Potential development of non-timber forest products in the Sapat Village Forest Indragiri Hilir Regency

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Abstract. Non-Timber Forest Products (NTFPs) are an important source of livelihood and forest sustainability. Village Forest (VF) is a social forestry program that can help to promote NTFP development. This study aimed to assess the potential and strategies for NTFP product development in Sapat VF, Indragiri Hilir Regency, Riau Province, Indonesia. Data were collected using observation, interviews, and literature review. Snowball sampling was used to select informants. SWOT analysis was used to assess the potential for NTFP product development. The results showed that Sapat VF has a high potential for NTFP product development, with a variety of NTFPs such as mangrove crabs, lokan, shrimp, nipah, mangrove fruit, nyirih fruit, and jeruju leaves. The community has a positive attitude towards protecting Sapat VF, as evidenced by their membership in the Supervisory Community Group (SCG). An aggressive strategy was used to develop NTFP products, which is a favorable situation because it has opportunities and strengths that can be exploited.

1 Introduction

Non-timber fores products (NTFPs) are an essential source of livelihood and forest sustainability, especially in light of the declining productivity of timber from natural forests [1]. The current paradigm shift in forest management focuses on managing the forest as a whole ecosystem, which demands diversification of forest products beyond timber [2]. NTFPs come from parts of trees and plants that have unique properties, and they can be used to produce goods for the community, export, or industrial use [3].

According to the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. 8 of 2021, NTFP utilization is the activity of using and cultivating non-timber forest products in a way that does not damage the environment or reduce their primary function. NTFPs can continue to be utilized sustainably if appropriate management practices are applied. According to [4], sustainable forest resource development opens up opportunities for the development of non-timber forest products (NTFPs) because they have comparative advantages and are in direct contact with communities around the forest. The

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economic value resulting from the use of NTFPs is much greater than wood and does not cause forest damage, so it will not result in the loss of functions and service values of the forest [5]. Managing NTFPs should involve community empowerment. So by empowering the community towards the development of NTFPs, of course it can open up new job opportunities and this is not only beneficial for the government but also benefits the community, especially towards preserving forest resources. One such concept is the Social Forestry program, which is being implemented by the government.

Social forestry is a widely accepted and recognized approach to achieving forest sustainability and provides multiple benefits for communities, including those outside the program area [6]. Village Forest (VF) is a social forestry program initiated by the government that includes NTFP development. The critical principle of VF management is to involve communities living around the forest to benefit from the forest without altering its function or status. According to [7], VF development can contribute to livelihood security for communities that depend on forest resources by increasing public accountability for natural resource management policies and institutions.

Riau is the third largest province in Indonesia for social forestry target area. One of the villages that has been granted a social forestry permit with a village forest scheme is Sapat Village Forest. Sapat Village Village Forest (VF) has the largest designation of all village forests in Riau, with 4,249 hectares. It has a broader potential for NTFPs than other villages, including shrimp, rapeseed, mangrove crabs, honey, and nipah shoots. Nipah shoots are used by the community, especially housewives, as an alternative source of income. They are dried and used as raw material for cigarettes, which has allowed this commodity to penetrate the export market to Thailand at a reasonably high price.

Knowledge of the types of NTFPs with the potential to become superior commodities that can improve the welfare of the local community and contribute to the region is essential for understanding their development potential. However, the topic remains largely unexplored within academic research. The synergy between multiple stakeholders and good resource management and development is essential for the long-term development of superior NTFPs [8]. This study aims to identify the potential for developing NTFP products in Sapat VF, Indragiri Hilir Regency, and to analyze the strategies used to develop NTFP products in Sapat VF, Indragiri Hilir Regency.

2 Methods

This research was conducted from July to August 2022 in Sapat Village Forest (VF), Kuala Indragiri District, Indragiri Hilir Regency, Riau Province. This research used a mixed approach. The research employed the snowball sampling technique for sample selection, prioritizing the identification of key informants as a crucial step. Following interviews with the key informant, subsequent informants were identified based on recommendations from the initial key informant [9]. In the snowball sampling technique, the emphasis lies not in the quantity of informants but in the depth of information they provide. This method entails initially selecting a small sample, progressively expanding it until sufficient and accurate information is gathered for comprehensive analysis, resulting in an increased sample size [10]. Key informants chosen for this study include the Head of the Sapat subdistrict, the Head of the Sapat LPHD serving as the Village Forest manager, YMI in the role of the village assistant, the Head of the Social Forestry Business Group (KUPS), and the Head of the Mandah Forest Management Unit (KPH) overseeing forest management at the site level. The selection criteria for informants are based on their association with the institutions managing HD Sapat and their relevance to the local community set to benefit from the development of non-timber forest products (NTFPs).

