

SUSTAINABLE LIVELIHOODS FOR SUKU ANAK DALAM: INTEGRATING LOCAL WISDOM AND NATURAL RESOURCES

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Abstract

The issue of poverty and food and nutritional vulnerability in the Suku Anak Dalam (SAD) community in Bukit Duabelas National Park requires special attention. This study will integrate various assets owned by indigenous communities, including local wisdom and social capital, with opportunities to develop the potential of natural resources in TNBD to support the achievement of SDGs. This research aims to describe the picture of SAD livelihoods and their changes and design a design or pattern for sustainable SAD livelihood development. The research uses a constructivist paradigm with a case study approach. Data analysis uses the Sustainable Livelihoods Framework to identify and evaluate SAD individuals or communities' assets, capacities, and strategies for maintaining sustainable livelihoods. The results of this research show that, SAD communities in TNBD still depend on extractive agriculture, such as hunting and gathering, but are starting to switch to plantation cultivation, such as oil palm and rubber. Professions outside the agricultural sector are limited, and their access to formal employment is hampered by limited education and skills. SAD has a variety of assets, including human, natural, social, financial, and physical capital. Social and natural capital are their main assets. Despite limited education, their natural resources are sufficient to support life. To increase SAD's livelihood sources, interventions such as utilizing mapped site space, piloting productive site projects, strengthening cooperation between government, NGOs and the private sector, and community-based sustainable forest management are needed.

Keywords: Livelihood, Sustainability, Suku Anak Dalam, SDGs.



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INTRODUCTION

The complex yet vital global challenge of meeting the Sustainable Development Goals (SDGs), particularly those about eradicating poverty (SDGs 1) and eliminating hunger, ensuring food and nutrition security (SDGs 2) to reduce the number of people living in severe poverty, cannot be overstated. Since their inception, several initiatives and policies aimed at mitigating the prevalence of extreme poverty have failed to meet the anticipated desired objectives. Thus, poverty remains the

primary challenge that Indonesia faces. Indonesia's abundant natural resources do not guarantee sufficient socioeconomic well-being for its population (Wigati & Firianto, 2013).

It is imperative to focus mainly on the problem of poverty and susceptibility to food and nutritional issues in the Suku Anak Dalam (SAD) community located in Bukit Duabelas National Park. These communities are characterized by their traditional and marginal livelihoods, which result in limited access to essential services and consequent inability to meet their basic needs (Fitriani, Triandafillidis, & Thao, 2023; Pratama, 2023). Implementing different development programs and the robust operation of the free-market economy following the New Order era have led to significant transformations in SAD life's social, economic, and ecological aspects. The persistent deforestation rate has led to the gradual loss of forests as sustenance for the SAD community (Cahyadi & Setiadi, 2022; Dessi, & Shah, 2023; Rahmayani et al., 2023).

The rapid pace of industrialization and globalization in the last twenty years has posed a significant risk to the long-term viability of the SAD traditional community. With the advent of industrialization and external influence, certain members of the SAD started to engage in other economic endeavors, such as labor on tropical plantations. The growing level of engagement with the external environment has led to a scenario where the everyday needs of Suku Anak Dalam (SAD), such as automobiles, telephones, and other electronic products, are on the rise. Furthermore, specific organizations have employed diesel engines to produce power in residential areas. This surge in demand stimulates diverse land-buying and selling transactions, altering the livelihoods of marginalized individuals.

The Forest Management Policy, which grants concessions for Forest Cultivation Rights in the Bukit Dua Belas Forest region, has sparked a crisis of legitimacy and authority for the Suku Anak Dalam (SAD) in establishing the spatial management of forest areas. Government actions such as issuing permits for forest concessions, industrial forest plantations, oil palm plantations, and transmigration schemes have reduced the available habitat for the SAD community (Muchlis et al., 2016; Chumburidze et al., 2023; Setiyani, Baharin, & Jesse, 2023). The livelihood of the SAD people has been heavily reliant on the forest habitat in which they reside, as their hunting and gathering activities are now under threat. Traditional hunting and fishing practices continue to hold significant importance in the daily life of the SAD. They utilize ancestral knowledge and expertise to extract sustenance from woodlands and rivers. Some are also proficient in preparing traditional medicinal and wild herbs for consumption and therapeutic uses, drawing upon their indigenous knowledge.

The economic state and orientation of the SAD community have undergone a significant transformation. Some individuals with SAD have already established stable means of living, adopted a settled way of life, and fully assimilated into the local community. Yet, most of the SAD are in a precarious state, as their way of life roams throughout the TNBD region and in gardens owned by locals and businesses. As a result of the depletion of resources in the forest, certain individuals have ceased to rely on the forest for their means of subsistence. Instead, they collect palm oil fruit nuts acquired from locals and businesses to sell them, and after that, they use the proceeds to purchase food and other essential items. The SAD groups have cultivated commercial commodities like rubber and oil palm but adhere to traditional management practices.

