

Financial and marketing analysis of pedada syrup (*Sonneratia caseolaris* L.) in Sei Nagalawan village, North Sumatra province, Indonesia

Agus Purwoko^{1,*}, Kansih Sri Hartini¹, and Posma Agustinus Rajaguguk¹

¹Department of Forestry, Faculty of Forestry, Universitas Sumatera Utara, Jl. Dr. T. Mansur No.9, Medan 20222, North Sumatra, Indonesia

Abstract. Sei Nagalawan village is one of the coastal villages in Perbaungan district, Serdang Bedagai regency that has the potential of mangrove ecosystems. Some fishermen in this village use pedada fruit (*Sonneratia caseolaris* L.) to be processed commercially into pedada syrup. Pedada syrup is marketed in mangrove tourist sites of Kampung Nypah and around Perbaungan district. This research aimed to analyze the financial feasibility, flow and marketing margins of the pedada syrup making business conducted by the Sei Nagalawan village community. The method used is quantitative descriptive analysis on the business actors processing, distribution and marketing of pedada syrup. The results showed that the business of making pedada syrup was feasible with an R/C ratio of 5, a break event point of 17 bottles and a payback period of 2 production cycles. The marketing flow of the pedada syrup business consists of 2 channels, namely the short line (direct) marketing channel and the long line marketing channel. The profit margin obtained by the producer through the short line marketing channel is IDR. 9.000,-/bottle. In the long line marketing channel, the margin obtained by producers is IDR. 6.000,-, collectors of IDR. 1,000,- and retailers IDR. 2,000,- per bottle.

1 Introduction

Mangrove forest is a tropical coastal vegetation community which is dominated by several species of mangrove trees that are able to grow and develop on tidal and muddy beaches [1]. Mangrove forests cover 60–70% of tropical and subtropical coastlines worldwide and have outstanding ecological functions [2, 3]. Mangrove ecosystems have a very important role for biodiversity conservation, adaptability to sea level rise, natural barriers that block storms and tsunamis and potential as carbon sinks [4-9].

Indonesia has a very large potential of mangrove resources [10]. Economically, mangroves can be used directly for daily needs such as sources of firewood, building materials, household needs, paper, medicine, bark and charcoal. Mangrove fruit can even be processed into various foods and beverages [11]. This shows that the mangrove ecosystem

*Corresponding author: agus9@usu.ac.id

has a very high economic value. Using the total economic valuation methodology, the economic value of mangrove resources is estimated to be in the range of US\$3,624.98 - US\$26,734.61 per ha per year [12].

Efforts to use mangrove fruit as a food source are still limited to programs for empowering people living around mangrove forest areas. Pedada (*Sonneratia caseolaris* (L.) is a freshwater tolerant mangrove and is known to produce fruit for nutritional function [13]. The nutritional content of pedada fruit and syrup is very good, containing about 15.95% carbohydrates, water content 77.10% , 0.86% fat, 3.85% glossary, and 2.24% protein [14].

One of the locations on the east coast of North Sumatra which is directly adjacent to the sea is Sei Nagalawan Village, Perbaungan District, Serdang Bedagai Regency, North Sumatra [15]. In this location, residents carry out various agricultural activities, plantations, industry, trade, fisheries, and various other activities [16]. Sei Nagalawan Village, which is located in a coastal area, has a mangrove forest area, one of which is the pedada (*Sonneratia caseolaris* L.) constituent species. By the local community, pedada fruit is used as a processed food ingredient, especially as a syrup. The pedada syrup processing business in this place was started in 2012 by the village community to support family income. This business is managed by a Multipurpose Cooperative (KSU) Muara Baimbai in the village.

As the pedada syrup processing business continues, research is needed to determine the financial feasibility analysis as well as the marketing flow and margins for the business unit. With more in-depth research on this matter, it is hoped that the pedada syrup processing business can be managed and developed properly as a productive business unit. The business of processing syrup made from pedada is expected to help improve the economy and welfare of the local community. Investment appraisal is also included in the feasibility study which is also useful to avoid the occurrence of unprofitable investments because the business is not feasible [17].

