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Development Strategy of Non-Timber Forest Product Multi-Business Forestry In Social Forestry Partnership

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ABSTRACT

Indonesia's forest area is decreasing every year, and the high pressure from the community has caused massive public access to forests, so there is a need for solutions to overcome tenure problems and community welfare. The policies offered as a solution is social forestry with a multi-business forestry system. The research aims are to formulate multi-business NTFP utilization development strategies. The analysis used the SWOT and AHP combination methods to formulate the best possible development strategy. Based on the research conducted, the best strategy for developing multi-business NTFPs utilization is a growth-oriented strategy that focuses on SO strategy, as follows: increasing the number of species combinations, business diversification, taking advantage of FMUs and local government's role in supporting the diversification of NTFPs utilization, actively involved in sharing information which is carried out both to fellow members and outside parties, promotion of products or commodities to expanding the market and attracting investors, and empowerment through community institutions with assistance and training. The strategies are expected to improve the quality of the forest and community welfare so that the main functions of the forest are maintained but still provide benefits to the community.

Introduction

Forests according to Laksemi and Sulistyawati [1] have various benefits and crucial functions as ecological, economic, and social. Forest utilization to obtain more benefits is possible through multi-business forestry. According to Nurrochmat et al. [2], multi-business forestry is the utilization of forest areas as optimally as possible based on social, economic, and ecological sustainability principles that regard their primary functions for the benefit of the state, society, and the business world. Forest utilization with multi-business forestry also supports the achievement of Sustainable Development Goals (SDGs) through this research, especially SDG-1 Poverty (alleviate poverty), SDG-2 Hunger (food source), SDG-3 Health (source of medicine and recreation), SDG-6 Water (water source), and SDG-13 Climate (climate regulator). Multi-business forestry can be implemented through business permits or social forestry management agreements. The Cempaka Forest Farmer Joint Group is a community group that partnered with Batutegi FMU and has obtained approval for social forestry management with a forestry partnership scheme according to the Regulation of Minister of Environment and Forestry of the Republic of Indonesia Number 1711/MenLHK-PSKL/PKPS/PSL.0/3/2021 with Non Timber Forest Products (NTFPs) utilization permit that covers 183 ha with management rights assigned to 129 members

Non-timber forest products according to Irwan and Ratnaningsih [3] are both vegetable and animal forest products and their derivative products. NTFP utilization is the primary livelihood source and fulfillment of daily needs for most communities around the forest [4,5]. NTFPs utilization can help people get a variety of livelihood sources without damaging the forest [6]. Furthermore, NTFPs utilization provides community

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access to forest resources and other sources of income and reduces the occurrence of fires, conflict, and community empowerment [7]. The NTFPs utilization with multi-business forestry is intended to increase the value of the forest and provide more benefits. Multi-business forestry in social forestry management approval working area based on the Minister of Environment and Forestry Regulation number 9/2021 [8] concerning Social Forestry Management can be carried out with agroforestry, silvofishery, silvopasture, and agrosilvopasture patterns based on the forest function and spatial type.

The pattern of NTFP utilization applied by farmer members of *Gapoktan Cempaka* is agroforestry and agrosilvopasture, which combines forestry activities with agriculture and/or livestock, a form of diversification from multi-business forestry [9]. As stated by Mawardhi and Setiadi [10], an agroforestry system is a practice that utilizes land to be productive and sustainable. In addition, various benefits can be obtained from agroforestry, such as critical land rehabilitation, improvement of environmental services, improvement of people's economy, and reduce potential erosion [11]. Agroforestry could be applied by integrating forestry activities with agricultural components or combining woody with non-woody plants [12]. The contribution of agroforestry to social forestry is considerably high in relation to the socioeconomic conditions of the community [1,13].

