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Feasibility analysis and contribution of beekeeping to the welfare of beekeepers in Gunung Megang, Muara Enim Regency, South Sumatra Province, Indonesia

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Abstract: The purpose of this study was to obtain data on costs incurred from the production process, and data on farmer income from beekeping. The total revenue data is then used to analyze the feasibility of beekeeping and its contribution to increasing farmers welfare. The research was carried out using a survey with a quantitative method. Respondents were determined by purposive sampling, the members of Sari Puspa Farmers Group domiciled in Sumaja Makmur Village, Gunung Megang, Muara Enim Regency, totaling 20 peoples. Respondents are farmers who also work as beekeepers in their rubber and oil palm plantations. From the results of research on the cash flow of each beekeeper during 2022, a total revenue (TR) of IDR 152,600,000,- and the total cost of production (TC) is IDR 21,900,000.-. So that overall a total income of IDR 130,700,000,- with an average profit of IDR 6,535,000,- per year. Meanwhile, from farming activity, which is the main job of beekeepers, the average annual income per hectare of arable land is IDR 38,400,000,- so that the total income of the farmer's household is IDR 44,935,000,- per year. Income from the beekeping contributes 14.5%, and is included in the low category. The initial investment value based on financial feasibility analysis is IDR 11.153.600,- While the income for 1 harvest period is IDR. 6,535,000,-. So based on these data the BEP of production is 102 Kg. The bekepers will break even if production reaches or exceeds 102 Kg. Meanwhile, at a BI rate of 5.75%, NPV of IDR 13,564,82,- is obtained, an IRR value of 55%, B/C ratio value of 1.61 and a Payback period of 1 year 8 months and 8 days. Based on the analysis indicators, the beekeeping at Farmer Group of Sari Puspa is in the feasible category.

Keywords: Beekeeper, Economic, Environment, Suistanability, Value.

INTRODUCTION

Agriculture development is fundamentally an effort to enhance the welfare of society, particularly farmers. By ensuring the availability of the required infrastructure and facilities, the existence of funding sources, the application of technological advancements in the agricultural sector, the availability of farmer guidance, and the stability of agricultural product prices, efforts can be made to improve the welfare of farmers (Pretty and Bharucha, 2014). The development of social wellbeing is correlated with economic progress. The degree to which a population is prosperous can be used to measure a region's economic growth. The agro-industry, or industrialization of agriculture, can contribute to social welfare.

Honey bees are a potential resource in integrated farming, including agroforestry, both inside and outside of forests since it helps increase the variety, quality, and amount of plant products while also helping to preserve the environment. Stingless bees are one of the biological pollinator insects that play numerous roles in aiding pollination and have several advantages over other pollinators, including the ability to visit flowers repeatedly, the ability to work in all seasons, the ability to visit multiple flowers at once, and the ability to make only brief visits to flowers that have mature pollen or stigmas that are prepared for fertilization (Meilin 2016).

There have been beekeeping operations in a number of Indonesian provinces. Bees are an excellent resource since they are crucial to preserving the ecosystem's balance. By pollinating crops and consequently increasing seed and fruit yields, bees keep agriculture alive (Reybroeck et al. 2014). Beekeeping is thought to be a powerful pastime that can inspire people to protect nature, particularly forests, as well as provide farmers with financial rewards from bee products like honey and other items made from honey.

Stingless bee beekeeping is called meliponiculture (Purwanto et al.2022). These activities are performed in accordance with custom and local knowledge and are typically performed by individuals who exhibit traits of local wisdom. Meliponiculture gets its name from the family of stingless bees known as the Meliponini. Meliponiculture is currently beginning to grow quickly in a number of nations. Negrín and Sotelo (2016) conceptualized meliponicultures as immaterial cultural heritage and focused on their association with origin myths that account for the sacredness of these invertebrates, as well as how honey is commonly as revered as blood and rain.