Data analysis in this study included the potential for NTFP product development using SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). SWOT analysis is a comprehensive examination of both internal and external factors affecting an strategy to developing NTFP products. The internal analysis assesses the strengths and weaknesses inherent to the community, exerting a significant impact on decision-making processes. Conversely, the external analysis delves into identifying opportunities and threats posed by factors external to the community [11].

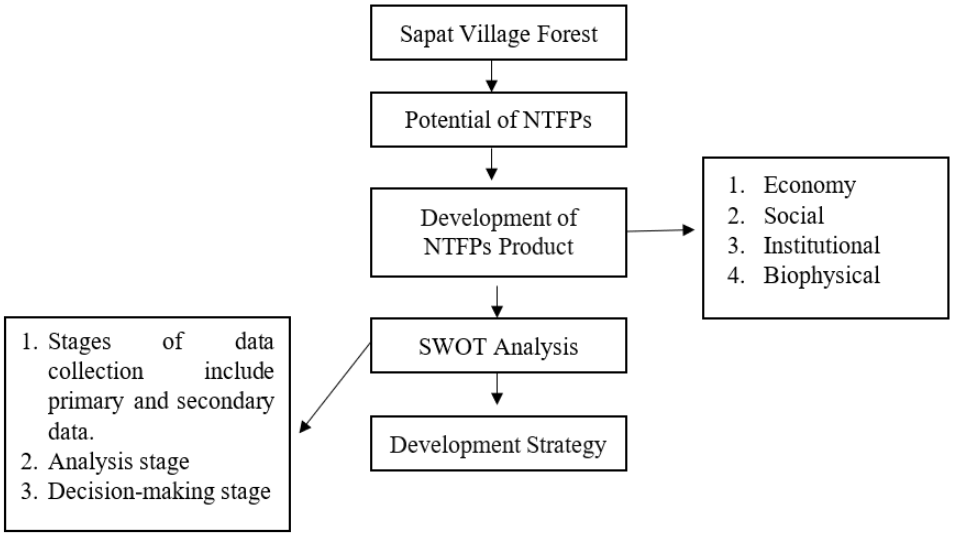

Fig. 1. Research stages.

3 Results and discussion

3.1 NTFP potential in Sapat VF

Non-timber forest products (NTFPs) are all products that come from the extraction and use of forest resources, including plants (other than wood products), animals, and forest services [12]. NTFPs can be used in their raw form (primary products) or processed into secondary products. They are diverse in type, form, and quantity and have many uses, including providing economic opportunities for communities around forests. Forest utilization by communities encompasses all aspects of life, from economic dependence to hunting for protein, cultivation, building materials, and other uses of forest products.

Field results show that the condition of Sapat VF has improved significantly in the past 10 years due to a change in community behavior. Activities such as river poisoning and illegal logging, which were once common, have been reduced. In 1997, Sapat villagers used to fish by poisoning the river with pesticides to increase their catch. They also engaged in illegal logging and planted coconut trees in the forest. However, these activities decreased after the Ministry of Environment and Forestry issued a decree granting village forest management rights. This decree had a positive impact on the community around the forest, as it led to a change in behavior and habits. The community became more aware of the threat of illegal logging and river poisoning and formed a Supervisory Community Group (SCG) to protect the VF.

The majority of local people have two types of jobs, namely as fishermen and farmers. The types of NTFPs that are widely used by the community around VF Sapat are dominated by the use of fisheries, among others: lokan, shrimp, and mangrove crabs. In addition, nipah shoots are also utilized by the community. The potential types of NTFPs that have been utilized and not utilized by the community around VF Sapat are presented in Table 1.

Table 1. Potential NTFPs in Sapat VF.