The implementations of various multi-business forestry patterns in social forestry have enormous potential to improve community income and land restoration to achieve forest sustainability. Therefore, further studies are required to optimize the benefits gained from the implementation of multi-business forestry. This research aims to formulate possible forestry multi-business development strategies to optimize the forest value and the benefits obtained by the community. Through this research, the forest benefit is expected to be greater while maintaining social, economic, and ecological sustainability.

Methods

Study Area

This research was conducted in a part of the protected forest in Batutegi FMU managed by a forestry partnership scheme with the Cempaka Forest Farmer Joint Group, located in Sumber Bandung Village, North Pagelaran District, Pringsewu Regency, Lampung Province, with a total area of ± 183 ha as location shown on the map in Figure 1.

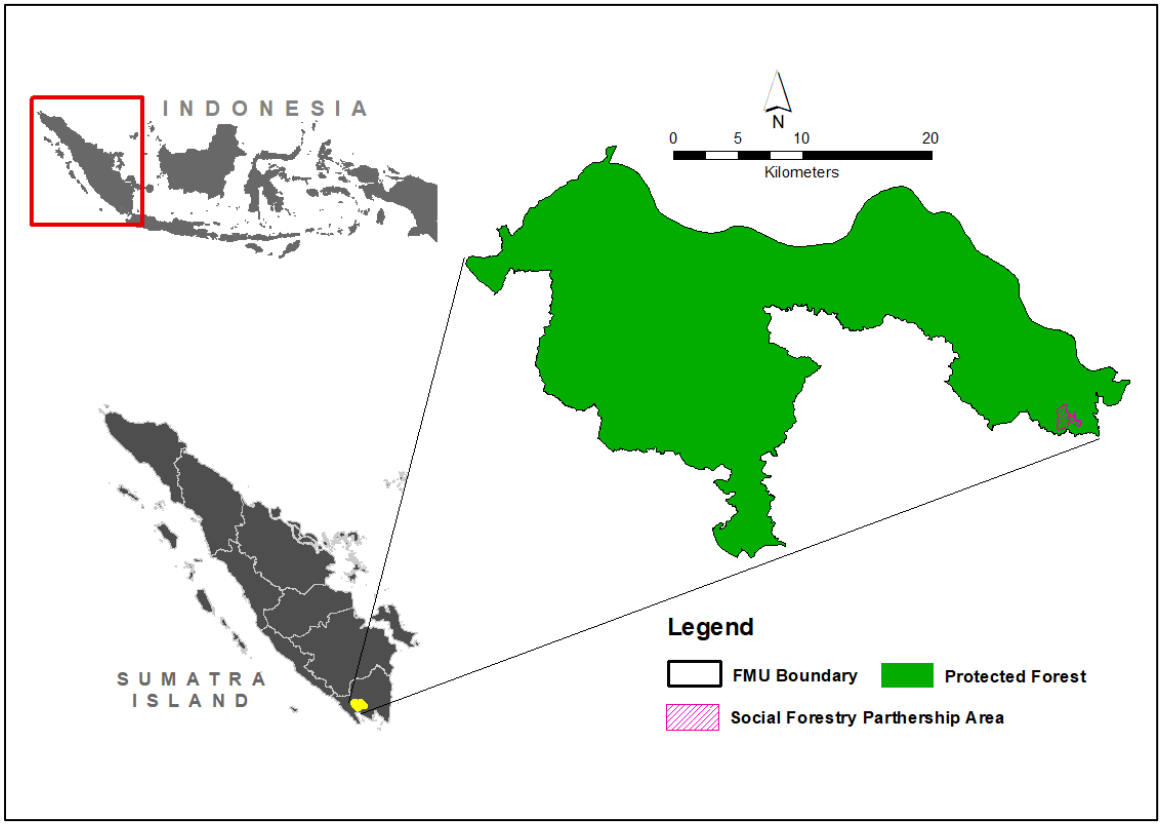

Figure 1. Study area.

