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FINANCIAL ANALYSIS ALSINTAN SERVICE BUSINESS (UPJA) COMBINE HARVESTER OF RICE FARMING IN BANJAR REGENCY, INDONESIA

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ABSTRACT

This research aims to assess the financial feasibility of the Combine Harvester Agricultural Equipment and Machinery Service Business (UPJA) in rice farming. The research uses a survey method on UPJA that is still active in Banjar Regency. The research was analyzed financially which included Net Present Value (NPV), Internal Rate of Return (IRR), Net B/C, Gross B/C and Pasyback Period (PP) analysis, as well as sensitivity analysis. Based on the results of the financial analysis, UPJA Combine Harvester in Banjar Regency is feasible to operate with a positive NPV value of IDR 338,194,852, an IRR value of 26% and greater than Bank BNI's interest of 11%/year. The Net B/C and Gross B/C obtained are 1.69 and 1.42 respectively and greater than 1. The Payback Period obtained is quite short for 3.18 years. Based on the sensitivity analysis, UPJA Combine Harvester is sensitive to a 35% decrease in harvest area in Banjar Regency and a 5% decrease in operational costs, so that financially UPJA Combine Harvester in Banjar Regency is no longer feasible.

Keywords: Financial Analysis, Rice Farming, UPJA, Combine Harvester.

1. INTRODUCTION

The development of agricultural mechanization technology must of course be supported by a social system that makes efforts to achieve the goals to be produced. Agricultural development requires a more intensive active role of farmer institutions.

The government in this case optimizes the role and function of institutions in rural areas, one of which is through the growth and development of the Agricultural Equipment and Machinery Service Business (UPJA). UPJA is expected to overcome the problems of limited farmers' ability to cultivate agricultural land (0.5 Ha/MT), inefficient management of individual alsintan, low level of education and skills of farmers, weak farming capital ability and inefficient farming management [1].

The development of UPJA is inseparable from the area of rice farming in the form of the provision of Combine Harvesters. Banjar Regency as one of the rice production centers in South Kalimantan, where in 2021, the harvest area used for paddy rice farming, in this case local rice and superior rice during the 2015-2024 period, averaged 41,924 ha. During this period, the yield area of rice decreased, as a result of climate change in the form of drought and pest and disease attacks.

In Banjar Regency in 2015 the rice harvest area reached 74,661 ha and continued to increase to 74,181 ha in 2016. However, in 2017 there was a considerable decrease, so that the rice harvest

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area only reached 56,189 ha. A considerable decrease in rice harvest area occurred in 2020 to only 38,600 ha, and the largest decline occurred in 2022 and 2023 with a harvest area of 9,563 ha and 4,787 ha, respectively. Furthermore, a very large decrease in harvest area will also occur in 2024, which is only 172 ha. The decline in harvest area in the 2022-2023 period was caused by pest and disease attacks as well as droughts that hit the district as a result of climate change.

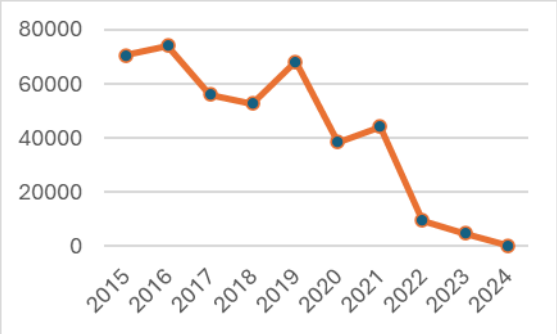

Figure 1. Graph of the development of local and superior rice harvest area in Banjar Regency for the period 2015-2024

Purpose and Uses

This study aims to analyze the financial feasibility of the Combine Harvester Agricultural Tool and Machinery Service Business (UPJA) in rice farming in Banjar Regency. The results of this research are expected to provide important uses for various parties. For the government, the results are a reference in formulating targeted agricultural development policies and programs to improve the welfare of farmers. For farmers, as the main actors and business actors, this research is expected to be used as knowledge and models to strengthen UPJA and can also be used as a reference in carrying out farming management towards agribusiness businesses. Meanwhile, for students, the results of this research can be used as scientific references and information materials to support similar research in the future.

