

## **SOCIOECONOMIC CHALLENGES OF FOREST DEPENDENCE: CASE STUDY IN TEMENGGOR, PERAK, MALAYSIA**

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### **ABSTRACT**

**Background and Purpose:** This study focuses on the socioeconomic challenges faced by Orang Asli in Temenggor, Perak, Malaysia. The research aims to analyze the dependence and economic difficulties experienced by this community. The background context involves the unique socioeconomic situation of Orang Asli populations and the challenges they face in maintaining their traditional livelihoods while adapting to modern economic pressures.

**Methodology:** The study employs an exploratory case study approach. Data collection methods include extensive interviews and the examination of case studies. This qualitative approach allows for an in-depth understanding of the socioeconomic challenges faced by the Orang Asli community in Temenggor. The research also involves developing recommendations to address these challenges from an educational perspective.

**Findings:** The study found that the Orang Asli population in the study area actively pursues natural resources, such as rattan, agarwood, and medicinal herbs, for selling purposes. They also engage in activities like gardening, fishing, and handicrafts. However, logging activities pose a significant threat to forest resources, negatively impacting their financial and social well-being. The findings highlight the vulnerability of the Orang Asli community's traditional economic activities to external pressures and environmental changes.

**Contribution:** This research contributes to the understanding of socioeconomic challenges faced by Orang Asli communities and proposes educational interventions as a solution. The study recommends that Orang Asli require knowledge to become more resilient in the face of socioeconomic pressures. It suggests implementing development projects that focus on education and knowledge enhancement to improve their capacity to adapt to the external environment. Specifically, providing education in entrepreneurship, hospitality, e-commerce, and sustainable development is proposed to enhance their adaptability and effectively address socioeconomic challenges. The study emphasizes the importance for policymakers and the government to incorporate such educational programs into their development initiatives for Orang Asli communities. This approach ensures a comprehensive and effective plan that enables Orang Asli to enhance their socioeconomic status, contributing to more sustainable and culturally sensitive development policies.

**Keywords:** Orang Asli, reliance on forest resources, socioeconomic challenges.

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## 1.0 INTRODUCTION

Belum Temenggor, designated as a Permanent Forest Reserve since the 1990s, is recognized as one of the oldest tropical rainforests in the world, rich in biodiversity (Burenhult, 2023). This area is home to the Orang Asli Jahai and Temiar communities, with a population of approximately 2,309 individuals residing in 19 villages (Kamal, 2020). The government has implemented various conservation policies to maintain this forest ecosystem; however, the permanent reserve status poses significant challenges to these Orang Asli communities, who rely heavily on natural resources for their livelihoods (Diansyah et al., 2022). The conflict between biodiversity conservation and the socio-economic well-being of Orang Asli communities has become increasingly apparent, particularly when environmental protection policies often fail to consider the economic, cultural, and educational needs of local communities (O'Bryan et al., 2020). Orang Asli communities in Malaysia, such as the Jahai and Temiar, represent an ethnic minority with a unique socio-economic background. Many of them continue to practice traditional lifestyles that are directly influenced by their natural surroundings, engaging in subsistence activities such as hunting, foraging, and fishing (Diansyah et al., 2022). Forests, lakes, and rivers not only provide essential food and materials but also shape their cultural identity (Sharip & Noor, 2021; Kenrick et al., 2023). However,

increasing logging activities, infrastructure development, and land-use changes have significantly reduced their access to these vital resources, adversely impacting their well-being and economic resilience (Yamada et al., 2014). Furthermore, limited access to relevant and structured education restricts their ability to adapt to the socio-economic changes occurring around them. This study aims to examine the dependence of Orang Asli communities in Belum Temenggor on natural resources and identify the challenges they face due to resource degradation. Additionally, it seeks to understand how changes in conservation policies and economic pressures affect their livelihoods, as well as the role of education in empowering these communities to enhance their resilience to environmental changes. By gaining a deeper understanding of these issues, this research hopes to propose more balanced solutions that ensure forest conservation efforts do not compromise the rights, interests, and well-being of Orang Asli communities through a more inclusive educational approach.

## **2.0 LITERATURE REVIEW**

### **2.1 Orang Asli's Survival Relies on Natural Resources**

The Orang Asli group has always relied heavily on forest resources and has been referred to as 'Forest People' due to their strong connection to nature, particularly the forest (Haliza, 2010). Natural resources like forests, air, soil, wildlife, fish, rivers, oceans, and mountains are crucial for human existence, particularly for Orang Asli communities (Adekola et al., 2015). Natural resources are defined by The World Bank as fundamental resources that sustain human life and can fluctuate in quantity based on circumstances and surroundings, as noted by Mahesh (2006). Orang Asli rely solely on natural resources and the environment for their socio-economic activities such as shifting farming, hunting, harvesting forest produce, and fishing. Orang Asli groups in Malaysia engage in self-sufficiency activities, whilst those in Northern Canada connect with the environment by hunting, fishing, and gathering forest and sea resources. The Orang Asli's actions demonstrate a significant connection with nature, aligning with the concept of determinism as discussed by various authors (Smith, 2008). Determinism is the idea that the natural environment is the primary influence on human actions and thoughts, shaping culture and constraining behavior. It is a significant factor in defining a society's culture, reflecting the community's way of life and activities. Figure 1.

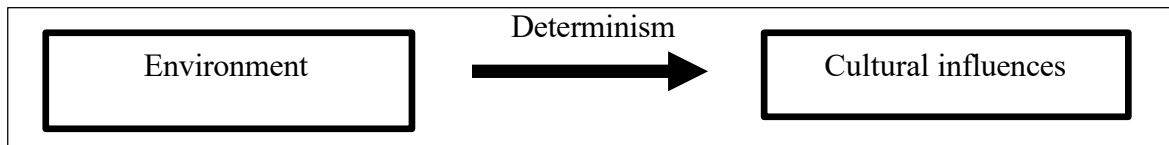


Figure 1: Determinism model concept

Determinism is the idea that Orang Asli live in harmony with the forest and nature, relying on them for food, medicine, water, and other essentials of existence (Maharam, 2015; Kenrick et al., 2023). Orang Asli rely on nature because it is their primary source of nourishment. Orang Asli have a close connection to natural resources like forests, which enables them to excel in activities like hunting, fishing, and producing medicinal remedies. Orang Asli economic activities are categorized into two groups: money-earning activities like searching for rattan, agarwood, and tapping rubber, and subsistence activities such as fishing, hunting, and agriculture. Common staple crops cultivated by Orang Asli populations include yams, bananas, beans, and sugar cane (Hampton & Toombs, 2013). The Orang Asli community relies on forest resources for revenue by selling non-food items including rattan, rubber, agarwood, and incense. Resources like bamboo, rattan, and mengkuang are gathered to create handicrafts like baskets, carpets, and mengkuang mats, serving as a source of revenue for the skilled Orang Asli population. Forest products such as sweet potato shoots, bamboo shoots, coconut pulp, and forest vegetables are gathered for personal consumption (Kunasekaran et al., 2017). Furthermore, they cultivate crops for sustenance, and any surplus is sold to external parties. The Orang Asli stressed the significance of the forest by advocating for the teaching of hunting skills and plant knowledge to children. Reliance on natural resources leads to a greater appreciation for the environment and the development of a balanced connection with it (Maharam, 2015). The environment and its resources have always been central to the life of Orang Asli, serving as a vital means of meeting their needs, desires, and generating revenue (Haliza, 2010).