Keeping honey bees is extremely beneficial to humans. Honeybees have traditionally been kept in various nations and utilized for a variety of reasons. For example, a beekeeper can gain knowledge and expertise, which is fulfilling and leads to self-sufficiency, while other local traders profit from constructing hives and equipment, as well as utilizing and selling the goods. On the other hand, addressing the new government strategy to minimize dependency on oil revenue and to grow agricultural and industrial export crops to give the country with essential foreign money, this will encourage producers to develop those items in which we have more potential (Vaziritabar and Esmaeilzade. 2016). The bees pollination service is estimated to be worth over 15 times the value of all hive products together (Ghaderzadeh and Fattahi , 2014). Beekeeping is a crucial part of agricultural and rural development programs in several nations. Beekeeping has a significant role in providing nutritional, economic, and ecological security to rural people, as well as producing additional money. Honey cultivation can reduce poverty and alleviate hunger in rural underdeveloped nations (Legesse and Getu, 2022).

One of the best ways to help communities to enhance their quality of life is to empower farmers through farmer group institutions. Organizations typically use various control, coordination, and incentive mechanisms to manage knowledge-based activities, diverse interests, and imperfect information, rather than solely on market relationships. An organization's "business model" outlines how it generates, delivers, and collects value in many settings, including economic, social, and cultural (Giagnocavo et al. 2017). Farmer

Group (KTH) is one of farmer institution that can give contribution to increase production and income of farmer family. This institution is developed to fulfill the feasibility of economy scale and business efficiency, so that it functions as a unit of the provider of production facilities and infrastructure, farm / production unit, processing business unit, marketing business unit and micro finance / savings and loan business unit (Arsyad et al, 2018). Focusing on exceptions to the purported relationship between economic growth and poverty reduction allows us to adjudicate some of these debates. It allows us to ask: what besides economic growth has caused poverty rates to decline, as well as what prevents economic growth from benefitting the poor? While focusing on exceptions does not undermine the commonly assumed relationship between economic growth and poverty reduction, it can provide evidence that can be used to confirm and extend existing theories, as well as illuminate new pathways to reduce deprivation (Moore and Donaldson, 2016)

Muara Enim Regency is situated between 3° 3' 21" and 4° 15' 14" South Latitude and 103° 18' 18" and 104° 42' 4.99" East Longitude. An agricultural region with a total area of 7,483.06 km2, Muara Enim Regency is organized into 20 districts, each of which has 245 distinct villages and 10 sub-districts. The average rainfall ranges from 18.80 mm to 143.75 mm, with April seeing the most rain. Muara Enim Regency has both lowlands and highlands, making it highly diversified. Twenty (20) sub-districts, or 7,058.41 km2 (77.22 percent) of the total area of Muara Enim Regency, are located primarily in lowland regions with an altitude of less than 100 meters above sea level (masl). The other five districts, Lawang Kidul District (100–50 masl), Tanjung Agung District (500–800 masl), Semende Darat Tengah District (100 masl), Semende Darat Laut District (500–1000 masl), and Semende Darat Ulu District (>1000 masl), are all higher than 10 meters above sea level (Sukerik 2018).

METHOD

Study area

The location of the honey beekeeping group where this research was done was in Sumaja Makmur Village, Gunung Megang District, Muara Enim Regency, South Sumatra Province. The study was carried out between January and June of 2023. Figure 1 below displays the locations of the spatial research:

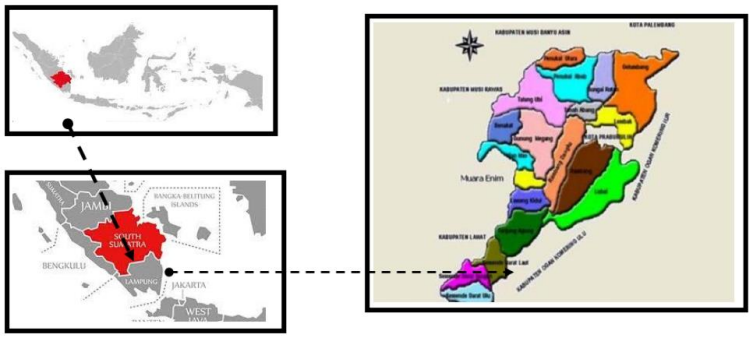

Figure 1. Location of research location on Muara Enim Regency, South Sumatera Province, (3°32'5.622"S, 103°57'5.622"E),

Method of Collecting Data

Research will be conducted utilizing a survey method and a quantitative methodology. Purposive sampling was used to identify the respondents, which consisted of 20 members of the Sari Puspa Forest Farmers Group (KTH) living in Sumaja Makmur Village, Gunung Megang District, Muara Enim Regency, South Sumatra Province. The respondents are small-scale farmers who also raise stingless bees in their oil palm and rubber farms.

