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Community Dependence on Lore Lindu National Park and Limited Production Forest in Kapiroe Village, Palolo Sub-district, Sigi Regency

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Abstract

Dependence on forests is a condition in which humans are highly dependent on forests to support their livelihoods. Forests provide various natural resources. This study aims to determine the extent of community dependence on limited production forests and Lore Lindu National Park, as well as the factors that influence it. The research sample consisted of 58 people in Kapiroe Village, selected using the simple random sampling (SRS) methodology. Data were analysed using the Likert scale method. The dependence of the community in Kapiroe Village shows that 34.29% of the community's income comes from activities and utilisation in the TNLL area, while 65.7% comes from the HPT area. This finding confirms that the community of Kapiroe Village is highly dependent on limited production forests as their main source of livelihood. This high level of dependence highlights the role of the area in supporting the local economy, far exceeding the contribution of conservation areas such as TNLL.

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Keywords: Forest Dependency, Lore Lindu National Park

INTRODUCTION

Forests are a form of terrestrial ecosystem that has an important role in maintaining the balance of nature and providing various benefits for humans and other living things. Forests function as the lungs of the world that produce oxygen, absorb carbon dioxide, maintain the water cycle, protect biodiversity, and prevent natural disasters such as floods and soil. These conditions make forest areas a space that is not only ecologically important, but also has strategic value in supporting the welfare of local communities (Oktavia Prasetyaningtyas & Trimurtini, 2024).

Lore Lindu National Park (TNLL) and limited production forest (HPT) in Kapiroe Village, Palolo Sub-district, Sigi Regency, have a very important role in environmental sustainability and the lives of local communities. TNLL is one of the conservation areas that has a very high biodiversity wealth, as well as being a refuge for various endangered species of flora and fauna. In addition, the limited production forest area is also a natural resource that is used to fulfil the needs of the surrounding community.

For a long time, the community in Kapiroe Village, Palolo Sub-district, Sigi District, has utilised forest products to open up business land in both the Lore Lindu National Park and the Limited Production Forest. The form of business utilised by the community has the potential to damage the forest area (Maiwa et al., 2018) . In an effort to prevent the community's dependence on the Lore Lindu National Park and Limited Production Forest, a study was conducted on the importance of preserving protected forests and limited production forests, as well as the impact of over-exploitation on the ecosystem. Education on the long-term benefits of maintaining forest sustainability is essential to change community perceptions and behaviour (Ely et al., 2021).

In this context, research on community dependence on Lore Lindu National Park and Limited Production Forest in Kapiroe Village is essential to provide a clearer picture of the relationship between communities and forests, as well as to formulate steps that can be taken to maintain forest sustainability and improve community welfare in a sustainable manner.(Herutomo & Istiyanto, 2021).