2. METHOD

Place and Time of Research

This research was conducted in several UPJA Combine Harvesters in Banjar Regency, South Kalimantan Province. This research was carried out for 6 (six) months starting from November to April 2025, starting from data collection, data analysis to report making.

Data Types and Data Sources

The data used in this study is in the form of primary data and secondary data. Primary data were obtained from the results of direct interviews with UPJA managers who became research samples with the help of questionnaires that had been prepared beforehand. Secondary data is obtained based on literature studies, institutions and related agencies relevant to this research through annual reports and publications.

Sampling Methods

This study uses a survey method. The population of this study is UPJA which manages Combine Harvester (CH) in rice farming in Banjar Regency, which totals 12 UPJAs. From this

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number, 1 UPJA was selected that has a fairly complete record, so that it can represent UPJA in Banjar Regency.

To analyze the objectives of the study, financial analysis was used consisting of NPV, IRR, Net B/C, Gross B/C, Payback Period [2,3, 4, 5]

Net Present Value

Net present value as a result of calculation that expresses the current investment value of future cash flows by involving the right discount rate. Net present value can also be used to analyze the profits and losses of the Combine Harvester rental service business so that it can be used as a basis for future investment, with the formula:

$$NPV = \sum_{t=0}^{n} \frac{[B_t - C_t]}{(1+i)^t}$$

With:

Bt = *Benefit* in the year t (Rp)

Ct = *Cost* in the year t (Rp)

n = Length of n time period (Year)

i = *Interest rate* applicable (%)

Result criteria:

1. If the NPV > 0, the CH rental business is financially feasible
2. If the NPV < 0, it is financially unfeasible

Internal Rate of Return

Internal rate of return (IRR) to analyze the rate of return on the purchase of *Combine Harvester* so that the rate of return of operational activities for the rental of equipment and machinery can be accurately determined with the formula;

$$IRR = i_1 + \frac{NPV_1}{NPV_1 + NPV_2} \times (i_2 - i_1)$$

With:

i1 = *Discount rate* that results in a positive NPV

i2 = *Discount rate* which results in a negative NPV

NPV1 = NPV with a positive value

NPV2 = NPV whose NPV has a negative value

Result criteria:

1. If the IRR > i *(interest rate),* financially the CH rental business is feasible
2. If the IRR < i *(interest rate),* financially the CH rental business is not feasible
3. If IRR = i *(interest rate),* financially the CH rental business is at a break-even point

Net Benefit Cost Ratio

The *benifet cost ratio* analysis is necessary to determine the comparison between the costs incurred now and the benefits or current value obtained from the *Combine Harvester* rental business, with the formula used as follows [3];

$$\text{Net B/C} = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+i)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+i)^t}}$$

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B1 = Reception (*benefit*) in the t year (Rp)
C1 = Fees (*cost*) in the t year (Rp)
t = Age of alsins (years)

i = *Discount rate* that applies at the time of research (%)

Result criteria:

1. If *the Net B/C ratio* > 1, then the CH rental is feasible
2. If the *Net B/C ratio* < 1, then the CH rental is not feasible

If *the Net B/C ratio* = 1, then the CH lease is at breakeven

Gross Benefit Cost Ratio

Gross B/C as a comparison between the benefits obtained in *the form of gross* that has been discounted and the *overall cost* that has been discounted (Ibrahim, 1998). The *Gross B/C* formula is as follows [3];

$$\text{Gross B/C} = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+i)^t}}{\sum_{t=n}^{n} \frac{C_t}{(1+i)^t}}$$

With:

Gross B/C = *Gross Benefit Cost Rasio*

Bt = *Benefit* in the year t (Rp)

Ct = *Cost* in the year t (Rp)

n = Project time period (Year)

i =*Interest rate* that is valid at the time of the study (%)

The Gross *B/C criteria* are as follows:

1. If *the Gross B/C* > 1, then the *CH* investment is worth it
2. If Net B/C < 1, then the CH investment is not feasible
3. If Net B/C = 1, then the CH investment breaks even

Payback Period

Payback Period, is one of the criteria in investment, to analyze how long the initial investment has been made to be returned. The analysis used can be seen from the net cash flow *(proceed)* obtained every year. Payback *Period calculation*, using cumulative net benefit [3].

Payback period criteria used:

1. If the payback period < maximum time, then the project is feasible
2. If the payback period > maximum time, then the project is not feasible

3. RESULTS AND DISCUSSION

UPJA *Combine Harvester* in Banjar Regency is quite a large number, both managed by the community and managed by UPJA, money has been formed by the government. The number of

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UPJAs formed by the government is still small, namely only 12 units (Provincial Agriculture and Food Security Service). On the other hand, the development of UPJA managed by the community is quite large, so it is important to carry out a financial analysis of UPJA in the form of *a Combine Harvester* . The data sources used were obtained from various UPJAs for more detail as in the following description.

Initial Investment Cost. The initial investment cost of UPJA *Combine Harvester* in Banjar Regency is quite large, reaching IDR 490,000,000 which consists of the purchase of Combine Harvester equipment which reaches IDR 475,000,000, the average wage to the location is IDR 950,000, then the construction of a warehouse which reaches IDR 15,000,000, so that the total investment cost reaches IDR 490,950,000 (Table 1).

Table 1. UPJA Combine Harvester Initial Investment in Banjar Regency

Cost Component	Operating Costs
Purchase price of the appliance	475.000.000
Transport to location	950.000
Warehouse Manufacturing	15.000.000
Sum	490.950.00

Operational Costs. Based on the results of the analysis of operational costs which reached Rp 984,590,620 during the 2016-2024 period. The largest fee is used to pay operators which reaches Rp 249,898,038 or reaches 50.62% of the total cost as in (Table 2). This is because operator costs are very important in the operation of Combine Harvester, so that the wages received are 20% of the services received by the use of Combine Harvester. The next cost that is also quite large is for the purchase of Fuel Oil (BBM) which reached Rp 131,202,607 during the same period or 26.58% of the total cost.

Table 2. UPJA Combine Harvester Operational Costs in Banjar Regency

Cost Component	Value (Rp)	Percentage (%)
Fuel Oil	131.202.607	26,58
Pergantian Olie	9.571.717	1,94
Repair and Maintenance	49.071.737	9,94
Manager's incentives	8.591.801	1,74
Operator Incentive (20% of	249.898.038	50,62

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Services)		
CH Transport to Location (PP)	32.172.992	6,52
Miscellaneous (donations and security)	13.131.728	2,66
Over Haull	-	-
Sum	493.640.620	100,00

Source: Primary and secondary data 2016-2024

Next is the cost of repair and maintenance which reaches 9.94% of the total cost. The repair cost is relatively small, this is because the quality of the *Combine Harvester* is relatively good, so the quality of the spare parts is also more, so it can last longer.

The cost of transportation from *the Combine Harvester warehouse* to the farmer's location or rice field is6.52% of the total cost. The unique thing about UPJA is the cost of donation to Mosholla or Mosque, as well as the cost of salvation at the *Combine Harvester* location which reaches 2.66%. Meanwhile, the cost of oil change and manager incentives are relatively small, only 1.94% and 1.74%, respectively.

