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## FINANCIAL FEASIBILITY ANALYSIS OF SMALL-SCALE FOREST HONEYBEES ON TROPICAL ISLAND INDONESIA

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### ABSTRACT

This study aims to analyze the cost of production and the financial feasibility of a forest honeybee business in the Kupang Regency. Research respondents are forest bee seekers with a 51-100 trees ownership scale. The sampling of respondents was determined by purposive sampling as many as 60 farmers. The data collection method is a survey to collect primary data from respondents and secondary data from related agencies. Financial feasibility analysis uses the criteria of net present value (NPV), benefit-cost ratio (BCR), internal rate of return (IRR), the payback period of credit (PPC), followed by a break event point (BEP). The results showed that the cost of production was Rp. 44,827/kg with an NPV value of Rp 20,905,525 (NPV > 0), an IRR of 74% (IRR > 24%), a Net B/C ratio of 1.1 (B/C ratio > 1), a BEP of 2,438 kg and Payback period for 10.8 months.

### KEY WORDS

Forest honey, cost of production, financial feasibility, small scale.

Indonesia is one of the countries in the Asian continent with a significant potential for honey production due to various ecological and climatic conditions. Indonesia's forests contain many plant species that provide a surplus of nectar and pollen to foraging bees. Indonesia's forest area is 96.4 million hectares or 51.53 percent of Indonesia's land area (BPS, 2020), so the potential for honey development in Indonesia is quite significant. Some 75% of the honey produced in Indonesia is obtained from hunting wild honey in the forest, with a production yield of around 4000 tons per year (Kuntadi, 2008). However, when viewed from the side of the forest area, there was a relatively high decline in the forest area. Wherefrom the data obtained in 2014, the forest area is 126.30 million ha. Compared to the forest area in 2010, this total area decreased by 136.88 million ha (Kementerian Lingkungan Hidup and Kehutanan, 2014). Based on data from the Director-General of BPDASPS in 2103, honey production in Indonesia is only around 2,000 tons per year. Compared with honey production in 2008, which was 4,000 tons per year, this shows that honey production has decreased significantly.

The development of various forestry businesses answers the challenges mentioned above. The result of different forestry businesses is directed at developing non-timber forest product commodities with high comparative and competitive advantages so that the development opportunities are very high. The forest honey business is one of the various non-timber forestry businesses. Forest honey is honey that is produced in forest areas. Kupang Regency is one of the forest honey-producing areas in East Nusa Tenggara (NTT). The spread of forest honey in the Kupang area, which has an expansive forest, has its points and potential for honey production. *Apis dorsata* nests usually hang above the trees. Therefore, forest honeybees have very high opportunities and can be developed into a large-scale industry. This business opportunity can be created, given the various sources of bee feed found in NTT. In addition, the hot climate of NTT helps accelerate the process of decreasing the water content of honey so that the quality of honey is good.



Forests in the Kupang Regency area are classified as community plantation forests. The types of plants supporting forest honey, namely ampupu (*Eucalyptus urophylla* S.T. Blake), which is a source of food for forest honeybees, are widely available in the province of NTT. This plant also has several advantages, including growing on more minor fertile soil types or critical land. The distribution of this tree is also extensive, with the extent or distribution of the ampupu (*Eucalyptus urophylla* S.T. Blake) plant, so the availability of forest honeybee feed is very abundant.

Besides increasing production, honeybee cultivation can also provide opportunities to improve people's income. So, based on the problems above, a financial analysis is carried out to see whether this business is feasible or not to be developed.

## METHODS OF RESEARCH

The research was conducted in Kupang Regency, East Nusa Tenggara (NTT) Province, Indonesia. The determination of the research location was carried out purposively with the consideration that Kupang Regency is a large forest honey-producing area in NTT. The type of research used is descriptive research with quantitative approach. Data collection was carried out in November 2021 - December 2021. The sample used as the respondent was beekeepers with an ownership scale of 51-100 trees. The number of representatives of beekeepers is as many as 60 people. The data taken include the characteristics of the respondents, namely age, formal education, main occupation, Number of productive family members, experience raising livestock, land ownership area (ha), and technical and economic parameters that affect revenues and costs. The business feasibility analysis method uses the criteria of Benefit Cost Ratio (BCR), Net Present Value (NPV), and Internal Rate of Return (IRR), payback period (PP) and Break Event Point (BEP) (fisu, 2016).