The purpose of this study was to analyze the financial feasibility, flow and marketing margins of the business of making pedada syrup (*Sonneratia caseolaris* L.) carried out by the community in Sei Nagalawan Village, Serdang Bedagai Regency, North Sumatra Province.

2 Materials and methods

This research was conducted in Sei Nagalawan Village, Perbaungan District, Serdang Bedagai Regency, North Sumatra Province. This location is also a mangrove tourism object which is visited by quite a lot of people around it, known as Kampung Nypah Mangrove Tourism.

2.1 Research procedure

Primary data were obtained through field observations, questionnaires, and interviews with people who carry out processing and marketing of pedada fruit on a regular basis (Figure 1). For business actors, 3 KK (Head of Families) were selected as resource persons representing similar business actors in this location representing Producers, collectors, and retailers. For business actors selling pedada syrup, the determination of the source is done by the snowball sampling method.



Fig. 1. Research respondent flow

2.2 Data Analysis Techniques

2.2.1 Financial analysis

Financial analysis is done using cost and income analysis, revenue cost ratio, break-even point (BEP) approach, and payback period.

1. Cost and revenue analysis

The cost and income analysis is intended to analyze how much the costs and income earned by the pedada fruit processing entrepreneur. According to [18], the formula for calculating production costs, revenues and profits is as follows:

Production cost:

$$TC = TFC + TVC \quad (1)$$

Note:

TC = Total Cost

TFC = Total Fixed Cost

TVC = Total Variabel Cost

Acceptance:

$$TR = P \times Q \quad (2)$$

Note:

TR = Total Revenue

P = Price per Unit

Q = Quantity

Profit:

$$I = TR - TC \quad (3)$$

Note:

I = Income

TR = Total Revenue

TC = Total Cost

1. Revenue cost ratio

Revenue cost ratio is a comparison between total revenue and total cost, which shows the value of revenue obtained from each rupiah spent. According to [18] Revenue cost ratio can be formulated as follows:

$$R/C = \frac{TR}{TC} \quad (4)$$

Note:

TR = Total Revenue

TC = Total Cost

Assessment criteria R/C

R/C < 1 = Processing business suffers losses

R/C > 1 = Processing business makes a profit

R/C = 1 = Processing business reaches break-even point

3. Break-even point approach

Break even point (BEP) or commonly called the break-even point is a point or condition at a certain level of sales volume (production), with a certain selling price, where the company does not experience a profit or loss [18]. The calculation of BEP (break-even concept) which is carried out on the basis of production units can be done using the following formula:

$$\text{BEP (Q)} = \frac{\text{TC}}{\frac{\text{P}}{\text{Unit}} - \text{VC/Unit}} \quad (5)$$

Note:

BEP (Q) = break-even point in units of production

TC = Total Cost

P = Price per Unit

VC = variable cost per unit

Variable Costs per unit (VC) are calculated using the following formula:

$$\text{VC/unit} = \frac{\text{Cost Variabel Total}}{\text{Quantity Production}} \quad (6)$$

The calculation of BEP on the basis of rupiah units can be done using the formula:

$$\text{BEP (IDR)} = \frac{\text{TC}}{\text{Y}} \quad (7)$$

Note:

BEP (IDR) = break-even point in units of production

TC = Total Cost (IDR)

Y = Total Production (unit)

BEP assessment criteria: pedada processing business will bring profit if the pedada production (in units of production) and the selling price of pedada (on the basis of rupiah units) exceeds the production and selling price at the break-even point.

4. Payback period

This analysis finds out how long it takes for a new business or project to be able to return the investment. The faster the return on investment costs of a project, the better the project because the smoother the turnover of capital. The formula used is as follows:

$$\text{Payback Period} = \frac{\text{Investment}}{\text{Net Benefit}} \times 1 \times \text{Production} \quad (8)$$

If the payback period is shorter than the specified project life, then the project is feasible. Basically, the faster the payback period, the smaller the risk faced by investors.