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RESEARCH METHODS

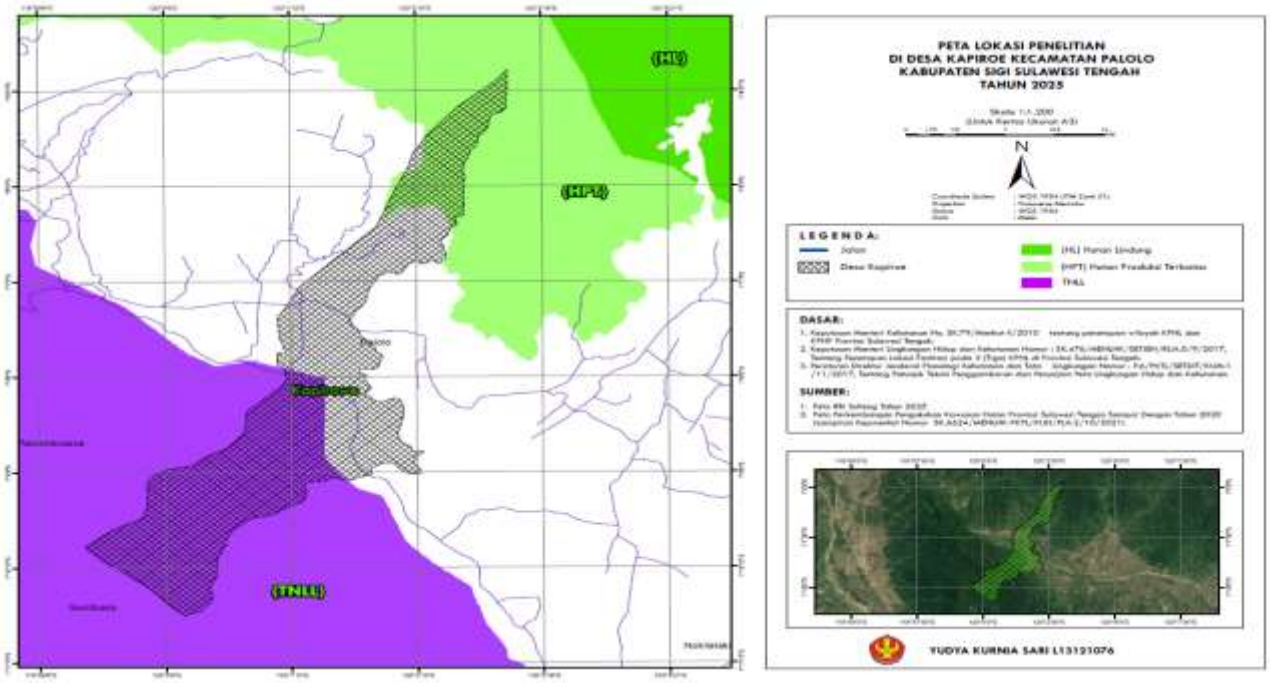


Image 1. Research Location Map

This research was conducted during the period September to November 2024. Kapiroe village was purposively selected because it has strong interactions between the community and forest areas, particularly the Lore Lindu National Park (TNLL) and Limited Production Forest (HPT), so it was considered relevant to study in the context of dependence on forest resources. This research used a case study approach with a survey method. Data collection consisted of primary and secondary data. Primary data were obtained from observations and interviews, while secondary data were collected through document searches from the literature and documents from various parties observed as supporting data (Maiwa et al., 2025). The sample of this research is people who have identity in Kapiroe Village. (Rante, 2021) Stated that the identity of respondents includes age group, education level, gender and area of cultivated land that utilise forest products around TNLL and HPT areas to meet their daily needs.

The approach used is descriptive quantitative, with data analysis using a Likert scale. The sampling process is Simple Random Sampling (SRS) by considering the following five factors:

1) respondents' land-based activities

2) Frequency of forest activities

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3) Area of cultivated land in the forest

4) Distance of residence to the forest

5) Utilisation of forest products

For this study, researchers took a sample of 15%. This sample size was considered sufficient to represent the existing population. Thus, the number of samples taken from 391 was 58 communities, of which 15% were successfully sampled. This study used Likert scale analysis to determine the level of community dependence on the Lore Lindu National Park (TNLL) and Limited Production Forest (HPT). Using this scale, individuals or groups can rate their opinions, attitudes and perceptions about social phenomena. There are five categories of answers in the Likert scale applied, namely Very High, High, Medium, Low, and Very Low (Amaliyah, 2021)

The formula is = T x Pn

T = Total number of respondents who chose

Pn = Likert score number options

Table1. Dependency Value

No	Respondent Category	Dependency Class
1	Very High	243,6 - 290,0
2	High	197,2 - 243,6
3	Medium	150,8 - 197,2
4	Low	150,8 - 150,8
5	Very Low	58,0 - 104,4

Table 1 provides an overview of how respondents rated the proposed statements, and facilitates data analysis to determine the general trend of respondents' attitudes towards the research topic. With structured ratings and ranges, researchers can easily interpret the survey results and draw conclusions based on the data obtained (Kunci, 2023).

