



PRIMATE CONSERVATION
EDUCATION PROGRAM
ON THE MENTAWAI ISLAND, INDONESIA

FINAL REPORT

PRIMATE CONSERVATION EDUCATION
2024 PROGRAM

SURVEY ON PRIMATES MENTAWAI



With a land area of 6,011 km², Mentawai is home to six endemic primate species found nowhere else in the world (Whittaker, 2007). This diversity makes the Mentawai Islands a global conservation priority area, including being ranked in the top 10 priorities by the IUCN SSC Primate Specialist Group (Mittermeier et al., 2012). These primates are not only an integral part of the local ecosystem but also have high cultural and scientific value.

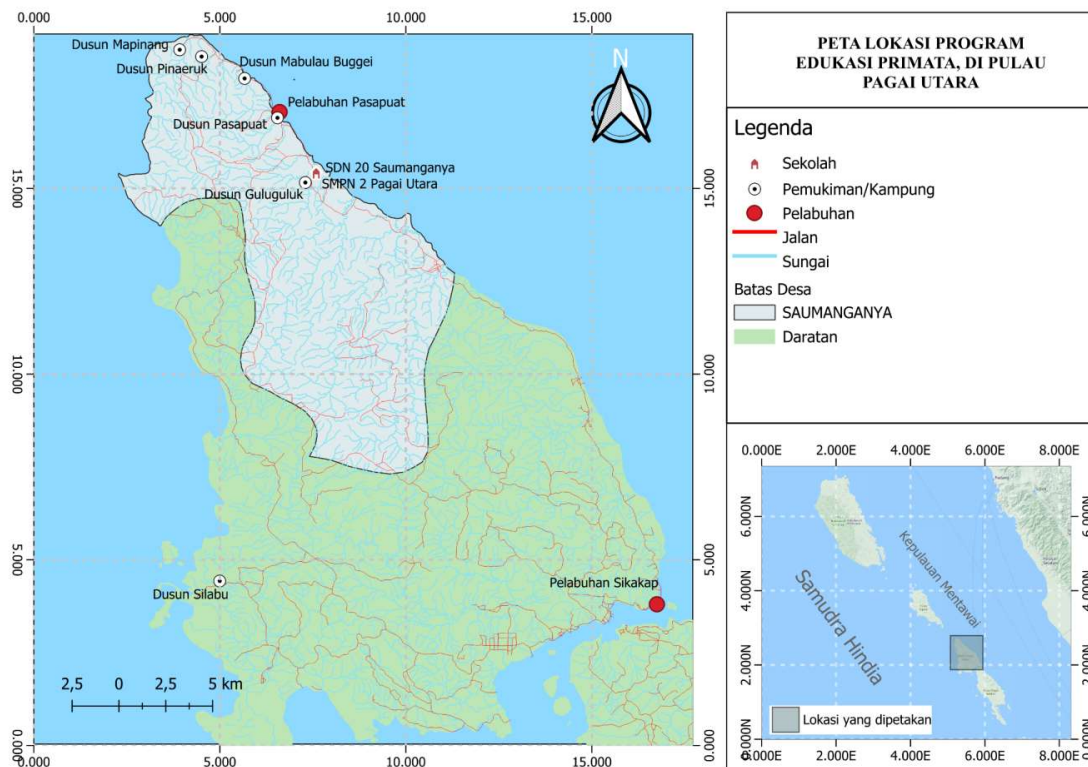
The existence of primates in the Mentawai Islands faces serious threats, mainly due to habitat destruction and hunting. Habitat destruction caused by activities such as logging and land conversion has reduced the living space for these endemic species (Setiawan et al., 2020). On the other hand, hunting, which was previously traditional in nature, has now turned into sporadic and uncontrolled activities, accelerating the drastic decline in primate populations (Riley, 2007). This problem is further complicated by the loss of traditional knowledge among communities about the importance of maintaining ecosystem balance, which should be a key asset in supporting conservation (Whittaker & Mittermeier, 2007).

As a first step in addressing this threat, a community perception survey is essential. Local communities play a key role in primate conservation because they are the main stakeholders living alongside these species (Lee & Priston, 2005). Therefore, this study focuses on exploring the knowledge and perception of communities on the three main islands of the Mentawai Islands—North Pagai, South Pagai, and Sipora—regarding habitat conditions, flora and fauna, and threats to primates, including hunting activities.

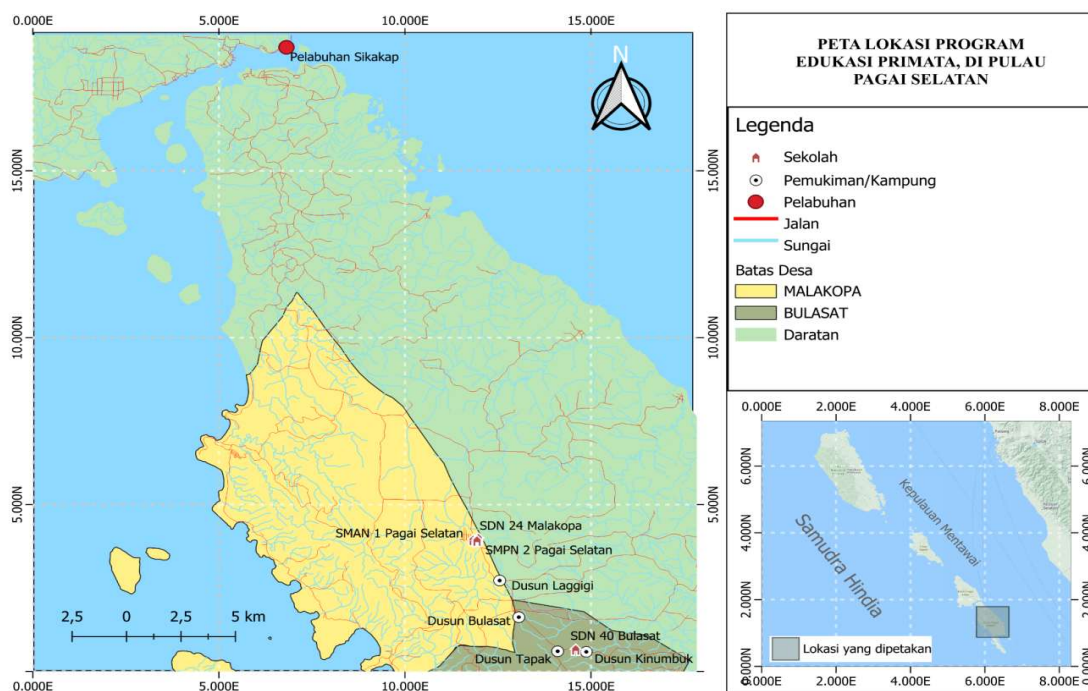
The survey was conducted using a questionnaire method on 160 respondents, with a primary focus on their perceptions of primate conditions, forest benefits and conditions, activities that threaten habitats, and the importance of conservation. The survey results are expected to serve as a basis for designing primate conservation strategies that are not only scientifically based but also involve local communities as active partners in the preservation of this species (Setiawan et al., 2020; Mittermeier et al., 2012).

