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Patterns of Forest Encroachment Behavior Based on Characteristics of Immigrants and Local Communities

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Abstract

This study aims to analyze the comparison of the behavioral characteristics of forest encroachers between migrants and local communities. The research method uses descriptive analysis. Sampling using the snowball sampling method. The results showed that the behavior of forest encroachment was formed based on the number of respondents from the most, namely the behavior of sustainable, mixed and unsustainable use. However, when viewed based on land area, it turns out to be inversely proportional to where the area of rubber plantations is at least 822 ha, while the area of oil palm plantations reaches 1203 ha. In addition, it should be noted that the highest land area is found in a mixed pattern. This means that local people have started to look at oil palm plantations for cultivation. Overall, based on the age that dominates the forest encroachers, the range is 31-50 years. The education of migrants is higher than that of local communities, but the pattern of encroachment of local communities is more sustainable when compared to migrants. The number of family members of immigrants is mostly in the medium category, while the number of family members of local communities is mostly in the small category. In addition, squatters whose main occupation is farmers tend to be more sustainable when compared to other occupations. Efforts to resolve the problem of forest encroachment in the Dharmasraya PFMU area can be resolved through sustainable community empowerment activities, improving the handling of encroachers, and increasing the effectiveness of PFMU management.

Keywords: *Behavior, Characteristic, Encroachment, Land Conversion, Sustainable.*

1. Introduction

Drivers of deforestation vary widely between countries, for example cattle and soybeans are important only in Latin America, while oil palm plantations are found almost exclusively in Indonesia and Malaysia. Deforestation in Southeast Asia cannot be separated from the role of the timber industry, where logging is often followed by conversion of forests to plantations to produce logs/pulp or oil palm [1]. There is no single factor in deforestation, but they influence each other. If the drivers of deforestation are not addressed, local reforestation efforts will be weighed down by broader trends in deforestation [2] .

The rate of deforestation also occurred in Dharmasraya Regency, especially in the Production Forest Management Unit (PFMU) area which was set at 33,550 ha, which has decreased to 27,216.57 ha in the last decade [3]. Degradation and deforestation of course cannot be separated from the behavior of the community around the forest, considering that forests are high-value natural resources [4]. It is feared that forest degradation and rapid deforestation will cause serious pressure on the production forest ecosystem in the Dharmasraya PFMU area. The encroachment of the ex-HPH area is suspected to have resulted in the loss of forest ecosystem service value and ecological value in the Dharmasraya PFMU area. Forest encroachment that occurs in the label of customary land is contrary to the principle of customary land itself, where customary land must be preserved and reserved for future generations [5].

The success of communities claiming to be indigenous peoples in reoccupying their ulayat lands does not make the indigenous peoples fully manage the land properly. Community members who own communal land, members of the local community who do not own customary land or people outside the Dharmasraya area have different ways of getting land/encroaching on the forest[6].

Various studies have attempted to analyze the different scales at which deforestation occurs, but few have investigated the dynamic interactions of drivers of deforestation [7]. Therefore, systems thinking is needed to understand the deforestation process. Obviously, the specific driving forces affecting forest cover are highly dependent on the geographic location and scale of the study area [8]. Therefore, supporting the argument of Reference [9] that there is a need for more research at the local level. To this end, research was carried out so as to fill the void that exists from research at the local level. Efforts to restore forest conditions cannot be separated from the behavior of communities around the forest [4]. Human behavior is inseparable from the individual's circumstances and their environment which is driven by certain

motives so that they behave [10]. Based on the above, the purpose of this research is to find out the forms of encroached land use patterns and analyze the encroached land use patterns based on the characteristics of migrants and local communities at the household level.

2. Literature Review

2.1. Forest encroachment

Forest encroachment is a land clearing activity in a forest area that is problematic due to different interpretations regarding the authority to manage it [11]. Forest encroachment is illegal activities carried out within state forest areas (e.g. tree cutting, burning and cultivation) and have an impact on forest ecosystems [12]. Forest loggers are defined as people who may use the existing slash-and-burn vegetation system, but with the primary intention of establishing permanent or semi-permanent agricultural enterprises [13].

2.2. Behaviour

Behavior is an activity or activity of the organism (living thing) concerned, these human activities can be grouped into two, namely: (1). Activities or activities that can be observed by others, such as walking, laughing and so on; (2). Activities or activities that cannot be observed by others (cannot be observed from the outside), such as thinking, acting, etc [10] [14].