RESULTS AND DISCUSSION

Respondent Characteristics

Respondent characteristics are internal factors of the community that describe the state and condition of the respondent's status in knowing the function of the forest. The results of the research on the characteristics of respondents can be seen in table 2.

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Table 2. Respondent Characteristics

No	Age Group	Number of Respondents	Percentage
1	< 25	4	6,90%
2	26 - 35	22	37,93%
3	36 - 45	14	24,14%
4	46 - 55	17	29,31%
5	<55	1	1,72%
Totally		58	100%
No	Education Level	Number of Respondents	Percentage
1	Primary school	26	44,83%
2	Junior secondary school	16	27,59%
3	Senior secondary school	14	24,14%
4	Higher Education	2	3,45%
Totally		58	100%
No	**Jenis Kelamin**	**Number of Respondents**	**Percentage**
1	Man	29	50,00%
2	Woman	29	50,00%
Totally		58	100%
No	Dominant Occupations of HPT and TNLL	Number of Respondents	Percentage
1	Forest farmers	50	86,21%
2	Rice field farmer	8	13,79%
Totally			100%
No	**Side Job**	**Number of Respondents**	**Percentage**

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No	Age Group	Number of Respondents	Percentage
1	Honorary Teacher	2	3,45%
2	grocery trader	12	20,69%
3	market traders	8	13,79%
4	workshop	5	8,62%
5	casual labourer	14	24,14%
6	construction workers	4	6,90%
7	transport service	3	5,17%
8	village officials	10	17,24%
Totally		**58**	100%

Source: Primary data after processing, 2025

The majority of respondents are aged 26-55 years, which means that people who use TNLL and HPT are classified as productive or still have strong enough energy and good ability to use and manage land. This is in accordance with Pokhrel's research, (2024) which says that a human being can be said to be productive if he has an age in the range of 15-64 years.

The dominant level of community education is at the elementary level with a percentage of 44.83%, which means that the level of education of respondents who use is still low. (Rahman et al., 2023) state that people with low levels of education tend to have limitations in accessing information and knowledge about sustainable natural resource management so that skills and employment opportunities in the non-forestry sector are limited, which causes high dependence on forest products as the main source of livelihood and income.

The kapiroe village community who were respondents were 50% women and 50% men. Saputra & Zaini, (2023) stated that although there are differences in roles based on gender, men and women both show dependence on forests, although in different forms and intensities.

This balance does not mean that both groups have identical dependence, but rather that both contribute complementarily to the utilisation and management of forest resources. The main occupation of the community is predominantly forest farming with a percentage of (86.21%). There are 8 types of side jobs other than being a forest farmer because having a side job can help the community to generate a source of income and fulfil their daily needs (Wale et al., 2022). From the data above, it can be seen that the dominant side job of the community in Kapiroe village is casual daily hunters with a percentage of 24.14%.

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Area of Cultivated Land

The production of farmers is influenced by the size of the land cultivated, the greater the land area, the greater the possibility of production results obtained, and vice versa if the land area owned is less, the lower the production or income obtained (Nursahada, 2020). The table of community cultivated land area towards TNLL and, is presented in table 3.

Table 3. Area of Cultivated Land

No	Area of Cultivated Land (M)	Number of Respondents in TNLL	Number of Respondents in HPT
1	½ Ha	10	**9**
2	1 Ha	18	**13**
3	2 Ha	10	**22**
No	Area of Cultivated Land (M)	Number of Respondents in TNLL	Number of Respondents in HPT
4	3 Ha	-	**5**
5	Not utilizing	20	**9**
Total	**-**	**58**	**58**

Source: Primary data after processing, 2025

There is a significant difference in the use of cultivated land in TNLL and limited production forest (HPT). The community tends to utilise more land in the HPT than in the TNLL, as shown by the number of respondents who cultivate 20 hectares of land in the HPT, 22 respondents compared to only 10 respondents in the TNLL. In addition, there are still respondents in the HPT who cultivate 3 ha of land as many as 5 respondents, while in TNLL no one cultivates land of that size. This suggests that land in the HPT is more flexible to utilise than in the TNLL, where there are stricter regulations for land management.