TIME AND LOCATION

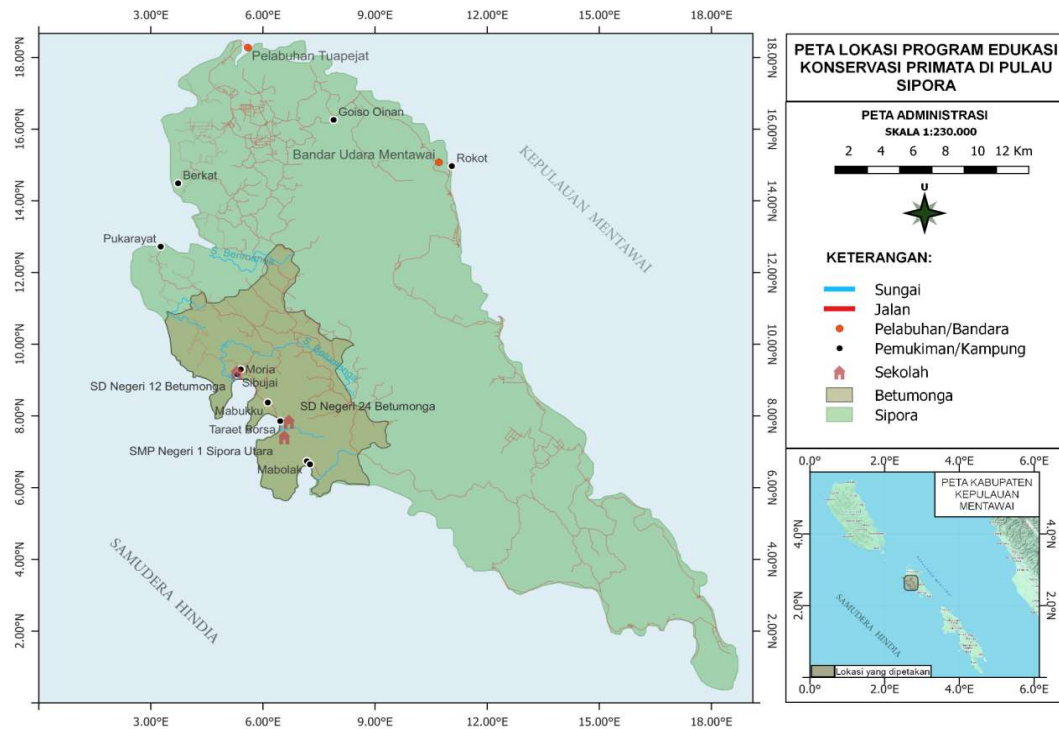
The survey of the community was conducted between June and October (5 months) on 3 islands in Mentawai. In June-July, the team conducted a questionnaire-based survey of the community on North Pagai Island, in Guluguluk Hamlet, Saumangaya Village. This was followed in August-September by a survey on South Pagai Island, in Malakopa Village and Bulasat Village. On South Pagai, there were several hamlets that the team was able to reach, namely Laggai Sibau Hamlet, Kinumbu, Bulasat, Komik KM 37, Muntei Kecil, Muntei Besar, Sabbiret, Tapak Jaya, Matobat, Purupugat, Aban-Baga, Asahan, Makialo, Tobbou Leleu, Laggigi, Bagat Simalelet Pororogat, Malakopa Sibau, Parak Ka, Marinang, and Para Batu. In October, the team conducted a final survey on Sipora Island, specifically in North Sipora District, Betumonga Village, which included the hamlets of Moria, Sibujai, Sipaarau, Taraet, Borsa, and Mabukku.



Map - North Pagai Activity Locations



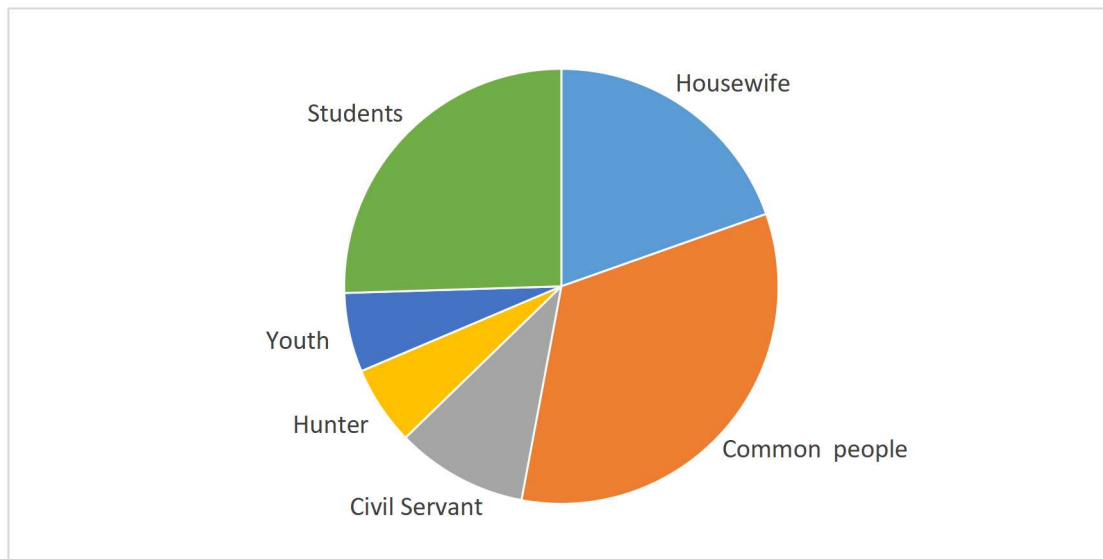
Map - South Pagai Activity Locations



Map - Sipora Activity Locations

RESPONDENT

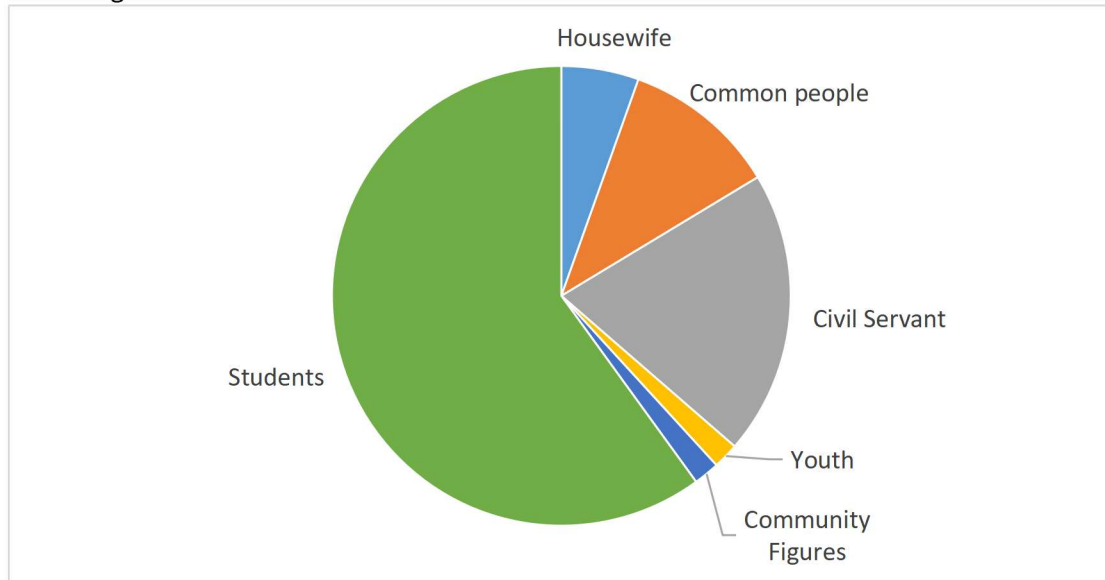
North Pagai



Graphic - Categories and number of correspondents in North Pagai

In Saumangaya Village, the categories of respondents that the team could reach were people who usually work as fishermen or farmers (17), followed by housewives (10), government employees (5) who usually serve as hamlet heads, school principals, or teachers. There were also several school students (13), young people (3), and hunters (3). The team was able to collect a total of 51 respondents in the village.