2.2.2 Marketing Analysis

Marketing analysis is done to analyze the marketing flow. Data from interviews with questionnaires were collected and calculated using the marketing margin and profit margin formulas. Mathematically, the marketing margin can be formulated as follows:

$$\text{Mm} = \text{Pc} - \text{Pp} \quad (9)$$

Note:

Mp = Marketing Margin

Pc = Prices at consumer level

Pp = Price at producer level

3 Results and discussion

3.1 Characteristics of business actors

Age is an important factor in supporting a production activity. The older the age, it will affect the process of running activities such as the slower the work. But on the other hand, the older you are, the more experience you get. Both producers and sellers are generally in the productive age range of 20-50 years. This age is a mature age in entrepreneurship, that at productive age is usually faster in adopting an innovation [19]. Resource persons belonging to productive age have good communication in interviews, optimal physical abilities, and have a good response in accepting new things to improve their farming business. Table 1. shows a recapitulation of respondent characteristics by education level.

Table 1. Recapitulation of respondent characteristics by education level.

No	Education Level	Amount	Percentage (%)	Note
1	Primary school	1	16,67	Collectors
2	Junior high school	2	33,33	Producers
3	Senior high school	3	50,00	Producers, Retailers
	Jumlah	6	100,00	

The education level of the pedada syrup business actors is different, from elementary to high school (the majority). This level of education is expected to sufficiently understand various matters related to cost analysis, flow, and marketing margins from the production activities carried out. The higher the level of education is also expected to be better at solving problems or making decisions related to the business being managed. In [20] explained that education has a relationship for farmers in applying technology and management skills in managing their business. The higher the education taken by business actors, the farmers are expected to be more rational in accepting the failures that may occur.

3.2 Pedada syrup processing background

Sei Nagalawan Village, located in Perbaungan District, Serdang Bedagai Regency, is an area near the coast. The people here, who initially tended to work as fishermen, have now begun to develop the existing natural potentials such as for ecotourism, mangrove nurseries, trade in fishery products and even processed food production.

Pedada fruit is one of the potential natural resource locations in Sei Nagalawan Village which is the concern of the community. The pedada fruit is considered very suitable to be made into processed syrup. Although the taste of the fruit is sour, but with good processing techniques, a product with a favorable taste and high economic value will be produced. According to [21] *Sonneratia caseolaris* fruit has several advantages compared to other types of mangrove plants. The nature of the fruit is non-toxic, can be eaten directly, the presence of a sour taste and distinctive aroma and soft fruit texture makes *Sonneratia caseolaris* suitable for processing into several food products such as jenang, lunkhead, jam and syrup. With the various preparations of mangrove fruit, the community is helped economically and automatically participates in preserving the mangrove forest around them.

The production of this pedada syrup was started by fishermen mothers in order to help their husbands' income apart from fishing. With minimal business capital, these fisherwomen process the pedada fruit into a syrup product. The manufacturing process

which is relatively simple and does not require a long time is one reason why they choose the production of pedada syrup as one of their side jobs.

3.3 Aspects of production influence

Pedada fruit can not be processed all the time. The location of the pedada tree in this village is quite far from where it is processed so that it takes time to harvest it. The pedada fruit as in Figure 2 below bears seasonally every 2 times a year, namely in the period of June and November. This is in accordance with the statement [22] which states that the production of pedada syrup is different from jeruju crackers whose production is always carried out throughout the year. This is because the pedada tree bears seasonal fruit so that its production is also done seasonally. While the leaves of jeruju which is a bush plant are always available to be produced around the clock. These constraints are quite difficult for them to be able to produce well. The raw materials must also be harvested by the Producers who incidentally are women.

The positive value obtained from processing this pedada syrup is that the results are very helpful in improving the welfare of the local community. These processed products are usually marketed around the area such as the Kampung Nypah Mangrove Tourism Object and the Pasar Bengkel Village Souvenir and Fruit Center. This product is also often exhibited and marketed in various exhibitions and bazaars held by the local Tourism Office. In addition, the main raw materials that come from nature cause the added value margin of the resulting production to be more that can be enjoyed by business actors.