However, issues arise when the habitats and surroundings of Orang Asli communities are intruded upon, and logging operations are conducted on a large scale. The Orang Asli community is experiencing food scarcity due to human economic activities. Wan Suzita et al. (2015) stated that the Belum Temenggor Forest Reserve is crucial for the habitat of plants, animals, and local residents. However, there are problems that must be overcome to ensure the resource's survival. The issues mentioned include logging operations and the infiltration of unauthorized immigrants who engage in illicit harvesting of forest resources (Wan Suzita et al., 2015). The decrease in forest products and the impact on the well-being of Orang Asli

have been caused by logging, widespread deforestation, illegal hunting, and excessive harvesting of forest resources (Mei, 2023). These activities lead to the depletion of natural resources, damage to the environment, loss of biodiversity and ecological wealth, as well as long-standing cultural impacts. The intrusion into the Temenggor forest reserve has affected the revenue and food requirements of the Orang Asli as they now must vie with external parties for these resources. As a result, Orang Asli turn to other resources like rubber to replenish their income (Kunasekaran et al., 2017). Moreover, the Orang Asli group is highly vulnerable to the impact of ongoing development. Their settlement in the forest is shrinking due to land removal for construction. The ongoing growth poses a concern since specific regions are being considered for future zoning for development. Gentrification in the area may disturb the Belum Temenggor ecosystem, impacting the Orang Asli's livelihoods and socioeconomic activities (Manton et al., 2023).

Figure 2 illustrates the correlation between resource reliance and the natural environment as referenced from Leach and Mearns (1995) in Mohd Elias and Chamhuri Siwar (2008). Orang Asli rely on natural resources because these resources are their primary economic and food source. The availability of the natural environment in their habitation area pertains to the forest and lake resources present. Human activities like forestry and hotel development can alter existing resources, impacting the socio-economic activities of Orang Asli. Logging activities can lead to a decrease in forest resources such as plants, rattan, and timber. Tourism activities, such as hotel development, have influenced the lake's environment and harmed the protein resources of the Orang Asli population. This study aims to examine the reliance and socioeconomic challenges experienced by Orang Asli in Temenggor, Perak, through the analysis of case studies derived from in-depth interviews. Following the analysis of the case study, recommendations will be formulated to address the socioeconomic challenges.

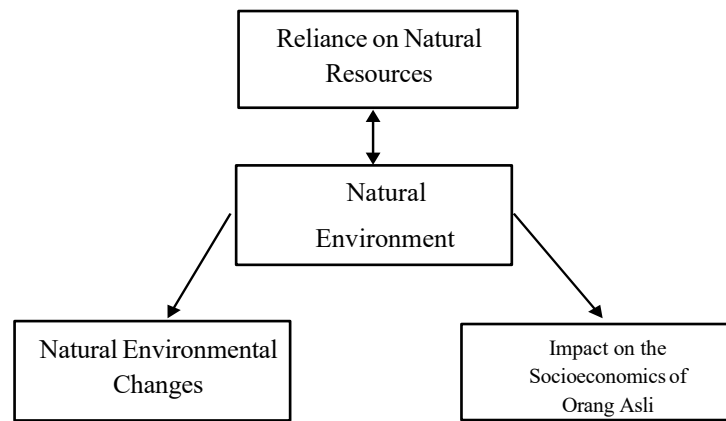


Figure 2: A theoretical framework of the relationship between poverty and the natural environment (Leach & Mearns, 1995, cited in Mohd Elias & Chamhuri Siwar, 2008)

## 2.2 Addressing Socioeconomic Challenges by Means of Education

Primarily, Orang Asli populations sustain their livelihoods by relying on natural resources. They utilise it as their financial institutions and grocery stores. They prioritise the preservation of nature as it is the fundamental source of their sustenance and means of living. Their secluded lifestyle has resulted in their marginalization and impoverished living conditions (Chew et al., 2022). The situation exacerbates when they confront a multitude of socioeconomic issues, such as the destruction of natural resources. Socioeconomic issues will result in their descent into poverty. Based on data from the United Nations, Orang Asli make about 5% of the world's population and account for 15% of individuals living in poverty (Wodon & Cosentino, 2019). The Malaysian government has initiated a relocation strategy with the aim of fostering the development of the Orang Asli population in the country. The program, initiated in 1980 as part of the 4th Malaysia Plan, follows an integrated development approach. It involves relocating and reorganizing the Orang Asli community to new or existing sites, with the aim of facilitating better management and preventing them from falling behind in terms of development. Infrastructure such as security stations, educational institutions, residential buildings, medical facilities, and paved roads is established in anticipation of their transition to a new lifestyle (Itam Wali, 1993). Efforts have been made to enhance the standard of living of participants through various socioeconomic development projects, including rubber plantations, fruit orchards, short-term crops, animal husbandry, freshwater fish farming, the rattan and bamboo industries, and the establishment of cooperative shops (Itam Wali, 1993). Furthermore, during the early phase of their participation in the relocation plan, a monthly allowance of 10.64USD is provided to alleviate their living

expenses (Nicholas, 2000). After an extended period of administering this plan, it appears that the program's purpose of effectively alleviating poverty among the Orang Asli was not achieved. Conversely, the Orang Asli were burdened with higher living costs by living without depending on their Orang Asli knowledge and forest natural resources.

Therefore, one viable approach to assist them is by including education in their communities. It is essential to provide a variety of educational opportunities for both children and adults in order to facilitate comprehensive transformation (Abdullah et al., 2023; Albury & Aye, 2016). Education has a significant impact on poverty in various aspects. Educational qualifications play a significant effect in shaping inequalities in an individual's socio-economic status. They determine an individual's position in the labor market and their future social standing (Yusof et al., 2019). Access to high-quality lifelong learning is essential for poverty reduction. The primary factor contributing to poverty is a deficiency in education (Khairul & Ibrahim, 2007). Based on Figure 3, a lack of education might result in a lack of options, particularly in terms of employment, which in turn can result in individuals becoming trapped in low-income homes. Ultimately, they will face the peril of falling into poverty, which will result in living in a state of hunger, poor health, and unfavorable living conditions. Poverty perpetuates inter-generationally, creating a cycle of disadvantage. Under those circumstances, it will result in enduring consequences such as chronic hunger, insufficient access to education and healthcare, limited assets, and a dearth of possibilities.

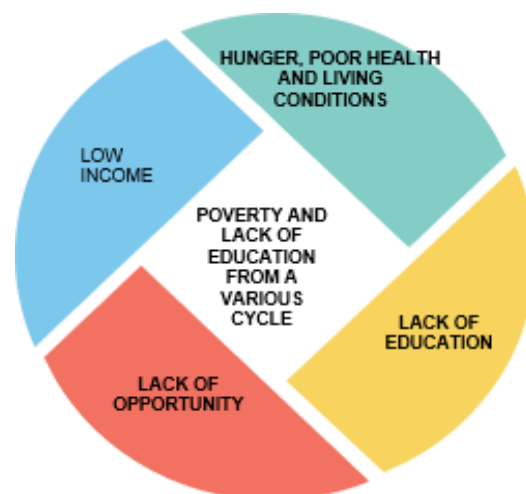


Figure 3: Poverty and lack education form a vicious cycle

### 3.0 METHODOLOGY

#### 3.1 Research Design

This study employs a case study methodology, utilizing in-depth interviews as a qualitative method to investigate the socioeconomic challenges faced by Orang Asli in Temenggor, Perak, Malaysia. The research focuses on individuals who depend primarily on natural resources from the forest as their primary means of sustenance.

#### 3.2 Research Site and Participants

The study took place in three Orang Asli villages: Chuweh village, Tebang village, and Carok Bus village situated in the Temenggor Forest, Perak, Malaysia. Respondents were selected using the snowball sampling approach. Eight respondents were questioned, consisting of seven males and one female (Table 1: Respondent's profile). Most women in Temenggor Forest were noted to be reclusive and hesitant to engage with outsiders. Therefore, there are more male Orang Asli respondents in this study. The researcher was guided by a staff member of Banding Island Rainforest Research Centre to meet the Tok Batin (village leader) in each village, who then facilitated the researcher's introduction to interested respondents.