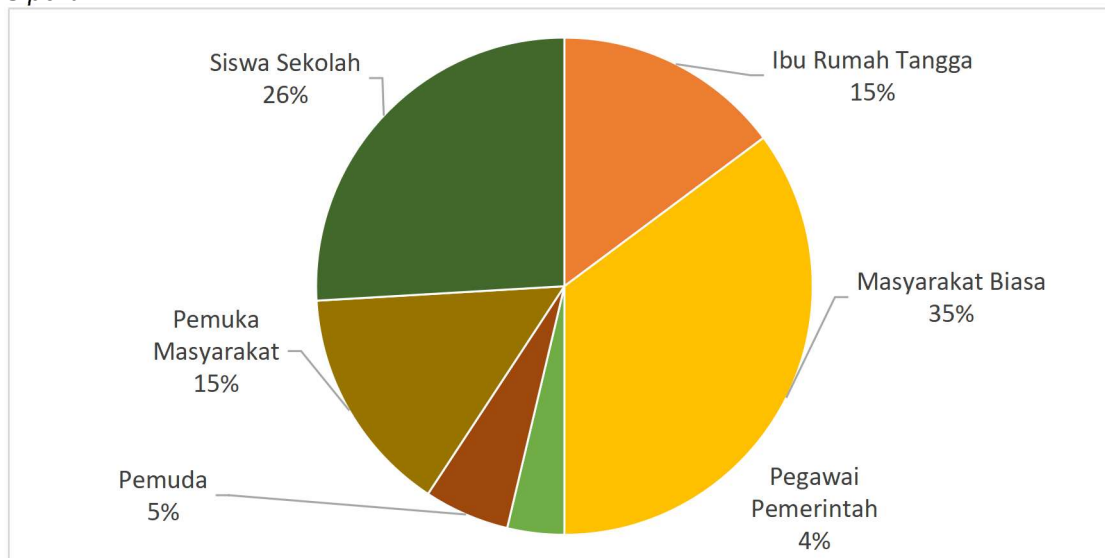
South Pagai



Graphic - Categories and number of correspondents in SouthPagai

In Malakopa and Bulasat villages, the respondents were mostly school students (33), consisting of junior high school and high school students. There were also government employees (11), consisting of village heads and several school teachers. This was followed by ordinary citizens (6) who worked as farmers, housewives (3), community leaders (1) who served as picaris (priests), and young people (1). The team was able to collect a total of 55 respondents in both villages.

Sipora



Graphic - Categories and number of correspondents in Sipora

In Malakopa and Bulasat villages, the respondents were mostly school students (33), consisting of junior high school and high school students. There were also government employees (11), consisting of village heads and several school teachers. This was followed by ordinary citizens (6) who worked as farmers, housewives (3), community leaders (1) who served as picaris (priests), and young people (1). The team was able to collect a total of 55 respondents in both villages.

COMMUNITY SURVEY

In an effort to understand the local community's perceptions of environmental conditions and primate conservation in the Mentawai Islands, a survey was conducted on three main islands, namely North Pagai, South Pagai, and Sipora. This survey explored the community's views on the benefits of forests, habitat conditions, the existence of flora and fauna, and activities that could potentially threaten the sustainability of primates. Involving a total of 160 respondents, this survey provided an overview of the community's relationship with their environment and the potential for local support for primate conservation efforts.

Forest benefits for the community

For communities on the three islands, the main benefits of forests are generally considered to be as a place for farming and gathering wood for fuel and building materials for houses, boats, or bridges. Of the 160 respondents, 36.88% mentioned the benefits of forests as a place for farming/gardening; 31.88% as a source of water, food, and medicine; 12.5% as a place to obtain materials for making houses, boats, or firewood; 10% as a habitat for animals and plants; 5% as a place for hunting; and 3.75% stated they did not know.

This view suggests that forest utilization is more directed towards the short-term needs of the community, such as meeting food and economic needs. This can harm primate conservation because people are less aware of the function of forests as important habitats for wildlife, including primates (Riley, 2007; Nijman et al., 2019).

The traditional gardening system of the Mentawai people, dominated by taro and sweet potato plants, is an integral part of their lives, as mentioned by Koentjaraningrat in Rudito (1999). This system also includes hunting and gathering as complementary activities. However, forest pressure is increasing due to land conversion into plantations or other economically oriented activities. These activities accelerate habitat destruction, which has a direct impact on endemic primate populations, such as Bilou Gibbon (*Hylobates klossii*), Mentawai langur (*Presbytis potenziani*), Siteut (*Macaca pagensis*), and Simakobu (*Simias concolor*) (Whittaker, 2007; Meijaard et al., 2011).

In this context, low public awareness of the ecological role of forests is a major challenge. Forests are important for biodiversity and ecosystem services such as climate regulation, clean water provision, and disaster mitigation (Giam, 2017). Communities' reliance on agricultural activities often ignores the long-term impacts of ecosystem damage, both on primate species and the communities' well-being.

Education are key to improving community understanding of the long-term benefits of protecting forests and primates. Programs that link primate presence with ecosystem sustainability, such as ecotourism development or non-timber forest product utilization, can be a strategic step to change community perceptions and support community-based conservation (Santika et al., 2019; Wich et al., 2011).

Good forest criteria

The next question that the team posed to the community was about the criteria for a good forest for them. A good forest is a balanced ecosystem where flora and fauna can coexist, creating mutually supportive ecological functions. A healthy forest is characterized by high biodiversity, large trees that absorb carbon dioxide and produce oxygen, and the ability to maintain global climate balance (Myers et al., 2000).

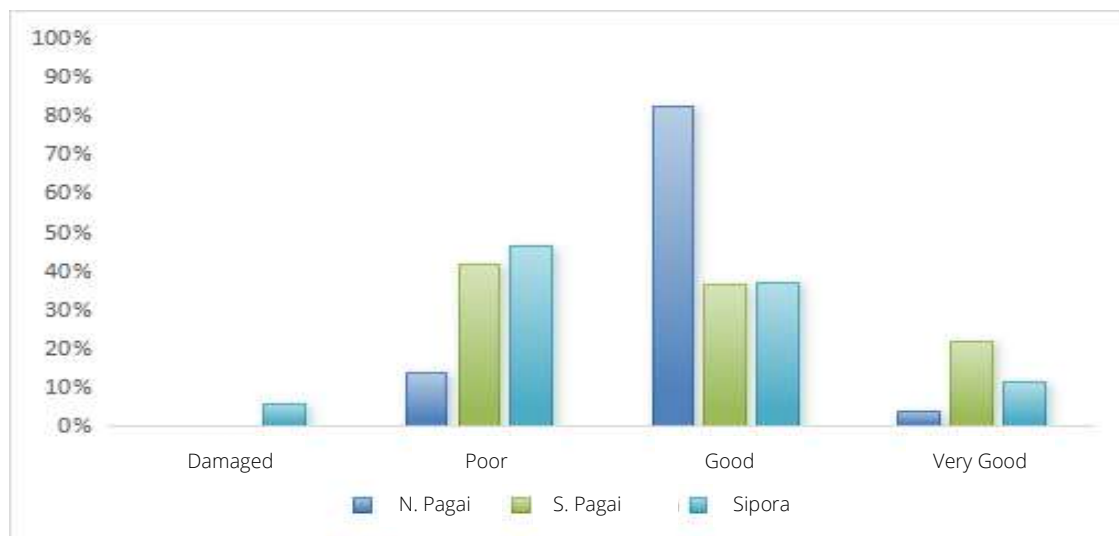
In addition, the presence of wildlife in the forest, ranging from birds in the canopy to animals living on the forest floor, indicates that the ecosystem is still intact and functioning optimally (Gentry, 1992). Forests also greatly benefit humans by providing food and medicine, protection from natural disasters, and recreational and educational spaces (Chazdon, 2008).

Of the 160 respondents, they provided an overview of the community's perception of the criteria for a good forest. From the data, it appears that the community has diverse views regarding the ideal condition of a forest. A total of 20% of respondents considered that a good forest is one where there is no logging activity. This shows public awareness of the negative impacts of logging, such as ecosystem damage and the loss of the forest's function as an environmental protector. And the majority of respondents, 45%, considered that the existence of biodiversity is the main criterion for a good forest. This view shows the importance of flora and fauna conservation as an indicator of forest ecosystem health. It also reflects concern about the negative impacts of deforestation, such as the loss of wildlife habitat and the decline in forest ecosystem quality (Hansen et al., 2013).

A small percentage of respondents, 5%, see forests as directly beneficial to humans, such as food sources, shelter, and medicines. This relatively small percentage may reflect that people prioritize conservation over exploitation. Furthermore, 18.13% of respondents considered that a good forest is maintained and protected. This indicates an awareness that forest protection plays an important role in maintaining its ecological function. And finally, 11.88% of respondents did not have a clear view or understanding of the criteria for a good forest. This could indicate an information gap or lack of understanding of the importance of forests.