According to Skinner's theory states that behavior is a person's response or reaction to external stimuli or stimuli. In Skinner's theory there are 2 responses, namely: (a). Respondent response or flexive, namely the response that arises by certain stimuli (certain stimuli). This stimulus is called electing stimulation because it causes relatively fixed responses; (b). Operant response or instrumental response, namely a response that appears and develops then is followed by a certain stimulus or stimulus. This stimulus is called reinforcing stimulation or reinforcer because it strengthens the response [10] [15].

3. Methods

3.1. Research location

This research was conducted in the area of the Production Forest Management Unit (PFMU) Dharmasraya which covers an area of 33,550 ha of production forest. This location was chosen to analyze the behavior of forest squatters because the PFMU area was supposed to be a forest, but currently the condition of the forest is very worrying, where most of the forest area has been turned into plantations.

3.2. Research Methods

The method used in this research is descriptive qualitative method. Collecting data using triangulation techniques, which combine several research techniques together, namely: field observation, documentation, structured interviews/surveys with the object of research, in-depth interviews. with key informants (nagari apparatus and ninik mamak; stakeholders from companies, related agencies, and other parties deemed to have a role in PFMU), literature review.

3.3. Population and Sample

The population in this study are households that have cleared forest areas. The population size is unknown. Considering that until now there is no accurate data regarding the number of squatters in the PFMU and the squatters are not only local people but also from surrounding villages. Therefore, it was not possible to determine the encroachment population, so this study used a snowball sampling technique.The steps in the sample of encroachers are as follows: First, visiting the areas included in the Dharmasraya PFMU covering an area of 33,550 ha. Second, using the snowball sampling method until it is saturated. Snowball sampling is a sampling technique that is initially small in number, then enlarges. Like a rolling snowball that grows big [16]. Squatters are identified by asking who owns the land around their plots. Overall, there were 250 respondents interviewed spread over various villages and occupying land in all parts of the areaThe population in this study are households that have cleared forest areas.

4. Results and Discussion

4.1. Pattern of Forest Encroachment Behavior

The pattern of forest encroachment behavior is divided into 3 types, namely:

a. Unsustainable behavior, namely squatters who plant non-forest commodities such as oil palm because oil palm plantations are not included in the category of forest plants. Oil palm plantations include plants that are not forest friendly because of the high water absorption capacity of plants and can disrupt groundwater supplies for other plants. Palm oil is often the main cause of natural disasters such as floods and landslides, palm oil also reduces organic matter content.
b. Mixed behavior, namely squatters who grow rubber and oil palm plantations.
c. Sustainable behavior, namely squatters who plant forest commodities such as rubber. Most of the forest commodities planted by encroachers are rubber plants, according to Government Regulation No. P.35/Menhut-II/2007 and No. P.12/Menlhk-II/2015 Rubber plants are included in forest plantations so that they are included in the category of forest-friendly patterns. In addition, rubber creates a healthy environment because rubber can function as a source of oxygen, regulating groundwater management, preventing erosion, forming humus and also has high economic value because it is a producer of latex and wood so that it can increase land productivity [17]. Communities who grow rubber, of course, indirectly participate in carrying out reforestation.

Table 1. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya

Encroachment Pattern	Frequency	Area (ha)
Unsustainable (oil palm)	54	1203
Mixed (oil palm and rubber)	88	1717
Sustainable (rubber plantation)	108	822
Total	250	3742

Overall, the pattern of forest encroachment behavior formed based on the number of respondents from the most, namely sustainable, mixed and unsustainable. However, when viewed based on land area, it turns out to be inversely proportional to where the area of rubber plantations is at least 822 ha, while the area of oil palm plantations reaches 1203 ha. In addition, it should be noted that the highest land area is found in a mixed pattern. This means that local people have begun to be interested in oil palm plants for cultivation. Based on the results of interviews, most of the people still want to expand their land.

4.2. Forest Encroachment Behavior Patterns Based on Community Characteristics

The table below shows the pattern of encroached land use based on the characteristics of origin and land ownership of forest encroachers in the Dharmasraya PFMU.

Table 2. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya Based on Origin and Land Ownership

Origin	Land Ownership	Encroachment Pattern			Total
		Unsustainable	Sustainable	Mixed	
Immigrant	Customary land	0	8	1	9
	Buy land	32	7	14	53
	Customary land and buy	0	1	1	2
	Total	32	16	16	64
Local resident	Customary land	13	85	46	144
	Buy land	6	4	4	14
	Customary land and buy	3	5	20	28
	Total	22	94	70	186
Total	Customary land	13	93	47	153
	Buy land	38	11	18	67
	Customary land and buy	3	6	21	30
	Total	54	110	86	250
	Land Area (ha)	1203	822	1771	3742

Based on the table above, it can be seen that the pattern of encroached land use based on origin and land ownership (how to obtain encroached land) shows that the encroachers who obtained encroached land started by buying land for up to 67 people and tended to be dominated by migrants by showing an unsustainable pattern. Meanwhile, local communities mostly obtained land from customary lands reaching 153 respondents and more showed a sustainable pattern and followed a mixed pattern. This means that the local community who initially planted rubber began to clear land for planting oil palm.