Cost of Production (HP):

$$Hp = \frac{Bt + Bv}{\Sigma M}$$

Where: Hp = Cost of goods (IDR/kg); Bt = Fixed costs (IDR/year); Bv = Variable cost (IDR/year);  $\Sigma M$  = Number of honey products produced per year (kg/year).

Cost of Honey Production:

$$Hp = \frac{Jbp - Jps}{\Sigma M}$$

Where: Hp = Cost of goods (IDR/kg); Jbp = Total production cost per year (IDR/year); Jps = Total sales of by-products/year (IDR/year);  $\Sigma M$  = Number of honey products produced/year (kg/year).

To Know BEP:

$$BEP (Q) = \frac{F}{P - V}$$

Where: Q = Number of production units sold; F = Fixed cost; P = Selling price per unit; V = Variable cost per unit.

To Know B/C Ratio:

$$B/C = \frac{\pi}{TC}$$

Where: B/C = Benefit and Cost Ratio (BCR) = Benefits (Benefits); TC = Total cost (Total Cost). Condition: B/C > 1 (one) indicates that the business is feasible to run; B/C < 1 (one) indicates the business is not feasible to run because it cannot return the invested capital.



To Know PBP (Payback Period):

$$PBP = \frac{\text{Total Investment}}{\text{total income}} \times 1 \text{ year}$$

Condition: PP > Economic Age = Not Eligible; PP < Economic Life = Eligible.

## RESULTS AND DISCUSSION

Kupang Regency is a district whose topography is hilly, and part of it is lowland which spreads in coastal areas. The land surface in the Kupang Regency area is generally hilly, mountainous, and partly consists of lowlands. The forest area consists of a protected forest area of ±109,463.41 Ha and a production forest area of ±107,904.42 Ha whose condition is still maintained. The surrounding community depends on flora and fauna non-timber wealth, namely forest honey (Hutama, et al, 2021). The forest is so vast, and the diverse types of trees will support the development of forest honey. Feed sources for forest honey in Kupang Regency, NTT Province, come from mangrove trees, kosambi, ampufu, and white grass. Kupang Regency has a tropical and dry climate with a short rainy season of 3-4 months (December to March), during a very long dry season of 8-9 months. The air temperature ranges from 22.90°-32.17°C. This is very suitable with the nature of poikilothermic bees, where the temperature of its environment influences the bee's body temperature. Before morning activities, the bees will stand in front of the hive to warm up before flying because the bees need optimal body temperature to fly and meet the needs in the pack, including obtaining food (Sihombing, 2005).

Each respondent shows various characteristics in terms of age, education, main occupation, average availability of family labor, average land ownership, and average experience of raising livestock (Table 1).

Table 1 – Characteristics of respondents

No	Characteristics of respondents	Quantity	Percent
1	Age		
	18-60 years	53	88,3
	>61 years	7	11,7
2	Education		
	SD	45	75
	SMP	8	13,3
	SMA	7	11,7
3	Work		
	Farmer	49	81,67
	Trader	8	13,3
	civil servant	3	5,1
4	farming experience	15,20	

Table 1 shows that the age of the respondents ranged from 18 to 60 years, and most (88.3%) were included in the productive category according to data from the (BPS, 2015) which stated that the effective age ranged from 15-64 years, before and after classified in the unproductive category and the rest (11.7%) included in the weak category.

The respondents' education is still relatively low because most (75%) have graduated from elementary school. Respondents reasoned that the high cost of schooling and the distance of the secondary school from their residence made them reluctant to continue their education to a higher level. Only 11.7% or seven people graduated from high school. Educational factors can affect how respondents think and act in running their business; this results from their more comprehensive insight and abilities to apply their knowledge to their business. (Arifin & Firmansyah, 2017) education is one of the critical factors in the development of human resources. Education not only adds ways to carry out work but can make decisions and become the basis for developing oneself to take advantage of all the facilities and infrastructure around for the smooth implementation of tasks. The higher a



person's education, the higher the ability and opportunity to work.

Most of the respondents (81.67%) are farmers, while the rest have various professions, including traders and civil servants. The Number of respondents who work as farmers has a relationship with the condition of the Kupang Regency area, which is a yard or dry field. The respondent's experience in raising livestock is quite long, with an average of 15.20 years. Respondents' knowledge about the management of finding and maintaining forest honeybee colony trees was passed down from generation to generation from their ancestors. Since childhood, the respondents had helped their parents look for forest honeybees.