This data reveals that most people understand the importance of preserving biodiversity and forest ecosystems. However, there are still a small number who view forests solely from the perspective of exploitation, and others who lack sufficient awareness of this issue. Therefore, more intensive education and campaigns, as suggested by Pretty et al. (2001), can be an effective step to encourage active community participation in forest conservation. Thus, a better understanding of the importance of forests not only supports biodiversity conservation but also provides long-term benefits for the surrounding community.

Forest condition



After understanding the community's views on the criteria for a good forest, the team tried to ask about the condition of the forests around their homes. In this case, the team divided the condition of the forests around them into categories: damaged, poor, good, or very good. In this case, the responses from the communities on the three islands showed the general condition of the forests around them.

The data shows that there are differences in community perceptions of forest conditions on the three islands: North Pagai, South Pagai and Sipora. This difference reflects the variation in the condition of forest ecosystems in each region based on local people's perspectives.

North Pagai had the highest percentage of people who rated the condition of the forest in their area as good (82.35%). This suggests that the forest in North Pagai may be better preserved than on the other two islands. Most likely, human activities such as logging, encroachment or land conversion are still minimal in this area. Previous research has shown that the level of forest destruction is often inversely related to community awareness and the effectiveness of local policies (Gaveau et al., 2009). This may indicate that North Pagai has a higher awareness of the importance of protecting the forest or that local policies may be effective in protecting forest areas.

In contrast, the majority of people in South Pagai feel that the forest in their area is in poor condition (41.82%). This could be due to greater pressure on forests, such as illegal logging, conversion of land to cultivation, or lack of protection of forest areas. Such activities have been identified as a major cause of forest cover loss in many tropical regions, including Sumatra (Hansen et al., 2013). Therefore, special attention is needed to identify the factors that damage forest ecosystems in South Pagai and find solutions to improve them.

Sipora also has a similar pattern to South Pagai, where most people rated forest conditions as unfavorable (46.30%). However, the percentage is slightly higher than in South Pagai, which suggests that forest degradation in Sipora may be more severe. Factors such as land clearing, illegal logging and the entry of timber companies may be the main causes of this condition. Issues such as land clearing for agriculture or timber

company activities could be the main drivers of forest degradation in Sipora (Margono et al., 2014).

These results highlight the disparity in forest conditions across the three islands. North Pagai appears to be an example of a region that is more successful in maintaining forest ecosystems based on the perceptions of its people, while South Pagai and Sipora face major challenges regarding the sustainability of their forests. To address this, a holistic approach is needed, including community education on the importance of forest protection in South Pagai and Sipora for their livelihoods, strengthening of forest protection policies, and restoration of degraded areas (Chazdon, 2008) to restore their ecological functions, and collaboration between government, local communities, and conservation organizations is needed to support forest sustainability on all islands (Pretty et al., 2001). With these steps, it is hoped that community perceptions of forest conditions in South Pagai and Sipora can change in a more positive direction.

Logging activity, location, and purposes

Logging activity

Based on the updated data, the survey results regarding logging activities across the three islands of the Mentawai Islands show significant differences in the community's understanding and engagement with logging activities. In North Pagai, most respondents (70.59%) confirmed that logging activities do exist, while only 27.45% stated that logging does not exist, and 1.96% claimed not to know about the existence of logging. This indicates that logging in North Pagai is more common for local and commercial purposes. This may include utilization of timber for household use, agriculture, or even for new agricultural land that opens forest areas into gardens (Sheil et al., 2009). This activity can exacerbate habitat degradation for primates in the region, such as bilou, siteut, atapaipai and masepsep, which require forests as their natural habitat.

In South Pagai, the higher figure (85.45%) shows that most respondents also confirmed logging, while only 5.45% stated that logging did not exist, and another 9.09% did not know about logging that occurred. Logging in South Pagai is most likely also driven by the economic needs of the community, who rely on the forest for timber resources, land for agriculture, and other needs (Houghton et al., 2009). The impact of logging in this area is enormous, as many primates depend on tropical forests for their survival, and deforestation threatens the survival of these species. More massive logging in South Pagai could also reduce primates' natural habitat and increase the risk of biodiversity loss.

Meanwhile, in Sipora, the level of knowledge about tree felling is also quite high, with 94.44% of respondents confirming that tree felling exists in their area. This indicates that tree felling in Sipora has become a fairly common practice, although it is slightly more controlled compared to North Pagai and South Pagai. Only 3.70% stated that tree felling does not exist, and 1.85% did not know. This suggests that while there is knowledge of logging, the intensity is not as great as on the other two islands, but it still has the potential to damage the natural habitat of primates. Logging in Sipora is likely related to land clearing for agriculture or other commodities that require large areas free of large trees (Gibson et al., 2011). Deforestation will reduce the diversity of flora and fauna in Sipora, including primates that depend on the integrity of the forest ecosystem.



Overall, despite variations in community understanding and engagement with logging across the three islands, a major challenge for primate conservation is the persistence of illegal or uncontrolled logging practices, which can lead to the loss of critical habitat for primates. Deforestation in these areas threatens not only primate species, but also entire ecosystems, with potential loss of endemic species and degradation of water and soil quality (Brockelman et al., 2011). The main challenge for primate conservation on these three islands is reducing deforestation, both through raising public awareness of the importance of forests for the survival of primate species and through strict monitoring of activities that damage forest ecosystems.

It is important to improve conservation efforts on each island by integrating community-based approaches that involve local stakeholders, such as traditional leaders, in natural resource management and forest protection. By improving community understanding and knowledge of the importance of protecting forests and developing environmentally friendly livelihood alternatives, success in primate conservation can be achieved. In addition, stronger policies and law enforcement against illegal logging are essential to reduce the negative impacts of deforestation on primate conservation in the Mentawai Islands (Kinnaird & O'Brien, 2012).

Logging Location

Based on the results of surveys conducted across the three Mentawai Islands, the location of tree felling showed significant variation between North Pagai, South Pagai and Sipora, reflecting the pattern of felling activities and their impact on forest ecosystems and the sustainability of primate conservation.

In North Pagai, the majority of respondents (66.67%) indicated that logging occurred in the Gulu-Guluk area, an area of high deforestation. Gulu-Guluk may be a prime location for logging due to the community's need for timber and land for agriculture and easier accessibility to this area (Brockelman et al., 2011). According to previous research, areas such as Gulu-Guluk are often the focus of land conversion, which increases the risk of destruction of natural habitats of primate species such as bilou, siteut, atapaipai and masepsep, which depend on forests for survival (Gibson et al., 2011). However, around 33.33% of respondents in North Pagai claimed to be unaware of the logging sites, suggesting ignorance or lack of understanding of ongoing deforestation activities.

Meanwhile, in South Pagai, various logging sites are spread across several points with the highest rates in Kinumbu (21.82%) and Bungo Rayo (21.82%). These areas are also likely to be used for agriculture and cultivation, with the conversion of forests to oil palm or other profitable commodities being the main option for local communities. Logging in Aban Baga (16.36%) and Bulasat (5.45%) suggests a concentration of logging in some perhaps more remote areas, with greater impacts on primate habitat in these areas (Kinnaird & O'Brien, 2012). Although around 23.64% of respondents did not know the location of logging, this still indicates a lack of community oversight and involvement in forest monitoring and conservation efforts.

In Sipora, the logging site recorded was Pukarayat, managed by PT.BRN, which received 51.85% of responses from respondents. This suggests that most logging activities in Sipora are related to industrial activities, such as those recorded by plantation or timber companies (Sheil et al., 2009). PT.BRN has the potential to conduct significant exploitation of natural resources, and this could potentially lead to a decline in primate habitat quality. In addition, 44.44% of respondents claimed not to know about logging sites.

in Sipora, indicating a lack of understanding or awareness of logging practices in their area (Houghton et al., 2009). This is a major challenge for primate conservation efforts, as community knowledge and involvement are essential for maintaining the sustainability of forest ecosystems.