Table 1: Respondents' profile

Respondent	Age	Gender	Village	Economic Activities
1	68	Male	Chuweh	Engaging in fishing, selling handicrafts created by his wife, and rearing chickens and ducks
2	42	Male	Chuweh	Catching fish and gathering forest products for sale (rattan, agarwood)
3	65	Male	Chuweh	Seeking rattan and plants for retail purposes
4	56	Female	Chuweh	Making handicrafts
5	48	Male	Tebang	Engage in fishing and gather forest resources such as rattan, agarwood, and herbs for sale
6	46	Male	Carok Bus	Fishing and gather cane
7	52	Male	Tebang	Engage in fishing and gather forest resources such as rattan and agarwood for selling
8	54	Male	Tebang	Engage in fishing and gather forest resources such as rattan, agarwood, and herbs for sale

### **3.3 Data Collection**

The researcher conducted in-depth interviews to gather information about the respondents' use of natural resources and the challenges they encountered relating to these resources. Interviews were carried out with household heads and supportive family members. Observation methods were also employed to determine the socioeconomic activities of the Orang Asli in the Temenggor Forest. The researcher noted various self-sufficiency activities for survival, including looking for forest goods, hunting, fishing, manufacturing handicrafts, digging potatoes, planting bananas, and rearing ducks and chicks.

### **3.4 Data Analysis**

This study uses content analysis to conduct qualitative data analysis. The content analysis method was employed to interpret and derive meaningful insights from the collected interview data and observational notes, allowing for a comprehensive understanding of the socioeconomic challenges and activities of the Orang Asli in Temenggor Forest.

## **4.0 FINDING AND DISCUSSION**

### **4.1 Reliance of Orang Asli on Natural Resources in Temenggor Forest**

This study examines the responsibilities of the family patriarch and the primary family members who rely entirely on natural resources for their survival. The leader of the Orang Asli family typically provides for the family by engaging in activities like collecting forest resources, hunting, fishing, and farming. In the Temenggor forest, the chiefs of Orang Asli families are responsible for overseeing all activities, with a focus on gathering forest goods such as rattan, agarwood, and medicinal herbs (Haliza, 2010). Forest products are sold to wholesalers on a daily or weekly basis, depending on the amount harvested. Abundant forest resources will be sold to purchase essential household items. If the yield is low, they will gather it first before selling. Herbs will undergo processing, including chopping, washing, and drying, before being supplied to wholesalers. The family patriarch often goes to the jetty by either renting a boat or using his own boat to sell the forest products collected. The leader of the Orang Asli family stated that they will collectively gather forest resources and distribute the proceeds equally among themselves. The forest products will be sold to wholesalers at the Belum- Temenggor jetty. If they don't go to the forest, they will engage in other hobbies like fishing and gardening. Typically, fish and garden products are used for personal consumption, and any excess is sold to those outside the household. As per the respondents:

*"I am employed in fishing, searching for agarwood, and harvesting rattan." The amount I get from the forest varies depending on the season. During their peak seasons, I can gather 20kg at once. Outside of the season, I can only obtain approximately 10kg. When searching for agarwood, I may need to camp in the wild for one or two nights. I can vend the crops at the dock. If I am short of funds, I withdraw money from the bank where I have a substantial amount deposited, as mentioned by the villager (Respondent 2, 40's, Chuweh Village).*

*"I will daily search for rattan in the forest and fish," I own three boats, one of which is typically rented out to individuals for RM100, however it is not rented out every day. Previously, a group of 4 or 5 individuals would venture into the forest, gather rattan, sell it, and distribute the earnings evenly. I also fish for sebarau fish, which costs RM3 a kg. Some days I can catch enough to sell for RM30, and other days I can make up to RM50. Currently, it is challenging to capture fish due to their absence. I occasionally hunt once a week to procure deer, birds, and mousedeer for personal consumption, not for commercial purposes. When I am not working, I create a makeshift weapon called an ipo (chopstick bullet) for hunting. I typically engage in hunting throughout the morning hours and return in the evening. Occasionally, one person departs, while other times multiple individuals depart. I will eat yams if I become weary of eating rice, as my wife also plant yams." (Respondent F, Kampung Carok Bus).*

*I search for rattan and fish, gather medicinal plants from the forest, and sell them to Mat Syah at the jetty, who acts as a middleman for forest product transactions. I own a boat and am searching for the closest rattan areas, which are sometimes located 2 miles from my current position. I often acquire 20 to 30 rattans. Previously, we would venture out in significant groups to gather a huge quantity of items to sell, resulting in a profit of MYR200 for the group. While searching for rattans, we also gathered herbs. We collected 20 to 30 bags of fresh herbs, which we then processed by chopping, washing, and drying before selling them. We typically enter the forest with a group of 15 individuals and use 2 boats. After subtracting the cost of boat oil, we will receive MYR15 per person. If we receive MYR5, it will be sufficient. A soap with sugar can be purchased for MYR5. (Respondent E, 50's, Kampung Tebang).*

*Typically, when searching for rattan in a group, the cost can be RM100 per day, but it may vary. Travel together in 2 or 3 boats. I search for agarwood in the forest, occasionally finding it and sometimes not finding any at all. Rattan comes in several grades, ranging from pricey to affordable. Rattan prices: Normal grade is RM1.20 per stick, grade A is RM3.50 per stick, and double A is RM5.00 per stick. However, obtaining it can be challenging, and at times, one may need to spend the night in the jungle. To refuel without money, borrow from Mat Syah, the forest products distributor, and repay after selling the rattan. (Respondent G, 50's, Kampung Tebang).*

The conversation illustrates the intricate and precarious economic realities of Orang Asli communities relying on forest resources, fishing, and informal trade. A critical analysis reveals that their livelihoods are shaped by environmental uncertainties, fluctuating resource availability, and the constraints of a market system dominated by intermediaries. Respondents highlight the seasonal nature of resource extraction, where peak seasons allow for higher yields, while off-seasons result in diminished returns, affecting income stability. The need to camp in the forest for agarwood collection or travel long distances for rattan underscores the labor-intensive and unpredictable nature of these economic activities. Additionally, the existence of informal financial systems, such as borrowing from middlemen like *Mat Syah* (Mat Syah is a middleman who buys forest products from the Orang Asli at the jetty) for fuel, indicates limited access to formal banking, reinforcing economic dependency. While some respondents describe collective harvesting and income-sharing practices, others engage in more individualistic entrepreneurial strategies, such as renting out boats. This shift suggests evolving socio-economic structures influenced by market pressures. The pricing disparities in rattan, with different grades fetching varying market rates, highlight the villagers' vulnerability to market exploitation, as they often receive minimal earnings after deducting operational costs. Moreover, the balance between subsistence and commercial practices is evident—while fishing and rattan collection generate income, hunting remains primarily for household consumption, reflecting adaptive survival strategies. The reliance on yams as a food alternative when rice is scarce further signifies economic constraints. These verbatim underscore the urgent need for policies that enhance market access, financial inclusion, and sustainable resource management to ensure long-term economic security and environmental conservation for these communities.

This study provides a critical examination of the complex economic conditions faced by the Orang Asli communities, who depend heavily on forest resources, fishing, and informal trade for their livelihoods. The respondents' testimonies reflect the volatile and labor-intensive nature of these activities, with seasonal fluctuations influencing resource availability and income stability. These findings align with existing literature, which highlights the precariousness of subsistence economies that rely on natural resources (Dove, 2006; Milne, 2007). The seasonal nature of resource extraction, such as the peak and off-seasons for agarwood collection and rattan harvesting, underlines the vulnerability of these communities to environmental uncertainty and market unpredictability.