***Benefit* UPJA.** The benefit or business revenue of alsintan services or UPJA is the multiplication between the physical results in the form of grain obtained *by the Combine Harvester* multiplied by the wages. Based on the results of the analysis, it shows that the volume or grain produced by UPJA *Combine Harvester* in Banjar Regency during the 2015-2024 period reached 2,973 tons, or 2,973,000 kg of grain, with an average wage during that period of Rp 633 per kg, so the revenue or benefits obtained by UPJA in Banjar Regency reached Rp 1,875,291,000 (Table 3). *This benefit* is quite large considering that *the Combine Harvester* works according to its optimal capacity.

Table 3. Benefits of UPJA Combine Harvester in Banjar Regency

Year	Volume (ton)	Upak (Rp/kg)	Admission (Rp)
2016	294	600	176.291.000
2017	333	600	200.000.000
2018	333	600	200.000.000
2019	350	600	210.000.000
2020	367	600	220.000.000
2021	383	600	230.000.000

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2022	343	700	240.000.000
2023	270	700	189.000.000
2024	300	700	210.000.000
Sum	2.973	633	1.875.291.000

Net Benefit. *Net benefit* is the difference between the benefit and the initial investment cost and operational costs. Based on the results of the calculation with a benefit of Rp 1,875,291,000 and the initial investment cost and operational costs of *the Combine Harvester*, a *net benefit* of Rp 890,700,380 was obtained for the period 2016 to 2024 (Table 4). This amount is quite large considering that *the Combine Harvester* is used optimally, so the costs incurred are relatively efficient. In other words, if the machine is used optimally or in the best conditions, then operational costs will be more efficient.

Table 4. Benefits, Costs and Net Benefit of UPJA Combine Harvester in Banjar Regency

Year	Benifet (Bt) (Rs)	Cost (Ct) (Rp)	Net Benefit (Rp)
0	-	490.950.000	(490.950.000)
1	176.291.000	62.472.520	113.818.480
2	200.000.000	60.737.820	139.262.180
3	200.000.000	63.797.360	136.202.640
4	210.000.000	50.763.900	159.236.100
5	220.000.000	48.551.250	171.448.750
6	230.000.000	57.717.770	172.282.230
7	240.000.000	45.100.000	194.900.000
8	189.000.000	44.000.000	145.000.000
9	210.000.000	60.500.000	149.500.000
Sum	1.875.291.000	984.590.620	890.700.380

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UPJA *Combine Harvester Investment Criteria*

An analysis of investment criteria is very necessary to find out whether the management of UPJA *Combine Harvester* is worth pursuing. The various investment criteria used in this study are in the form of *Net Present Value (NPV)*, *Internal Rate of Return (IRR)*, *Net B/C* and *Gross B/C* and *Payback Period* (PP) analysis. Based on the results of the analysis that has been carried out, all the values obtained exceed the criteria that have been set, so it can be concluded that *the Combine Harvester* managed by UPJA in Banjar Regency is financially feasible to be tried. This is in accordance with the results of research on the use of *Combine Harvester* in optimal conditions financially feasible [6,7]. In detail as in the following description.

Net Present Value (NPV). The results of the analysis with one of the components of the investment criteria obtained a large NPV of IDR 338,194,852 at an interest rate of 11% (Bank BNI loan interest 2024). Based on the criteria set, the NPV value obtained is much greater than zero or is marked positive. So it can be concluded that the *Combine Harvester* service business managed by UPJA in Banjar Regency is financially feasible. This means that at this interest rate, the benefits obtained are still greater than the costs incurred (Table 5). In other words, UPJA Alsintan in the form of *a Combine Harvester* is worth working on and needs to be continued and developed.

Internal Rate of Return (IRR). Based on the results of the analysis, the value of the IRR obtained is 26% and is still much greater than the loan interest used in investments which reaches 11% per year. The IRR value is quite large, so it is quite safe in the event of an increase in loan interest. Theoretically, if the IRR value is more than 2 times the loan interest rate, then the investment is relatively safe. In other words, financially UPJA Alsintan in the form of *a Combine Harvester* in Banjar Regency is feasible to be tried and developed.