It is important to note that logging activities on these three islands have a significant impact on primate habitat. The areas where trees are cut down are important habitats for endemic Mentawai primate species. Deforestation in these areas threatens the survival of primates that depend on forest integrity for survival. Uncontrolled logging activities can lead to habitat fragmentation and reduced food availability for primates, ultimately worsening conservation conditions in the region (Kinnaird & O'Brien, 2012).

The challenge in overcoming this logging problem is the lack of strict supervision and law enforcement. The number of people who do not know the location of logging indicates that supervision of logging activities is minimal. Therefore, strengthening community-based monitoring systems and raising awareness of the importance of forests for the sustainability of life, including primate life, is needed. Conservation programs that involve local communities in natural resource management and forest monitoring can be a solution to reduce the negative impacts of logging on ecosystems and biodiversity, including primates.

Purpose of Logging

Based on the results of surveys conducted on the three Mentawai Islands, the purpose of logging on each island shows different patterns, reflecting local economic activities and their impact on forest sustainability and primate conservation in the region.

In North Pagai, the purpose of logging is mostly to fulfil the need for construction materials, such as wood for building houses, canoes and firewood. It is clear from the data that the domestic needs of local communities drive most logging in the region. The felled timber is used to support their daily lives in construction and economic activities in the household. This practice is more subsistence and less geared towards heavy commercial exploitation. However, the cumulative impact of this logging remains potentially damaging to primate habitats that are highly dependent on forest sustainability (Brockelman et al., 2011). Using timber for building materials and energy indicates a high dependency on local forests, increasing pressure on North Pagai forest ecosystems.

Meanwhile, in South Pagai, the purposes of logging are more diverse and largely driven by commercial interests. Logging in this region is mostly related to the timber industry, papermaking, and the existence of Forest Concession Rights (HPH), which allow companies to exploit forest resources on a large scale. In addition, there are also plans to clear land for oil palm plantations, which could increase land conversion into agricultural and industrial areas. Logging activities for these purposes have the potential to significantly degrade primate habitat, as many primate species depend on intact forests for shelter and food (Kinnaird & O'Brien, 2012). The conversion of forests to oil palm plantations is also a major challenge for primate conservation, as it not only reduces habitat area, but also causes fragmentation that can isolate primate populations in different parts of the forest.

In Sipora, the purpose of logging is mostly related to commercial activities managed by timber companies. This logging is carried out to meet industrial needs, with a small portion of logging also intended to meet local community needs such as house building

materials, canoe making, and firewood. The presence of timber companies in Sipora suggests that the region's forests are being exploited for commercial purposes, which risks worsening habitat conditions for primates, such as bilou and masepsep, which are endemic to Mentawai (Gibson et al., 2011). Commercial logging is often carried out with an approach that pays insufficient attention to ecosystem sustainability, which can cause long-term damage to biodiversity and primate habitats.

Within this context, the greatest challenge for primate conservation on these three islands is the imbalance between the economic needs of communities and the protection of forest habitats. Logging for subsistence purposes in North Pagai demonstrates communities' dependence on forest resources, while in South Pagai and Sipora, greater logging activity is driven by commercial industries. Better sustainability-based natural resource management is essential to reduce the negative impacts of this logging on primates and the forest ecosystem. Integrating conservation approaches with wise natural resource management and involving communities in forest monitoring and surveillance will be key to achieving successful primate conservation programs in the region (Houghton et al., 2009).

In Sipora, one of the companies involved in logging activities is PT BRN (Berkah Rimba Nusantara), which operates in the Pukarayat area. PT BRN is one of the companies engaged in the timber industry and has a license to exploit the forest in the area. The logging carried out by this company is mainly aimed at meeting the needs of the timber industry, which is used for various commercial wood products. The logging activities carried out by PT BRN risk causing significant habitat destruction for primates in Sipora, especially endemic species such as bilou, siteut, atapaipai and masepsep, which are highly dependent on the preservation of primary forests as their home and food source (Gibson et al., 2011).

Sipora's forests also face greater pressure as most of the logging carried out by PT BRN is to meet local market demand and fulfill national and international market needs, especially for raw materials for the wood and paper industries. Forest resources exploited by these large companies are often not managed sustainably, potentially degrading habitat quality for wildlife, including primates (Kinnaird & O'Brien, 2012). Greater efforts are needed to ensure that logging activities carried out by large companies such as PT BRN do not threaten the sustainability of the ecosystem and can be balanced with effective conservation efforts.

The presence of companies like PT BRN also adds challenges to primate conservation, given their dependence on non-renewable forest products. Sustainability-focused Forest management projects must engage these large companies to commit to environmentally friendly practices. One possible solution is to integrate sustainable forestry principles, such as those set out in the Forest Stewardship Council (FSC) or other certification systems, to ensure that forest exploitation does not damage ecosystems that are critical to the survival of primate species (Houghton et al., 2009).

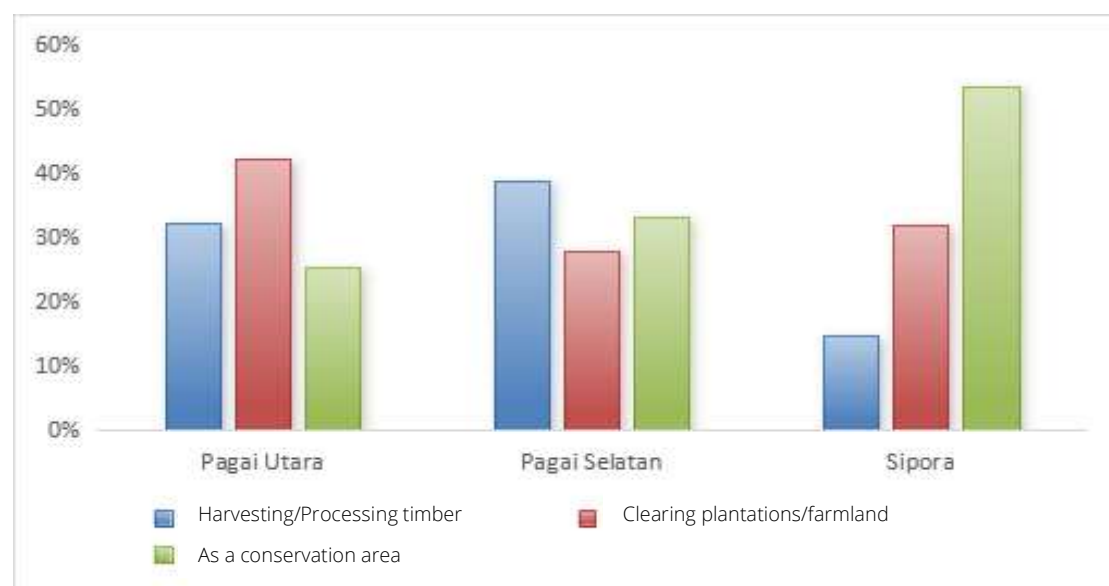
In South Pagai, logging activities are carried out by local communities for their daily needs and are dominated by large timber companies, one of which is PT MINAS. This company is engaged in the forestry sector, primarily focusing on exploiting timber for industrial needs, including raw materials for papermaking and processed wood products. The logging sites associated with this company include Kinumbu, Aban Baga and Bungo Rayo, which are areas of intensive forest exploitation. The activities of PT MINAS are

often linked to the existence of Forest Concession Rights (*Hak Pengusahaan Hutan / HPH*), which allow the company to exploit forests on a large scale.

The main purpose of logging by PT MINAS is to meet the needs of the commercial timber industry, but the issue of land clearing plans for oil palm plantations also accompanies this. Forest conversion to oil palm plantations has become one of the biggest threats to the sustainability of tropical forest ecosystems in South Pagai. This practice not only reduces forest cover, but also causes habitat loss for endemic primates such as bilou and masepsep. In the long term, this increased pressure on forest areas could lead to habitat fragmentation and significant primate population declines (Meijaard et al., 2011).