No	Types of forest resources	Scientific Name	Amount	Price (Rp/Kg)
1	Mangrove crab	*Scylla* sp	200 kg	50.000
2	Shrimp	*Litopenaeus vannamei*	200 kg	50.000
3	Lokan	*Geloina erosa*	200 kg	45.000
4	Nipah shoots	*Nypa fruticans*	25 ton	7.500
5	Mangorve fruit	*Rhizophora* sp	Unknown	-
6	Nyirih fruit	*Xylocarpus* sp	Unknown	-
7	Jeruju leaves	*Acanthus ilicifolius*	Unknown	-

Most local people in Sapat VF have two main occupations: fishing and farming. The types of NTFPs widely used by the community are dominated by fisheries, such as lokan, shrimp, and mangrove crabs. Nipah shoots are also utilized by the community. The research results above show the types of NTFPs with potential in Sapat VF. More optimal utilization of NTFPs can be achieved with more diverse types of NTFPs, which can lead to more products being marketed [13]. However, the utilization of NTFPs by the community around Sapat VF has yet to be optimal, as there are still NTFPs that still need to be utilized, such as mangrove fruit, nyirih fruit, and jeruju leaves. Mangrove fruit can be processed into processed mangrove syrup and soap products, nyirih fruit can be used as raw material for batik dyes, and jeruju leaves can be processed into tea. The need for more data on NTFP potential, traditional utilization, and non-existent markets are obstacles to the optimal utilization of NTFPs. The NTFPs commonly utilized by the community are mangrove crabs, lokan, shrimp, and nipah shoots, while the potential of other NTFPs has not yet been optimally utilized.

The community around Sapat VF mainly utilizes mangrove crabs, lokan, and shrimp because catches of mangrove crabs can reach 13.1-24.5 kg per day. Farmers catch mangrove crabs, lokan, and shrimp in large numbers from September to February, when the river water is high, and mangrove crabs come out of their nests to look for food. The production process of mangrove crabs, lokan, and shrimp comprises raw material receiving, clamping and binding, and packing. The marketing chain of mangrove crabs, lokan, and shrimp in Figure 1 has three stages: (i) from local producers directly to consumers, (ii) from producers to retailers, then to consumers, and (iii) from producers to suppliers, such as restaurants.

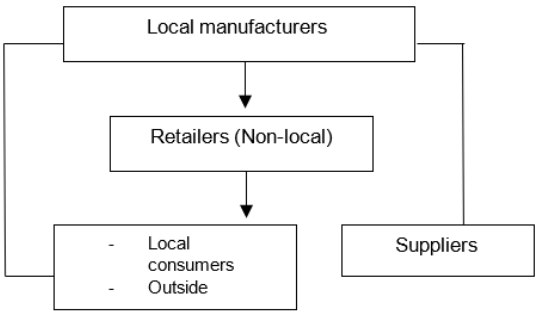

Fig. 2. Marketing chain of mangrove crab, lokan, and shrimp.

The average selling price of mangrove crabs, lokan, and shrimp at the producer-to-consumer and supplier level is Rp.50,000/kg for mud crabs, Rp.50,000/kg for shrimp, and Rp.45,000/kg for lokan. At the retailer-to-consumer level, mud crabs are sold for Rp.75,000/kg, shrimp for Rp.60,000/kg, and lokan for Rp.50,000/kg. The most profitable marketing chain of the three stages is when producers sell directly to consumers or suppliers. This fact shortens the long marketing chain. This finding aligns with [14], who states that producers will get high prices and consumers will get low prices when the marketing chain is short.

In addition to mangrove crabs, lokan, and shrimp, the community around Sapat VF also utilizes nipah shoots. Nipah is a type of plant that usually grows by the sea in tidal areas and is considered a wild plant because it lives and grows naturally without any special cultivation. The VF Sapat community utilizes nipah shoots for household needs, such as roofing houses, and also processes nipah shoots into handicrafts, such as woven plate products. However, sales of plate products from woven nipah shoots have been limited due to difficulty finding a market.