Smaller cultivated land areas of 1/2 Ha to 1 Ha are more common in TNLL, with the majority of respondents cultivating 1 Ha with 18 respondents. However, a similar proportion of land use was also found in the HPT, although the number of respondents was lower with 13. There was a notable difference in the number of respondents who did not use land in the two areas. In

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TNLL, 20 respondents did not use land at all, compared to only 9 respondents in HPT. This indicates that more people in TNLL do not use land than in HPT, which is likely due to TNLL's status as a conservation area that has strict rules regarding resource utilization.

Distance to Lore Lindu National Park and Restricted Production Forest Limited Production Forest

Community access to forest resources is one of the important factors in community-based forest management. One commonly used approach to measure the level of community access to forests is to take into account the distance between the farmer's house and the forest location (TRIA PUSPITA, 2022). The comparison table of distance from home to TNLL and HPT is presented in Table 4.

Table 4. Distance of Residence to Lore Lindu National Park and Limited Production Forest

No	Distance Traveled	Number of TNLL Respondents	Number of HPT Respondents
1	500M	5	-
2	855M	7	-
3	1000M	11	**7**
4	1500M	4	-
5	2000M	8	**24**
6	2500M	-	**4**
7	3000M	3	**14**
8	(Not pursuing)	20	**9**
Totally	**11355**	**58**	**58**

Source: Primary data after processing, 2025

There are differences in the distribution of respondents' travel distance to Lore Lindu National Park (TNLL) and Limited Production Forest (HPT). A total of 20 respondents did not travel to TNLL while in HPT only 9 did not travel. This suggests that TNLL is more difficult for residents to access compared to HPT, perhaps due to stricter regulations and restrictions in protected areas.

In the travel distance category, most people who visited TNLL were within 1000 meters as many as 11 respondents, while the majority of respondents in HPT were within 2000 meters as many as 24 respondents. This shows that people often travel further to the HPT than to the TNLL, which is due to the community's perception that the HPT is more open for economic activities such as agriculture and social forestry. In addition, in the longer distance category of 3000 meters,

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the number of respondents who traveled to the HPT was 14 respondents compared to 3 respondents to the TNLL. This indicates that the community is more dependent on the HPT than the TNLL.

This comparative analysis shows that community accessibility and dependence on TNLL is lower than that of HPTL. Regulatory factors, area function and distance are the main factors influencing the pattern of community interaction with the two areas (Mulyana & Moeis, 2022).

Frequency of Forest Activities

The frequency of community visits to the forest is how often people visit the forest within a certain period of time (Ramadanti, 2019). This frequency can be measured on a daily, weekly, monthly or annual scale. The frequency of forest visits is closely related to the level of community dependence on forest resources. The higher the community's dependence on the forest, the more often they visit (Nurhaliza et al., 2024).

