

# Investment Analysis of Rattan Farmers in Central Sulawesi, Indonesia

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This study aims to determine the production of rattan, financial analysis, sensitivity, and monetary policy. The location of this research was conducted in Sigi Regency, Central Sulawesi Province and the object of research was rod rattan, rattan symbol, bitter rattan, noko rattan, and wood. The sampling method uses a stratified random sampling system. To find out the financial feasibility, an analysis is carried out using the Pay Back Period, Net Present Value, Net B / C, Internal Rate of Return, and monetary policy models. After sensitivity analysis, all types of rattan combined with Suren wood at a 5% discount are still feasible. Bank interest rate policy given to farmers is not more than 5%. The results also showed that optimum rattan production was achieved at 33 years old while optimum suren wood production was reached at 25 years old.

**Key words:** *Rattan, Farmers, financial, Investment, Forests.*

## Introduction

An environmental component that has a very vital role is called the forest. Forests are a prominent economic resource in our lives, especially wood, while non-wood is still lacking attention, especially where forests are a source of sap. Forest resources have an essential role in providing industrial raw materials, sources of income, job creation, and employment opportunities (Richardson *et al.*, 2006).

Indonesia has a vast tropical forest and is rich in vegetable and animal products. Types of vegetable forest products that have filled the world market from Indonesia's tropical forests are timber, especially from the *Dipterocarpaceae* group (Labetubun, Suhendang and Darusman, 2005). Economically, wood from this group provides enormous support for the income and development of our country (Tallis *et al.*, 2008).

In this study, rattan is the leading research object because rattan is already known and widely used by the community as a rope, transportation, storage of goods, agricultural and household equipment, and use.

Types of rattan that are developed and are quite popular in Central Sulawesi are stem rattan (*calamus zilingerii* Becc), large Tohiti (*calamus dydimocarus* becc), Tohiti (*calamus inops* becc), and the symbol (*calamus qrnartus* becc) (Lal, 2004). Most of the domestic and foreign furniture and rattan handicraft industries use this type, so it has high economic value (Belcher, Ruíz-Pérez and Achdiawan, 2005).

In this study, the authors focus on research on investment. In life, the word "investment" is so often heard that investment can be defined as a form of managing funds to provide benefits by placing and allocating; it is expected to provide additional benefits. Of course, the process of seeking profits with investments requires analysis with the approach or formula that is usually done, especially on the economic aspects, by conducting a business feasibility study, in this case, rattan farming.

With a background in the above thinking both empirically and theoretically, the writer tries to research with the title analysis of investment in rattan farming in Sigi Regency, Central Sulawesi Province. The types of rattan studied are the types of rattan rods, symbols, and *noko* at the research location, which have high selling value and the models that are widely cultivated by the community.

## **Review of Literature**

Rattan is derived from the Malay language which means the name of plants group that grow in a climbing family called "Lepidocaryodidae". *Lepidocaryodidae* comes from Greek which means it covers the size of the fruit. The word rattan in Malay is derived from the word "expression" which means peeling (skinning) and smoothing (Menon, 1979 in Kalima, 1996). Rattan is a tolerant plant because it can grow between and under forest stands. Rattan plants require forest stands as host plants for climbing or leaning on rattan stems [Irawati and Dwiprabowo, (1996)]. Rattan grows from seeds, then propagates in nearby trees and can spread to places far or near the location of growth.

Rattan is a palm trunk that usually spreads and includes quality species, always coated with a varnish layer, and has segments about 15-50 cm long, and the stem surface is hard, shiny, usually dense, flexible and green yellow and brownish. (Hyne, 1988). Rattan according to Hyne, (1988) named also as *Calamus* sp, *Daemonorops*, *Karhalsia*, *Ceratolabus*, *Plectocomis*, *Myrialepis*, *Plectocomiopsis*. The leaves are generally thorny and curved so that it feels rough

when held. Flower and fruit seasons generally vary from region to region, depending on the circumstances of the place. Rattan ripe fruit is marked with a yellowish skin color.

In this research, the farming business that is discussed is the Rattan farming business, which is carried out in an effort to utilise forest products which has direct benefit. According to Bratawinata, (2010), forest products are divided into two, those that are results-oriented and those that are environmentally sound. Forests with benefit-oriented products are those which have direct benefits such as wood, sap, bark, medicines, fruits, rattan, mushrooms, hutable animals, etc., This means the benefit is to provide one of the forest functions as a production forest. While environmentally friendly forest products (ecosystems) provide indirect benefits such as water sources, animal shelter, recreation etc.