Data Collection

The data collection method used was interviews with ten key informants determined by purposive sampling. Purposive sampling is a non-random method that determines samples based on specific identities that follow research objectives [14]. Interviews were conducted to explore information related to internal and external factors that influence multi-business activities that utilize NTFPs at the research location.

Data Analysis

Data analysis used SWOT (Strengths, Weaknesses, Opportunities, and Threats) and AHP (Analytical Hierarchy Process) method. Pesonen et al. [15] stated that internal factors (strengths and weaknesses) are owned, and external factors (opportunities and threats) are likely to occur in the future. Jahan et al. [16] expressed a similar opinion, SWOT analysis is a commonly used tool to assist decision-making by exploring issues and related activities to integrate the factors that affect the research object. Weihrich [17] classifies strategies into four categories: reducing the impact of both weaknesses and threats by minimizing internal weaknesses and avoiding external threats (WT), overcoming internal weaknesses using external opportunities (WO), reducing the impact of threats by using internal resources (ST), and taking advantage of external opportunities by using internal resources (SO). Strategy formulation can combine SWOT with other methods (such as AHP).

AHP, according to Saaty [18], is a decision-making method based on various criteria in a hierarchical manner with pairwise comparisons that describe the level of preference between one factor and another. The three problem-solving principles stated in Saaty [18] are decomposition, comparative assessment, and priority description. According to Radomska-Zalas [19], there are four main steps of the AHP method: determining the problem hierarchy by explaining the problem in the form of criteria and indicators. Conduct an assessment by comparing criteria in pairs, namely, by assigning a relative value to the level of importance of each criterion compared to the others. Determine the weight of each criterion and indicator assessed. This weight reflects the relative importance of each criterion and indicator for achieving the objectives. The best results are selected based on the objectives to be achieved.

This research is conducted by combining the SWOT method with AHP so that these steps are carried out based on the data from the SWOT analysis with four steps, as follows conduct a SWOT analysis by identifying SWOT factors and indicators, conduct pairwise comparisons between factors to evaluate the relative importance of each factor concerning other factors, determine priorities, and determine the degree of influence of each factor on the overall situation, conduct pairwise comparisons of indicators on each SWOT factor to prioritize these indicators and understand the extent to which each indicator affects the SWOT factor, formulate and select strategies by considering existing strengths and opportunities and find ways to overcome weaknesses and face threats to obtain the right strategy for development following the objectives to be achieved [20].

Table 1. Fundamental scale of absolute numbers.

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective.
3	Moderate importance	Experience and judgment slightly favor one activity over another.
5	Essential or Strong importance	Experience and judgment strongly favor one activity over another.
7	Very strong importance	An activity is strongly favored and its dominance is demonstrated in practice.
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation.
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When compromise is needed.
Reciprocals	If activity i has one of the above non-zero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared with i	

Source: Saaty [24]

This research was conducted using AHP with Expert Choice 11 software. The software used for pairwise comparisons of factors and indicators uses a numerical scale that indicates the level of importance of a factor/indicator compared with other factors/indicators. The consistency ratio (CR) of pairwise comparisons must be < 10% [18]. Furthermore, a rating of 1–4 describes the response to SWOT factors [21–23]. Table 1 shows the scales used in pairwise comparisons. SWOT analysis with AHP was performed to obtain the score value of each factor component for both internal and external factors.

The score is then used to calculate the X factor (the difference in the values of the strength and weakness factors) and the Y factor (the difference in the values of the opportunity and threat factors). The coordinates of the X and Y factors describe the direction of the forestry multi-business development strategy, which is most effective and appropriate for implementation. There are four quadrants for depicting X and Y coordinates, as follows: quadrant I aggressive or expansion strategy, quadrant II diversification strategy, quadrant III defensive or defensive strategy, and quadrant IV turnaround strategy.