The current obstacles faced by socially and economically disadvantaged SAD that hinder their ability to break free from poverty include restricted availability of education and healthcare, with schools and health facilities generally located far away from their homes, and insufficient existing infrastructure; A continued dependence on a subsistence way of life, such as hunting and gathering characterizes economic poverty. Amidst environmental shifts and economic constraints, they frequently encounter challenges in fulfilling fundamental requirements. Environmental Change and External Influences: Deforestation practices and land conversion for plantations negatively impact natural resources that rely on SAD for survival. Furthermore, social stigma and marginalization tend to restrict the access of individuals with SAD to resources and economic opportunities, therefore affecting their lifestyle and well-being.

Livelihood studies have been conducted by several researchers, including Nugroho & Murtasidin (2023) who concluded that poor people will basically build their livelihood strategies on the available vital resources. The sustainable livelihood framework adopts a different perspective in understanding poverty and how to intervene to improve the conditions of poor people, rural livelihoods are caused by the impact of climate change on rural livelihoods and changes caused by globalization (Natarajan et al., 2022; Sultanuddin et al., 2023), The livelihood strategy used by the community is a

dual strategy covering aspects of agriculture, livestock, and other aspects (civil servants, private employees, and laborers) (Husen et al., 2021). Farmers who implement survival strategies aim to achieve livelihood outcomes, including improving livelihoods and using sustainable natural resources (Izzati et al., 2021; Rini et al., 2023; Yolviansyah et al., 2023). Cultural values can encourage the ability to access resources such as natural and social capital (Singgalen, 2020), utilize natural resources by converting raw products into products with added value (Riantoro & Semet, 2018; Yusnidar et al., 2023), maximize the use of owned land and residential locations as tourism potential (Annisa et al., 2022; BoangManalu, Iqbal, & Garcia, 2024), and use consolidation strategies so that the stability of the community's economy is maintained (Saputra et al., 2019; Khoviriza et al., 2024).

Studies that explore livelihood strategies in indigenous communities and link them to Sustainable Development Goals (SDGs) are infrequent. This research focuses on the traditional lifestyle and natural resource interactions of the SAD community. It evaluates how their way of life supports the goals of poverty eradication (SDG 1) and food security (SDG 2). Using a constructivist paradigm, the study delves into the community's knowledge and practices through qualitative methods such as interviews and observations, aiming to understand and enhance their livelihoods in line with SDG targets.

The research emphasizes sustainability and inclusivity, integrating local wisdom and social capital with modern development objectives. It highlights the significance of community-based approaches and collaboration among multiple stakeholders to ensure sustainable livelihoods for the SAD community. While these studies often touch upon local knowledge, environmental concerns, and traditional livelihood sources, they seldom combine these aspects comprehensively. This research bridges various resources available to indigenous people, like local knowledge and social capital, to explore viable livelihood options and align them with the Sustainable Livelihoods Framework to achieve SDGs.

LITERATURE REVIEW

Poverty and Vulnerability

A multifaceted interaction of historical, socioeconomic, and environmental elements gives rise to the poverty and vulnerability of indigenous peoples in contemporary civilizations. These factors exacerbate their marginalization and persistent challenges in obtaining rights and resources.

Indigenous communities often face the consequences of historical dispossession from their lands, a legacy of colonialism that continues to affect their socioeconomic status (Viola, 2024). The ongoing impact of colonization is viewed as a disaster, perpetuating vulnerability through systemic disempowerment and resource extraction (Lambert, 2022; Herawati, Khairinal, & Idrus, 2023). Poverty and vulnerability of indigenous communities are also caused by climate change (Wardhana et al., 2023), and changes in the landscape due to policies in the forestry sector that do not favor them (Muchlis et al., 2016).

Many indigenous groups experience significant socio-economic challenges, including limited access to education, health care, and employment opportunities, which exacerbate their poverty. Social vulnerability has two dimensions, namely the human physical environment dimension (ecological) and the social institutional and social structure dimension (sociological) in a broader sense (Musa et al., 2021). Indigenous people experience disproportionate impacts from environmental change and disasters, especially because of their dependence on natural resources for food. Their well-being remains consistently threatened by the convergence of colonialism and environmental degradation. The lack of incorporation of indigenous knowledge into disaster risk reduction methods exacerbates their vulnerability, as these communities are not sufficiently involved in planning procedures. This marginalization also occurs in the indigenous community of Suku Anak Dalam (SAD) around Bukit Duabelas National Park, Jambi (Muchlis et al., 2016; Wandu, 2019).

Indigenous People

Indigenous peoples refer to ethnic groups residing in a sovereign nation with distinct social, cultural, and economic circumstances compared to other community groups or ethnic groups who have been part of a country since the colonial period. These indigenous peoples retain their own economic, cultural, and political institutions (Chairul, 2019). As integral members of a nation or country, indigenous peoples have interests that the government or state must uphold, particularly concerning the exploitation of natural resources. The administration is responsible for effectively managing and using

natural resources to promote development and ensure the population's well-being, primarily indigenous peoples (Muazzin, 2014).

SAD is an indigenous population residing in the interior regions, particularly in the Bukit Duabelas National Park in Jambi Province. They are a tribal population that leads a traditional lifestyle and relies on the forest as their primary sustenance. The SAD indigenous community is characterized by their reliance on the forest for sustenance, their nomadic or semi-nomadic lifestyle, their primary mode of livelihood being hunting, gathering, and farming using traditional methods, and their uncomplicated social structure, often headed by a traditional leader known as Temenggung (Muchlis, 2023).