### **Farming Business**

Farming business according to Firdaus (2010) is an organisation of nature (land), labor and capital aimed at production in agriculture. The management of the organisation stands alone and is deliberately sought by a person or group of people as managers. With the term farming, it includes a broad understanding from the simplest form to the most modern.

Farming can also be clearly distinguished from industry. These differences can be seen in Table 1

**Table 1:** Distinction between farming Business and Industry

| No. | Characteristic     | Farming Business                                   | Industry         |
|-----|--------------------|--|------------------|
| 1   | worker             | Biological (human / livestock) or mechanical labor | Mechanic /Engine |
| 2   | Production process | Open natural resources, outdoor                    | Fast, in door    |
| 3   | Empowerment        | Simple   | Modern           |
| 4   | Decision Maker     | Fast and accurate                                  | Long term        |

In this research, the farming business that is discussed is the farming business which is carried out in an effort to utilise forest products which are of direct benefit in this case, rattan. According to Bratawinata (2010), forest products are divided into two, namely those that are results oriented and those that are environmentally sound. Forests with yield-oriented products, such as those that have direct benefits such as wood, sap, bark, medicines, fruits, rattan, mushrooms, hunt-able animals, etc., provide one of the functions of the forest as a production forest. While environmentally friendly forest products (ecosystems) provide indirect benefits such as water sources, animal shelter, recreation and so on.

## Investment

There are lots of notions about investment. Relly and Brown (1997) provide an understanding of investment with "investment is the current commitment of dollars for a period of time to derive future payments that will compensate the investor for (1) the time the funds are committed, (2) the expected rate of inflation, (3) the uncertainty of the future payment ". While Smith and Skousen (1992) said "investing activities are transactions and events the purchase and sale of securities (excluding cash equivalents) and building, equipment. Also, other assets are not generally held for sale, and the making, and collecting of loans. They are not classified as operating activities since they relate only indirectly to the central, on going operations of entity ". Furthermore, American economists Paul L. Krugman and Maurice Obstfeld (1999) say that the output used by private companies to produce output in the future can be called investment.

## Methodology

This research was conducted in Lempelero Village, Kulawi Selatan District, Sigi Regency. Central Sulawesi and the time of the study was held for 8 (eight) months from January 2016 to August 2016. In this study, the research object was the research of tan rattan farmers. The data collection techniques were used, are: (1). Observation, used by making direct observations on the object of research to describe carefully and in detail about conditions in the field associated with research.(2) Interview, is carried out by conducting unstructured direct interviews with a number of informants to obtain information and data related to the problem under study.(3) Documentation, used as a support in research, which is carried out by tracing a number of documents, references and reports relating to problems in this study.

Determination of eligibility using parameters Payback Period (PP), Net Present Value (NPV), Net B /C, Internal Rate Return (IRR). Where,

- Payback Period (PP), is the period of time required to return an investment to a project. Payback period is defined as the number of periods (years) in return on the investment incurred. This method measures how fast an investment can return; the basis used is cash inflows. The Payback Period is formulated as follows:

Payback Period = Investment spending/ Cash inflows

- Net Benefit Cost Ratio is a comparison between the amount of positive NPV and negative NPV. Net B/C shows a figure of how many times the benefit will be obtained from the costs incurred. Where the benefit is deducted from the cost each year to find out the

positive and negative net benefits, then the amount of positive present value is compared with the negative present value. The Net B / C formula can be written as follows:

$$\text{Net B/C} = \frac{\sum_{t=0}^{t=n} \text{NPV}_1}{\sum_{t=0}^{t=n} \text{NPV}_2}$$

Where:

NPV1 = positive net present value

NPV2 = net present value is negative

n = length of time period

## Result and Discussion

### *Financial Analysis and Business Scale of Rattan Rod Business*

The amount of this investment comes from all costs incurred from zero until the 14th year, namely before the exploitation of rattan stems are harvested and get income, while the total charge for all rattan stems' business activities for 45 years is Rp. 110,602,000 and gross revenue of Rp. 319,712,000, then the business has a value of benefits (B / C ratio) of 2.9, which means every Rp. 1,000 costs incurred will generate revenue of Rp. 2,900. This means that the exploitation of rattan stems is suitable for planting.

Rattan stems can be harvested from the age of 15 to 45 years. However, optimal production is achieved at the age of 33 years. With a selling price of Rp. 2,000 / kg, the total income received from rattan can be seen in Table 1 below.