Given this phenomenon, the government and conservation organizations need to monitor and regulate the activities of companies operating in forest areas, including PT BRN and PT MINAS, to avoid negative impacts on forest sustainability and wildlife. In addition, cooperation between companies, local communities and the government to develop inclusive community-based conservation models will be key to achieving a balance between economic development and nature protection.

Forest Land Conversion



In the question about forest conversion, the team asked whether they agreed or disagreed with the change of forest land. In this case, the team made 3 choices on the point of forest land conversion, namely, conversion of forest land as a place to collect/process timber, conversion of forest land to open plantations/fields, and conversion of forest into conservation areas. In this case, the communities on the 3 islands that the team has interviewed have very different views between the three.

The analysis results show significant differences in community preferences regarding forest land conversion on the three islands. These differences reflect the unique values, needs, and local potential in each region.

The majority of the people of North Pagai agree that their forest land should be converted into plantations or farmland (42.22%). This may be due to the high

dependence of the community on the agricultural sector as a source of livelihood. This condition may reflect the community's view that forests can provide greater economic benefits if they are converted into productive areas. However, land conversion for plantations/farms can cause ecosystem damage if not managed sustainably, as reported by Margono et al. (2014), which shows that the conversion of forests into agricultural land in Sumatra is one of the main causes of primary forest loss.

In South Pagai, the community is more in favor of converting their forest land into a place for processing or harvesting timber (38.89%). This indicates that timber resources are considered the main asset of the forest, which has high economic value for the community. This preference is consistent with the findings of Saifullah et al. (2015), which show that the utilization of timber forest products is often an economic priority for communities in rural areas of Sumatra. However, if this practice is carried out without wise management, the potential for forest degradation and ecological loss can increase significantly (Ashton et al., 2001).

Unlike the other two islands, the majority of Sipora residents chose to designate their forest land as conservation areas (53.41%). This choice demonstrates a higher awareness of the importance of preserving forests for long-term ecological benefits. Conservation areas can provide protection for flora, fauna, and biodiversity, while also supporting sustainable ecotourism activities that have the potential to increase community income without damaging the environment (Chazdon, 2008).

These differences in preferences reflect the different social, economic, and ecological conditions on each island, where North Pagai is more oriented towards agriculture, South Pagai is more focused on the exploitation of timber as a resource, and Sipora has a community-based conservation approach as proposed by Pretty et al. (2001), it is crucial to ensure that forest management strategies on each island are aligned with local needs and values without compromising ecological sustainability.

Hunting activities

North pagai

Of the total 51 respondents in North Pagai, the majority of the community are not hunters (76.47%) and only 23.53% are hunters. Hunting practices carried out by the North Pagai community reflect their subsistence needs as well as their traditional relationship with nature. The animals most frequently hunted are *lamentas*, *leituak*, *kuret*, and birds. Although primates are also hunted, this is not a priority. Primate hunting usually occurs in specific situations, such as when primates disturb fields or when the community needs additional food. In such cases, the community sets traps around the forest, and this activity generally only occurs once a month.

The most commonly targeted primate is the *masepsep*, as its meat is considered a delicacy. In addition, *atapaipai* are also occasionally captured to fulfill food needs. The *sitout*, on the other hand, tends to be hunted not because of taste preferences, but because it is considered a nuisance in nearby fields. Although this hunting is limited, capturing only 1 to 3 primates at a time, this pattern still indicates the potential pressure on primate populations if the activity continues without wise management. As explained by Robinson & Bennett (2004), wildlife hunting, even if conducted on a subsistence basis, can have a significant impact on populations when combined with other threats, such as land use change.

Hunting in North Pagai is not only based on economic needs, but also on strong local beliefs. These beliefs include moral rules that prohibit people from speaking harshly or playing with hunted animals. This prohibition reflects the community's respect for wildlife, even though they are part of the resources being utilized. As found in Lingard et al. (2003) on hunting ethics in indigenous communities. This prohibition shows that local beliefs can be the foundation for developing culture-based conservation approaches. In addition, there is a belief that hunters must maintain harmony in family relationships before going hunting. If there are unresolved problems, it is believed that it can bring disaster during hunting in the forest.

Another tradition is the rule of cooking game, where the meat of the animal should only be boiled and not processed into other forms of cooking. These rules may reflect spiritual values or rituals passed down through generations, and are a way for people to maintain a harmonious relationship with nature.

From an ecosystem perspective, although hunting activities in North Pagai are small-scale and conducted with limited frequency, there is still potential for impacts on wildlife populations, especially primates. This local belief-based approach has proven effective in other regions, as proposed by Manfredo et al. (2020), who emphasized the importance of integrating cultural values in conservation to increase community support.

Changes in land use, such as clearing fields around forests, also influence the behavior of animals who approach human areas. This creates human-animal conflict, which sometimes leads to trapping to protect the fields. This situation emphasizes the importance of an integrated approach to conflict management, as Redpath et al. (2013) suggested, combining technical interventions and local community empowerment.

However, despite these challenges, there are great opportunities to support conservation efforts by capitalizing on local traditions and beliefs. If reinforced, disrespectful beliefs towards game animals can form the basis of more effective conservation approaches. This culturally-based approach can be combined with educational programs to raise public awareness about protecting wildlife populations, especially vulnerable species.

Overall, the hunting practices of the people of North Pagai illustrate the balance they try to maintain between subsistence needs, traditional values and their relationship with the environment. With the right support, this harmony can continue to be preserved while ensuring the sustainability of the region's forest ecosystems and wildlife populations.

South Pagai

Hunting activities in South Pagai reflect a much higher level of intensity than North Pagai and Sipora, with 50.91% of the community engaged in this activity. This percentage suggests that hunting is a more common practice and an important part of community life on the island. It is also much more frequent, with some groups hunting up to three times a week, or at least every week.

Not only more frequent, the scale of hunting in South Pagai is also much larger. Hunting groups are able to capture up to 5-10 animals in a single hunt. The animals hunted include various types of primates, such as bilou, masepsep, atapaipai, and siteut, as well as other animals found in the forest. This shows that hunting in South Pagai is more comprehensive and not limited to certain types of animals, indicating a high dependence

on forest products as a source of food or other needs. Such practices are common among communities that depend on forest products, as explained by Bennett et al. (2007), where pressure on forest fauna increases among communities that are highly dependent on forest resources for subsistence.

However, like in North Pagai, the people of South Pagai also hold traditional beliefs regarding the processing of games. They only allow the meat of hunted animals to be boiled, not processed into other forms of cooking. This tradition is most likely related to local beliefs passed down from generation to generation and maintains the sacredness or respect for the hunted wildlife. Research by Lingard et al. (2003) also shows that traditional practices often reflect efforts to maintain a harmonious relationship with nature and can be the basis for culture-based conservation management.

Although this hunting practice is rooted in tradition and community needs, the high frequency and number of game in South Pagai has the potential to put great pressure on wildlife populations, especially primates. Primates such as bilou, siteut, atapaipai and masepsep are important species in forest ecosystems, both as seed dispersers and as part of the food chain (Nasi et al., 2008). If this practice continues without wise management, the existence of primates and other biodiversity in this region could be threatened.

This suggests the need for stronger measures to manage hunting activities in South Pagai. Culturally-based approaches, such as utilizing local traditions related to hunting ethics and game processing, can be an initial strategy to build community awareness about the importance of forest ecosystem sustainability. In addition, education and the introduction of alternative sources of livelihood that are environmentally friendly can also help reduce dependence on intensive hunting. This strategy is in line with the approach proposed by Manfredo et al. (2020), which emphasizes the integration of local cultural values in conservation efforts to support sustainability.

Hunting in South Pagai also has cultural and social value. Among young people in particular, hunting is more than just a means of obtaining food; it is considered a symbol of pride. The animals they often hunt include primates, fruit bats, and frogs. They view hunting as something cool and a way for men to prove their masculinity. This attitude reflects the role of hunting as an element of social identity formation for the younger generation, while also confirming the position of hunting as an important part of local tradition.