Social Capital

Social capital is a resource found in individuals or community groups connected in a network, which is related to institutional and non-institutional relationships and is mutually beneficial to each other. Social capital is a network that connects individuals and community groups, positively impacting each party. The network that connects individuals and society does not appear (given) but is the result of individual or collective interactions carried out consciously and unconsciously, resulting in long-term relationships. Reciprocal collective life patterns based on kinship, brotherhood, interdependence and cooperation have become the hallmark of a community (Sholehuddin & Subari, 2022).

Social capital is assumed to be an alternative form of other modalities. Theoretically, there is a debate about social capital leading to social relations. The debate concerns conceptualizing social capital as concrete capital where individuals or groups can utilize social relations, including norms, social networks, and trust, to obtain economic and social benefits (Fathy, 2019). Meanwhile, the form of social capital based on the type of social ties (social networks) can be distinguished as follows: (a) Bonding social capital, meaning ties between people in the same situation, such as close family, close friends and neighbourhood associations, (b) bridging social capital, including looser ties between several people, such as distant friends and co-workers, and (c) Linking social capital, reaching people in different situations who are entirely outside the community, thus encouraging its members to utilize many resources from those available within the community (Fathy, 2019).

RESEARCH METHOD

This research uses a constructivist paradigm with a qualitative approach, where the research process is based on a unique methodology, namely researching social or humanitarian problems. This qualitative approach is expected to produce in-depth studies of speech, writing and behaviour that can be observed from a particular individual, group, society or organization in a particular context setting which is studied from a complete, comprehensive and holistic point of view.

This research was conducted from August to November 2021 in the Bukit Duabelas National Park, Jambi Province. Primary data collection was carried out through in-depth interviews, FGDs and field observations. FGD and field observations. In-depth interviews were conducted with informants consisting of SAD figures, traditional leaders and communities around TNBD, BTNBD employees, academics and NGO activists. Informants were obtained using the snowball technique. Data and information are also collected from research reports, statutory regulations, newspapers, BPS and documents from BTNBD. To obtain data, researchers emphasize dialectical interaction between researchers and sources to confirm reading various literature relevant to the research topic.

The collected data were analyzed descriptively and qualitatively. The steps are data reduction, data presentation with charts and text, and then concluding to reveal facts, circumstances, phenomena, variables, and conditions during the research (Miles & Huberman, 2014). Data analysis uses the Sustainable Livelihoods Framework, an analytical approach used to understand people's lives, especially in rural areas or vulnerable communities. The main objective is identifying and evaluating the assets, capacities, and strategies individuals or communities have to achieve and maintain sustainable livelihoods. By using this framework, analysis can be more comprehensive and help design programs or policies that are more effective and sustainable.

RESULTS AND DISCUSSION

SAD population in Bukit Duabelas National Park

In general, there are 13 Temenggung located around and in the forest area of Bukit Duabelas National Park. The SAD population of each Temenggung can be seen in Table 1.

Table 1. Population of Orang Rimba or Anak Dalam Tribe in the Bukit Duabelas National Park Area, Regency/City in Jambi Province in 2021

No	Temenggung	Number of families	Population
1.	Afrizal	20	78
2.	Bebayang	19	80
3.	Bepayung	20	87
4.	Celitai	45	235
5.	Girang	35	164
6.	Jelitai	142	553
7.	Meladang	46	172
8.	Nangkus	83	378
9.	Ngadap	101	428
10.	Ngrip	95	434
11.	Nyenong	29	113
12.	Nyurau	62	161
13.	Ngamal	21	77
Amount		718	2960

According to the data presented in Table 1, the Temenggung Jelitai Group has the highest number of Heads of Families (KK), making up 142 families (19.78%). The Temenggung Ngadap Group follows closely with 101 families (14.07%), and the Temenggung Ngrip Group has 95 families (13.23%). Nevertheless, there exist variations in the largest population groups, particularly the Temenggung Jelitai group with 553 individuals (18.68%), the Temenggung Ngrip group with 434 individuals (14.66%), and the Temenggung Ngadap group with 428 individuals (14.46%). The group with the fewest families was Temenggung Bebayar, consisting of 19 families (2.65%), whilst the Temenggung Ngamal group had the smallest number of individuals, with 77 persons (2.6%). To visualize these distinctions more clearly, refer to Figure 1.