In addition to using nipah shoots for household needs and processed products, farmers also sell nipah shoots to collectors in Sapat Village, including the KUPS Setia Kawan business group. This business group was formed by Sapat Village Decree No. 14/KLS-V/2021 to trade nipah tops and sticks. The distribution of nipah shoots is indirect, meaning that the goods are distributed from producers to consumers through third parties or intermediaries. KUPS Setia Kawan is a collector in the village who buys dried nipah shoots from farmers. Farmers dry nipah shoots by exposing them to sunlight in their yards. After the nipah shoots are dried, KUPS buys them from farmers for Rp.6,000/kg. KUPS then collects the nipah shoots in a warehouse until enough nipah shoots have been collected. The group then sells the nipah shoots to the following agent in Tembilahan for Rp.7,000/kg for wet nipah tops and Rp.7,500/kg for dry nipah tops. The agents at the sub-district level then sell the nipah shoots to Batam, a giant collector. From Batam, the nipah shoots can be exported to Thailand and Malaysia. The marketing chain of nipah shoots is shown in Figure 3.

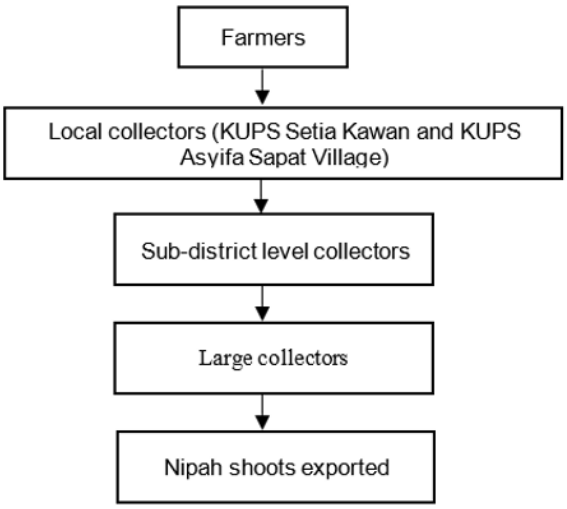

Fig. 3. The marketing chain of nipah shoots.

3.2 Management and development of NTFP potential

3.2.1 Knowledge

Based on our study, 70% of the informants interviewed knew the meaning of NTFPs, the existence of Sapat VF, and the establishment of Sapat VF. However, 30% of the informants needed to learn the meaning of NTFPs, the existence of Sapat VF, or the establishment of Sapat VF. This percentage difference is due to differences in exposure to information. The 70% of informants who knew about NTFPs were people who were invited to trainings on NTFPs organized by YMI, such as the Head of KPH, Head of Sapat Village, Yayasan Mitra Insani / YMI (a local NGO in Sapat VF), and LPHD. The 30% of informants who did not know about NTFPs were people who were not invited to the training.

The utilization of NTFPs in Sapat VF is still done traditionally, such as making crafts, traditional medicines, and food ingredients. The community utilizes NTFPs for daily needs by selling their crops to the market. The main reason why the community only utilizes NTFPs by selling raw materials is limited knowledge. Local knowledge is rooted in local or traditional knowledge and management systems. Local knowledge is a collection of knowledge with a way of thinking that is rooted in the culture of a community group and is the result of observation over a long period. Local people's knowledge is generally limited to what they can feel directly, usually through observation, and what they can understand based on their concepts and logic.

To increase the knowledge of communities around the forest, third-party institutions such as YMI conduct training and comparative studies by inviting several representatives from communities around the forest. The goal of these trainings is to increase community knowledge in utilizing NTFPs in products so that the selling value of these NTFPs can be higher. The community is taught how to utilize and process NTFPs into products such as jeruju leaves into tea and nyirih fruit (*Xylocarpus sp*) into batik dyes.

3.2.2 Interest

Based on our study, 90% of informants were very interested in developing NTFPs into products, while 10% were less interested. People less interested in the development of NTFPs may assume that if there is no apparent utilization and management, the community will be less interested. Conversely, if the utilization and management of NTFP development are going well, the community will be more interested in developing it.

Interest is a tendency to act towards a situation or carry out activities that are the object of that interest and are accompanied by pleasure. People interested in developing NTFPs into products are motivated by their desire to increase their income. The high interest of the community can affect the potential for NTFP product development, as they are more likely to make efforts to increase the selling value of NTFPs that can be utilized from VF. Obstacles to the development of NTFP products include lack of capital, lack of tools to develop NTFPs into products, lack of personnel to develop NTFPs, as some people choose to do gardening instead, lack of information about marketing NTFP products, which can discourage some people from developing NTFPs into products.