Diagrams 1. Comparison of the frequency of utilization of TNLL and HPT

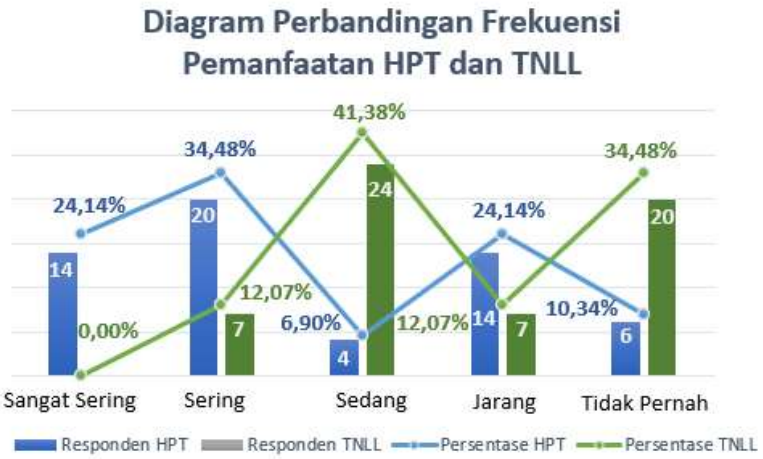


Table 5. Frequency of Forest Activities

No	Frequency of Utilization	Limited Production Forest		Lore Lindu National Park	
		Number of Respondents	Number of Respondents	Number of Respondents	Percentage
1	Very often	14	24,14%	0	0,00%
2	Often	20	34,48%	7	12,07%

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3	Medium	4	6,90%	24	41,38%
4	Rarely	14	24,14%	7	12,07%
5	Never	6	10,34%	20	34,48%
	Totally	**58**	**100%**	**58**	**100%**

Source: Primary data after processing, 2025

There is a significant difference between the frequency of utilization of Limited Production Forest (HPT) and Lore Lindu National Park (TNLL) by the community. Respondents who used the HPT "very often" and "often" amounted to 34 people (58.62%), while for TNLL only 7 people (12.07%). This shows that the HPT is utilized more than the TNLL.

In the "Medium" category, more respondents utilized the TNLL (41.38%) than the HPT (6.90%). This shows that people utilize the TNLL less frequently than the HPT. In the "rarely" category, the number of respondents is also the same in both areas (24.14% for HPT and 12.07% for TNLL). In the "never" category, 34.48% of respondents stated that they had never used TNLL, while only 10.34% had used HPT. This shows that some people are more likely to avoid TNLL than HPT, possibly due to stricter conservation regulations in TNLL.

From this comparison, it can be concluded that the HPT is more widely used by the community for various purposes compared to TNLL, which has stricter restrictions on access and utilization of its natural resources.

Types of Plants Utilized

Communities living around forests are mostly direct users of forest resources (Massiri et al., 2016). Some community groups living around the forest choose forest resources to meet direct material needs such as land sources for gardening or farming and so on (Anno et al., 2022). The table of Plant Types Utilized in TNLL and HPT is as follows:

Tablel 6. Types of plants utilized

No	Plant Type	Limited Production Forest		Lore Lindu National Park	
		Number of Respondents	Area of Cultivated Land (Ha)	Number of Respondents	Area of Cultivated Land (Ha)
1	Candlenut	49	36,21	19	18,17

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2	Chocolate	26	19,21	14	13,38
3	Avocado	3	2,22	12	11,48
4	Durian	8	5,91	-	-
5	Crops	4	2,96	-	-
6	**None**	**9**	**0**	**20**	**0**

Source: Primary data after processing, 2025

It can be analyzed that community dependence on forests is quite high, especially in the Limited Production Forest (HPT) area compared to the Lore Lindu National Park (TNLL). This can be seen from the number of respondents who utilize land in both areas. In the HPT, the majority of respondents have cultivated land with various types of crops, such as candlenut (49 respondents, 36.21 Ha), cacao (26 respondents, 19.21 Ha), durian (8 respondents, 5.91 Ha), and secondary crops (4 respondents, 2.96 Ha). Whereas in TNLL, although there are respondents who cultivate land, the number is smaller than in HPT. Cacao and avocado are the most cultivated crops in TNLL, with 14 and 12 respondents respectively, and cultivated areas of 13.38 Ha and 11.48 Ha.

In addition, the number of respondents with no cultivated land in TNLL is much higher (20 people) than in HPT (9 people). This shows that communities around TNLL are more limited in utilizing land, most likely due to stricter regulations regarding the utilization of conservation areas. On the other hand, in the HPT, dependence on the forest is higher because people are more free to cultivate land for various types of crops, especially candlenut and cacao which are the main commodities.

From this comparison, it can be concluded that communities around the HPT are more dependent on the forest for livelihoods, both in the form of plantations and agriculture. Meanwhile, in TNLL, land use is more limited, so there are a large proportion of respondents who do not have arable land. This indicates that forest management policies in both areas affect the level of community dependence on the forest, where areas with stricter regulations such as TNLL limit access to utilization compared to the more flexible HPT.