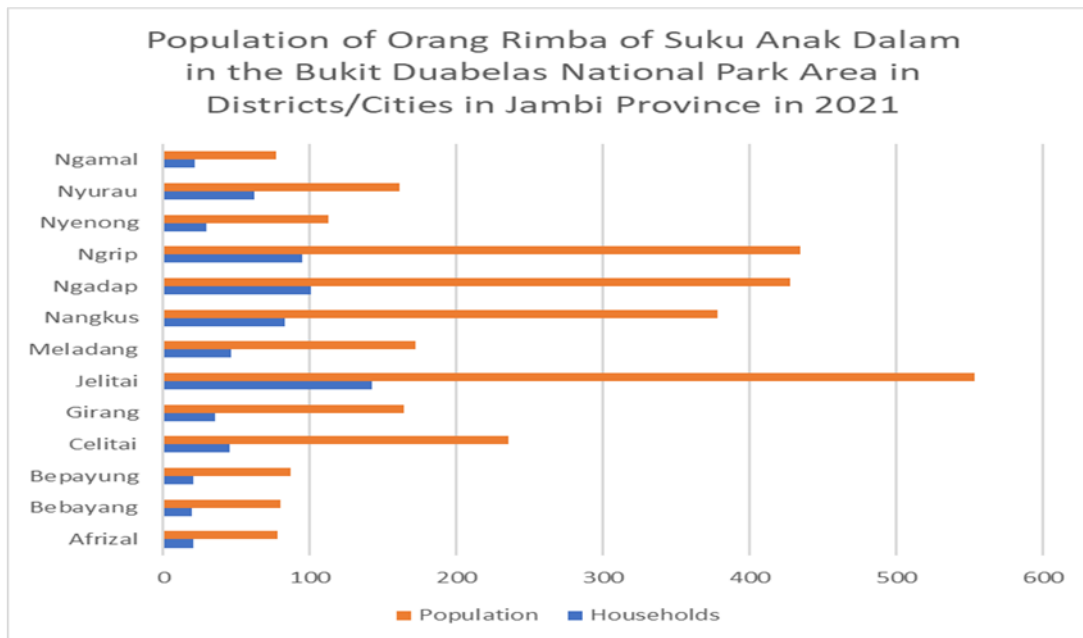


Figure 1. Population graph of the Orang Rimba/Suku Anak Dalam (Source: TNBD, 2021)

Description of SAD livelihoods in the TNBD area

Extractive Agriculture: Hunting and Gathering

Extractive agriculture involves harvesting products from nature and land without efforts to restore these valuable resources for future use. For the SAD community, this includes traditional practices such as gathering and hunting. This subsistence mode heavily depends on forest resources and is performed continuously. Gathering involves the intentional collection of forest resources like fruit,

tubers, and other consumable items, playing a key role in sustainable agriculture by leveraging the forest's rich biodiversity. Hunting is a customary activity for obtaining protein and sustenance from wild animals, including deer, wild boars, snakes, and birds. Additionally, concocting involves using natural ingredients to create food and medicine, such as herbal remedies, which have proven effective in treating various ailments through traditional preparations.

Research findings indicate that collecting and hunting activities are typically conducted in groups, occurring concurrently. Gathering activities primarily pertain to two aspects: collecting forest products in the form of food to fulfill food requirements, and collecting non-food forest items that have economic value as a means of generating family income. In the context of SAD life, the integrity of plants that yield edible fruit products is effectively safeguarded from disruptions that may adversely affect their long-term viability. Geographical regions abundant in fruit plants are referred to as continents. Numerous forest plant species, such as forest durian, tampui, bedaro, kedondong, and langsung, provide fruit suitable for SAD consumption. Additional forest commodities that are also sought after in collection operations include edible tubers such as banar, gadung, bayay, junjung, and soan. Furthermore, forest honey is one of the products SAD consumes and sells.

Apart from consuming several types of forest products derived from plants, SAD also uses several types of animals to support its food needs. In hunting activities, several types of animals that are targeted include pigs, deer, mouse deer, several types of forest fowl, labi-labi, snakes, monitor lizards, and types of fish found in rivers in the Bukit Dua Belas National Park forest area. Currently, hunted fish are categorized as rare and can no longer be relied upon to meet the family's food needs. According to information from several SAD residents, in the past, hunted animals, apart from being partially consumed, could also be sold.

Gathering and hunting to fulfil the family's food requirements are fundamental in the context of SAD. Engaging in gathering and hunting activities is also intended to acquire forest goods that can be traded for essential food requirements, such as rice and other ingredients unavailable from the forest. The economically valuable forest products that SAD typically acquires include jernang, rattan, and latex. Jernang has historically been the primary revenue stream for SAD. However, its reliability has diminished due to the rarity of jernang in the Bukit Dua Belas National Park region. This shortage results from the declining population of jernang and the continually growing number of users. Similarly, rattan and latex trees formerly enjoyed a market value that could be depended upon as a reliable source of household revenue. The presence of this entity is becoming progressively scarce, as its population is limited and its position is distant from the center of the SAD settlement in the Air Hitam community. *“Kami kalau nak mencari roan (berotan), bejernang, kiniko sudah memakan hari, bisa sampai dua tiga minggu masuk ke hutan, baru kembali ke rumah kami. Kalau 10 tahun lalu, kami pergi pagi hari dan sore hari sudah pulang ke rumah. Kami sudah membawa rotan, jernang atau manau [If we want to look for roan (rattan), bejernang, kiniko, it takes days, it can take up to two or three weeks to go into the forest, then we return home. If 10 years ago, we would go in the morning and return home in the evening. We would bring rattan, jernang or manau]”*, said Tumenggung Nggrip, one of SAD Temenggung on the depth interview with researcher.

SAD, who make their living from gathering, gathering and hunting, are increasingly faced with a crisis of natural resources which are a source of food and family income. This source of livelihood is faced with challenges, including a decline in forest resources due to illegal logging and land conversion, which can reduce the availability of collected materials, decline in populations and habitats of game animals, a decline in the number and diversity of plant and animal species used in concocting, and access to knowledge, where knowledge of ingredients and techniques processing could disappear as the younger generation of SAD begins to abandon this traditional practice.