3.2.3 Attitude

Based on our study, the VF community has a positive attitude towards the potential for NTFP product development. This finding is due to the high interest in developing NTFPs, which can create a positive attitude. The percentage of people around VF who agree with the potential for NTFP product development is 90%, while those who disagree are 10%. People

who disagree with the potential for NTFP product development do so because they need more capital, tools, and marketing. Capital is a factor of production that has a strong influence on productivity. It is usually in the form of money or goods used to run a business. Tools are needed to support the running of a business, while marketing is needed because it is one of the main activities in maintaining business continuity.

3.2.4 Behavior

Based on our study, community behavior towards VF is generally high, which means that the community takes positive actions, such as participating in water patrols to monitor the VF and reduce illegal logging and river poisoning, planting mangrove trees on damaged land along the shoreline to maintain the condition of Sapat VF, and generally being aware of the need for forests and sustainably managing and utilizing forest products. However, some people cut mangroves for personal purposes, such as to build house foundations or for certain activities or events. These people cut mangroves with the necessary permits.

Community behavior towards NTFP utilization is that the community engages in activities related to developing potential NTFP products, such as forest rehabilitation, forest maintenance, security, group discussions, and training and mentoring by KPH Mandah and YMI on sustainable NTFP management. In general, people's livelihoods around Sapat VF are fishing and gardening. This phenomenon is due to the natural and geographical conditions of Indragiri Hilir, especially Sapat Village, where people are more likely to plant coconuts and fish because they live in a water area.

3.3 NTFP Production and marketing in Sapat VF

Community involvement in forest management should aim to conserve forests and improve community welfare through cooperation between forest managers and communities in various ways [15]. In this case, KPH Mandah and YMI are concerned with improving the welfare of communities around forests and conservation through programs that aim to improve the welfare of village communities through forest ecosystem rehabilitation and training in the development and management of NTFPs according to their potential. This NTFP development effort is expected to reduce the dependence of forest communities on timber forest products. Increased NTFP management is also expected to increase the income of communities around forests from NTFPs, foster awareness of the need to protect and maintain forest areas, and create new jobs in the forestry sector from NTFP commodities.

NTFP development as a way to improve the welfare of communities around VF Sapat has been done often. However, until now, it has not shown significant results in improving community welfare. One weakness of NTFP development is the lack of efforts to increase the competitiveness of NTFP businesses and the unavailability of good development facilities at the village, sub-district, and district levels. This fact shows that support from local governments could be more optimal.

Currently, the development of NTFPs in Sapat VF faces various challenges, including community knowledge and awareness. NTFPs are still seen as not having a significant impact on community welfare. However, the community has an understanding of the types of NTFPs that can be utilized and can provide economic value, such as mangrove crabs, lokan, shrimp, and nipah shoots. Some communities have carried out NTFP management in VF Sapat, but it is still on a small scale and through a simple process. There are still many obstacles and things to consider if NTFPs are to be developed into products as a source of income for communities around forests. These obstacles include people who receive training in NTFP development only receiving training on a basic level, and there needs to be continuity or follow-up after training.

Meanwhile, production or management activities are still carried out individually. The most significant obstacle is that the community still needs a market for the processed NTFPs they produce. As a result, the community only sells NTFPs in the form of raw materials to agents, which reduces the selling value of NTFPs. The problem of people not having a market for processed NTFP products also occurs with processed VCO (Virgin Coconut Oil) products in Sapat Village. The reason is that people prefer products that they have long consumed rather than having to buy new products whose quality and function they need to be sure of. Consumer behavior is fundamental to deciding whether to purchase an item. Consumers always think about the goods they want to buy in advance, starting with the price, model, shape, packaging, quality, function, or usefulness of the item.

3.4 Analysis of NTFP product development potential in Sapat VF

The potential strategy for developing NTFP products is carried out by identifying internal and external factors using the SWOT matrix in Figure 3.