Fig. 2. a. Pedada fruit (*Sonneratia Caseolaris* L.), b. Spicy syrup (*Sonneratia Caseolaris* L)

3.4 Production process

The technology used in making syrup from pedada fruit (*Sonneratia caseolaris* L.) is still relatively simple, because it only uses human power and is assisted by tools that are easy to obtain. Pedada fruit syrup as can be seen in Figure 3. is one of the processed products from mangrove fruit that can increase the economic and ecological value of mangrove forests and can increase the income of people living around mangrove forests. In terms of content, pedada syrup has various positive values. Based on research [23], among others, the content of vitamin C is quite high (50.1 mg/100 gr syrup), and contains iodine with a concentration of 0.68 mg/kg syrup.



Fig. 3. Process of processing pedada fruit (*Sonneratia caseolaris* L.) into syrup processed products

3.5 Financial Feasibility Analysis

A financial feasibility analysis was used to determine the value of pedada fruit processed into syrup and to determine whether or not it was feasible to process pedada fruit into syrup in Pasar Bengkel Village. The analysis that has been carried out is as follows.

3.5.1 Production costs and revenue

The calculation of production costs is carried out to determine the amount of costs incurred by the processor in processing Pedada fruit into syrup. According to [24], production costs are the total costs used to finance the entire business process. There are 2 types of production costs incurred in processing Pedada fruit into syrup for one month, namely fixed costs and variable costs. According to [25], fixed costs are types of costs whose size does not depend on the size of the production. While variable costs are costs whose size is directly related to the amount of production. The depreciation cost of syrup processing equipment can be shown in Table.2

Table 2. Depreciation cost of syrup processing equipment.

No	Equipment Type	Purchase price (IDR)	Lifespan (Years)	Depreciation cost/1x Production (IDR)
1	Machete	40.000,00	5	166,67
2	Cooking keg	90.000,00	4	468,75
3	Spoon 1 dozen	25.000,00	3	173,61
4	Pan	60.000,00	8	156,25
5	Jerry can	60.000,00	3	416,67
6	Knife	50.000,00	5	208,33
7	Soaking pot	45.000,00	3	312,50
8	Clamp 3 pieces	20.000,00	2	208,33
9	Big bucket 4 pieces	220.000,00	5	916,67
10	Small bucket 3 pieces	120.000,00	5	500,00
11	Dipper	5.000,00	2	52,08
12	Sieve 4 pieces	60.000,00	1	1.250,00
13	Basket	25.000,00	2	260,42
14	Packaging bottle	300.000,00	3	990,33
	Total	1.120.000,00		6.080,61

Table 3. Variable cost of syrup processing.

No	Type	Amount	Unit	Price (IDR)	Amount (IDR)
1	Pedada Fruit	2	kg	20.000	40.000
2	Water	6	Jerry can	250	1.500
3	Firewood	¼	Pick-up car container	150.000	37.500
4	Plastic	10	Sheets	2.000	20.000
5	Jute	10	Pieces	2.000	20.000
6	Transportation	4	Liter	10.000	40.000
	Total				159.000

The costs included in the variable costs are the cost of raw materials, water, firewood, fresh plastic, jute, transportation, and labor costs. Details of the costs incurred for one production (1 week) are presented in Table 3.

The total cost is obtained from the sum of the total fixed costs and total variable costs in a one-time production period (Table 4).

Table 4. Total cost of syrup processing.

No	Description	Value per production (IDR)	Percentage (%)
----	-------------	----------------------------	----------------

1	Total fixed cost	6.080,00	3,7
2	Total variable cost	159.000,00	96,3
3	Total production cost	165.080,00	100,00

From Table. 4 it can be seen that the percentage of total fixed costs is only the cost of equipment depreciation each time it is produced while the total variable costs include the cost of raw materials, support costs, and transportation.

Total revenue is obtained by multiplying the selling price per unit with the amount of syrup produced in one production (Table 5).

Table 5. Total revenue.