With diminishing forest resources, some members of the SAD community have shifted their production patterns to agriculture, specifically cultivating rubber and palm oil. Those unable to make this shift continue to rely on traditional gathering and hunting practices. The scarcity of forest resources has driven them to gather and hunt in gardens owned by village communities and companies near Bukit Dua belas National Park. They collect palm oil stalks from these areas to sell for income. Additionally, SAD consumption patterns have evolved, with rice becoming a staple, necessitating monetary income to meet this basic need. It is anticipated that the push to transform production patterns, as gathering and hunting livelihoods become less viable, will intensify among SAD communities in the future.

This study aligns with Lubis (2022) findings, which indicate that traditional agricultural systems, such as extractive agriculture, have historically been effective in sustaining local food security

for centuries. However, these systems currently confront numerous challenges, including population growth, land use changes, and climate change, which jeopardise their sustainability.

Cultivation of Plantation and Food Crops

Apart from hunting and gathering, the research results also show that the SAD community has oil palm and rubber plantations, especially for the Temenggung Nangkus, Temenggung Ngrip, Temenggung Bepayung, and Temenggung Kecinto groups in Bukit Suban Village and Pematang Kabau Village. The location of the plantation owned by the SAD community is in the buffer area and utilization zone of the Bukit Dua Belas National Park. For gardens located within TNBD, there are no production roads to release the harvest. For this obstacle, the TNBD can accommodate this with a strategy of building patrol roads that can function as production roads. The SAD community of the Air Hitam group started planting rubber in 1984, after the construction of a transmigration settlement in their forest area. Rubber gardening activities were initially a strategy to survive the pressure of clearing forest land that had been used as transmigration settlements and clearing garden land by the Terang People. The opening of rubber plantations was planted on border land between village community gardens and TNBD forest areas. The rubber plantations planted are called "hompongan". In SAD language "hompongan" means mixed garden.

This model of Hompongan rubber plantation, which is planted with various types of trees, makes Hompongan more appropriately called a rubber forest, because the planting pattern still uses sweeping seedlings that come from the rubber gardens of village residents. Hompongan which is planted in a polyculture manner refers to the forest plantation system (agroforestry), based on many research results that from an environmental aspect this plantation system has high conservation value, and also from an economic aspect it has quite high economic value. The purpose of opening the rubber plantation is to fence off or block the Terang people from clearing land in the forest area which is the SAD's living space. Apart from rubber trees, fruit trees are also planted in the hompongan such as durian, duku, rambutan, pedaro (a type of longan), jengkol and other fruit trees.

The results of the research show that the SAD which has quite large rubber plantations is limited to the "pengulu" group, while the rombongan members are limited to working as tapping workers in the rubber plantations of the pengulu. Even if there are group members who have a rubber plantation of no more than 2 (two) hectares, they don't plant very many rubber trees, on average each person is only able to plant 200-300 trees. but this is only a small part, most of the group members do not have rubber plantations and still depend on looking for non-timber forest products in the TNBD area for their living. This rubber farming business has enabled SAD to carry out significant intensification of economic efforts and increase the productivity of their workforce. The main problem with this rubber farming is the low quality of their rubber latex and the limited amount of rubber produced when compared to rubber from village residents.

In addition to rubber gardening, members of the SAD community in Bukit Suban Village, the Temengung Ngrip Group, and the Temenggung Nangkus Group in Pematang Kabau Village have now begun cultivating oil palm. This transition, initiated by the SAD Air Hitam community leader H. Jailani (Temenggung Tarib), shows their growing familiarity with oil palm cultivation alongside rubber gardening. The influence of nearby village communities around the TNBD buffer area, which generally operate oil palm plantations as part of the plantation company's plasma program, has also played a role. Surrounding the TNBD area, there are four oil palm plantation companies: PT. Sawit Desa Makmur, PT. Jambi Agro Wiyana, PT. Era Mitra Agro Lestari, and PT. Sari Aditya Loka 1.

The existence of oil palm plantations belonging to the SAD community in this area cannot yet become an economic source because the plantations they own are not yet producing and the plantation location does not have access to production roads, thus hampering the process of transporting the harvest. The SAD community's oil palm plantations in the TNBD area are a phenomenon that, according to conservation norms, is not permitted to be cultivated in conservation areas. This is a challenge, especially for the TNBD Center in its efforts to continue to maintain the existence of conservation areas.

Meanwhile, the food crop sector, which is a source of daily food needs for the SAD community, is not yet optimal for SAD. The results of research identification show that tuber commodities are the staple food for the SAD community, such as cassava, gadung and banar. Choices of food commodities are needed to be developed as staple foods that can be produced or cultivated sustainably. This

commodity was once developed by SAD, through the company's CSR empowerment program, but it was not sustainable.

The transformation of the SAD livelihood system from extractive agriculture to settled agriculture is a demand and involves various factors, both internal in the SAD community such as the increasingly limited availability of hunting and gathering space and external factors, such as the practice of settled agricultural cultivation carried out by villagers which also influences the mindset and drive to change from SAD. This fact is in line with the results of Purwaningsih et al., (2022) and Sulistiyoni et al., (2015) which state that the drive for rational action by farmers to carry out transformation is influenced by internal and external factors.