Both quantitative and qualitative data analysis was done. The identification of all plant compositions utilized by farmers as bee feed crops and their classification into various

compositions served as the basis for qualitative analysis. In order to enable the grouping of plant compositions, each composition comprises of two primary types of plants and a variety of filler plants. Plantation crops, fruit trees, and forestry plants make up the primary plant categories according to the dominant plants. Shrubs, edible plants, and ornamental plants make up filling plants. Income and welfare are quantitatively examined. The annual total income of farmers is calculated as annual total income less annual total production costs.

A prepared questionnaire containing structured questions about income from agriculture, income from beekeeping, and other income that influences household income will be given to respondents to fill out and respond to. The data was also examined for financial viability and the income contribution of the honey beekeeping to households.

Data analysis

According to Miyazawa (2012) income analysis is the analytical technique used to determine the income received by honey beekeepers for the computation of both the honey bee cultivation business and other income outside the honey bee cultivation industry, with the following formulation:

$$I = TR - TC$$
$$TC = TFC + TVC$$
$$YR = P.Q$$

Information :

I = Income (IDR)
TR = Total Revenue (IDR)
TC = Total Cost (IDR)
P = Price (IDR)
Q = Production Quantity (Kg)
TFC = Total Fixed Cost (IDR)
TVC = Total Variable Cost (IDR)

Utilizing the subsequent selection criteria:

1. TR > TC, profitable honey beekeeping
2. TR = TC, beekeeping is at the breakevent point
3. TR < TC, nonprofitable honey beekeeping

Calculations are employed in the analytical process to determine how much honey bee keeping income contributes to farmer household income. Miyazawa (2012) state that the following is the presenting formulation of the contribution calculation:

$$Z = A/B \times 100\%$$

Information

Z = Revenue contribution (%)
A = beekeeping Income (Rp)
B = Farmer household income (apart from honey bee cultivation and income of other family members).

The decision making criteria are as follows:

1. Z < 35%, low contribution value to farmers' income
2. 35% ≤ Z ≤ 70%, moderate contribution value to farmers' income
3. Z > 70%, high contribution value to farmers' income

The following are the financial feasibility assumptions made for this study:

1. The calculated operating life is five years after the bee box's economic life at the research site.
2. The interest rate used is 5.75%, which was calculated by deducting the inflation rate for 2023 from the interest rate on investment capital loans at Bank Indonesia.
3. It is expected that there would still be Trigona sp. bee colonies and annual honey production up until the conclusion of the company life study.

4. Until the end of the business life, costs associated with investments, operations, and selling prices are regarded as fixed. Honey is sold for between IDR 140,000 and IDR 150,000 every 600 ml bottle.

The financial viability of a company or project is evaluated using three broad criteria: Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit Cost Ratio (BCR). According Miyazawa (2012), a business is considered practicable if its NPV, BCR, and IRR are all greater than zero.

1. Net Present Value (NPV)

Assuming that the types of plants managed have a certain economic age (n), use family labor, and have limited capital, NPV is the present value of the net benefits after discounting the flow and return costs at the beginning of the base year (first year), as shown by the equation:

$$NPV = \sum_{i=1}^{n} \frac{(Bt-Ct)}{(1+i)^t}$$

Information:

NPV = net present value
Bt = gross income of farmers in year t.
Ct = farming costs in year t.
N = economic life of farming
T = project year
I = interest rate (discount rate)

2. IRR (Internal Rate of Return)

IRR is either an interest rate (discount rate) that causes the NPV to equal zero or one that demonstrates that the NPV is equal to the total of all project investment expenses utilized to calculate a project's profit. If the IRR for a company or project is the highest and exceeds the current interest rate, it is seen to be the most profitable (Mellichamp, 2019). IRR equation is as follows:

Present Value Bt = Present Value Ct or
Discounted Σ Bt = Discounted Σ Ct or

$$IRR = i' + \frac{NPV'}{NPV'-NPV''}(i''-i')$$

Information :

i' = first trial value for the discount rate
i" = second trial value for the discount rate
NPV' = first trial value for NPV
NPV" = second trial value for NPV

3. Benefit Cost Ratio (BCR)

The benefit ratio's absolute value fluctuates depending on the interest rate utilized, while the discount factor is used to calculate the present value. The value of the BCR decreases with increasing interest. If BCR is utilized as a project evaluation criterion, the project with the highest BCR value is a priority project. According to Lind (2013) BCR compares total revenue and total project expenditures using the following formula:

$$BCR = \frac{\sum_{t=1}^{n} \frac{Bt}{(1+r)^t}}{\sum_{t=1}^{n} \frac{Ct}{(1+r)^t}}$$

Information :

Bt = benefit value in year t
Ct = cost value in year t
n = economic life of farming

r = interest rate (discount factor)

4. Payback Periode (PP)

The payback period is the amount of time required to recoup the initial investment's cost through cash inflow from investment returns The following equation is used to calculate the payback period's length (in long terms):

$$PP = \frac{Cf}{A}$$

Information:

PP = payback period
Cf = cost first (first cost)
A = cash flow (net) per year

RESULTS AND DISCUSSION

Income from Beekeeping Business

By measuring the difference between the income from the honey beekeeping business and the entire costs incurred by the breeder within a year, income analysis is used to calculate the amount of income from the beekeeping business. The overall revenue is calculated by multiplying the sum of all beekeeping product production by the average selling price of each item. The entire costs incurred, which include both variable costs and fixed costs, are used to calculate the cost amount.

The entire income less the farmer's expenses will be able to demonstrate if the honey bee growing business is profitable or not. A honey beekeeping operation will be deemed lucrative if its revenue exceeds its expenses. In contrast, a honey bee farming operation is seen to be in the red if sales are lower than expenses. Even though management is done simultaneously in nearby regions, each farmer member of KTH Sari Puspa has their own cultivation stup.

Table 1. Average variable costs, fixed costs and total costs of honey beekeeping in 2022

No	Description	Amount (IDR)	
1	Variable Cost (VC)		
	purchasing seeds for a bee colony	3.000.000	
	purchasing of safety gear		3.000.000
	production of stop boxes		6.000.000
	constructing a bee house		3.000.000
	acquisition of harvesting tools	550.000	
	buying of bottles	500.000	
	buying seeds for the garden	300.000	
	the production of sticker labels	150.000	
	Buying disinfectants and medications	300.000	
	13.800.000		
2	Fixed Cost (FC)		
	Labor Costs		6.000.000
	Electricity Costs	1.200.000	
	Freight Charges	900.000	
	Total Of Fixed Cost (TFC)	8.100.000	
Total Cost (TC)		21.900.000	

Initial investment costs are another name for expenditure costs. Because expenses have a significant impact on the sustainability and efficiency of the honey bee farming industry. Data on expenses that must be incurred by the group within a year, namely in 2022, are shown in Table 1. variable costs and fixed costs are included in expenditure costs.

According to calculations, the variable costs, which include the price of colony seeds, the price of making stup, the price of purchasing protective gear, the price of building bee houses, the price of purchasing drugs and disinfectants, and the price of purchasing

harvesting and packaging equipment, total IDR 13,800,000. The fixed expenses incurred are IDR 8,100,000. They are made up of labor pay, electricity charges, and freight prices. The overall costs incurred as a whole are then calculated by adding the total variable costs and the total fixed costs, resulting in a total of IDR 21,900,000.

The profit or loss can be computed based on the difference between the entire costs incurred and the total revenue realized throughout a year of honey bee farming at KTH Sari Puspa.

Table 2. Calculation of honey beekeeping income

No	Description	Quantity	Unit price	Amount (IDR)
1	Cerana honey sales (kg)	806	100.000	80.600.000
2	Trigona honey sales (kg)	25	200.000	5.000.000
3	Stup sales (boxes)	100	150.000	15.000.000
4	Colony starter sales (boxes)	130	400.000	52.000.000
	Total Revenue (TR)			152.600.000

Table 2's revenue calculation results demonstrate that beekeepers' income is derived from the selling of kelulut and *Apis cerana* bee honey. 806 kg of *Apis cerana* bee honey were sold in total in a year at a cost per kg of IDR 100,000. Therefore, the sale of honey, which brings in IDR 80,600,000, is the major source of income. Sales of kelulut honey are generally low because, despite its higher selling price, kelulut honey production is less than that of cerana honey.