No	Description	Unit	Value per Production (IDR)
1.	Price/Unit	Rupiah	12.000,00
2.	Total production	Bottle	70,00
3.	Bruto	Rupiah	840.000,00

The selling price per unit and the amount of production are influenced by market demand and the fruiting season of the pedada. In terms of market demand, the higher the market demand, the selling price per unit and the amount of production will increase. These events usually occur when the holiday season arrives where market demand increases for this product. Pedada is a seasonal fruit and is not always available like other fruit-based snacks, while market demand tends to increase during the holiday season. According to [26], the price of each of the crops used applies the price agreed upon between the seller and the buyer. However, the processed pedada syrup marketed by the public still often experiences changes due to the absence of a fixed price. The market price for pedada syrup is still very dynamic depending on the agreement between the seller and the buyer at the time the transaction occurs.

The calculation of net income or profit is intended to find out how much net income or profit is obtained in processing Pedada fruit into syrup in each production (Table 6).

Table 6. Advantage.

No	Description	Value per production (IDR)
1	Total receipt	840.000,00
2	Total production cost	165.080,00
3	Profit	674.920,00

The profit obtained by the syrup processor in Sei Nagalawan Village, Dusun Tiga, Perbaungan District, Serdang Bedagai Regency from the table is IDR. 674.920.00 with a total revenue of IDR. 840,000.00 in one production. Production costs of IDR. 165,080.00 per single production. According to [27], in a feasibility analysis of a project, production costs and income will usually be used as a benchmark in measuring business feasibility because these two things are core components in a business activity.

3.5.2 Revenue cost ratio (R/C)

R/C Ratio analysis is used to determine the feasibility of a business seen from the comparison between the total revenue obtained by the processor and the total production cost in processing pedada fruit into syrup.

Table 7. Calculation results of R/C ratio

No	Description	Unit	Value
----	-------------	------	-------

1	Total receipt	Rupiah	840.000,00
2	Total production cCost	Rupiah	165.080,00
3	R/C Ratio		5

The assessment criteria from the R/C Ratio analysis are if the R/C Ratio < 1 then the pedada processing business into syrup suffers a loss, if the R/C Ratio > 1 then the pedada processing business experiences a profit, and if the R/C Ratio = 1 then the business reach the break-even point. Based on Table 7, the R/C Ratio obtained from the research results is 5. This shows that the business of processing pedada fruit into syrup in Sei Nagalawan Village, Perbaungan District, Serdang Bedagai Regency is declared feasible and profitable.

3.5.3 Break even point (BEP) approach

Break even point is an analysis that looks at a certain price and a certain amount of business activity does not experience a profit or loss (Table 8). In other words, the income is equal to the costs incurred.

Table 8. Results of recapitulation of BEP values.

No	BEP	Unit	BEP	Production	Difference
1	Unit Production	Bottle	17	70	53
2	Unit IDR	IDR	2.358	12.000	9.642

From the results of the study, it was found that the processor was able to produce as many as 70 bottles and sell them at a price of IDR. 12,000.00 in one production. This means that this pedada fruit syrup processing business provides benefits for entrepreneurs who process it. The amount of production and selling price of syrup is higher than the production and the resulting break-even price.

According to [28] that the advantage of using break-even analysis is that it is able to provide a quick estimate of how much product must be sold to break even and how much profit can be made if higher sales volumes are obtained.

3.5.4 Payback period

Payback period analysis is used to find out how long a business that is run can return the investment that has been invested (Table 9).

Table 9. Payback period.

No	Uraian	Satuan	Nilai
1	Investasi	Rupiah	1.279.000
2	Net Benefit	Rupiah	674.920
3	Payback Period	Produksi	2

Based on Table 10 shows that the payback period for 2 times the production. That is, with an investment of IDR. 1,279,000.00 and a net profit of IDR. 674,920.00 for one production will be refundable within a period of two productions. Investment of IDR. 1,279,000.00 is obtained from the sum of the total cost of the purchase price of equipment and variable costs in one production. This shows that the return on investment occurs quickly enough so that the business of processing pedada fruit into syrup is feasible to be developed. This is in accordance with the statement

This is in accordance with the statement [29] that the most important variable that affects the company's financial needs is the projected sales volume. Sales forecasts usually tend to be overstated in projected financial needs. Statement [30] confirms that the advantage that entrepreneurs get when conducting financial analysis is that entrepreneurs will know the amount of costs incurred and the amount of revenue that will be obtained, so that they can make plans for the use of production factors. In addition, entrepreneurs can also carry out business development for further.