**Table 1:** Rod Rattan Income (Rp/Ha/Year)

| Age (year) | TP<br>(kg/ha) | Price<br>(Rp/Kg) | Income<br>(Rp/Kg/ha) |
|------------|---------------|------------------|----------------------|
| 15         | 6,190         | 2,000            | 12,380,000           |
| 18         | 7,630         | 2,000            | 15,260,000           |
| 21         | 9,220         | 2,000            | 18,440,000           |
| 24         | 10,940        | 2,000            | 21,880,000           |
| 27         | 12,960        | 2,000            | 25,920,000           |
| 30         | 15,700        | 2,000            | 31,400,000           |
| 33         | 17,280        | 2,000            | 34,560,000           |
| 36         | 18,500        | 2,000            | 37,000,000           |
| 39         | 19,560        | 2,000            | 39,120,000           |
| 42         | 20,500        | 2,000            | 41,000,000           |
| 45         | 21,376        | 2,000            | 42,752,000           |

From Table 1, it can be explained that the rattan stems can be harvested from the age of 15 years to 45 years with the total amount of production starting from 6,190 (kg/ha) to 21,376 kg/ha and with a selling price of Rp. 2,000 / kg; we get a gross income as in the table. After knowing the level of production and revenue, the data is analysed financially at an interest rate of 5%, 10%, and 15%. At an interest rate of 5%, the Present Net Value (NPV) and Net B / C value are Rp.29,910,000 and 2.30.

This statement is reinforced by the analysis of the Internal Rate of Return (IRR) model with a value of 9% and average annual income (EAA) of Rp. 1,822,522. If it is assumed that the expenditure of consumption per farmer household head/year (5 inhabitants / HH) is Rp.50,000,000 /HH/year, then the cultivation of rattan stems per family head requires an area of 27 ha to be able to meet his/her living needs. The above results indicate that the cultivation of rattan stems at an interest rate of 5%, is feasible to be cultivated because the value is greater than the Minimum Accessibility Rate (MAR = 5%).

Stem rattan when combined with Suren wood / malapoga (*Toona clytiata*), will be very feasible to be cultivated; why this can be said to be possible is because, at an interest rate of only 5%, self-cultivated rattan without any combination of Suren wood alone is feasible because the rattan IRR value of 9% is higher than the MAR value. Whereas if the combined rattan with Suren wood turns out to be at an interest rate of 5%, it produces NPV and Net B / C values of Rp.57,020,000 and 2.26, respectively. While the IRR value is 8.3%, and while the scale of the rod rattan business combined with Suren wood is 14 ha with an average income level of Rp.3,563,182, this means that the utilisation of rod rattan combined with Suren wood is still feasible to be cultivated because the IRR value is higher than MAR. The average level of income is greater, and the scale of business is narrower when compared to

the exploitation of stem rattan alone. The overall financial analysis of rattan exploitation in Central Sulawesi Province can be seen in Table 2 below.

**Table 2:** Financial Recapitulation of Rattan Exploitation

| Object            | Financial Indicator |              |            |            |              |               |
|-------------------|---------------------|--------------|------------|------------|--------------|---------------|
|                   | PP<br>(year)        | NPV<br>(Rp.) | Net<br>B/C | IRR<br>(%) | EAA<br>(Rp.) | Scale<br>(ha) |
| Rattan Stems      | 20.5                | 29,165,000   | 2.26       | 9.0        | 1,822,522    | 27            |
| Rattan<br>Lambang | 23.2                | 16,002,000   | 1.69       | 7.5        | 999,966      | 50            |
| Rattan Noko       | 29.3                | (2,181,000)  | 0.91       | 4.5        | (136,291)    | -367          |

Description:

- PP : Pay Back Period ((rate of return on capital) in years  
 NPV : Net Present Value  
 Net B/C : Net Benefit Cost Ratio  
 IRR : Internal Rate of Return (%)  
 EAA : Equivalent Annual Annuity  
 Scale : Scale of business in hectares

Table 2 shows that the cultivation of stem rattan is the most feasible to be cultivated while the rattan nook is not possible to be developed. This is based on financial indicators, namely PP, NPV, Net B / C, and its IRR. Stem rattan has the fastest rate of return on capital, the most considerable NPV value, a decent Net B / C, and an IRR value higher than MAR. It is followed later by the exploitation of the rattan emblem. While Noko rattan is not feasible to be cultivated because it does not meet the criteria of existing financial values, where the NPV value is negative, the Net B / C is less than one. The IRR value is smaller than the MAR. This is due to the low level of production and income of rattan noko.