The local community encroached on the secondary forest and then sold the wood from the encroached land (until now, trucks were still found carrying logs from the forest area) and then the land was used for self-planting or for sale. Migrants who buy encroached land are usually still filled with wooden twigs and still need to be cleaned again and this is usually done by cutting and burning [18]. In addition, based on interviews with key informants, there are several people who buy land in large enough quantities and then sell some of the land. Migrants who are able to buy land mean they are not poor people, but the behavior they show is not sustainable. Based on various previous studies that forest encroachment tends to be carried out by the poor [19], [20], [21]. This is contrary to the findings of research in Dharmasraya Regency. In addition, the high number of migrants in an area that causes changes in the function of forest land can also result in the shift of local tribes becoming the dominant immigrant tribes (the occurrence of cultural acculturation) [22]. Furthermore, in the table below, it can be seen the pattern of forest encroachment behavior in the PFMU Dharmasraya based on origin and age.

Table 3. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya Based on Origin and Age

Origin	Age	Encroachment Pattern			Total
		Unsustainable	Sustainable	Mixed	
Immigrant	21-30	1	2	0	3
	31-40	15	7	8	30
	41-50	13	6	8	27
	52-60	3	1	0	4
	Total	32	16	16	64
Local resident	21-30	1	7	6	14
	31-40	13	47	29	89
	41-50	7	29	19	55
	52-60	1	8	16	25
	>61	0	1	2	3
	Total	22	92	72	186
Total	21-30	2	9	6	17
	31-40	28	54	37	119
	41-50	20	35	27	82
	52-60	4	9	16	29
	>61	0	1	2	3
	Total	54	108	88	250

Based on the table above, it can be seen that the pattern of encroachment behavior based on the characteristics of origin and age shows that migrants tend to show an unsustainable pattern with the highest age range between 31-50 years and the local population more sustainable with the number of respondents being 92 respondents with an age range of 31-50 years. and followed by a mixed pattern of 72 respondents. This shows that there is a shift in the mindset of the people who grow rubber to plant oil palm. Overall, based on the age that dominates the forest encroachers, the range is 31-50 years with a sustainable, mixed and finally unsustainable pattern. Furthermore, in the table below, it can be seen the pattern of encroached land use in PFMU Dharmasraya based on origin and education.

Table 4. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya Based on Origin and Education

Origin	Education	Encroachment Pattern			Total
		Unsustainable	Sustainable	Mixed	
Immigrant	low (<6 years)	4	5	3	12
	medium (7-12 years old)	22	9	9	40
	height (>12 years)	6	2	4	12
	Total	32	16	16	64
Local resident	low (<6 years)	8	58	33	99
	medium (7-12 years old)	13	32	32	77
	height (>12 years)	1	2	7	10
	Total	22	92	72	186
Total	low (<6 years)	12	63	36	111
	medium (7-12 years old)	35	41	41	117
	height (>12 years)	7	4	11	22
	Total	54	108	88	250

Based on the table above, it can be seen that the pattern of encroachment land use based on the characteristics of origin and education shows that the education level of migrants is mostly in the medium category with an unsustainable pattern of encroachment, for the local community, the education level is in the low category with a sustainable pattern and followed by a mixed pattern. It can be concluded that the education of migrants is higher than that of local residents, but the pattern of land use encroached by local residents is more sustainable when compared to migrants. What is at risk is when a person's high education is not directly proportional to his concern for the forest and the environment. The educational output obtained has even made him materialistic and a businessman who tries to exploit the forest without thinking about the future sustainability of his next generation. Furthermore, in the table below, it can be seen the pattern of use of encroached land in PFMU Dharmasraya based on origin and number of family members.

Table 5. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya Based on Origin and Number of Family Members

Origin	Number of Family Members	Encroachment Pattern			Total
		Unsustainable	Sustainable	Mixed	
Immigrant	small (1-4)	14	10	5	29
	moderate (5-7)	17	6	11	34
	large (>7)	1	0	0	1
	Total	32	16	16	64
Local resident	small (1-4)	16	46	40	102
	moderate (5-7)	6	42	31	79
	large (>7)	0	4	1	5
	Total	22	92	72	186
Total	small (1-4)	30	56	45	131
	moderate (5-7)	23	48	42	113
	large (>7)	1	4	1	6
	Total	54	108	88	250

In the table above, it can be seen that the pattern of encroachment behavior based on the characteristics of origin and the number of family members shows that the number of migrant family members is mostly in the moderate category with an unsustainable pattern, while the number of family members of the local population is mostly in the small category with a sustainable pattern. Overall the number of encroaching family members in Dharmasraya is in the small category with a sustainable pattern, followed by mixed and unsustainable. Furthermore, in the table below, you can see the pattern of encroachment behavior at PFMU Dharmasraya based on origin and occupation.