Community Acceptance in Lore Lindu National Park and Limited Production Forest

The acceptance rate of respondents in Lore Lindu National Park and Limited Production Forest can be seen in the table below.

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Table 7. Community Acceptance in TNLL and HPT

No	Utilization	Totally Production/Month (Kg)	Average Production Price/Month (Rp)	Revenue (Rp/Month)
HPT				
1	Candlenut	1.607	11.000,00	17.373.000,00
2	Chocolate	157	185.000,00	28.827.000,00
3	Avocado	100	5.000,00	500.000,00
4	Durian	76	30.000,00	2.010.000,00
5	Crops	33	54.000,00	1.782.000,00
Totally HPT		**1.973**	**285.000,00**	**50.492.000,00**
TNLL				
1	Candlenut	780	11.000,00	8.515.000,00
2	Chocolate	84	185.000,00	15.050.537,00
3	Avocado	596	5.000,00	2.780.000,00
Total TNLL		**1.460**	**201.000,00**	**26.345.537,00**

Source: Primary data after processing, 2025

There are significant differences in the utilization of forest products in the Limited Production Forest (HPT) and Lore-Lindu National Park (TNLL). In the HPT area, the community utilizes more forest products with a higher total production than in TNLL. This can be seen from the total income of the community in the HPT which reaches Rp. 50,492,000.00 per month, while in TNLL it only reaches Rp. 26,345,537.00 per month.

The main commodities that dominate in both areas are candlenuts and cacao. However, the quantity of candlenut produced in HPT is much higher than in TNLL (1,607 kg versus 780 kg). Similarly, cocoa reached 157 kg in HPT versus 84 kg in TNLL. The relatively high selling price of cocoa (Rp. 185,000 per kg) makes it an important source of income for communities in both areas.

In addition, there are other commodities in the HPT that are not found in TNLL, such as durian and secondary crops. Although the production is lower, these commodities still contribute to the income of the community in the HPT. In contrast, avocado production in TNLL is greater than in the HPT (596 kg compared to 100 kg), although the selling price is relatively low, at IDR 5,000 per kg.

From an economic perspective, communities in the HPT earn higher incomes than

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communities in the TNLL due to diversified cultivation and larger production volumes. This factor suggests that resource utilization in the HPT is more optimal than in the TNLL, which could be due to stricter conservation regulations in the TNLL area.

This analysis shows that although TNLL offers economic opportunities for communities, these opportunities are still more limited compared to HPT. Therefore, more adaptive measures are needed so that communities around TNLL can increase the utilization of forest products in a sustainable manner without damaging the ecosystem (Pathak et al., 2021).

Comparison of Community Income in TNLL and HPT

A comparison of community incomes in the Limited Production Forest (HPT) and Lore Lindu National Park (TNLL) is an important aspect of understanding the economic conditions of local communities. Environmental factors, access to natural resources, and forest management policies can influence income differences in these two areas.

Table 8 presents a comparison of community income in the two areas. The data shows that people living in the HPT area have higher incomes than those living in the TNLL area. This difference can provide an insight into how economic factors and resource accessibility affect the welfare of local communities.

Table 8. Comparison of Community Income in TNLL and HPT

Region	Total Income (Rp/Month)	Percentage (%)
Lore Lindu National Park (TNLL)	Rp. 26.345.537,00	34,29%
Limited Production Forest (HPT)	Rp. 50.492.000,00	65,71%
Totally	**Rp. 76.837.537,00**	**100%**

Source: Primary data after processing, 2025

Table 8 shows that community income in the two areas, namely the Limited Production Forest (HPT) and Lore-Lindu National Park (TNLL), is very different. Communities in the HPT area earned an income of Rp50,492,000 per month or around 65.71% of total income. In contrast, community income in the TNLL area is IDR 26,345,537 per month or around 34.29% of total income.