Rattan stem combined with Suren wood produces an average income and business scale of Rp.3,563,182 and 14 ha, respectively. Whereas Suren wood exploitation combined with each rattan, such as symbol rattan, tohiti rattan, bitter rattan and noko rattan, respectively produced an average income of Rp. 2,716,505; Rp. 2,204,024; Rp.1,754,345 and Rp.1,588,934 while the business scale was 18 ha, 23 ha, 29 ha and 31 ha respectively. From these data it can be concluded that rattan exploitation combined with Suren wood produces a greater average income and has a narrower business scale than just rattan alone without Suren wood.

When viewed from the average income and business scale, it turns out that rod rattan produces the highest average income among other rattan businesses and has the narrowest

business scale. Stem rattan generates an average income and business scale of Rp. 1,822,522 and 27 ha, respectively, whereas symbol rattan generates an average income of Rp.999,966, while the scale of business is 50 ha in a row.

Even though the above rattan business was feasible before the Noko rattan business, it still has a small income level and a large business scale. Therefore, it is necessary that rattan cultivation in Central Sulawesi Province needs to be combined with other businesses such as Suren wood / malapoga to generate higher average annual income and more companies. Rattan seeds that have been planted must be maintained so that intensive rattan can grow well and produce high-quality rattan stems (Belcher, Imang and Achdiawan, 2004). This activity discusses shrubs and other excavation plants available for the summer (Xu *et al.*, 2007). To get good results, maintenance is done every three months or four times a year.

Harvest time depends on the type of plant, soil, and growing conditions. In general, rattan is harvested at the age of about 7-15 years. After that, it can only be collected again after 2-3 years, because the best quality and results are obtained after the rattan reaches that age (Heaton, Dohleman and Long, 2008). When the rattan is old and ready to be harvested, usually the stems fall off by themselves, and thorns turn black.

Use of rattan is done by cutting the rattan on the stem as high as approximately 30 cm - 2 meters from the base of the stem, to provide opportunities for the growth of rattan shoots. The next step is to pull the rattan that can be successfully cut, so it does not damage the useful stems (Myers, 2015; Lal, 2016). Rattan is cut to a length of 20 meters, after that it is cut again into 4 fathoms ( $\pm$  6 meters). This depends on the order and to facilitate the binding and weighing.

A good harvest of rattan is at the age of 8-12 years. Then in 2 or 3 years, it can be collected again. The amount of this investment is removed from all costs incurred from zero to 14th, namely before the exploitation of the rattan symbol is harvested and receives a total value of funds for all 45 years of rattan exploitation activities in the amount of Rp.9.4744,000 and gross profit of Rp. .240,426,000; then the business has a Benefit value (B / C ratio) of 2.5, which means that every 1,00 rupiah of costs incurred will generate an income of Rp. 2,500. This means rattan exploitation is feasible to be cultivated.

Rattan can be harvested from 15 years old to 45 years old. However, optimal production is achieved at the age of 33 years. With the selling price of symbol rattan as much as Rp. 1,900 / kg, this is the total income received from rattan exploitation.

## **Conclusion**

This study concludes that optimum rattan production is achieved at 33 years of age with total production and average production respectively for stem rattan 17,280 kg / ha / yr and 523.6 kg / ha / yr, rattan symbol 13,800 kg / ha / yr and 418.2 kg / ha / yr, and noko rattan 8,640 kg / ha / yr and 261.8 kg / ha / yr. Whereas the optimum production of suren wood is reached at the age of 25 years with a total volume of 145.40 m<sup>3</sup> /ha/yr and an annual average increment of 5.82 m<sup>3</sup> /ha/yr. The amount of investment needed in the rattan business is Rp.23,685,000 per hectare/ha. For this reason, this study recommends the type of rattan rods and symbols to be prioritised for planting, because in addition to producing greater total production, it is also very much needed by the processed wood industry. Then rattan exploitation should be cultivated with agroforestry systems, especially noko rattan because if it is cultivated in monoculture, noko rattan is not financially feasible to be cultivated while another rattan is still feasible to be cultivated. Considering that rattan has a strategic value in meeting the raw materials for the furniture industry, it is essential to develop one of them in the form of financial subsidies and monetary policy of no more than 5%.

## **Ethical Clearance**

Our study was not directly applied on humans, hence ethical clearance was not required.

## **Source of Funding**

Self-funding.

## **Conflict of Interest**

The author declares that he has no conflict of interest.

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