	13	13.726	27
	8	8	8.366	19	18.634	27
	9	2	4.324	25	22.676	27
	10	3	1.776	21	22.224	24

Classification Table[a]

			Predicted		
			Y		Percentage Correct
	Observed		Tindakan Positif	Tindakan Negatif	
Step 1	Y	Tindakan Positif	155	20	88.6
		Tindakan Negatif	19	73	79.3
	Overall Percentage				85.4

a. The cut value is .500

Variables in the Equation

							Exp(B)	95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.		Lower	Upper
Step 1[a]	X_gender(1)	-4.731	1.130	17.539	1	.000	.009	.001	.081
	X_age	-.019	.023	.710	1	.399	.981	.938	1.026
	X_edu			1.718	2	.424			
	X_edu(1)	-.661	.521	1.609	1	.205	.516	.186	1.434
	X_edu(2)	-.179	.572	.098	1	.754	.836	.272	2.565
	X_Famsize	.066	.189	.122	1	.727	1.068	.738	1.546
	X_income	.000	.000	.133	1	.715	1.000	1.000	1.000
	X_Worktime	.067	.134	.250	1	.617	1.069	.822	1.391
	X_Work_Variance	-.238	.457	.270	1	.603	.788	.322	1.932
	X_distance	-.001	.000	36.916	1	.000	.999	.998	.999
	X_Livestock(1)	2.175	.441	24.314	1	.000	8.802	3.708	20.895
	X_fuelwood(1)	1.935	.852	5.161	1	.023	6.925	1.304	36.767
	X_ComGroup(1)	-1.112	.449	6.133	1	.013	.329	.136	.793
	Constant	-.349	2.010	.030	1	.862	.706		

a. Variable(s) entered on step 1: X_gender, X_age, X_edu, X_Famsize, X_income, X_Worktime, X_Work_Variance, X_distance, X_Livestock, X_fuelwood, X_ComGroup.

Casewise List[b]

Case	Selected Status[a]	Observed Y	Predicted	Predicted Group	Temporary Variable Resid	ZResid	SResid
112	S	1**	.018	0	.982	7.398	2.858
132	S	1**	.041	0	.959	4.842	2.593
141	S	0**	.958	1	-.958	-4.796	-2.549
149	S	0**	.912	1	-.912	-3.221	-2.273
208	S	0**	.931	1	-.931	-3.673	-2.341
218	S	1**	.149	0	.851	2.389	2.027
230	S	1**	.088	0	.912	3.217	2.327

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

KEMENTERIAN LINGKUNGAN HIDUP DAN KEHUTANAN
german cooperation DEUTSCHE ZUSAMMENARBEIT
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