3.6 Marketing flow and problems

Marketing is an activity that aims to distribute products or goods produced. The marketing is divided into various channels, namely long lines, medium lines and short lines or graded lines [31-33]. In this study, pedada Producers sell their processed products directly to consumers at the location where they are made, namely at the Kampung Nypah Mangrove Tourism Object. or the so-called short path. The production is not carried out on a large scale and in order to maintain the sustainability of the mangrove ecosystem, the Producers focus on selling their products in that location.

In general, the buyers of this product are visitors to the mangrove ecotourism object of Kampung Nypah and its surroundings. Producers also sell their products when they receive orders from within or outside the region or what is known as a long line. The retailers here generally market their products at hawker centers and souvenir shops at Bengkel Market, Perbaungan District, Serdang Bedagai Regency (Figure 4).

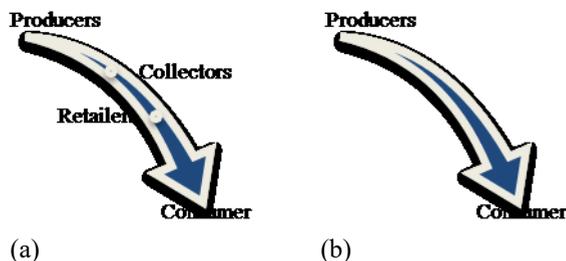


Fig. 4. a. Long line of syrup marketing flow
b. Short line syrup marketing line

The marketing cycle of this product is also not long, only about 7-15 days. Products that are distributed are goods that are not durable, so the type of distribution must also be fast. This is in accordance with the statement [34] that the nature of an item that is traded or produced can limit the distribution channel or the chosen marketing channel. Non-durable products require different production channels with durable products so that the nature and type of product can limit the distribution or marketing channels used.

Problems related to pedada syrup products that do not last long can actually be solved by storing this product in the refrigerator and a good packaging process. By doing this the product can last longer and the marketing channel is also bigger. It can also overcome the problem of fluctuations in market demand, especially during the holiday season. During the holiday season, tourist attractions and hawker centers at Pasar Bengkel are crowded with people so that market demand can be met through more production.

The lack of public transportation facilities that can reach this area also makes pedada syrup products not easily marketed to other places. This is in accordance with the statement [35] that the local government has not yet made improvements to the transportation infrastructure, even though this route is used by many vehicles to go to tourist attractions in

Perbaungan District as well as a public route for community mobility facilities. Another problem comes from the seasonal availability of raw materials and limited processing capital to make this product, causing production limitations when demand increases. In fact, this can be used as an opportunity that can increase the income of producers.

3.7 Pedada syrup marketing margin

Marketing margin is the difference between the price paid by consumers and the price received by producers (Table 10).

Table 10. Syrup marketing margin analysis results.

Types of products	Processing Price (IDR)	Collector Price (IDR)	Retailer Price (IDR)	Consumer (IDR)
Long Path	6.000	12.000	13.000	15.000
Margin	6.000 (40%)	1.000 (6,7%)	2.000 (13,3%)	-
Short Path	6.000	-	-	15.000
Margin	9.000 (60%)	-	-	-

The new marketing system can be said to be efficient if it is able to distribute the produce from producer farmers to consumers at the lowest possible cost and is able to hold a fair distribution of the overall price. From the results of the marketing analysis of processed pedada syrup products in Perbaungan District, Serdang Bedagai Regency, North Sumatra, it is known that the market system for this product is quite efficient, at least every marketing actor gets a fairly fair profit.