Unlike young people, adults in South Pagai have a more pragmatic approach to hunting. For them, hunting is more often done when wild animals begin to disturb their fields, such as by eating their crops. However, if they are busy with activities in the fields, hunting is not a priority. This difference in motivation shows that hunting among adults is based more on immediate needs, while for young people, there are strong social and symbolic elements.

The presence of these two groups in hunting activities provides a broader picture of the dynamics of hunting in South Pagai. The high intensity, especially from the younger group, puts additional pressure on the forest ecosystem. With their main focus on primates, fruit bats, and frogs, these activities can have a direct impact on the balance of wildlife populations in the region.

Therefore, management strategies for hunting activities in South Pagai should consider these socio-cultural factors. Environmental education targeting young people can be important in reducing the perception that hunting is the only way to show pride. Meanwhile, adults can be encouraged to limit hunting to immediate needs and maintain the sustainability of the forest ecosystem.

Integrating this approach with preserving local traditions can create a balance between respect for culture and environmental protection. Thus, the people of South Pagai can continue to have a close relationship with the forest without sacrificing the preservation of nature for future generations.

Sipora

Sipora has the least hunting activities among the three islands, with only 18.52% of respondents engaged in this activity. This figure shows that hunting in Sipora is less common than in North Pagai and South Pagai. Hunting practices in Sipora are more subsistence in nature, where people only hunt when there is an urgent need to fulfil food needs. No specific schedule or time pattern exists, so this activity tends to be sporadic and carried out based on daily needs.

The intensity of hunting is also relatively small. In one hunt, the people of Sipora usually only catch one or two animals. The animals hunted include a variety of species, such as atapaipai, masepsep, bilou, siteut, deer and pigs. The variety of hunted animals shows that people rely on animals easily found around their area without focusing on specific species. Reliance on wildlife for subsistence is often characteristic of communities in tropical forest areas, as described by Nasi et al. (2008), that subsistence hunting tends to focus on the most accessible species rather than specific species.

Local beliefs play an important role in shaping the people of Sipora's hunting activities. One unique belief is the obligation to keep hunting plans confidential. The community believes that hunting plans should be done secretly and should not be known by many people. However, this activity must still get permission from traditional leaders or elders in the community. This process of seeking permission demonstrates the social hierarchy governing hunting activities and respect for customs and traditions. Such beliefs and customary rules are often part of traditional natural resource management, as explained by Colding and Folke (2001) that customary taboos or prohibitions can function as unintentional conservation mechanisms.

Before hunting, people must undergo a series of rituals, including traditional prayers and fasting. Traditional prayers involve asking for safety and success during the hunt while fasting reflects the deeply spiritual aspects of Sipora's hunting traditions. These practices show that hunting is not just an activity to obtain food but has significant spiritual and social dimensions. Such spiritual approaches often support sustainability, as they instil respect for nature in the culture of local communities (Lingard et al., 2003).

The combination of low hunting intensity and the involvement of indigenous traditions means that the ecological impact of hunting in Sipora is likely to be more minimal compared to North Pagai and South Pagai. However, despite the low frequency of hunting, the variety of animals hunted, including primates such as *bilou*, *siteut*, *atapaipai* and *masepsep*, still requires attention. This is important to ensure that wildlife populations in Sipora are maintained, especially if hunting is practiced in the long term.

The customary and tradition-based approach in Sipora provides a great opportunity to support conservation efforts. By strengthening the role of traditional leaders and the tradition of praying before hunting, communities can be encouraged to better understand the importance of preserving forest ecosystems. In addition, integrating customary values with scientific approaches to natural resource management can create harmony between human needs and environmental sustainability. This approach has proven effective in various contexts, as shown by Berkes (2009), who underlines the importance of traditional ecological knowledge in community-based conservation.

Primates condition

Primate condition in the Mentawai Islands reflects dynamics that vary between islands based on community surveys. In North Pagai, 43.14% of respondents rated primate condition as "Good," indicating a positive perception likely influenced by controlled hunting practices and traditional values that respect environmental sustainability. The study by Quinten et al. (2019) revealed that hunting in Mentawai is often subsistence and guided by customary values that limit negative impacts on wildlife populations. In contrast, South Pagai faces greater challenges, with 32.73% of respondents stating "Don't Know" about primate conditions and only 10.91% rating it "Very Good." The high intensity of hunting, which takes place up to three times a week, creates enormous pressure on species such as the bilou (*Hylobates klossii*), an endemic primate highly threatened by intensive exploitation (Whittaker, 2007).

Meanwhile, in Sipora, 31.48% of respondents rated the condition of primates as "Poor," despite the relatively lower hunting intensity compared to South Pagai. The study by Marshall et al. (2015) shows that hunting with a small intensity has a more minimal ecological impact, but threats remain if not managed wisely. Overall, North Pagai shows better primate conditions than the other two islands, consistent with Whittaker's (2007) finding that lower hunting intensity often reflects a stronger integration of traditional values in maintaining the sustainability of biological resources.

Intensive hunting in South Pagai is a major concern for primate populations. The Kloss gibbon, which plays an important role in seed dispersal, faces serious threats from unmanaged exploitation (Tilker et al., 2021). Loss of this species reduces biodiversity and degrades forest ecosystem functions. Nonetheless, local traditions such as rules for secrecy before hunting and customary rituals reflect great opportunities to support conservation efforts. Riley (2010) emphasizes the importance of leveraging local cultural values in creating more effective conservation approaches.

Community-based approaches that leverage local trust need to be strengthened to protect primate populations in Mentawai. Community-based education campaigns, such as those proposed by Sheil and Boissière (2006), can raise public awareness of the important role primates play in the ecosystem. By combining traditional values with scientific approaches, sustainable conservation can be achieved. Overall, the condition of primates in the Mentawai Islands reflects the enormous challenges posed by intensive hunting, especially in South Pagai. However, the potential of local traditions and beliefs offers hope for protecting biodiversity in this region. Approaches that actively involve the community can maintain a balance between subsistence needs and forest ecosystem sustainability.

Impact of primate decline on forests

Based on data on the impact of primate loss on forests in the Mentawai Islands, there is considerable variation between the three islands: North Pagai, South Pagai and Sipora. Respondents showed different levels of awareness and understanding of the impact of primate loss on forest ecosystems.

In Pagai Utara, most respondents (39.22%) did not know about the impact of primate loss on the forest, indicating a lack of understanding or awareness of the ecological role of primates. This reflects a gap in environmental education that can educate people about the importance of primates as seed dispersers and their role in maintaining forest biodiversity. On the other hand, 45.10% of respondents believed that the loss of primates would not affect the forest, which could indicate a misconception or lack of understanding about the ecological role of primates. Only 15.69% of respondents stated that primate loss would affect forests, recognizing the potential consequences to ecosystem functions such as seed dispersal and forest regeneration (Marshall & Sugardjito, 2017).

In South Pagai, the trends are somewhat similar, but there are slight differences in awareness levels. Most respondents (60%) did not know about the potential impact of primate loss on the forest, further emphasizing the need for environmental education in this region. However, 30.91% of the population recognized that primate loss would impact the forest, indicating an understanding of their ecological role. Interestingly, only 9.09% believed that primate loss would not affect the forest, indicating a higher awareness level than Pagai Utara. This is consistent with findings showing that communities in areas with higher levels of knowledge about ecosystem functions are better equipped to manage natural resources sustainably (Lahm & Lee, 2020).

In Sipora, a similar pattern of responses was observed. Most respondents (46.30%) did not know the impact, indicating the importance of awareness-raising efforts. 25.93% of respondents recognized the negative impact of primate loss on the forest. In comparison, 27.78% thought that primate loss would have no effect, indicating a mixed understanding of the importance of primates to the ecosystem in this region. Research in various tropical regions has shown that communities with a poor understanding of the role of primates often do not realize the impact of the loss of these species on the sustainability of their ecosystems (Sritama & Supriyanto, 2019).