Other Occupations Outside the Agricultural Sector

Professions outside the agricultural sector remain relatively scarce. The SAD community's access to diverse employment opportunities is significantly constrained because their individual human resource capacities often do not meet formal employment criteria. Available job opportunities for SAD community members typically include roles such as security personnel (SATPAM) for local plantation companies. To enhance access and capacity for the SAD community, training activities tailored to their skills and abilities, utilizing their natural resources, must be developed. Generally, SAD community members lack access and opportunities for formal sector employment due to their limited knowledge and inability to meet formal education requirements. Nonetheless, there are already some SAD community members who have succeeded in becoming members of the TNI and POLRI, in addition to working as SATPAM.

Livelihoods Strategies for Economic Sustainability of SAD Communities

The concept of livelihood has become an important topic in development and is an issue that continues to be discussed. The concept of livelihood is often used as a topic of discussion about poverty and rural areas (Dharmawan, 2007). Livelihood can be interpreted as the ability of humans to develop strategies and implement these strategies to ensure the sustainability of their lives. The study of SAD livelihood design is closely related to the Sustainable Development Goals (SDGs). SDGs is a global action plan agreed by world leaders, including Indonesia, to end poverty, reduce inequality and protect the environment (Febriani & Samudra, 2023). In the context of ending poverty and maintaining food security in SAD communities (SDGs 1 and SDGs2), the livelihood design for SAD communities in TNBD will link to the Sustainable Livelihoods Framework, namely Asset Identification, Asset Categorization, Capacity Analysis, Livelihood Strategy, Relationship between assets, External factors to formulate interventions and policies that can end poverty and maintain food security in SAD communities.

To design livelihood strategies for SAD communities in TNBD, researchers refer to DFID (2001a) by creating a framework that links conditions and context that influence livelihood assets. The Livelihoods framework can be seen in Figure 1.

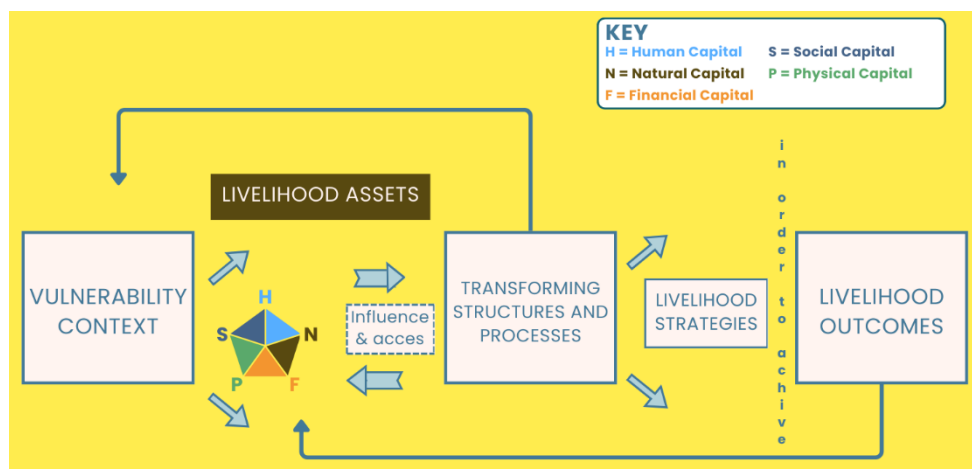


Figure 2. Sustainable Livelihoods Framework (DFID, 2001a)

Analysis steps in implementing the Sustainable Livelihoods Framework in SAD Communities include: Asset Identification, Asset Categorization, Capacity Analysis, Livelihood Strategies, Relationships Between Assets, External Factors, and Interventions and Policies.

1. Asset Identification

Assets are defined as various forms of capital, such as social capital, physical capital, human capital, natural capital and financial capital that are owned and used for the lives of individuals, groups, communities or households to maintain material well-being at different levels of survival. DFID (2001a) groups livelihood assets into five groups called the asset pentagon (Figure 2).

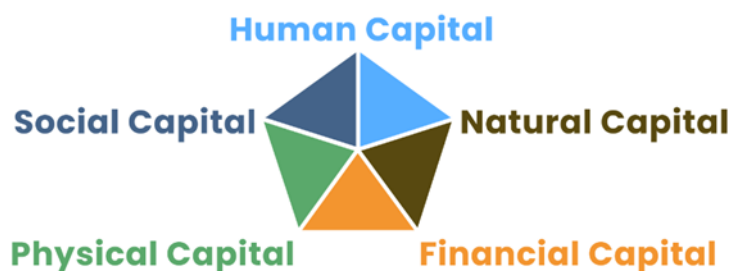


Figure 3. Pentagon Assets (DFID, 2001b)

Description of Asset Identification owned by the SAD community is described as follows:

- a. Human Capital, refers to the workforce available to households with education, skills, health and experience. SAD. Having local wisdom in maintaining and conserving natural resources in TNBD. The Traditional Knowledge possessed by SAD is local wisdom which includes knowledge about hunting, gathering techniques, natural resource management and traditional medicine. This also includes cultural practices and rituals related to the forest and their daily life
- b. Natural Capital, also known as natural resources or supplies that produce carrying capacity and beneficial value for human livelihoods. The SAD community has Flora and Fauna resources such as plants, fruit, tubers, and animals as well as Non-Timber Forest Products (NTFPs) in the TNBD. which provides a source of food and other materials essential for daily life
- c. Financial Capital is financial resources that can be used and utilized by individuals, groups or communities in achieving livelihood goals. In the context of the SAD community, they are still limited in capital accumulation and limited in household income. However, the SAD community does not have relatively many needs like other village residents.
- d. Social capital is a combination of communities that can provide benefits to individuals, groups or households that are members of it. The SAD Community has local institutions that have local structures such as Temenggung, Depati, Debalang Batin, Mangku, and Anak Dalam. This local institution hasThe social structures and kinship networks within the SAD community help support and strengthen social solidarity and social support mechanisms.
- e. Physical Capital (Physical Capital), Physical capital encompasses essential infrastructure and facilities designed to sustain community livelihoods. Possession of these physical assets represents a level of comfort crucial for household survival. It includes control over land, the extent of land area, types of cultivated crops, and ownership of buildings such as houses, vehicles, furniture, household equipment, factories, and production technology (Rahman et al., 2024). The primary assets of the SAD community are the land they inhabit and the forests within TNBD. These forests are crucial, offering food, building materials, medicinal resources, and biodiversity vital to their way of life. The Indonesian Ministry of Environment and Forestry's policy designating TNBD as a living space and livelihood for the SAD community reinforces their rights and access to these forest resources. This policy provides for the establishment of communal and family sites, enabling the SAD community to utilize or manage the potential within these areas. Additionally, the policy delineates core spaces, such as the Benuaron conservation area, where forest fruits grow, which can be sustainably utilized by the SAD community.

2. Asset Categorization:

Categorizing these assets is done to understand how important and impact they have on sustainable livelihoods. The most important assets owned by SAD in sequence are social capital, natural capital, physical capital, human capital and financial capital. This order of assets refers to the hierarchy or priorities in the SAD livelihoods framework

1. Social Capital (Social Capital). This aspect is considered the most basic because it includes social relationships, networks and norms that enable the SAD community to work collectively and effectively. Without strong social capital, other assets may not be utilized optimally.
2. Natural Capital (Natural Capital). The natural capital aspect includes natural resources and ecosystems that provide goods and services that support the livelihoods and sustainability of SAD, namely food sources and non-timber forest products (NTFPs). This aspect is the second priority and is very important for the sustainability of SAD livelihoods.
3. Human Capital: Human capital includes skills, knowledge and individual health. This is important because the quality of the workforce and their ability to innovate and adapt can affect the ability to utilize other assets.
4. Physical Capital: This aspect includes the infrastructure and equipment required for production and services. The main physical capital owned by SAD is land and forests. This is important capital to be managed by the SAD community into useful and sustainable results.
5. Financial Capital (Financial Capital): Financial capital including money, investments and other financial resources, owned by SAD is relatively limited.

3. Capacity Analysis

The SAD community's knowledge and skills in modern technology and farming are somewhat limited compared to villagers, primarily due to restricted access to formal education and modern skills training, which hampers their ability to enhance livelihoods and productivity. Nevertheless, within the TNBD, the SAD community has relatively ample resource availability to support sustainable livelihoods, particularly in terms of flora and fauna. These forests, abundant in biodiversity, provide food, medicine, and building materials. Additionally, the TNBD holds ecotourism potential that can be developed with the involvement of the SAD community as guides or service providers, offering them opportunities to generate additional income.

Policy support from TNBD is in line with Wibowo et al., (2021) which states that forest resource management by indigenous communities must receive great attention from related parties, so that they get special space to manage natural resources. In addition, capacity analysis must also pay attention to important issues, the relationship between the characteristics of indigenous communities and local institutions and the socio-ecological relationships of indigenous communities with the forests they manage, and an approach to the relationship between groups and other supporting institutions is also needed (Suharyon, 2020, 2022).

4. Livelihood Strategy

Sustainability strategies for SAD livelihoods must consider the need to preserve their culture, protect their environment, and improve their economic well-being. This is in line with research of Izzati et al., (2021) and Wijayanti et al., (2016), which states that facing the threat of inadequate livelihoods by relying on natural resources can be done by combining existing and accessible livelihood assets. In addition, the use of forest resources is not only oriented towards economic aspects but also prioritizes ecological aspects (Husen et al., 2021). This is important to avoid vulnerability due to natural disasters, changes in seasonal trends and climate change which will affect livelihoods and livelihood strategies (Irsyad et al., 2020).

Sustainability strategies for SAD livelihoods must consider the need to preserve their culture, protect their environment, and improve their economic well-being. Considering the natural, physical and social capital resources possessed by SAD communities, future livelihood strategies are as follows:

- Carrying out generative agricultural practices for both plantation commodities that comply with conservation principles and food commodities to meet family food needs. This generative agricultural practice must of course be based on Best Agricultural Practice which does not violate conservation principles in conservation areas (TNBD).

- Cultivating plantation commodities, NTFPs such as rattan, jernang, sialang (honey), and gaharu also needs to be developed in communal and family sites.
- Local Economic Development, based on forest resources, such as processing economically valuable herbal medicines from endemic plants in TNBD while still considering sustainable agricultural practices, namely, in addition to down streaming products, at the same time carrying out in situ and ex situ conservation to ensure the availability of sustainable raw materials.