4 Conclusion

The conclusion of this study is that the business of making pedada syrup (*Sonneratia caseolaris* L.) carried out by the people of Sei Nagalawan Village is declared feasible with an R/C ratio of 5, a break event point of 17 bottles (price of IDR. 2,358,-) and a payback period of as much as 2 times production cycle. The marketing flow of the pedada syrup business consists of two channels, namely direct marketing (short route) from producers to consumers at the Nypah Village Mangrove Tourism Object, Sei Nagalawan Village and surrounding areas and marketing through collectors and retailers around Pasar Bengkel, Kec. . Perbaungan and its surroundings (long line). The profit margin obtained by the producer through the short channel marketing channel is IDR. 9,000,- (60%)., and in the long channel marketing channel the margin enjoyed by producers is IDR. 6.000,- (40%), collecting traders IDR. 1,000,- (6,7%) and retailers IDR. 2.000,- (13.3%) for each bottle.

Thank you to the managers of the Nipah Village Mangrove Tourism Object, Sei Nagalawan Village, Perbaungan District, Serdang Bedagai Regency and all parties who have helped facilitate the implementation of this research.

References

1. M. Basyuni, S.M.T. Situmeang, L.A.P. Putri, E. Yusraini, I. Lesmana, IOP Conf. Series: Earth and Environmental Science, 454, 012112 (2020)
2. H. Thatoi, B.C. Behera, R.R. Mishra, S.K. Dutta, Ann. Microbiol, **63**, 1–19 (2012)
3. W. Zhuang, Y. Xiaoli, H. Ruiwen, L. Zhiwen, L. Xingyu, Z. Xiafei, X. Fanshu, P. Yisheng, H. Qiang, T. Yun, Y. Tony, W. Shanquan, S. Longfei, Y. Qingyun, W. Cheng, H. Zhili, npj Biofilms and Microbiomes, **6**, 52 (2020)