This finding suggests that while most people on the three islands do not fully understand the ecological impacts of primate loss, some do recognize the importance of primates. This discrepancy suggests an opportunity for conservation initiatives to increase community understanding of primates' crucial role in maintaining forest health. Further research on the impacts of primates on forest ecosystems would be useful in supporting conservation efforts (Marshall & Sugardjito, 2017).

The challenge of primate conservation in the Mentawai Islands appears to be twofold: addressing the lack of knowledge of local communities and changing perceptions of the role of primates in ecosystems. Areas with higher levels of ignorance, such as North Pagai and Sipora, may require specific interventions to increase community understanding of how primates contribute to biodiversity and forest regeneration. Meanwhile, areas such as South Pagai, which already have a higher awareness of these

potential impacts, can reinforce this message by addressing misconceptions about the role of primates in forest ecosystem dynamics (Lahm & Lee, 2020).

The challenges of primate conservation management in the Mentawai Islands can be addressed by approaches that combine local knowledge with scientific knowledge and involve communities in participatory conservation efforts. This provides a great opportunity to improve the protection of primates and their habitats and create sustainable solutions for communities and ecosystems (Sritama & Supriyanto, 2019; Lahm & Lee, 2020).

FIELD OBSERVATION

North Pagai

Based on field observations, forest conditions in North Pagai are still relatively good. This aligns with the questionnaire results, which showed that people in this area tend to have a positive view of the forests around them. The fields in North Pagai are mostly cleared on former company encroachment land. This situation strongly supports the view of the community, which generally agrees that forests are used for plantations or farming because, for them, forests provide direct benefits as a source of livelihood, both for farming and as a food provider.

In the perception of the people of North Pagai, a good forest is rich in biodiversity, including many plants and animals. This view is consistent with observations in the field, where a very close relationship exists between the community and nature. The community's dependence on the forest covers a variety of basic needs, such as food sources, medicines, and other materials that support daily life. This dependence creates a harmonious relationship between the community and the environment, where the preservation of the forest is an important part of the sustainability of their lives.

However, while communities highly value the benefits of forests, there is an ambivalent attitude towards companies planning to exploit timber in the area. Most communities tend to resist the presence of companies, as they recognize the potential impacts on the forest and their livelihoods that depend on these resources. This resistance is even stronger if the company does not benefit the community directly.

On the other hand, the people of North Pagai also show flexibility in their views on the entry of companies. If the company has the consent of the landowner and provides concrete benefits to the community, such as the construction of road infrastructure or employment opportunities for residents, they tend to be willing to accept the company's presence. This attitude reflects the community's need for local economic development, provided there is a balance with forest conservation.

Community awareness of the importance of ecological and economic forest benefits provides a great opportunity to support sustainable forest management in North Pagai. Approaches that involve communities directly in decision-making, particularly in company licensing or forest resource management, are critical to maintaining a balance between economic development and environmental conservation.

South Pagai

Forests in South Pagai play an important role in people's lives, especially as a source of water, food, and medicine. The community's dependence on the forest reflects their close relationship with the environment. Based on the community's perception, the criteria for a good forest is a forest that is rich in biodiversity, with many animals and plants in it. This view shows the community's awareness of the importance of preserving the forest ecosystem for their survival.

However, based on field observations, the condition of forests in South Pagai has generally deteriorated. One of the influencing factors is the high level of hunting activity. With almost 51% of the community involved in hunting and a high intensity of up to three times a week, hunting is one of the main pressures on wildlife populations in this forest. The large scale of hunting, with catches of up to 5-10 animals in a single hunt, magnifies the impact on ecosystem balance, especially for targeted species such as primates.

In addition, the presence of companies operating in the area also impacts the condition of the forest. Although the company's activities affect parts of the forest, local communities tend to accept the company's presence. The main reason is the economic benefits provided by the company, such as donations for village development and employment opportunities for local people. The communities consider These benefits important, especially in supporting village economic development.

However, not all forests in South Pagai are affected by company activities. From the team's perspective, forests not within the company's operating area are generally still in good condition. This suggests that the potential for forest sustainability remains, especially if these remaining areas are managed wisely.

The community's acceptance of the company's presence but clear view of the criteria for a good forest reflects the need for a balance between economic development and environmental preservation. On the one hand, communities recognize the direct benefits of the company's presence, such as infrastructure and jobs. However, they also understand the importance of preserving the forest for long-term needs.

Therefore, a forest management approach that actively involves communities is needed. Education on the importance of maintaining biodiversity, more controlled hunting management, and fair sharing of economic benefits from companies can be the first step to creating this balance. Forests that are still in good condition in areas unaffected by the company should be prioritized for conservation, with communities as the main guardians and managers.

Sipora

Based on the results of the questionnaire conducted earlier and combined with the team's direct observations in the field, the condition of the forest in Sipora, particularly in Betumonga Village, shows interesting dynamics. The questionnaire data reflects the community's views on the importance of forests as part of their lives. Most Betumonga villagers agree that a good forest still has many animals and plants and support the idea of making the forest a protected area. This aligns with the facts on the ground, where the forests around Betumonga Village are still in very good condition and relatively well preserved.

Based on observations made by the team, it shows that the Betumonga Village community relies heavily on the forest around them for their daily needs. Forests are the main source of firewood and building materials, food from forest products, and traditional medicines. This dependency reinforces the importance of forests for the survival of local communities. The community's relationship with the forest in Betumonga Village is not only utilitarian, but also spiritual and cultural, where the forest is seen as an integral part of their identity.

However, there are pressures on this forest function, one of which is land clearing by companies in several spots. The community has generally shown disapproval of the company's activities. This view reflects the community's awareness of the negative impacts that can be caused, such as environmental damage, decreased quality of life, and the loss of the forest's function as a provider of their basic needs. This disapproval was also revealed from the questionnaire, where most of the respondents in Betumonga Village favored their forest being used as a protected area rather than being converted for other purposes.

Although the forest in Betumonga Village is still in good condition, massive hunting activities are one of the factors that have the potential to put pressure on the ecosystem. Based on questionnaire data, the level of hunting in Sipora is relatively low compared to South Pagai, but field observations show that hunting remains a part of people's lives. Animals that are often hunted include primates such as *bilou*, *masepsep*, *atapaipai* and *siteut*, as well as other animals such as deer and pigs. This hunting is usually done for food and tradition, with a low intensity of only 1-2 animals per hunt.

This hunting activity is accompanied by customary rules, such as obtaining permission from customary leaders, performing traditional prayers before hunting, and maintaining secrecy when going hunting. The fact that hunting activities are still fairly controlled shows that the community is aware of maintaining a balance between their needs and environmental sustainability. However, if these activities are not properly managed in the future, pressure on wildlife populations in the Betumonga Village Forest could increase.

And based on the team's observations, one of the biggest threats to Betumonga Village's forest conditions is land clearing by companies. The team found several points where the company carried out activities that damaged the forest ecosystem, such as cutting down trees and changing land functions for certain interests. The Betumonga Village community is generally opposed to the company's presence, unless the company provides direct benefits to them, such as infrastructure development or employment. However, the community's main concern is the damage to the forest that could directly affect their lives, given their high dependence on natural resources in the forest.

Overall, the condition of the forest in Betumonga Village is still relatively good, but existing challenges, such as company activities and hunting, need to be managed carefully. Questionnaire data and field observations show that the community has a high awareness of the importance of forests, both as a source of life and as part of an ecosystem that must be maintained. Support for conservation efforts, such as making the forest a protected area, is a positive indication that the community is ready to participate in conservation activities.

Future steps that can be taken include more intensive environmental education, sustainable management of hunting activities, and community empowerment through alternative livelihoods that do not damage the forest. In addition, the government and relevant organizations need to increase oversight of company activities in the region, ensuring that any actions taken do not harm local communities or forest ecosystems.

With an approach that focuses on conservation and community welfare, Betumonga Village can serve as an example of how a well-maintained forest can continue supporting community life while preserving its biodiversity.