Result and Discussion

Communities utilize forests to obtain sources of livelihood that meet their daily needs. Community farming activities in forest areas, both subsistence and commercial, can affect deforestation rates [25]. However, Melo et al. [26] stated that community awareness of forest potential has increased economically, socially, and environmentally. Communities can utilize forest products directly to meet their needs or indirectly improve their welfare by selling them to earn money to buy other necessities [27]. A forestry partnership is a forest management form that involves the community and places it as the subject. Communities can organize their business forms on their cultivated land on the condition that they continue to preserve the forest so that the primary function of the forest is not disturbed. They must comply with applicable regulations so that multibusiness forestry is a solution.

Multi-business forestry activities are the practice of several activities in the same space or time with various objectives to obtain more benefits from the forest. The forestry multi-business system applied at the research site was agroforestry and agrosilvopasture (a combination of agriculture, forestry, and animal husbandry). Agroforestry activities carried out by communities are generally a combination of rubber plants with various multipurpose tree species (MPTS) that produce fruit, sap, beans, chilies, and spices. Some communities add animal husbandry by feeding goats or cattle from the forest.

Agroforestry is important for improving people's livelihoods and contributing to climate-change mitigation [28]. Similarly, Quandt et al. [29] in addition to providing economic benefits, agroforestry also plays a role in climate change adaptation and disaster prevention. Agroforestry is a form of sustainable food security. According to FAO [30], sustainable food security can be achieved with five principles that balance the sustainability of economic, social, and environmental dimensions, namely by increasing productivity and added value, protecting and increasing biological natural resources, improving livelihoods, and inclusive economic growth, increasing the resilience of people, communities, and ecosystems, and government adaptation to change.

The utilization of NTFPs by farmers with multi-business forestry allows the community to earn more than one source of income. The multi-business utilization of NTFPs with agroforestry or agrosilvopasture carried out by the community has been successful. However, it also has the potential to provide more significant benefits. According to the research results of Diniyati and Achmad [31], the community can obtain periodic income from NTFP utilization in the form of weekly, monthly, and annual income, so that farmers can better manage their economy. However, the known economic value of NTFPs is still low because NTFPs are generally used as social crops, especially fruit and food crops. There are 23 types of NTFPs cultivated in the partnership area, divided into 6 NTFP groups, including groups of vegetables, fruits, sap-producing plants, spices, seed-producing plants, and animal husbandry. Based on the results of the study, it is known that 19 types of NTFPs have been utilized both subsistent and commercially. The types of NTFPs and their uses are listed in Table 2.

The utilization of NTFPs in the partnership area combines these types of NTFPs, which vary for each cultivated land. This utilization activity still has room for development; therefore, land utilization can provide optimal benefits to community income and the environment. System development requires a tool in the form of a strategy. Forestry business development strategies are prepared by identifying the factors likely to influence internal and external factors [15]. Identifying internal and external factors is important for sustainable strategic development planning [32]. Internal factors include weaknesses and strengths, whereas external factors include opportunities and threats. The analysis of internal and external factors using SWOT is a

comprehensive analysis model that describes the condition of an organization [33]. The identification of the SWOT factors is shown in Table 3.

Table 2. Non-timber forest products in partnership areas.