The precariousness of their livelihoods is further compounded by limited access to formal financial systems, with communities resorting to informal financial arrangements, such

as borrowing from intermediaries. This reliance on middlemen for credit is characteristic of rural economies with restricted access to formal banking systems (Tucker & Thomas, 2009). Moreover, the involvement of the middleman figure, Mat Syah, reflects the power dynamics within the trade system, where these intermediaries play a pivotal role in dictating market terms. Studies on indigenous trade systems have similarly documented the exploitative nature of intermediary relationships, where the bargaining power of resource gatherers is minimal (Poteete & Ribot, 2011).

The shift from collective practices toward individual entrepreneurial strategies—like renting out boats—illustrates an evolving socio-economic structure, likely influenced by broader market pressures. This change mirrors the broader trends observed in rural economies, where traditional collective practices give way to individualistic profit-driven behaviors in response to market demands (Becker, 2004). Furthermore, the vulnerability of these communities to market exploitation is evident in the pricing disparities for rattan, as different grades fetch varying market prices, leaving the villagers with limited income after operational costs.

The study's findings also shed light on the balance between subsistence and commercial activities. The practice of hunting primarily for household consumption, while fishing and rattan collection are income-generating, reflects adaptive survival strategies typical in rural economies under pressure (Berkes, 2007). The reliance on yams during food scarcity further underscores the economic constraints faced by the community, particularly in terms of food security.

These insights underline the urgent need for policies aimed at improving market access, enhancing financial inclusion, and ensuring sustainable resource management. A holistic approach to policy development, one that integrates economic security with environmental conservation, is crucial for the long-term well-being of the Orang Asli communities (Adger et al., 2009).

#### **4.2 Degradation of Forest Resources to the Orang Asli community**

If forest resources decline, it will impact the economic resources of Orang Asli families since forests are their primary economic asset. This study also investigates the elements that can impact forest resources to the extent of jeopardizing the economic resources of Orang Asli families. This study has revealed that the degradation of forest resources in the Temenggur forest is widespread due to open logging activities and the intrusion of natural resources by foreigners.

#### 4.2.1 Open Logging Activities

Orang Asli rely entirely on natural resources for the survival of their livelihoods. Logging activities in the Temenggong Forest have disrupted the environment, leading to a decrease in the forest's natural resources. The decrease in forest products has impacted the earnings of individuals who rely entirely on forest resources (Wan Suzita et al., 2015). According to Respondent B, "Orang Asli have no savings in the bank and they considered the forest as their bank". The statement indicates that the forest is crucial for Orang Asli in generating revenue. Logging activities have led to a reduction in forest resources and a decline in their reserves. Logging activities significantly affect the food resources and habitat of Orang Asli, in addition to causing financial challenges (Mei, 2023). The depletion of medicinal sources, rattan, agarwood, and fish due to these activities is forcing individuals to seek new means of sustenance and income. Orang Asli individuals face challenges in accessing forest resources due to territorial borders. Violating these boundaries set by other Orang Asli groups might result in physical harm or sabotage such as killed using blowpipe or poison. As per respondents:

*"We are currently experiencing difficulties in obtaining food. I observed that all the logs and our meals have disappeared. I don't mean to whine, but the food has been depleted. In March, loggers are planned to return. Residents in neighboring villages threaten us with blowpipes, so we reside in separate locations to avoid conflict. We are hesitant to visit other villages for fear of getting poisoned. Hence, we seldom interact with other settlements. If I wish to visit Bainun and establish a garden there, I must first inquire with the headman. If permission is not granted, we will return." (Respondent E, 50's, Kampung Tebang).*

*"I used to catch a large quantity of fish and sell them until the market became saturated with fish." Currently, I am unable to consume food. Before the logging activities began, I used to share fish with visitors, but now it's difficult for me to have enough for myself. Logging activities last year resulted in a decreased fish population. Langang fish or kelah fish is costly. Acquiring kelah fish used to be simple, but now it's difficult to obtain a pound. Following the logging activity, the rattan supply is diminishing. Forest resources such as Fatimah kacip and jaga yam are becoming increasingly scarce. Cutting it down is acceptable, but they clean it completely in one go. Spring potatoes are readily available in the forest before forestry activities commence. Even if offered RM100 per kilo, I am not interested in searching for it due to its scarcity. This morning I caught 3 fish for personal consumption. I plan to sell them, but the expenses for boat fuel may not cover the initial investment. Previously, I performed cooking, bathing, and washing tasks using water from the lake. However, once the trees*

*were cut down, I developed itchiness on my body, which prevented me from using the lake water.” (Respondent G, 50’s, kampung Tebang).*

The Orang Asli's ability to sustain themselves is significantly hindered by the disturbance of ecosystems caused by forestry activities, as they heavily rely on nature and its supplies. Respondent G states that loggers engage in activities beyond simply cutting down logs, including shoveling and levelling the land to facilitate the transportation of the logs. Logging activities result in a substantial decrease in the population of plants, including herbs and rattan. Depletion not only impacts forest products but also has consequences for the food resources of the Orang Asli population (Kenrick et al. (2023). Prior to the commencement of logging activities, a substantial amount of fish was captured with the intention of not selling it. Additionally, the surplus catch was distributed among others. Nevertheless, following the forestry activities, they encounter significant challenges in procuring fish, even for sustenance purposes. The scarcity of fish in the rivers and lakes led to a significant increase in price, as acquiring the protein source became increasingly challenging. Deforestation and other logging activities have resulted in the pollution of rivers and lakes, leading to the death and extinction of fish species. Respondent F asserts that logging activities have led to a scarcity of food for both the Orang Asli community and the wildlife in the forest. Respondent F stated that his brother perished as a result of a tiger attack, as the creature was experiencing hunger and ventured into their village in search of sustenance. This demonstrates that the logging activities not only result in the depletion of resources, but also pose a potential threat to the lives of the Orang Asli population. As per his account:

*“The excessive logging activity has significantly depleted the forest resources, as individuals have been trespassing to unlawfully extract logs. Not only are we lacking food, but the animals are also experiencing the same scarcity. Currently, the tiger has infiltrated the village in search of sustenance. My brother was attacked and bitten multiple times, but fortunately he managed to survive and did not sustain any injuries severe enough to prevent him from eating, thanks to the timely assistance of his friends.” (Respondent F, 40’s, Kampung Carok Bus).*

The verbatim above expose the deep-seated consequences of deforestation, particularly on Orang Asli communities who rely on forest ecosystems for sustenance, economic stability, and cultural survival. The accounts illustrate how large-scale logging has disrupted traditional livelihoods, exacerbated food insecurity, and intensified socio-environmental conflicts. A key

issue raised is the erosion of food sovereignty. Respondent E's statement, "the food has been depleted", signifies not just a scarcity of resources but also a loss of autonomy over food production. Logging has not only reduced access to essential materials like logs for shelter but has also forced Orang Asli into dependency on external food supplies. This is further compounded by social tensions, as fear of conflict with neighboring villages restricts mobility and resource-sharing networks. The traditional practice of communal food security, once central to these communities, is now severely weakened. Environmental degradation and economic marginalization are interlinked in Respondent G's experience. The depletion of fish stocks due to deforestation-driven ecological changes directly affects both subsistence and commercial fishing. The statement, "Before the logging activities began, I used to share fish with visitors, but now it's difficult for me to have enough for myself," reflects a shift from abundance to scarcity. This economic distress is exacerbated by increased costs, as fuel expenses for fishing trips may outweigh potential earnings. The loss of non-timber forest products like rattan and medicinal plants further diminishes financial independence, leaving Orang Asli communities with few viable alternatives.