The intriguing thing about the honey beekeepers at KTH Sari Puspa is that in addition to selling honey, they also sell starter boxes, or stups, and bee colony starters that can be grown in other places. KTH Sari Puspa was able to sell 100 empty stup boxes in 2022 for a price of IDR 150,000. Empty boxes are typically bought by other forest farmer organizations looking to start a honey beekeeping with assistance from governments or businesses. In addition to empty boxes, KTH Sari Puspa also offers 130 bee colony boxes for sale, each of which costs IDR 400,000. The high level of community engagement in other areas is advantageous for KTH's honey beekeepers.

From the sales of the aforementioned four products, KTH Sari Puspa was able to generate 152.6 million in income in a single year. IDR Table 3 below shows the amount of gain or loss realized:

Table 3. Total profit of beekeeping in 1 year

No	Description	Amount (IDR)
1	Total revenue in 1 year (IDR/th)	152.600.000
2	Total cost in 1 year (IDR/th)	21.900.000
3	Total income in 1 year (IDR/th)	130.700.000
4	Average income per person (IDR/person/year)	6.535.000

The analysis's findings indicate that a year's worth of sales will bring in IDR 152,600,000, while IDR 21,900,000 will be spent on production expenditures. Honey beekeepers who belong to KTH Sari Puspa can estimate their overall income at IDR 130,700,000 based on the value subtracted from the whole revenue and the total cost. This demonstrates that in 2019, the honey bee cultivation firm can give 20 members of KTH Sari Puspa an income of IDR 6,535,000 per person, or it can be argued that it has been able to provide benefits. The ability to estimate the number of bee stupes is useful for those who want to start a honey beekeeping.

The major harvest, which is carried out every two weeks during the flowering season for three months, provides the farmer with their primary source of income from honey bee production. After this period, the harvest's volume typically declines. Because bee colonies

depend on nectar and pollen for nourishment, the number of colonies is also influenced by the food supply in the area. Honey bees, like other invertebrates, are poikilothermic creatures; they are unable to regulate their body temperature and must go into inactivation when the ambient temperature becomes too high. During this phase, they have limited foraging opportunities, reducing their nutritional needs and metabolic activity. The queen's egg-laying and brood raising are reduced, however this depends on the amount of stored food. Researchers and beekeepers identified the negative impact of poor weather conditions and unavailability of bee flora in a certain area, and devised a migratory idea to address these issues (Paray et al, 2021). However, relocation itself is not a simple operation. The provision of artificial nutrition as an alternative to migration. Scientists worldwide have developed artificial food recipes for bees based on the nutritional value of honey and pollen, acceptability, palatability, digestibility, and cost of components. Maintaining colony characteristics might assist maximize the benefits of the upcoming flowering season. A globally approved standard balanced diet for commercial beekeeping has yet to be established (Paray et al, 2021).

Contribution of Honey Beekeeping Business Income to Beekeepers Household Income

The honey beekeeping created by beekeepers is an auxiliary or side business. Beekeepers primary occupation is that of smallholders, both on rubber plantations and on oil palm plantations. However, honey beekeeping has recently emerged as one of the industries capable of supplementing the income of beekeepers households.

The combined income of all family members who work as farmers to raise honey bees is referred to as the whole family household income. Data on sales, expenses, and profits from oil palm and rubber farming are presented in Table 4. According to a calculation of revenues and costs for the honey bee cultivation industry, this table will detail operating costs for the production of oil palm and rubber plantations, revenue from sales, and profits made in the same year.