	Non-timber forest product		Utilization
Category	Identified	Utilized	
Vegetables	Chili (*Capsicum annum*)	Chili (*Capsicum annum*)	Subsistence
Fruits	Avocado (*Persea americana*)	Avocado (*Persea americana*)	Subsistence and commercial
	Duku (*Lansium domesticum*)	Duku (*Lansium domesticum*)	
	Durian (*Durio zibethinus*)	Durian (*Durio zibethinus*)	
	Jengkol (*Archidendron pauciflorum*)	Jengkol (*Archidendron pauciflorum*)	
	Coconut (*Cocos Nucifera*)	Coconut (*Cocos Nucifera*)	
	Mangosteen (*Garcinia mangostana*)	Petai (*Parkia speciosa*)	
	Jackfruit (*Artocarpus* sp.)	Banana (*Musa paradisiac*a)	
	Petai (*Parkia speciosa*)	Sugar Palm Fruit (*Arenga pinnata*)	
	Banana (*Musa paradisiaca*)		
	Melinjo (*Gnetum gnemon*)		
	Vanilla (*Vanilla planifolia*)		
	Sugar Palm Fruit (*Arenga pinnata*)		
Sap	Resin (*Agathis dammara*)	Rubber (*Hevea brasiliensis*)	Commercial
	Rubber (*Hevea brasiliensis*)		
Spice	Java long pepper (*Piper retrofractum*)	Java long pepper (*Piper retrofractum*)	Subsistence and commercial
	Clove (*Syzygium aromaticum*)	Clove (*Syzygium aromaticum*)	
	Ginger (*Zingiber officinale*)	Ginger (*Zingiber officinale*)	
	Candlenut (*Aleurites moluccana*)	Candlenut (*Aleurites moluccana*)	
	Turmeric (*Curcuma domestica*)	Turmeric (*Curcuma domestica*)	
	Pepper (*Piper Nigrum*)	Pepper (*Piper nigrum*)	
	Nutmeg (*Myristica fragrans*)	Nutmeg (*Myristica fragrans*)	
Bean	Coffee (*Coffea* sp.),	Coffee (*Coffea* sp.)	Subsistence and commercial
	Cocoa (*Theobroma cacao*)	Cocoa (*Theobroma cacao*)	
Livestock	Goat (*Capra aegagrus hircus*)		Commercial
	Cow (*Bos taurus*)		

Table 3. SWOT factor analysis results.

Factor	Indicator	Weight	Rating*	Score	CR (%)
Internal					
Strength (S)	The clear and legal status of NTFP utilization	0.091	4	0.364	8
	Community institutions	0.010	3	0.030	
	Positive behavior and attitude of farmers	0.059	4	0.236	
	High diversity of NTFPs	0.023	3	0.069	
Weaknesses (W)	The dominance of rubber plants	0.052	1	0.052	7
	Limited human resources	0.035	1	0.035	
	Limited capital	0.012	1	0.012	
	Lack of accessibility	0.013	2	0.026	
	Lack of government support	0.019	1	0.019	
Eksternal					
Opportunities (O)	Enormous potential for NTFP utilization	0.065	4	0.260	9
	Development of processed products	0.214	4	0.856	
	Product marketing cooperation	0.096	4	0.384	
	Local government involvement	0.036	3	0.108	
	FMU facilitation	0.112	4	0.448	
	Institutional strengthening	0.024	4	0.096	
Threats (T)	Price fluctuation	0.012	1	0.012	6
	Future policy uncertainty	0.042	2	0.042	
	Productivity decline	0.022	1	0.022	
	Disasters	0.062	2	0.124	

Note: *1: major weakness; 2: minor weakness; 3: minor strength; 4: major strength.

The strength of association of farmer group *Gapoktan Cempaka* is the clear and legal status of NTFPs utilization, which guarantees the rights and obligations of farmers in managing arable land. The existence of an organization in the form of *Gapoktan* can also help farmers obtain support from various parties, such as access to capital, training, or other technical support. The existence of community organizations idealizes forest management so that it is sustainable [34]. Positive behaviors and attitudes of farmers play an important role in the success of community forest management. Farmers are better able to work together and are open to developing and facing challenges and changes in the agriculture and forestry industry. This is also related to the community's capabilities to properly understand forest management based on the research results of Hidayat et al. [35], which showed that knowledge and understanding of the community affect the level of awareness of the functions and benefits of forests as well as the impact of damaged forests on the environment and their lives. In addition, the high diversity of NTFPs indicates the potential of developing utilization businesses to minimize losses due to dependence on one type of plant.