The findings also highlight the unforeseen consequences of ecological imbalance, particularly human-wildlife conflict. Respondent F's account of a tiger attack underscores how deforestation forces animals to seek alternative food sources, increasing encounters with human settlements. This scenario reflects broader ecological consequences: when a keystone predator such as a tiger enters human spaces, it signals a severe disruption of the food chain. The depletion of prey species and habitat destruction push wildlife into conflict with humans, raising critical concerns about both conservation efforts and community safety. From a policy perspective, these testimonies call for urgent intervention. Sustainable forest management is necessary to prevent uncontrolled logging and its cascading effects. Community-led conservation programs and stricter regulations on deforestation should be enforced to protect Orang Asli rights and preserve biodiversity. Additionally, socio-economic support mechanisms, such as alternative livelihood programs and fair compensation for environmental damage, should be implemented to empower affected communities. Ultimately, these narratives reveal that deforestation is not merely an environmental issue, it is a profound socio-economic and cultural crisis. Without immediate and targeted action, Orang Asli communities will continue to face worsening vulnerabilities, reinforcing cycles of poverty, displacement, and environmental degradation.

The qualitative findings from the study shed light on the severe consequences of deforestation for orang asli communities, whose livelihoods, food security, and cultural

survival are closely tied to forest ecosystems. This narrative is supported by recent research which emphasizes that deforestation does not only lead to environmental degradation, but also disrupts the socio-economic structures of indigenous populations (Menzies & Butler, 2021). As noted in the verbatim accounts, the loss of food sovereignty, as articulated by Respondent E's statement, "the food has been depleted," reflects the multifaceted impact of deforestation on traditional food systems. Deforestation-driven resource depletion limits access to essential materials like timber for shelter, while simultaneously increasing reliance on external food supplies, undermining indigenous autonomy over food production (Sodik & Sulaiman, 2020).

The finding that deforestation leads to economic marginalization is consistent with broader studies showing that environmental changes driven by logging disrupt both subsistence and commercial livelihoods. For instance, the depletion of fish stocks, as highlighted by Respondent G's experience of reduced catches and increasing costs, mirrors findings from research on the economic impacts of deforestation on fishing communities (Harris & Ellis, 2022). This not only results in food scarcity but also exacerbates financial insecurity due to increased expenses for resource gathering, leaving communities with limited alternatives for economic survival.

Moreover, the report highlights the growing risks of human-wildlife conflict, as evidenced by Respondent F's encounter with a tiger. This issue aligns with recent studies on the ecological imbalance caused by habitat destruction, where the displacement of wildlife due to deforestation increases the likelihood of human-animal encounters (Mohamed et al., 2023). The disruption of the food chain caused by deforestation can push predators, such as tigers, into human settlements, creating both safety risks for the communities and challenges for wildlife conservation efforts.

To address these issues, the study advocates for sustainable forest management and policy reforms. These recommendations are in line with global calls for indigenous communities' rights to be considered in conservation efforts, as well as the need for alternative livelihood programs to mitigate the socio-economic impacts of environmental degradation (Jelinski et al., 2021). Without such interventions, orang asli communities will continue to face escalating vulnerabilities, reinforcing cycles of poverty, displacement, and ecological damage.

#### ***4.2.2 Foreigners' Encroachment on Natural Resources***

Furthermore, the respondents asserted that the encroachment of outsiders was causing a decline in the productivity of the Temenggor Forest, in addition to the logging activities. The

strategic location of the Belum Temenggor Forest, situated on the border of Thailand, facilitates the infiltration and pilferage of Orang Asli Forest resources, particularly by individuals from Thailand and Cambodia (Wan Suzita et al., 2015). This scenario necessitates their competition with individuals from external sources in order to get resources. As per the participants' responses:

*“I have been struck by a log, and all of the fish have disappeared, leaving only the small fish behind. The availability of rattan is diminishing due to deforestation. Agarwood is becoming scarce due to the influx of international buyers, particularly from Siamese origin.” (Respondent H, 50’s, Kampung Tebang).*

*“The forest is currently undergoing degradation, which has made it challenging for the Orang Asli community to procure sustenance. The situation is challenging since external individuals are increasingly seeking medical treatment, resulting in a decrease in available resources. Currently, we find ourselves in the forest, and the conditions are becoming increasingly challenging for us to comfortably sit outdoors. Previously, there was a substantial abundance of spring potatoes, but presently, there is a complete absence of them. Outsiders pose a significant challenge due to the absence of medical resources.” (Respondent C, 60’s, Kampung Chuweh).*

*“Acquiring agarwood was once a simple task, but now it has become challenging due to my ongoing conflicts with Cambodia and Siam, who are actively involved. He is consistently searching for agarwood.” (Respondent F, Kampung Carok Bus).*

These verbatim illustrate the deep environmental and socioeconomic distress experienced by Orang Asli communities due to deforestation, resource exploitation, and external pressures. Respondent H and Respondent F highlight the depletion of valuable natural resources like rattan and agarwood, attributing their scarcity to commercial exploitation driven by international buyers, particularly from Siam and Cambodia. Respondent C, on the other hand, emphasizes how forest degradation has directly impacted food security and well-being, indicating a broader struggle in which Orang Asli livelihoods are being undermined by external forces, making traditional survival increasingly difficult. Deforestation and resource exploitation have severely disrupted Orang Asli livelihoods, depleting essential natural resources and threatening food security. The respondents underscore how external commercial pressures exacerbate these challenges, making traditional survival increasingly unsustainable.

The environmental and socioeconomic distress experienced by Orang Asli communities, as highlighted in the verbatim responses of the study participants, is consistent with existing literature on the adverse impacts of deforestation, resource depletion, and exploitation. The depletion of vital resources, such as rattan and agarwood, due to commercial exploitation is a significant concern for these communities, as indicated by Respondent H and Respondent F. Previous research has shown that indigenous communities in Southeast Asia, particularly those in Malaysia, face increasing scarcity of natural resources because of large-scale deforestation and unsustainable logging practices (Aminuddin et al., 2019). These commercial activities are often driven by international demand, with buyers from neighboring countries such as Siam (Thailand) and Cambodia playing a major role in the depletion of resources (Loh, 2022).

Additionally, Respondent C's emphasis on the direct impact of forest degradation on food security reflects a broader struggle faced by the Orang Asli. Deforestation has been shown to significantly disrupt the availability of edible plants, wild animals, and other natural food sources that Orang Asli communities rely on for sustenance. As these resources dwindle, their ability to maintain traditional livelihoods is severely compromised, leading to increased vulnerability and dependence on external sources of food and income, which may not be sustainable in the long term (Goh & Siti, 2020).

The overarching theme in the respondents' testimonies highlights how external commercial pressures are exacerbating the challenges faced by the Orang Asli. The commercial exploitation of natural resources has not only depleted essential resources but has also threatened food security and overall well-being, undermining the community's traditional modes of survival. These findings are in line with existing literature, which points to the unsustainable nature of such pressures on indigenous livelihoods (Salleh et al., 2020).

#### ***4.2.3 Family Support to Continue the Survival of Orang Asli***

Aside from the family patriarch, other members of the family also contribute to the ongoing sustenance of the family. This study has conducted interviews with female family members, elderly individuals, and impoverished inhabitants who lack access to a boat for transportation to the forest. These individuals are classified as part of the vulnerable group due to their susceptibility and lack of power (Kartini, 2016). Nevertheless, they also demonstrate a remarkable proficiency in utilizing natural resources. The study revealed that women, primarily influenced by variables such as advanced age, health-related disabilities, lack of agency, poverty, and security concerns, opt to search for natural resources within the vicinity

of their village or place of residence exclusively. The resources acquired by this group are nearly identical to those sought by those in the forest, such as bamboo and medicinal plants. Nevertheless, the amount acquired is significantly smaller in comparison to the head of the household who gathers resources from the forest. Consequently, this group endeavors to explore alternative means of acquiring sustenance or financial resources solely from local sources. These activities include gardening, animal husbandry, fishing, and crafting. Most agricultural products are intended for personal consumption, with the exception of handicrafts that are specifically created for sale to visitors who visit their town. The respondents provided the following explanation:

*“I am currently engaged in the sale of handicrafts. My wife and son-in-law engage in the activity, while I sell the product and earn a daily wage of RM 5. Occasionally, I engage in fishing for the purpose of preparing my own supplementary meal, rather than for commercial purposes. Currently, I have reached an age where I am no longer able to venture into the forest. My wife engages in various activities at home, including gardening, handicrafts, fishing, and singing. The income ranges from RM300 to RM500 each month, which is insufficient to afford expenses like as petrol, food and boat fuel.” (Respondent A, 60’s, Kampung Chuweh).*

*“We produce artisanal goods with the purpose of selling them to tourists. Tourists are encouraged to visit as they have the opportunity to make purchases. Receive a monthly income ranging from RM200 to RM300, with the possibility of earning more during periods of high visitor activity in our hamlet. Individually, we explored the periphery of the forest and additionally cultivated cavities for the purpose of producing containers for storing wealth, small bags, physical forms, and receptacles. In the absence of engaging in handicrafts, we opt to cultivate a garden for the purpose of cultivating rubber, tubers, and bananas.” (Respondent D, 50’s, Kampung Chuweh).*

Respondent A, a Tok Batin (village head) in Kampung Chewah, engages in economic endeavors by assisting in the sale of handicrafts crafted by his wife and daughter-in-law. As a result of deteriorating health and advanced age, the respondent was unable to enter the forest. To enhance their income, respondents opted to engage in economic activities that do not necessitate strenuous labor, specifically by engaging in the trade of handicrafts. Respondent A's booth has a variety of things for sale, including honey, chopsticks, agarwood, and women's jewelry such as bracelets, necklaces, and rings. Additionally, baskets are also available. The products are crafted using raw materials sourced from the forest, including bamboo, mengkuang, and rattan. Artisanal crafts are marketed to tourists who visit their village. As to

the respondent's statement, his daily income from selling handicrafts is approximately RM5. Respondents engage in fishing activities to procure their own sustenance, in addition to their handcraft sales. Respondent D was the sole female participant in the study. She actively sought out forest items, including rattan and bamboo, in the vicinity of her dwelling in order to create handicrafts. Respondents primarily rely on handicrafts as their major source of income. The commodities are sold directly to tourists that visit their town, and some are also entrusted to Respondent A for selling. The respondents made various handcraft items, including baskets, rugs, pouches, and money bags (Nicholas, 2000; Haliza, 2010). Furthermore, Respondent C explicitly mentioned that his engagement in socio-economic activities was limited to his immediate vicinity due to the absence of a boat for fishing and forest exploration. Consequently, he solely sought sustenance and remedies, such as tongkat ali, kacip fatimah, and spring potatoes, in the vicinity. As per his account:

*“I am currently seeking to cultivate herbs in a garden located nearby. Additionally, I am interested in engaging in fishing activities. However, due to the unavailability of a boat, I am limited to using a canoe. It is important to note that canoes have a limited range and cannot travel long distances. Within this forest, a diverse array of herbs can be found. Specifically, I am searching for tongkat ali and kacip fatimah, along with spring potatoes, to be sold. However, if you desire to venture to distant locations, it can be challenging to get a suitable watercraft. Typically, by consistently searching for spring potatoes, you can locate them in one or two bags. Our purpose here is to produce medication specifically for alleviating back discomfort. We will make the medicine from the herbs we found and sell it. If you are experiencing hunger and there is a lack of food available, we will prepare and cook spring potatoes for consumption. My wife cultivates cassava and bananas for personal consumption, rather than for commercial purposes.” (Respondent C, 60’s, Kampungg Chuweh).*

The dialogue above illustrates that, despite facing limitations such as advanced age, health issues, and lack of access to a boat, they persist in their efforts to sustain their survival. Furthermore, women or spouses also contribute by engaging in supplementary tasks such as horticulture and crafting. Due to security concerns, they refrain from venturing into the forest, instead prioritizing taking care of their household while their husbands explore the wilderness. During their leisure time, they engage in gardening activities by cultivating various crops such as cassava, sweet potato, banana, chili, lemongrass, bayan, and others. Furthermore, there are Orang Asli women who engage in the cultivation of rubber plants. The majority of the agricultural yield is used for personal consumption. In the event of an excess, the household

leader will vend it to external parties at the Belum Temenggor jetty. As per the participants' answers:

*“My wife made a garden for cultivating lemongrass, chilies, sweet potatoes, and bananas. If there is demand for the product, I am willing to sell it. However, in the absence of any interest from potential buyers, we will use it for our own consumption. Create a garden that is tailored to the current season, as planting the same crops repeatedly is not advisable due to the soil's lack of fertility. When I choose not to go into the forest, I will help my wife in gardening. Typically, I engage in fishing in the morning to catch fish, and later in the day, either in the afternoon or evening, I venture into the forest.” (Respondent B, 40's, Kg Chuweh).*

*“My wife cultivates a garden just for our personal consumption. The crops include chili, yam, sweet potato, spinach, and lemongrass. On that particular day, we engaged in extensive planting activities and then sold the produce.” (Respondent G, 50's, Kampung Tebang).*

*“My wife cultivates sweet potatoes, veggies, and cassava. Additionally, she is responsible for managing the household. Typically, if there is a substantial quantity of veggies available, a portion of them can be sold, resulting in a payment of RM20. I receive a weekly allowance of RM50, although occasionally it may increase to RM100 depending on the agricultural season.” (Respondent E, 50's, Kampung Tebang).*

The verbatim excerpts from respondents in Kampung Chuweh and Kampung Tebang highlight the socio-economic struggles and adaptive strategies of the Orang Asli communities. Respondent A's reliance on handicraft sales, earning as little as RM5 daily, underscores the precarious nature of his income. His statement reflects not just economic vulnerability but also the constraints imposed by aging and deteriorating health, which limit his ability to engage in traditional forest-based subsistence activities. Similarly, Respondent D's account of selling artisanal goods to tourists illustrates the seasonal and unpredictable nature of their livelihood, with income fluctuations dependent on visitor inflow. The absence of a stable market and reliance on direct sales expose them to economic insecurity. Respondent C's discussion of foraging and the difficulties of accessing distant forest areas due to the lack of a boat highlights a critical infrastructural challenge that further restricts economic opportunities. Additionally, gender roles emerge as a significant theme; women, as indicated by Respondents B and G, take on multiple responsibilities, including gardening, household management, and limited economic production. However, their contributions remain supplementary and lack

formal economic recognition. The respondents' emphasis on subsistence agriculture, particularly the cultivation of crops like cassava and sweet potatoes, demonstrates their resilience but also signals their exclusion from broader economic networks. These verbatim collectively reveal a pattern of economic marginalization, infrastructural barriers, and gendered labor divisions. Addressing these issues requires targeted interventions in market accessibility, sustainable resource management, and gender-inclusive economic policies to ensure the long-term viability of Orang Asli livelihoods.

The qualitative findings derived from verbatim excerpts from respondents in Kampung Chuweh and Kampung Tebang provide rich insights into the socio-economic struggles and adaptive strategies employed by the Orang Asli communities. The respondents' accounts highlight critical themes related to economic vulnerability, adaptive resilience, infrastructural challenges, and gender roles in the context of subsistence livelihoods. For the economic vulnerability and income precarity, the Respondent A's experience of relying on handicraft sales and earnings as little as RM5 daily illustrates the precariousness of income among the Orang Asli. This reflects broader patterns of socio-economic marginalization, where communities with limited access to formal labor markets are left to depend on informal and seasonal income-generating activities. Studies show that communities in rural and isolated areas often experience economic vulnerability due to the lack of diversified income sources, as evidenced by similar findings in indigenous populations in Southeast Asia (Ting, 2020; Ali et al., 2019).