4. B. Blankespoor, S. Dasgupta, G.M. Lange, *Ambio*, **46**, 478-491 (2017)
5. J.B. Kauffman, C. Heider, T.G. Cole, K.A Dwire, D.C. Donato, *Wetlands*, **31**, 343-352 (2011)
6. Wintah, N. Agus, P. Rudhi, H. Moh, L. Windiariani, Y. Fredinan, *AAFL Bioflux*, **14**, 1855-1864. (2021)
7. R.P. Yudha, S.S. Yoga, S. Meriadec, N. Sandy, *Forest Ecology and Management*, **488**, 119038 (2021)
8. K.W. Krauss, K.L. McKee, C.E. Lovelock, D.R. Cahoon, N. Saintilan, R. Reef, L. Chen, *New Phytol*, **202**, 19-34 (2013)
9. T.A. Worthington, S.E. Philine, D.F. Ken, W.K. Catherine, E.L. Julia, T. Rick, D.W. Colin, B. Pete, C. Nicole, L. David, L. Richard, J.M. Nicholas, J.S. William, S. Mark, *Scientific Reports*, **10** 14652 (2020)
10. D. Donato, J. Kauffman, D. Murdiyarso, K. Sofyan, S. Melanie, K. Markku, *Nature Geosci*, **4**, 293-297 (2011)
11. S. Khoiriah, R. Johan, F. Trisnawati, *Analisis Finansial Usaha Kecil Menengah Sirup Mangrove di Kecamatan Rangsang Barat Kabupaten Kepulauan Meranti* (Program Studi Pendidikan Ekonomi, Universitas Riau, Pekanbaru 2015)
12. A. Rizal, S. Asep, H. Heti, *Biodiversity Int J*, **2**, 00051 (2018)
13. M. Basyuni, Y. S. Siagian, R. Wati, L.A.P. Putri, E. Yusraini, I. Lesmana, *IOP Conf. Series: Earth and Environmental Science*, **251**, 012042 (2019)
14. Jariyah, S.B. Widjanarko, Yunianta, T. Estiasih, P.A. Sopade, *Int. Food Res J*, **21**, 2161-7 (2014)
15. N. Sakila, A.R. Dinda, S. Ani, *Journal of Marine and Aquatic Sciences*, **4**, 316-323 (2018)
16. Badan Pusat Statistik [BPS] Kabupaten Serdang Bedagai, *Letak dan Geografis Kabupaten Serdang Bedagai* (Medan, 2015)
17. A. Subagyo, *Studi Kelayakan Teori dan Aplikasi* (PT. Elex Media Komputindo, Gramedia, Jakarta, 2008)
18. Kuswadi, *Analisis Keekonomian Proyek* (Andi Offset, Yogyakarta, 2007)
19. I.P. Ruwaida, K. Endang, *Jurnal Penyuluhan Pertanian*, **10**, 1 (2015)
20. M. Nauri, *Faktor-Faktor yang Berhubungan Dengan Konversi Lahan dari Usaha tani Jagung Kelapa Sawit di Kecamatan Sukaraja Kabupaten Seluma Provonsi Bengkulu* (Fakultas Pertanian, Universitas Bengkulu, 2009)
21. D. Andriani, *Mutu Sirup Buah Pedada (Sonneratia caseolaris) Selama Penyimpanan Dengan Penambahan Natrium Benzoat* (Jurusan Teknologi Pertanian, Universitas Riau, Pekanbaru, 2015)
22. Pradita, Adisti Yulia, *Analisis Kelayakan Finansial Dan Nilai Tambah Pengolahan Tanaman Mangrove di Kampung Nipah Desa Sei Nagalawan Kabupaten Serdang Bedagai* (Universitas Sumatera Utara, Medan, 2018)
23. Raindly, *Sirup Apel Mangrove* (Pustaka Pelajar, Yogyakarta, 2006)
24. Sopianur, Rita, Juraemi, *EPP*, **8**, 34-40 (2011)
25. M. Daniel, *Pengantar Ekonomi Pertanian* (Bumi Aksara, Jakarta, 2004)
26. L.P. Naibaho, *Kajian Potensi, Kontribusi dan Prospek Pengembangan Aren (Arenga pinnata). (Studi Kasus: Desa Rumah Sumbul, Kecamatan Sibolangit, Kabupaten Deli Serdang)* (Universitas Sumatera Utara, Medan, 2010)

27. R. Putra, *Analisis Kelayakan Finansial Usaha Pengolahan Gula Aren Secara Berkelompok di Kanagarian Talang Maur Kecamatan Mungka Kabupaten Lima Puluh Kota Provinsi Sumatera Barat* (Universitas Andalas, Padang, 2011)
28. C.W. Lamb, Hair, F. Josep, W. McDaniel, *Pemasaran* (Terjemahan David Octarevia, Salemba Empat. Jakarta, 2001)
29. Moerdiyanto, *Studi Kelayakan Bisni Bahan Ajar Fakultas Ilmu Sosial dan Ekonomi* (Universitas Negeri Yogyakarta, Yogyakarta, 2008)
30. E.D. Leatemia, *Jurnal Ichsan Gorontalo*, **3**, 1351-1359 (2008)
31. S. Astuti, Saron, *Jurnal Agristan*. **2**, 80-90 (2020)
32. R. Irnawati, S. Dini, S. Adi, R. Ani, M. Aris, Ratu, M. Sari, S.N. Hery, *Journal Sosek KP*, **15**, 159-168 (2020)
33. V. Lendel, S. Eva, Z. Anna, S. Veronika, *Generation Y Marketing—The Path to Achievement of Successful Marketing Results Among the Young Generation* (Strategic Innovative Marketing pp 11-17, 2016)
34. P. Ginting, B. Surbakti. *Pengantar Marketing* (Penerbit CV Monora, Medan, 1986)
35. W. Triwibowo, *Ekowisata mangrove studi etnografi tentang pengelolaan ekowisata mangrove berbasis masyarakat di kampoeng Nipah, desa Sei Nagalawan, Kecamatan Perbaungan Serdang Bedagai*, (Universitas Sumatera Utara, Medan, 2015)