3.4.1 Strength-Opportunity (SO) Strategy

The diverse types of NTFPs in Sapat VF and their abundant availability make NTFPs such as mangrove crabs, lokan, shrimp, and nipah shoots marketable. The positive behavior and attitudes of the community around Sapat VF are also a strength. In addition, the community's strong interest in developing and managing NTFPs into products is a further strength. One strategy that can be used to take advantage of these strengths is to focus on utilizing strengths and opportunities (SO) factors. This strategy could involve working with the government and third-party institutions to improve the quality of human resources and the quantity of NTFPs. This strategy could be done through training and assistance utilizing potential NTFPs to develop and manage them into products. Another strategy is cutting the product marketing chain by promoting business products at exhibition events and selling products online or through e-commerce. This strategy would allow the community to establish direct customer relationships and increase income. The diversity of NTFPs that exist and have the potential to be developed into products gives the community a significant opportunity to increase their income.

3.4.2 Strength-Threat (ST) strategy

Illegal logging and river poisoning are threats to the development of NTFP products. One strategy that can be used to avoid these threats is to supervise and assist social forestry assistants in developing business products that can be utilized and provide solutions to constraints in NTFP development, such as assisting with NTFP marketing networks.

3.4.3 Weakness-Opportunity (WO) strategy

The low creativity of the community in utilizing existing NTFPs, lack of information on marketing networks, and lack of fishing gear for mangrove crabs, shrimp, and lokan are weaknesses. Creativity in utilizing NTFPs and marketing can help the community to sell and market more diverse products, which can increase the selling value. Strategies that can be used to overcome these weaknesses and take advantage of opportunities include assisting with crab, shrimp, and lokan fishing gear and training the community on how to utilize NTFPs more creatively and protect forests through cultivation and replanting.

3.4.4 Weakness-Threat (WT) strategy

The relatively low selling price of NTFP products and the lack of post-training continuation can be weaknesses and threats to NTFP development. A strategy to minimize weaknesses and avoid threats is to make related parties mediators of NTFP product development and to increase human resources through training and promotional support from the government.

3.5 Potential strategy for NTFP product development

Based on the SWOT analysis, the strategy for the potential development of NTFP products is to use an aggressive strategy. This strategy is because the situation is very profitable, with opportunities and strengths that can be taken advantage of. The strategy that must be applied in this condition is to support an aggressive growth policy.

One strategy that can be used is to take advantage of government support and third-party institutions to improve the quality of human resources through training and mentoring on how to utilize NTFPs of various types to process them into a variety of business products. This support will increase the selling value and quantity of potential NTFP production. It can also cut the marketing chain by promoting business products at exhibition events and selling products online or through e-commerce.

Rich natural resources automatically lead to community prosperity if existing human resources can be utilized and developed. This fact means that training and mentoring are needed to improve the quality of human resources. Human resources development is significant because it improves the knowledge, skills, and attitudes of workers, enabling them to work more effectively and efficiently. This factor leads to better work results and increased competitiveness.

The extended marketing chain is another problem that can be faced in marketing products. Producers often sell their products in traditional markets at relatively low prices or through collectors. This fact indirectly lengthens the marketing chain and reduces the profits of producers. The market is an economic institution where sellers and buyers can conduct transactions directly or indirectly. This indirect buying and selling can be a solution to breaking the long marketing chain by promoting products and selling online or through e-commerce.

4 Conclusion

The potential for Non-Timber Forest Products (NTFPs) in Sapat HD is highly diverse, encompassing mangrove crabs, shrimp, lokan, nipah shoots, nyirih fruit, mangrove fruit, and jeruju leaves. Primarily, the community surrounding HD Sapat engages in the utilization and sale of mangrove crabs, shrimp, lokan, and nipa palm shoots to collectors. This preference is attributed to a lack of data regarding the broader potential of NTFPs. Currently, these activities are carried out through traditional methods and have yet to tap into established markets. Consequently, there remain untapped opportunities for NTFPs, such as nytel fruit, mangrove fruit, and jeruju leaves. Despite these challenges, the community demonstrates a positive attitude by actively participating and taking responsibility for maintaining the Sapat HD area. This commitment is evident through their involvement in the Community Monitoring Group (POKMASWAS). In addition, the community has a positive attitude towards protecting Sapat VF, as evidenced by their participation in the Supervisory Community Group (SCG). The strategy is aggressive and suitable for use in this situation because it has opportunities and strengths to exploit.

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