For the aging and health constraints, the Respondent A's acknowledgment of his declining health as a limiting factor for traditional forest-based subsistence activities reflects a wider issue among aging populations in indigenous communities, where poor health and lack of access to healthcare compound economic challenges. Research on aging in indigenous populations indicates that elderly individuals often face significant challenges in maintaining traditional livelihood activities, which are physically demanding (Feliciano, 2021; Sulaiman & Lee, 2022). Similarly, for the seasonal and unpredictable income, Respondent D's account of selling artisanal goods to tourists exposes the seasonal nature of their economic activities, dependent on fluctuating visitor inflows. This finding underscores the vulnerability of communities whose livelihoods are tied to tourism, which is often affected by external factors such as economic downturns or environmental disruptions (Tan, 2021). The absence of stable markets and reliance on direct sales heightens their exposure to economic insecurity, a challenge faced by indigenous groups in other parts of the world (Branigan, 2020; Lee et al., 2022).

For infrastructural barriers, Respondent C's description of foraging challenges due to the lack of access to boats emphasizes the infrastructural limitations that impede economic activities. The lack of transportation and communication infrastructure in rural indigenous communities is a significant barrier to economic development, reducing access to markets and vital resources. Studies on infrastructure in rural areas suggest that inadequate transportation infrastructure can exacerbate the isolation of indigenous communities, further limiting their economic opportunities (Chung, 2021; Samad et al., 2022). Gender roles, particularly the multiple responsibilities of women as noted by Respondents B and G, reveal an essential dynamic in the economic activities of the Orang Asli. Women are involved in household management, gardening, and limited economic production, but their contributions often remain informal and unrecognized in the broader economy. The gendered division of labor in indigenous communities is widely documented, with women performing significant work that supports subsistence economies but remains undervalued in formal economic frameworks (Miller & Mukhtar, 2021; Ibrahim et al., 2020). Addressing these disparities through gender-inclusive economic policies could enhance women's economic agency and promote more sustainable livelihoods.

The emphasis on subsistence agriculture, particularly the cultivation of crops like cassava and sweet potatoes, signals both resilience and exclusion. While these practices provide essential sustenance, they reflect the limited integration of the Orang Asli into broader economic networks. Indigenous communities often face barriers to entering formal markets due to structural issues such as land tenure insecurity and limited access to technology (Siti et al., 2022; Mohamad et al., 2023). Targeted interventions aimed at improving market accessibility and sustainable resource management are critical to ensuring the long-term viability of Orang Asli livelihoods. In conclusion, these findings highlight the intertwined nature of economic marginalization, infrastructural barriers, and gendered labor divisions within the Orang Asli communities. Addressing these issues through targeted interventions in market access, infrastructure development, and gender-inclusive policies could contribute to the sustainability and resilience of these communities.

### **4.3 Recommendations for Socioeconomic Challenges among Orang Asli**

Orang Asli knowledge refers to a distinct knowledge system that is specific to a particular Orang Asli tribe. Orang Asli knowledge is inherently implicit, as it is conveyed through actions or expressions. It is passed down from one generation to another mostly through oral traditions, such as folklore, traditional songs and dances, myths, and

ceremonies. Nevertheless, to establish a connection with the external world and enhance their standard of living, individuals require information that extends beyond their native understanding. The expertise encompasses understanding of governance systems, as well as the ability to enhance and elevate the value of their sources, which can result in higher compensation.

Therefore, according to the qualitative findings, the study incorporated the PICO framework to examine the reliance of Orang Asli on forest resources in Temenggor, Perak and the related challenges (refer Figure 4). The PICO framework, created by Richardson et al. (1995), is used to deconstruct clinical issues into searchable keywords. It is a versatile framework designed to address inquiries connected to health. The mnemonic formula was initially created to assist investigators in formulating research questions throughout the study design process. Subsequently, it gained widespread acceptance across other academic disciplines. In this study, the PICO framework was adopted to develop the suggestions for the findings of the study.

According to Figure 4, the population examined in this study consists of the Orang Asli residing in Temenggor, Perak, who depend on forest resources for their livelihood. However, their sustainability is being jeopardized by the detrimental effects of unregulated illegal forest encroachment, which is causing a decline in the availability of these resources. This circumstance causes them to experience food insecurity and a decrease in their household income. An intervention is required to assist them in restoring food security, enhancing household income, and improving their quality of life. Instead, then relying solely on government law enforcement to address unlawful forest encroachment, the Orang Asli communities in Temenggor require better governance and access to information to foster the development of their communities. Besides, it is essential to convert Orang Asli knowledge into Orang Asli development, particularly by changing their Orang Asli knowledge into greater earning opportunities. To foster the development of these communities, it is necessary to examine the methods of well-established Orang Asli communities around the world and adopt the most suitable ones. Therefore, their native knowledge will serve as a potent instrument for them to establish their own sustainability.

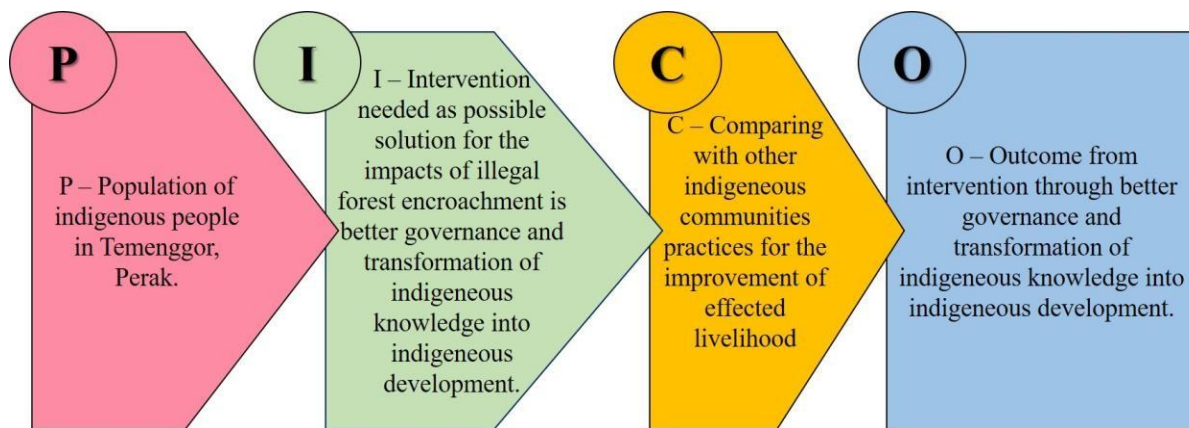


Figure 4: PICO framework of Orang Asli in Temenggor, Perak

#### 4.4 Good Governance for Orang Asli

According to findings of the case study, the Orang Asli are practicing sustainability living with nature and they benefit it as their "banks" and "supermarkets". They are preserving nature as it is the source of their food and livelihood. However, most of them encounter socioeconomic challenges due to their high poverty rates, lack of recognition of their land rights, and marginalized from modernized world (Hassan et al., 2022). Therefore, they need good governance and recognition of the rights for the land they have been living in for generations.

Good governance involves acknowledging and giving authority to Orang Asli to engage in decision-making procedures actively and significantly about issues that affect their rights, means of living, communities, lands, territories, and resources. The notion is based on the principles of consultation and consent, particularly in decisions pertaining to development, at various levels, spanning from the global to the local level.

It is crucial to recognize and affirm the Orang Asli practices of self-governance, autonomy, and ancestral authority, as well as their traditional methods of governing and owning land, regarding their territories, lands, and natural resources. Effective governance must address the issue of relinquishing authority over land and natural resources and necessitate collaborative decision-making. The governments in Asia have systematically denied the existence of most Orang Asli on their lands (Sibbel, 2005).