5. External Factors:

External factors that will influence the sustainability of the livelihoods of the SAD community are the strong influence of the expansion of oil palm plantation commodities carried out by village residents. The relatively good interaction between the SAD community and village residents will have an impact on the SAD community's interest in cultivating oil palm plants in the TNBD area, while oil palm plants are not a plant that has been recommended by the Ministry of Environment and Forestry as a conservation plant.

6. Intervention and Policy

Based on the description and analysis carried out by Asset Identification, Asset Categorization, Capacity Analysis, Livelihood Strategy, External Factors, the formulation of recommendations for interventions or policies that can improve the sustainability of SAD livelihoods is as follows:

- The Ministry of Environment and Forestry (KLHK), through the TNBD Hall, needs to design policies and interventions to utilize the communal site space and family sites that have been mapped within the TNBD area to be utilized or managed by the SAD community.
- The government needs to carry out a pilot project for the development and management of productive communal sites and family sites, so as to grow the confidence of the SAD community that the use of communal sites and family sites is able to support and improve the standard of living of the SAD community.
- Strengthening Cooperation and Partnerships, through Collaboration between Government, NGOs, and the Private Sector to support productive and beneficial programs for SAD, facilitate access to resources and technical support, and create community-based local economic opportunities.
- Facilitate and oversee sustainable forest management practices, community-based or community-based conservation, to protect TNBD as a living space and livelihood for SAD with the potential rich biodiversity available therein.
- Involve SAD in (inclusive) planning and decision-making regarding resource management and development programs, so that the solutions implemented are in line with their needs and preferences.
- Encouraging Empowerment of the SAD Community by active participation in processes that influence and encourage their economic welfare and implement the agenda of strengthening the capacity of economic groups in the SAD community, such as the Ubat Pusako group which has been approved by the Indonesian Ministry of Law and Human Rights Number: AHU-0003080.AH.01.07. This group focuses on processing and marketing herbal medicines from endemic TNBD plants; Management Training (Home Economics, Organization and group administration) and Strengthening community capacity in the dimensions of culture and local wisdom.
- Strengthen the organizational structure of the SAD community by reviewing the main tasks and functions of each institution contained in the SAD organizational structure.

The transition of livelihood systems that occurs in the SAD community is one form of social change that occurs in a community (Susanti et al., 2012). This transition requires the ability to adapt the SAD Community so that their livelihoods in the future can survive and be sustainable. Several efforts by indigenous communities to maintain and revitalize the values and cultural systems of their ancestors are believed to be able to guarantee the continuity and welfare of life and ensure ecological balance (Gunawan et al., 1998). This shift in the livelihood system will significantly influence the socio-economic landscape of the local population (Mbawo, 2014). The realization of a sustainable livelihood can be seen from the existence of opportunities to work and try, achieving prosperity, adaptation and

resilience of livelihoods, food fulfillment, and sustainability of natural resources (DFID, 2001a; Scoones, 2009). Realizing sustainable livelihoods can be done with livelihood strategies. Livelihood strategies are carried out by combining various available livelihood capital.

This research provides significant implications for the sustainability of the livelihoods of the Suku Anak Dalam (SAD) community, necessitating the consideration of ecological, cultural, and economic factors. The main implications of the research findings are as follows: (1) Integration of Ecological and Economic Aspects: Combining environmentally friendly agricultural practices and sustainable forest resource management will positively impact economic well-being; (2) Empowerment and Capacity Building: Training in forest resource management, especially Non-Timber Forest Products (NTFPs), and diversification of income sources to counter external threats, such as palm oil plantation expansion; (3) Inclusive and Collaborative Policies: Involving the community in planning and decision-making processes to ensure that the strategies implemented meet their needs and support sustainable natural resource management; and (4) Protection of Local Culture and Traditions: Integrating the cultural values or customs of SAD with modern economic approaches can provide long-term welfare assurance for the SAD community, while maintaining ecosystem balance. Overall, this research emphasizes the necessity of a holistic and collaborative approach to create sustainable livelihood strategies for the SAD community, integrating cultural, ecological, and economic aspects.

CONCLUSION

Currently, SAD's livelihood in TNBD still depends partly on extractive agriculture, namely gathering, hunting and gathering. Transformation Another source of livelihood, which SAD has started to implement, is the cultivation of plantations, especially oil palm and rubber. Professions outside the agricultural sector are still relatively limited. Access for members of the SAD community to take advantage of employment opportunities is very limited because their individual human resource capacity generally cannot meet the formal requirements for employment. SAD have various assets that support their livelihoods, including human, natural, financial, social and physical capital. Social capital, such as institutional structures and kinship networks, is considered the most important asset, followed by natural capital which includes flora and fauna resources in TNBD. Although SAD face limitations in education and modern skills, they have sufficient natural resources to support sustainable living. Interventions and policies that need to be carried out to support and improve SAD livelihood sources are designing the use of communal site space and family sites that have been mapped in TNBD, implementing productive site development pilot projects, strengthening collaboration between government, NGOs and the private sector to develop the local economy, as well as facilitating community-based sustainable forest management practices.

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AUTHOR CONTRIBUTIONS

All authors contribute to the creation of articles and development of instruments, taking responsibility for the research conducted.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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