The partnership area is part of a forest rehabilitation site carried out in 2011, with the primary plant type being rubber, so the characteristics of the cover tend to be uniform, namely dominated by rubber plants. This is a weakness because the dominance of rubber can inhibit the growth of other types of plants, so there will be a tendency for farmers to rely on rubber products, which causes them to be vulnerable to price fluctuations and can reduce biodiversity. Limited human resources regarding skills, expertise, and ability to manage forest resources will affect the productivity of managed forests. In addition, limited capital is a classic issue that often becomes a problem in farming and can impact production capacity. Another weakness was the lack of accessibility. The partnership area has only one access road to enter, which crosses the river using a bridge. In addition, road access in the forest area is small, muddy, and slippery, making it difficult for farmers to get to their cultivated land and reduce their production. The lack of government support is also a weakness that hinders the development of utilization businesses by farmers.

Opportunities owned by *Gapoktan Cempaka* have great potential for NTFP utilization because NTFP sources are quite diverse. The development of processed products can open opportunities to increase product-added value, and product marketing cooperation can expand the market. Local government involvement and FMU facilitation can help farmers obtain financial and technical support for business development and enable infrastructure improvements to increase accessibility. In addition, institutional strengthening opportunities enable farmers to develop group capacity. Threats that may have to be faced in the future include commodity price fluctuations that affect farmers' incomes. Policy uncertainty can lead to uncertainty in farmers' assurance of business development. A decrease in quantity and quality of productivity can impact farmers' incomes and business reputations. In addition, there are potential hazards, such as floods, forest fires, or landslides, that can cause damage to crop and infrastructure to the detriment of farmers. Based on the above description of the internal and external factors, four types of strategies can be formulated: SO, ST, WO, and WT, as shown in Figure 2.

Furthermore, analyzing SWOT factors and indicators using AHP with pairwise comparisons is necessary to determine which strategy is the most appropriate and effective. Pairwise comparisons were performed to calculate the factor weights with consistency ratios (CR) of 6% (CR < 10%) and 7% for all comparisons. This means that the assessment carried out in the analysis can be said to be consistent with the objectives to be achieved, namely obtaining the best strategy for developing multi-business forestry utilization of NTFPs to increase the benefits obtained from the forest. Weight describes the priority level of a factor, among other factors. The analysis results show that the opportunity factor has the highest weight with a value of 0.510, followed by the strength factor with a weight of 0.218, the threat factor with a weight of 0.148, and the weakness factor with a weight of 0.124. The results of the pairwise comparison analysis of internal and external factor components affecting the multi-business utilization of NTFPs are shown in Table 3.

Among the four strategies that have been formulated, the most effective and appropriate strategy to be applied in the development of multi-business utilization of NTFPs with agroforestry or agrosilvopastura patterns at the research site can be determined by calculating the indicator scores to determine the X and Y factors. The X and Y factor values were determined by calculating the difference between the internal and external factor scores. The X value is the difference between the scores of the strength and weakness factors ($\sum S - \sum W$), while the Y factor is the difference between the scores of the opportunity and threat factors ($\sum O - \sum T$) [36–38]. Referring to the score results in Table 3, the X factor calculation result is 0.555, and the Y factor value is 1.910. The higher the X-factor value, the greater the object's strength compared to its weaknesses. The higher the Y-factor value, the greater the opportunities the object can utilize compared to the threats it

may face [39,40]. The results of depicting the value (X,Y) on the Cartesian plane show that the proper development strategy is in quadrant I, namely, the SO strategy, as presented in Figure 3.