Table 4. Average income, costs and profits of farming for one year (for 1 ha)

No	Description	Amount (IDR)
1	Fertilizer cost (ton/year)	5.000.000
	Herbicide Cost	600.000
	Weeding cost	1.000.000
	Harvest cost	9.000.000
	Average Total Cost	15.600.000
2	Average Revenue	54.000.000
	Average annual profit	38.400.000

The information in table 4 shows that, on average, honey beekeepers who are also farmers earn IDR. 38,400,000 from their farming activities each year. The aforementioned figure represents the typical income from 1 hectare agricultural area for each farmer. The sum of a farmers familys other income and income from farming represents the households overall income. Beekeepeers income makes up a sizable portion of all honey bee farming businesses' income, which goes a long way toward determining the total income of farmer households. By calculating the ratio of honey beekeeping income to total family income, it is possible to determine the contribution of honey beekeeping income.

Due to the availability of space and plants for bee feed, honey bee farmers who are members of KTH Sari Puspa chose honey bee farming as a side business. In addition, farming honey bees is simpler and requires less time from the farmer. The routine of gardening is frequently followed by colony maintenance chores. The high level of interest among farmers in starting a honey bee farm as a side business can really promote farmer welfare.

Table 5. The contribution of the honey bee cultivation business to beekeepers revenue.

No	Description	Mark
1	Annual average agricultural income (IDR/year)	38.400.000
2	Average revenue from the honey beekeeping (IDR/year)	6.535.000
3	Average total income (IDR/year)	44.935.000
4	Average contribution of honey bee farming business income (%)	14,5

A value of 14.5 % is calculated as a consequence of the contribution computation, namely by comparing the average income from honey bee farming with the overall income of farmer households. This demonstrates that the contribution's value is included in the Z criterion by 35%, indicating that the honey beekeeping contribution falls into the low group. A number of factors, including the fact that honey beekeeping is still a side business and has not been managed with a competent managerial structure, contribute to the low value of the contribution of the industry. This analysis is consistent with the results of research Eriyati and Aqualdo (2016) in Gunung Sahilan Village, Gunung Sahilan District, Kampar Regency, Riau Province which stated that even though it is a seasonal business, honey farming is a business that is quite promising for maintaining the survival of beekeepers. This can be seen from the amount of revenue contribution that is greater than other businesses, namely the contribution of 75%. From the results of honey farming, farmers can use it to meet family needs such as daily meal costs, childrens school fees and other costs.

The traditional beekeeping industry increased the number of colonies as a result of increased honey output and honey export capacity (Ismail et al.2018). In order to lower overall unemployment, beekeepers should work more closely with scientists, promote social entrepreneurship, and adopt entrepreneurial behavior (Bula 2021). Beekeepers income has increased as a result of farmers adopting new beekeeping technology, indicating that providing farmers with better technology may be able to boost their income and reduce poverty (Gemeda 2014).

Analysis of Financial Feasibility of Honey Beekeeping

Table 6 below provides information from the financial feasibility analysis of honey beekeeping at KTH Sari Puspa.

Table 6: KTH Sari Puspa's Honey Beekeeping Financial Feasibility Analysis

No	Analysis Tools	Analysis Results	Information
1.	Break Event Point (BEP)	> 102 Kg	
2.	Net Present Value (NPV)	IDR 13.564.823	Feasible
3.	Internal Rate of Return (IRR)	55 %	Feasible
4.	Net Benefit Cost Ratio (B/C)	1,61	Feasible
6.	Payback Periode (PP)	20,8 month	Feasible

Beekeepers at KTH Sari Puspa have long supported honey beekeeping. The answer provided information indicating that the honey beekeeping had been established since 2014. Many people have expressed interest in this side hustle. Many farmers have transitioned from raising *Apis cerana* bees to raising *Trigona* sp. bees at this time. The income from honey beekeeping, while being a side business, is able to supplement the income of beekeeper households, the majority of whom are farmers.

Based on a financial feasibility analysis, the first investment is worth IDR. 11.153.600,- . While the income is IDR. 6,535,000,- for one harvest period. Accordingly, the BEP for honey production is 102 kg based on this facts. In the event that production equals or surpasses 102 Kg, the beekeeper will break even. An NPV value of IDR 13,564,823 is calculated at a BI rate of 5.75%, along with an IRR value of 55%, a B/C ratio of 1.61, and a payback period of 1 year, 8 months, and 8 days. The KTH Sari Puspa honey bee agriculture industry is inside the practicable category according to analysis indicators. The existence of

the Subanjeriji Production Forest Area lends assistance to one of Muara Enims beekeeping industrys viability.