#### 4.5 Empowering Education among Orang Asli

Orang Asli requires not just the recognition of their rights to the land they have inhabited for

generations, but also the provision of high-quality education. This type of education is not solely intended for children, but also for adults. The grownups are striving to secure the financial well-being of their household. Thus, it is imperative for adults to acquire additional knowledge beyond their inherited Orang Asli knowledge. By acquiring additional knowledge, Orang Asli can enhance their existing knowledge and transform their products into high-value goods that people are willing to pay a premium for, reflecting the true worth of their Orang Asli efforts. The Orang Asli inhabitants in Temenggor, Perak, Malaysia received meagre remuneration for their products, while some of these things are being sold at exorbitant prices in the market. This renders their efforts and diligent work worthless. For instance, the agarwood that they consistently seek. They are unaware of the true market worth of agarwood. The item was offered at a significantly discounted price, allowing the customer to subsequently resale it at higher rates and generate substantial cash with no effort and labor. Agarwood is, in fact, the costliest type of wood globally. The pure-grade agarwood oil can have a value ranging from USD 10,000 to USD 40,000, depending on factors such as its originality, kind, and distillation procedure. The current price for premium-grade agarwood can reach up to USD 100,000 per kilogram. Herbal remedies like tongkat ali and kacip fatimah are also in high demand globally. The market value of tongkat ali roots typically falls within the range of USD 20 to USD 25 per kilogram.

Therefore, according to the case study, the Orang Asli did not receive what they deserve. They were compensated an inadequate amount for their efforts in finding highly valuable natural resources. However, other parties are reaping substantial profits from it. According to the United Nations, Orang Asli comprises 5% of the global population and represent 15% of those living in poverty (Wodon & Cosentino, 2019). The Orang Asli knowledge holds significant value.

They simply need to be educated in ensuring that they receive what they are entitled to. They should not be perpetually ensnared in poverty. Despite residing in the forests and embracing a natural lifestyle, individuals in this context require access to education and a clear trajectory to overcome poverty. In that case, it is necessity for them to obtain access to quality education. The case study suggests four primary forms of education that should be offered to Orang Asli communities. This education aims to assist them in reducing poverty and safeguarding natural forest resources for future generations, as shown in Figure 5.

Education in entrepreneurship can help them to boost their economic growth. Entrepreneurship education often includes programming that incorporates support and training initiatives. These kinds of program will facilitate the transformation of Orang Asli

individuals into entrepreneurs, enabling them to establish and develop their own businesses. Therefore, they can enhance their economic conditions and elevate their socioeconomic standing from their own business. The entrepreneurship skills they acquire will enable them to increase the value of their items, which were previously undervalued despite their dedication and hard work.

In addition to the fundamental principles of entrepreneurship, knowledge in hospitality training and education is also crucial for fostering economic growth among the Orang Asli in Temenggor, Perak, Malaysia. Having a strong understanding of hospitality can enable them to generate income through agricultural, artistic, craft, and eco-tourism endeavors. With a strong understanding of hospitality, they can expand their business into the realm of eco-tourism by offering services such as campsites or natural homestays for tourists that appreciate the environment. In addition, they have the opportunity to generate income by demonstrating their distinct Orang Asli abilities, such as hand-catching fish and creating handicrafts, to tourists. Thus, it is imperative to provide them with education in hospitality.

Orang Asli in Temenggor, Perak must also possess information about e-commerce, which is crucial. This knowledge is crucial, as it has become a means of supporting economic activity in a volatile and evolving environment. Acquiring knowledge about e-commerce can enable Orang Asli communities to gain digital access and leverage its benefits for local economic development. They will have the capability to enhance the commercial value of their products for a broader range of global markets. Acquiring this expertise will enable individuals to tap into a vast range of economic opportunities and effectively overcome poverty.

The Orang Asli must acquire knowledge about sustainable development, which is crucial for their well-being. They require instruction on sustainable development to assure their willingness to preserve all natural forest resources, so benefiting future generations. Education on sustainable development not only enriches individuals' knowledge and cultivates their abilities, but also elucidates their values and attitudes, while fostering the practice of preserving the social, economic, and ecological aspects of forest systems. The Orang Asli knowledge possessed by Orang Asli holds significant potential for enhancing education on sustainable development and environmentalism, particularly in terms of sustainability knowledge, attitudes, values, skills, and behaviors. The application of sustainable development principles will provide them with guidance in fostering economic growth while ensuring the preservation of resources for future generations.

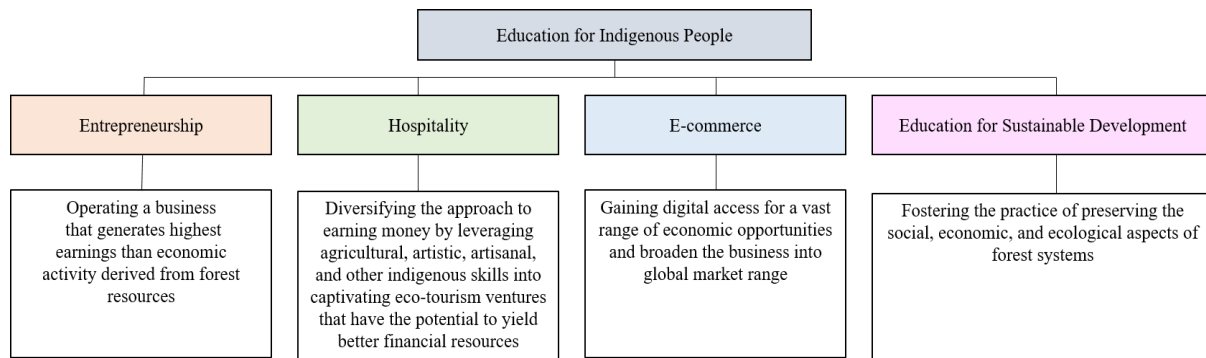


Figure 5: Empowering education among Orang Asli

## 5.0 CONCLUSION

According to the case study, the Orang Asli population had socioeconomic challenges because of various factors, including the degradation of natural resources. They are living in poverty and confront adversity in acquiring sustenance for their families. Transferring Orang Asli populations to areas with greater accessibility does not guarantee successful poverty reduction among them. Every development program must begin with educating them and equip them with additional knowledge to better prepare them for adapting to the outside environment. Therefore, providing education in entrepreneurship, hospitality, e-commerce, and sustainable development will enhance their ability to adapt to the external environment and effectively address the actual socioeconomic challenges they face. Acquiring knowledge in entrepreneurship will enable individuals to foster a more robust economy. Having a strong understanding of hospitality will enable individuals to explore new opportunities, such as engaging in captivating eco-tourism. Acquiring an understanding of e-commerce will enable them to expand their business into a broader range of markets, and potentially even into the worldwide market. The knowledge acquired from education for sustainable development will enable them to establish a robust economy while safeguarding the well-being of future generations and preserving valuable resources. These four types of knowledge are necessary for individuals to become more resilient in adapting to the outside world and escaping poverty. Thus, armed with this knowledge, they will persist in utilizing forest natural resources for future generations, preserving their Orang Asli wisdom, and being a distinct group.

The Orang Asli communities in the Belum-Temenggor Forest Complex rely heavily on forest resources for their basic needs and survival. However, resource exploitation due to logging, infrastructure development, and climate change has threatened their well-being. The loss of biodiversity not only affects their food and medicinal sources but also impacts their cultural and social identity. Therefore, proactive measures are needed to balance development

with the protection of Orang Asli rights. As a policy recommendation, the government should implement stricter forest protection policies, including tighter control over logging activities and land concessions. Sustainable development programs must be designed with active participation from the Orang Asli to ensure their well-being is safeguarded. Additionally, strengthening ecological education and Orang Asli land rights awareness among the Orang Asli can enhance their role in environmental conservation. Collaboration between government agencies, non-governmental organizations (NGOs), and academic institutions is also crucial in developing more inclusive and evidence-based forest management models. Through fair and community-oriented policies, a balance between conservation and social well-being can be achieved, ensuring the long-term survival of the Orang Asli communities in this region.

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