This difference shows that the HPT area has greater economic opportunities than the TNLL area. One of the main factors influencing this is the flexibility in the utilization of natural resources. In the HPT area, communities have greater flexibility in utilizing forest products for economic

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activities, such as agriculture and plantations, without strict conservation requirements. This is different from the TNLL area, which has strict regulations to preserve the environment, thus limiting resource utilization by the surrounding community. In addition, product diversification in the HPT also contributes to the high income of the community. Previous data shows that communities in the HPT utilize various types of crops such as candlenut, cacao, avocado, durian and secondary crops. However, in TNLL, the utilization of forest products tends to be limited to certain products such as candlenut, cacao and avocado. As a result, communities in TNLL are limited in developing alternative sources of income (Samura, 2024).

Thus, the results of this analysis indicate that although the TNLL area still contributes to the economy of the community in Kapiroe Village, the income generated is still lower than that of the HPT area. Therefore, a more adaptive strategy is needed in managing the TNLL area so that it provides economic benefits to the surrounding community without neglecting the principles of conservation and environmental sustainability (Elujulo et al., 2023).

Community Constraints in Utilizing Forest Products

The people of Kapiroe Village who live around the Lore Lindu National Park (TNLL) and Limited Production Forest (HPT) are highly dependent on forest products, both timber and non-timber. However, they face various obstacles in accessing and utilizing these resources legally. Systemically, the position of Kapiroe Village, which is directly adjacent to conservation areas and production forests, creates management dynamics that are strongly bound by the provisions of forestry law. One of the legal opportunities available to the community is through Government Regulation of the Republic of Indonesia Number 83 of 2019 on Social Forestry, which states that "Social Forestry is a sustainable forest management system implemented in state forest areas or customary forests/ rights forests implemented by local communities or customary law communities as the main actors to improve their welfare, maintain environmental balance, and local socio-cultural dynamics." (Article 1 paragraph 1, PP 83/2019).

This regulation provides a legal framework for communities to access In practice, Kapiroe Village faces various obstacles to legal forest utilization. From a regulatory perspective, the TNLL area is a conservation area with very limited utilization. In accordance with Law No. 5 of 1990 on the Conservation of Living Natural Resources and Ecosystems, and its derivative regulations, utilization activities can only be carried out through the Conservation Partnership scheme, which has long and complex procedures. On the other hand, HPT areas still require official licenses through Social Forestry schemes such as Community Forestry (HKm), Village Forest, or Community

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Plantation Forest (HTR), all of which are regulated in PP 83/2019 Article 5.

In terms of infrastructure, limited road access is a major challenge. Damaged and impassable roads, especially during the rainy season, cause inefficient mobilization of forest products. This has a direct impact on the economic value of forest products and demotivates communities to carry out sustainable management. To address these issues, the strategy that can be applied is to increase legal understanding through socialization and training on social forestry regulations, as mandated in Article 41 of PP 83/2019 on community empowerment. The local government, BPSKL, TNLL, and accompanying partners from NGOs or academics are expected to facilitate the strengthening of KTH. With these strategies, the ultimate goal is to ensure that the Kapiroe Village community gains legal and sustainable access to the surrounding forest resources

CONCLUSION

The results of the analysis show that community dependence on forest areas, especially Limited Production Forests, is very high and contributes significantly to their income (Jardan et al., 2023). The Limited Production Forest area shows a dependency rate of 65.71%, while the Lore Lindu National Park is 34.29% of the total community income. This reflects that the economic sustainability of the community is highly dependent on the utilisation of forest resources.

Although the main utilisation is in the Limited Production Forest area, it is indicated that some communities also utilise the Lore Lindu National Park area, which should have strict protection based on conservation principles. Therefore, it is important for stakeholders to increase monitoring and educate the community on applicable conservation boundaries and regulations. This step needs to be taken to preserve the conservation area while supporting the sustainability of forest resources on which the community depends.

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