The production costs of the forest honeybee business consist of fixed costs, including building costs, vehicles, tree rental, purchases of non-consumable tools (machetes, ropes, funnels, filters, and buckets), and variable costs, including the cost of buying jerry cans, crackles, and expenses—labor transportation. The determination of the cost of production is based on the total fixed and variable costs incurred and then divided by the amount of honey produced, which is Rp. 14,543,751 divided by the total production of 3,013 kg so that the cost of production is Rp. 44,827/kg. Meanwhile, the selling price at the producer level is IDR 69,034/kg. Based on the price applied by farmers to consumers, a mark-up of 54% of the cost of production was obtained. Based on the selling price, it means that the profit received by the farmer is 54% of each unit of product sold. (Harimurti, 2001) the mark-up at the producer level directly to consumers is 20% if through agents or retailers the mark-up is 40% and when retailers sell products to final consumers, the set mark-up can reach 70%. Forest honeybee seekers sell honey directly based on consumer demand so that consumers can now receive products/honey from forest bee seekers without any intermediary traders. The mark-up taken by honeybee seekers is more significant than the mark-up that should be. Forest honeybee seekers can set this high mark-up because no other marketing channels are involved. In addition, only forest honeybee seekers can produce and sell honey to consumers in the research area.

The method for measuring the financial feasibility of a forest honeybee business is carried out by several calculations/analyses, among others, the calculation of BEP, NPV, IRR, Net B/C ratio, and Payback Period. The method compares the initial investment cost with the net cash flow received during the honeybee business period. The recapitulation results of the financial feasibility analysis are presented in Table 2. Based on the results of the BEP calculation for forest honeybee cultivation, the BEP unit yield is 2,438 kg. If you want to break even, then a minimum of forest bee seekers must prepare 17 to 18 colonies of forest bees. This value shows the amount of honey that can produce a break-even point for the business.

On the other hand, suppose this honeybee business only has an output (honey) of 2,438 kg. In that case, this business will not experience a loss or will not make a profit, meaning that if you want to make a profit, forest honey seekers must be able to produce an output of more than 2,438 kg. Based on the results of research conducted, the yield of honey that forest honeybee seekers can obtain has exceeded that of 3,013 kg. This also indicates that the business can be concluded as feasible to run.

Table 2 – Results of Financial Feasibility Analysis of Forest Honeybee Business

No	Description	Analysis Results	Description
1	BEP	2.438 kg	Worthy
2	NPV	IDR 20.905.525	Worthy
3	IRR	74%	Worthy
4	Net (B/C)	1,1	Worthy
5	Payback Period	10,8	Worthy

Source: primary data processed (2020).

NPV is a method used to pay attention to both the net cash flow (Net Cash Flow) that considers the "Time Value Money" is the discount rate is set at 24% based on the credit loan interest rate prevailing at the bank and assuming there is no change in interest rates during the concession. The analysis of the NPV value that is reviewed is from the investor's side



because it analyzes the project's investment. Table 1 shows the NPV value with a discount rate of 24% of Rp. 20,905,525 is positive, meaning the business is feasible because the amount is greater than the investment value.

The NPV value also shows that this forest honeybee business can profit Rp. 20,905,525/year. The NPV produced in the forest bee business is in line with the results of other studies with a positive NPV ( $NPV > 0$ ), which is Rp 126,949,659 at a DF level of 7% [13]. Furthermore, the research results on the same type of business resulted in an NPV of Rp. 228,945,600 at a DF level of 10% ( $NPV > 0$ ) (Yelin, 2008). The size of the NPV value also depends on the investment costs and DF of each business. However, a positive NPV value ( $NPV > 0$ ) can already indicate that a business can/is feasible.

IRR is an investment criterion that can measure the percentage of profits in repaying the loan. Table 2 shows the IRR value of 74%. This means that forest honeybee businesses can pay up to 74% interest rates. This IRR value is greater than the discount rate used, which is 24% ( $IRR > 24\%$ ), so it can be concluded that the project is feasible to implement. The results of the IRR calculation are also comparable to the effects of (Adalina, 2008) research, where there is an IRR value of 75% for the Apis Dorsata honey business. The size of the IRR percentage in several honey businesses depends on the interest rate (DF) used in the financial analysis of each company. For example, the Honey Sari Bunga Bee business only shows an IRR value of 10.70% (Nurhasanah, 2007). When compared to the forest honeybee business, this value is still minimal. However, because the Honey Sari Bunga Bee business only uses a 7% DF in its financial analysis, the company can be feasible to carry out.