Table 5. Financial Analysis of UPJA Combine Harvester Optimal Capacity in Banjar Regency

Year	Benifet (Bt) (Rs)	Cost (Ct) (Rs)	Net Benefit (Rs)	Net Present Value (Rp) at 11%
0	-	490.950.000	(490.950.000)	(490.950.000)
1	176.291.000	62.472.520	113.818.480	102.539.171
2	200.000.000	60.737.820	139.262.180	113.028.309
3	200.000.000	63.797.360	136.202.640	99.590.196
4	210.000.000	50.763.900	159.236.100	104.893.751
5	220.000.000	48.551.250	171.448.750	101.746.488
6	230.000.000	57.717.770	172.282.230	92.109.115

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7	240.000.000	45.100.000	194.900.000	93.875.224
8	189.000.000	44.000.000	145.000.000	62.919.342
9	210.000.000	60.500.000	149.500.000	58.443.253
Sum	1.875.291.000	984.590.620	890.700.380	**338.194.852**

Source: Primary data processing (2025)

Net B/C. The same thing with this investment component, as part of the investment criteria, a *Net B/C* of 1.69 was obtained in accordance with the criteria that have been set greater than 1. In other words, the discounted benefits obtained are still greater than the discounted investment costs and operational costs, so that financially UPJA Alsin in the form of *a Combine Harvester* in Banjar Regency is financially feasible to be tried and developed.

Gross B/C. Not much different from *Net B/C*, the value of *Gross B/C* is 1.42 and according to the criteria is greater than 1. This means that the benefits obtained are still greater than the investment costs and operational costs that have been incurred. In other words, UPJA in the form of a Combine *Harvester* is financially feasible to be tried and developed.

Payback Period. Based on the investment component, all of which show financial viability, the calculation of the payback period is only a complement. Based on the results of the analysis of the investment criteria that have been stated, all of which are financially feasible, so that the payback period produced is relatively very short, which is 3.18 years. In other words, UPJA in the form of *a Combine Harvester* is financially feasible to be tried and developed.

Sensitivity Analysis

Sensitivity analysis is very necessary in investment analysis, especially the use of jasxa alsintan in the form of *a Combine Harvester*, where the income is highly dependent on wages and harvest area. Based on statistical data from BPS Banjar Regency, during the period from 2020 to 2023 there was a considerable decrease in harvest area by an average of 35% during that period, caused by seasonal changes and pest and disease attacks, so that the capacity of *the Combine Harvester* was not in accordance with its optimal capacity. This caused a decrease in revenue from the service business [8]. The decrease in harvest area led to a decrease in operator services and fuel costs, thereby reducing operational costs which reached 5% of the original cost, as shown in Table 6.

Table 6. Sensitivity analysis of UPJA Combine Harvester in Banjar Regency

Year	Benifet (Bt) (Rp)	Cost (ct) (Rp)	Net Benefit (Rp)
0	-	490.950.000	- 490.950.000
1	114.589.150	59.348.894	55.240.256

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2	130.000.000	57.700.929	72.299.071
3	130.000.000	60.607.492	69.392.508
4	136.500.000	48.225.705	88.274.295
5	143.000.000	46.123.688	96.876.313
6	149.500.000	54.831.882	94.668.119
7	156.000.000	42.845.000	113.155.000
8	122.850.000	41.800.000	81.050.000
9	136.500.000	57.475.000	79.025.000
Sum	1.218.939.150	959.908.589	259.030.561

Sum	1.218.939.150	959.908.589	259.030.561

Source: Results of primary and secondary data analysis

Decreased *Benefits*. A decrease in revenue of 35%, as a result of the decrease in harvest area that occurred during the three-year period (BPS Banjar Regency [8] and UPJA Maju Bersama) due to drought and pest and disease attacks, the revenue or *benefit* obtained became Rp 1,218,939,150 as (Table 6) from the original revenue or benefit of Rp 1,218,939,150 *as per Table 6 of the original revenue or benefit* of Rp 1,875,291,000 (Table 5), or a decrease of 35% from the receipts in its optimal capacity. The decrease *in benefits* can also be caused by a decrease in harvesting service wages, as a result of competition with *Combine Harvesters* managed by the community and private companies.