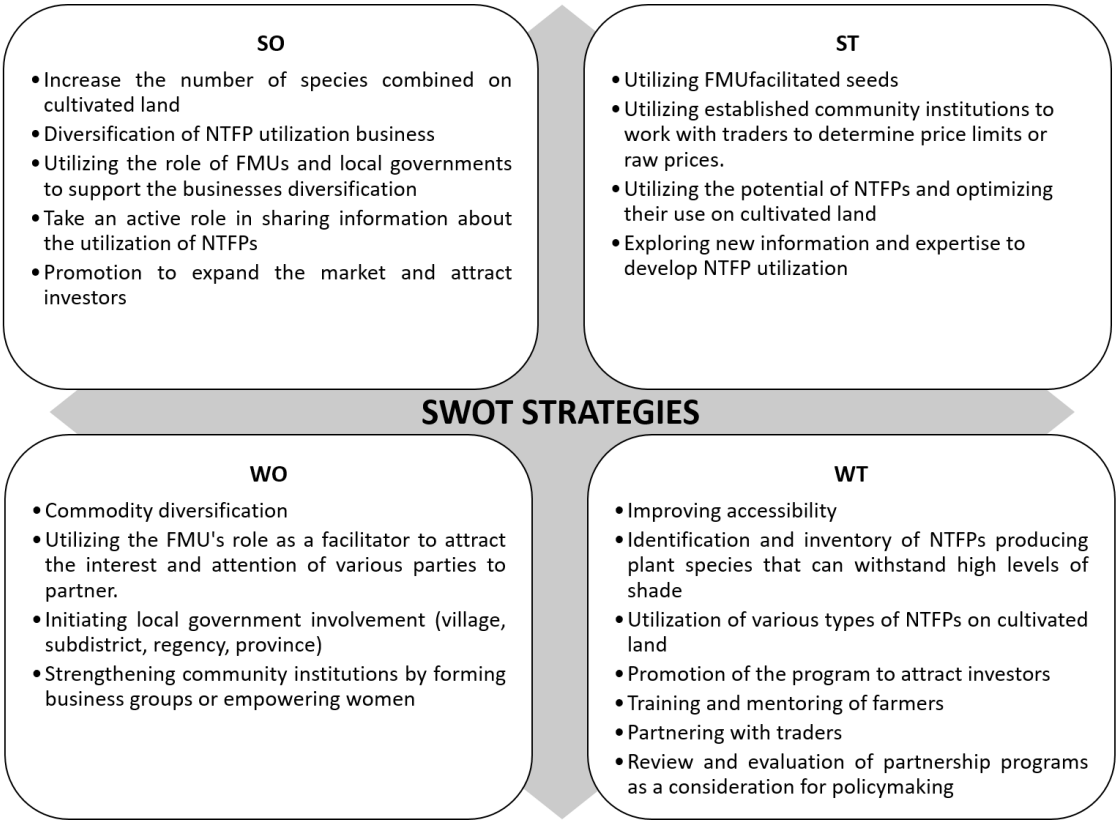

Figure 2. SWOT strategies.

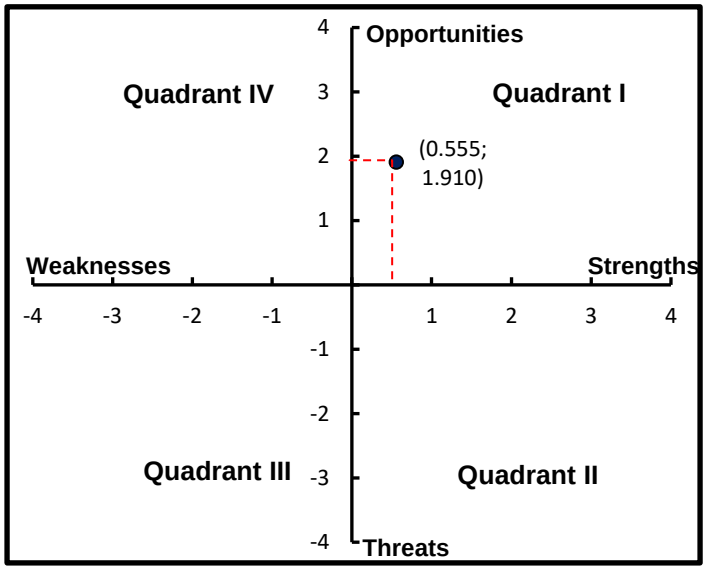

Figure 3. SWOT analysis diagram.