Table 6. Patterns of Forest Encroachment Behavior in PFMU Dharmasraya Based on Origin and Occupation

Origin	Occupation	Encroachment Pattern			Total
		Unsustainable	Sustainable	Mixed	
Immigrant	Employee	11	1	3	15
	Businessman	10	3	5	18
	Farmer	8	10	6	24
	Military	2	2	2	6
	etc	1	0	0	1
	Total	32	16	16	64
Local resident	Employee	10	5	20	35
	Businessman	5	11	13	29
	Farmer	4	76	35	115
	Military	0	0	1	1
	etc	3	0	3	6
	Total	22	94	70	186
Total	Employee	21	6	23	50
	Businessman	15	14	18	47
	Farmer	12	86	41	139
	Military	2	2	3	7
	etc	4	0	3	6
	Total	54	108	88	250

Based on the table above, it can be seen that the pattern of encroachment behavior based on the characteristics of origin and occupation shows that the work of migrants as employees and entrepreneurs tends to show an unsustainable pattern and the work of farmers with a sustainable pattern. When viewed as a whole, the work of farmers tends to be more sustainable when compared to other jobs. This is because rubber plants are still the foundation for farmers whose results can be taken every day.

For people who still choose to plant rubber because they have been planting rubber for a long time and in terms of capital to open an oil palm plantation is quite large. However, it should also be noted that 88 respondents are in the mixed category, this needs to be a concern because there is a tendency for respondents who initially only planted rubber plants to start clearing land to plant oil palm.

The change in people's behavior patterns from sustainable to unsustainable is certainly caused by several things, including: (a). It cannot be separated from the experience of the community around the forest and the influence of the entry of oil palm plantations into Dharmasraya. Initially, the community only planted rubber and did not know how to plant oil palm. With the entry of palm oil companies and the existence of a plasma nucleus program which is participated by the community, it increases the interest and knowledge of the community about palm oil. (b). The price of palm oil which tends to be stable compared to the price of rubber has made people start to look at oil palm plantations. The opportunity to occupy forest land makes people compete to clear forest land and start planting oil palm, as can be seen from the wider area of oil palm plantations which reaches 1,203 ha compared to rubber plantations of 822 ha. Oil palm plantations are mostly planted by immigrants who invest in Dharmasraya.

In order for society to be conservative, people sometimes not only need knowledge, positive attitudes, and support for facilities, but also need examples from community leaders, religious leaders and officials. In terms of forest encroachment in Dharmasraya, the community sees references to community leaders such as ulayat rulers in buying and selling land. In addition, the large number of government officials/employees who clear land in the area adds to the courage of the community to clear forest land, and the weak law enforcement that has so far caused the community to behave in a non-conservative manner.

Efforts to solve the problem of forest encroachment in the Dharmasraya PFMU area can be resolved through sustainable community empowerment activities, improving the handling of encroachers, and increasing the effectiveness of PFMU management. In relation to the handling of encroachers, it can be carried out through a series of stages, namely: (a) face-to-face with the squatter communities and land sellers, (b) researching and clarifying land ownership/tenure documents, (c) investigating cases of counterfeiting and crime. crime, (d) investigation/examination of land grabbing cases, and (e) socialization of team work results to the wider community, especially those related to law enforcement

5. Conclusion

Patterns of relationship between characteristics and behavioral patterns of forest encroachment, namely: (1). Migrants tend to acquire land by buying and show an unsustainable pattern and local communities tend to acquire land from customary lands and show a sustainable pattern. (2). Overall, based on the age that dominates the forest encroachers, the age range is 31-50 years with local communities being sustainable compared to migrants. (3). The education of migrants is higher than that of local communities, but the pattern of encroachment of local communities is more sustainable when compared to migrants. (4). The number of family members of immigrants is mostly in the moderate category with an unsustainable pattern, while the number of family members of the local community is mostly in the small category with a sustainable pattern. (5). On the whole, squatters whose main occupation is farmers tend to be more sustainable than other occupations. PFMU and local governments need to implement sustainable patterns of community empowerment around the PFMU area as an effort to find alternative income to reduce income from the sale of illegal lands. The need for consistent and continuous law enforcement by law enforcement officials as an effort to protect the PFMU area from perpetrators who commercialize land in the area.

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