Reduced operational costs. The decrease in UPJA *Combine Harvester*'s revenue or benefits is followed by a decrease in operational costs, this is because whether the machine is used or not, maintenance costs will still be incurred, in the form of replacing components because it takes time. The decrease in costs is only due to a decrease in operator revenue as a result of the decrease in the service and fuel costs which are relatively small or only 5-6% of the original cost. See (Table 5 and Table 6) on the operational cost component *of the* Combine Harvester *machine*. Based on the results of the analysis during the 2016-2024 period, it shows that the 5% cost reduction is Rp 959,908,589 as in (Table 6) caused by a decrease in operator and fuel revenues, from the original cost of Rp 984,590,620 (Table 5).

Net Benefit. The decrease *in benefits* or receipts and a decrease in operational costs will cause a decrease in *net benefits* to Rp 259,030,561 as in (Table 16) during the period 2016-2024, which originally reached Rp 890,700,380 as in (Table 14). The decline will be very large, and will have an impact on the investment criteria used.

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Investment Criteria. Based on the decrease in *benefits* and operational costs of 35% and 5% respectively mentioned above, a considerable negative NPV value was obtained reaching IDR 44,946,791 at an interest rate of 11% and is still far from zero or negative (Table 7), in accordance with the criteria set, so the decrease is not financially feasible. In other words, the Combine *Harvester investment* is sensitive to the decrease in harvest area in Banjar Regency.

This is usually followed by the values of other investment criteria such as the IRR value of only 11% as (Table 7), the same as the interest rate of BNI bank where the interest rate on commercial loans reaches 11-12% per year, so that it is financially unfeasible. Bank loan interest is highly dependent on economic conditions, so there is a possibility of an increase. In other words, with the amount of IRR being financially unfeasible and has a great risk to investment, so that *Combine Harvester investment* is sensitive to a decrease in harvest area in Banjar Regency.

The same thing happened with *the Net B/C* and *Gross B/C* values of 0.91 and 0.94 respectively and are still less than 1, so financially unfeasible. This shows that the net benefits and gross benefits received from the UPJA *Combine Harvester* in Banjar Regency are still smaller than the costs incurred, and sensitive to a decrease in harvest area.

Not much different from the *payback period* which increased to 6.02 years. In other words, the decrease in revenue from *the Combine Harvester* and followed by a decrease in operational costs caused the UPJA *Combine Harvester* in Banjar Regency to be financially no longer feasible.

Table 7.*Sensitivity Analysis of Combine Harvester in Banjar Regency*

Year	Benifet (Bt) (Rp)	Cost (Ct) (Rs)	Net Benefit (Rp)	Net Present Value 11%
0	-	490.950.000	-490.950.000	-490.950.000
1	114.589.150	59.348.894	55.240.256	49.765.996
2	130.000.000	57.700.929	72.299.071	58.679.548
3	130.000.000	60.607.492	69.392.508	50.739.204
4	136.500.000	48.225.705	88.274.295	58.149.012
5	143.000.000	46.123.688	96.876.313	57.491.376
6	149.500.000	54.831.882	94.668.119	50.613.442
7	156.000.000	42.845.000	113.155.000	54.502.057
8	122.850.000	41.800.000	81.050.000	35.169.743
9	136.500.000	57.475.000	79.025.000	30.892.830

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Sum	**1.218.939.150**	**959.908.589**	**259.030.561**	**(44.946.791)**

Source: Results of primary and secondary data analysis

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