Mukeshimana et al. [41] have discussed that SO strategy is a strategy that relies on strengths to take advantage of opportunities. The SO strategy is an expansion strategy where strengths and opportunities have a high dominance [17]. In the SO strategy, there are many expectations to be achieved. The SO strategy is a strategy to optimally utilize all owned resources and technology to reach existing opportunities. Those strategies are expected to be able to develop land and business-based forestry multi-businesses so that

greater benefits can be obtained from forests and are sustainable. In addition, forestry multi-business development can help improve the welfare of forest communities, reduce pressure on forests, and create new jobs in the forestry sector. In the long term, forestry multi-business development can help drive economic growth. The SO strategy can be implemented in the following manner, as shown in Table 4. Table 4 also shows that, based on various previous studies, implementing NTFP utilization development strategies with multi-forestry businesses can increase the value and benefits of forests obtained by the community, thus helping achieve sustainable forest management and prosperous communities.

Table 4. Implementation of multi-business development strategies for NTFPs utilization.

Strategy	Implementation	Previous research / remark
Increase the number of types combined on cultivated land	Planting potential NTFP species by considering the opportunity for combination with existing species on cultivated land	Farmland intensification strategies can be carried out by cultivating more than one type of plant on the same land or time [42] Adding crop types can increase productivity, land sustainability, maintain biodiversity, and reduce the negative impact of agriculture on the environment [43] Adding the number of combinations of NTFP types is expected to optimize land use and increase the potential source and farmer income.
NTFPs utilization business diversification	Coffee bean grinding business Honey bee cultivation Producing fertilizer from livestock waste	Business model diversification is the joint operation of several activity systems to create or obtain value [44]. Business diversification allows the diversification of income sources [45].
Utilize the role of FMUs and local governments	FMUs can provide training and assistance to farmers to increase the capacity, insight, knowledge, understanding, and competence Strengthen institutions and increase community capacity in management, harvesting, and post-harvest activities Form sub-sub organizations Mentoring, infrastructure development, relationship building, and promotion the products as well as socializing and bridging the administrative procedures required in developing NTFP utilization businesses by local government	Social forestry areas are integrated development areas carried out in an integrated manner and collaboration between the Ministry of Environment and Forestry, ministries/agencies, local governments, SOEs, academics, the private sector, and the community [8]. Farmers who receive training support from government and non-government institutions are better able to implement agroforestry [16]. There must be synergized planning at each level of government at the village, sub-district, district, and provincial levels formulated in the form of their respective planning documents in developing NTFP [46].
Sharing information	Exchanging insights and experiences in solving problems Sharing information to building trust so that it can help increase opportunities to obtain capital, for example, from cooperatives, fertilizer/ medicine distributors, or banks	Sharing information is important in innovation [47]. Social relations, including cooperation, togetherness, networks or information channels, and trust, are part of the community's social capital [48].
Promotion	Publicizing products, benefits, and production processes to attract the attention of target groups, whether buyers, distributors, or investors utilizing facilities provided around the farmer's residence, for example, village publication media such as wall magazines in the village office or other public facilities that are allowed to be used displaying or introducing NTFP utilization products in exhibitions at various activities carried out or making products as souvenirs for visiting outside parties	Promotion is part of marketing to distribute products and expand the market [49]. Promotion informs available resources to target groups [50]. Promotion refers to investment in advertising, publications, and other communication media [51]. Promotion can be done even with limited costs, namely by utilizing social media technology, websites, or word of mouth by relying on positive testimonials [52].

Conclusion

NTFPs in the *Gapoktan Cempaka* partnership area have been utilized with multi-business forestry, namely, an agroforestry or agrosilvopastura system that has the potential to be developed to obtain greater benefits. Based on the results of SWOT and AHP analysis of factors and components of internal and external factors, it is known that the most appropriate and effective development strategy is the SO strategy, which utilizes strengths to seize opportunities in the form of land and business-based forestry multi-business development.

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