The financial analysis results of the forest honeybee business obtained a Net B/C ratio of 1.1. This value shows that every IDR 1 spent will generate a profit of IDR 1.1. The results of a B/C ratio greater than 1 are also in line with the results of research by (Leonard, 2008) with a B/C ratio of 1.41 (adequate) for the Odeng honey business and (Adalina, 2008) for Apis cerana honey business with a B/C ratio. C ratio is 1.39 (decent). This also indicates that the forest honeybee business in Kupang Regency is feasible to run.

*The payback period* is calculated to determine how long the investment invested in the honeybee cultivation business can return. The analysis results show that investment costs can be produced by taking 10.8 months or less than 12 months to conclude that this business is feasible to run.

## CONCLUSION

The cost of production from the analysis is Rp. 44,827/kg. The results of the financial feasibility analysis of the forest honeybee business in Kupang Regency show that it is feasible to be developed in terms of the NPV, IRR, Net B/C ratio, BEP, and Payback period values.

## REFERENCES

1. Adalina, Y. (2008). Analisis Finansial Usaha Lebah Madu Apis Mellifera L. (Financial Analysis Of Apis Mellifera L. Honey Bee Enterprises). *Jurnal Penelitian Hutan and Konservasi Alam*, 5(3), 217–237.
2. Arifin, S., & Firmansyah. (2017). Pengaruh Tingkat Pendidikan and Kesempatan Kerja Terhadap Pengangguran Di Provinsi Banten. *Jurnal Ekonomi-Qu*, 7(2). <https://doi.org/10.35448/jequ.v7i2.4978>.
3. Badan Pusat Statistik. (2020). Statistik Produksi Kehutanan. <https://www.bps.go.id/>.
4. Badan Pusat Statistik. (2015). Profil Penduduk Indonesia Hasil Supas. <https://www.bps.go.id/>.
5. Harimurti, S. (2001). Manajemen Usaha Kecil. Bpfe-Yogyakarta. <http://inlislite.dispersip.tubankab.go.id/opac/detail-opac?id=2307>.
6. Hutabarat, S. (2006). Forestry Development Through Development Of Non-Timber Forest Products In East Nusa Tenggara. *Integrated Rural Development In East Nusa*



- Tenggara, Indonesia. [www.editingplus.com.au](http://www.editingplus.com.au).
7. Utama, R. R., Susilowati, S., & R, I. D. (2021). Analisis Kelayakan Usaha Lebah Madu Hutan Apis Dorsata Di Kabupaten Kupang Provinsi Nusa Tenggara Timur (NTT). *Jurnal Dinamika Rekasatwa*, 4(1), 35–41.
  8. Kementerian Lingkungan Hidup and Kehutanan. (2014). Basis Data Spasial Kehutanan Tahun 2014. [https://geoportal.menlhk.go.id/~appgis/publikasi/buku/buku\\_basis\\_data\\_spasial\\_kehutanan/buku\\_basis\\_data\\_spasial\\_kehutanan\\_2014.pdf](https://geoportal.menlhk.go.id/~appgis/publikasi/buku/buku_basis_data_spasial_kehutanan/buku_basis_data_spasial_kehutanan_2014.pdf).
  9. Kuntadi. (2008). Perkembangan Koloni Apis Mellifera L. Yang Diberi Tiga Formula Kedelai Sebagai Pakan Buatan Pengganti Serbuksari. *Jurnal Penelitian Hutan and Konservasi Alam (Jphka)*, 5(4), 367–379.
  10. Nurhasanah. (2007). Analisis Kelayakan Finansial Usaha Budidaya Lebah Madu Apis Mellifera (Studi Kasus Peternakan Lebah Madu Sari Bungan Di Desa Titisan Kecamatan Sukaraja Kabupaten Sukabumi) [lpb (Bogor Agricultural University)]. [Http://Repository.lpb.Ac.Id/Handle/123456789/49325](http://Repository.lpb.Ac.Id/Handle/123456789/49325).
  11. Sihombing, D. T. H. (2005). Ilmu Ternak Lebah Madu. Ugm Press. [Https://Ugmpress.Ugm.Ac.Id/En/Product/Peternakan/Ilmu-Ternak-Lebah-Madu](https://Ugmpress.Ugm.Ac.Id/En/Product/Peternakan/Ilmu-Ternak-Lebah-Madu).