Behind the numerous causes that have helped beekeeping grow, there are a number of obstacles that growers must overcome in order to maximize their income, such as the accessibility of production places that are too far away to be reached without a substantial transportation expense. The primary source of nectar, the *Acacia mangium* plant, has also disappeared as a result of the Subanjeriji Production Forest changing ecology. Acacia is an alien invasive shrub that uses spectacular blooms to attract insects. Flower heads are simple to manage because they contain pollen on their surface, and pollen grains are connected in polyads, which increases collecting speed. Pollen is not accessible all day: it peaks at 09:00, remains at a steady pace throughout the morning, and then decreases in the afternoon (Giovanetti et al, 2015). Acacia nectar droplets are visible on phyllodes and frequently accessed by sun specks, suggesting that they may be a more easily accessible energy source than those in species with cryptic nectaries. Nectar availability has a clear peak about 13:00, after which droplets' abundance decreases. Although they are an abundant source of food, we seldom saw insects other than honey bees on Acacia. Honey bees, on the other hand, are clearly efficient pollinators, returning to Acacia inflorescences on a regular basis and following a well-defined gathering strategy for each resource (Giovanetti et al, 2015) .

The switch from acacia to eucalyptus as a major crop not only decreased honey output, but it also had an impact on the varieties of stingless bees raised. Farmers currently prefer *Trigona* sp species that can endure famine circumstances in order to anticipate migration to bee colonies owing to shortage of forage, and *Tetrigona apicalis, Tetragonula fuscobalteata*, and *Tetragonula laeviceps* are the choices in cultivation (Rahmad et al, 2021). Nevertheless, selecting little Trigona has an effect on the typical amount of honey produced because small Trigona have restricted flight ranges, both in terms of radius and altitude. Nevertheless, selecting little Trigona has an effect on the typical amount of honey produced because small stingless bee have restricted flight ranges, both in terms of radius and altitude. This is due to the stingless bees small size, which allows it to fly close to the hive and without looking up into the air. This group of species has a similar nesting habit, favoring places with minimal variety or vertical vegetation structure, where one or a few plant species dominate. A significant influx of workers and a strong defense of the nest entrance were noted. In several cases, the species shared a single tree (de Oliveira Lima et al, 2013).

Policies that pay more attention to beekeepers needs, particularly regarding access to financing, are required to support the growth and sustainability of the honey beekeeping in Sumaja Makmur Village. When beekeepers consider expanding bee colonies, using new technologies, enhancing product quality, getting company licenses, and product certification, capital is a crucial prerequisite. Beekeeping subsidies are viewed as an additional source of income rather than production incentives or technology adoption. Three explanatory factors (human labor cost, sugar, drug and comb foundation, and migration cost) were analyzed to determine their impact on honeybee productivity. To encourage pollination management practices, such as beekeeping, one essential method is to improve the economic performance of diminishing pollinators like honey bees on farms. (Chandra et al, 2017).

CONCLUSION

1. The total cost of production (TC) is IDR. 21,900,000. The total revenue (TR) is IDR. 152,600,000. Thus, a profit of IDR. 6,535,000 per year on a total income of IDR. 130,700,000 is the result. The average yearly income per hectare of arable land from farming, which is the primary occupation of beekeepers, is IDR. 38,400,000, meaning that the household income of a farmer is IDR. 44,935,000. The income from the honey bee cultivation industry accounts for 14.5% of the honey beekeepers' overall income and falls under the poor category.

2. According to a financial feasibility analysis, the initial investment is worth IDR 11.153.600,-. While the income is IDR 6,535,000 for one harvest period. Accordingly, the BEP for honey production is 102 kg based on this facts. In the event that production equals or surpasses 102 Kg, the cultivator will break even. An NPV value of IDR 13,564,823 is calculated at a BI rate of 5.75%, along with an IRR value of 55%, a B/C ratio of 1.61, and a payback period of 1 year, 8 months, and 8 days. Based on the analysis indicators, the honey beekeeping in Gunung Megang District is in the feasible category.

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