

# Business feasibility analysis of agricultural equipment and machinery rental services unit (UPJA) in Rogojampi sub-district of banyuwangi regency

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## Business feasibility analysis of agricultural equipment and machinery rental services unit (UPJA) in Rogojampi sub-district of banyuwangi regency

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**Abstract.** UPJA Tani Makmur Gapoktan Surangganti in Rogojampi Sub-district of Banyuwangi classified as the developing UPJA. One of the superiority that they have is a newly developed agricultural machine in Indonesia, it is a grain seeder that comes from government assistance in 2018. This study aims to analyze the business feasibility of Alsintan Service Unit (UPJA) in terms of technical aspects, management aspects, and financial aspects. Financial feasibility analysis included the analysis of Net Present Value (NPV), Net Benefit Cost Ratio (Net B / C), and Internal Rate of Return (IRR). Technical aspects study shows that the agricultural equipment and machinery owned by UPJA Tani Makmur consist of: Combine harvester, hand tractor, grain seeder, and transplanter that comes from the government assistance (APBN) as well as three-wheeled and four-wheeled transportation equipment that come from UPJA self-funding. Based on the financial feasibility analysis result included Net Present Value (NPV), Net Benefit Cost Ratio (Net B / C), and Internal Rate of Return (IRR) indicators, UPJA Tani Makmur Gapoktan Surangganti is feasible to be implemented.

### 1. Introduction

The Ministry of Agriculture is implementing a breakthrough program called the Special Efforts Program/Program Upaya Khusus (UPSUS) for Increasing Rice, Corn and Soybean/Padi, Jagung, dan Kedelai (Pajale) Production, to realize food self-sufficiency. The scope of UPSUS activities includes the provision of agricultural facilities and infrastructure (seeds, fertilizers, agricultural equipment and machinery), while the agricultural tools and machinery that are distributed to the farmer groups in the form of tractors, water pumps, rice transplanters, combine harvesters, rice milling units, and others [1]. Agricultural tools and machinery have a very important and strategic role in supporting the fulfillment of ever increasing agricultural production. The use of agricultural tools and machinery is needed to accelerate and improve the quality of land management, water supply, increase cropping intensity, reduce yield losses, increase the benefit through processing agricultural commodity products and preserve environmental functions. Alsintan development strategy in utilizing innovation and agricultural mechanization technology conducted by growing and developing institutional systems of Alsintan Services Unit (UPJA) [2].

According to the Ministry of National Development Planning [2], the Agricultural Machinery Rental Services Unit (UPJA) is a rural economic institution that is engaged in providing services in the context of optimizing the use of agricultural equipment and machinery to gain business benefits both internal and external of the farmer group. The main function of UPJA institutions is to carry out

economic activities in the form of alsintan services in handling the cultivation such as land preparation and land management services, irrigation water supply, planting, maintenance, crop protection; as well as harvesting, post-harvesting and processing of the agricultural products activity such as harvesting, threshing, drying and grinding rice services; and also encourage the product development in the form of increasing added value, expanding markets, competitiveness and improving farmers' welfare.

One of the developing Alsintan Services Unit (UPJA) in Banyuwangi Regency is UPJA Tani Makmur Gapoktan Surangganti, Rogojampi Sub-District. They have 11 units and 4 types of alsintan. UPJA Tani Makmur was established in 2016. One of their superiority is having a newly developed agricultural machine in Indonesia, which is a grain seeder that comes from government assistance in 2018, so that UPJA Tani Makmur try to socialize the application of new technology for grain seeder machinery to the rice farmers and develop it to support increased production of rice farming. In addition, UPJA Tani Makmur also has other types of equipment, such as transplanter, combine harvester, and hand tractor that comes from government assistance. The development effort of UPJA is needed to support the improvement of productivity and efficiency of rice farming. To support the development of UPJA, an analysis to determine the business feasibility of the UPJA is needed. Therefore this research aims to determine the business feasibility of Alsintan Service Unit (UPJA) reviewed from technical aspects, management aspects, and financial aspects.

## 2. Research Methods

This research was conducted at the Agricultural Machinery Services Unit (UPJA) Tani Makmur Gapoktan Surangganti, Rogojampi Sub-District, Banyuwangi Regency. It was determined based on a purposive method. The basic consideration of the selection this research locations is, UPJA Tani Makmur Gapoktan Surangganti, Rogojampi Sub-district, Banyuwangi Regency is one of the Developing UPJA in Banyuwangi Regency, which has 4 (four) types of agricultural equipment and machinery namely Rice Transplanters, Hand Tractors, Combine Harvester and Grain Seeders.

The analysis conducted in this study is a qualitative analysis and quantitative analysis. Qualitative analysis conducted descriptively to represent the business system, technical aspects and management aspects of UPJA Tani Makmur Gapoktan Surangganti. Quantitative analysis used to determine the level of business financial feasibility. The analytical method that used to analyze the business financial feasibility includes the analysis of: Net Present Value (NPV); Net Benefit Cost Ratio; Internal Rate of Return; and Payback Period.

Net Present Value (NPV) is a comparison between net cash PV and investment PV during the investment period. The formula used in the NPV calculation is as follows [3]:

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

Assessment criteria :

NPV > 0: The business is financially feasible and profitable

NPV <sup>9</sup> 0: The business is not financially feasible to implement

Net B / C ratio is the ratio between a positive net benefit and negative net benefits. The Net B / C formula is as follows [3] :

$$Net\ B/C = \frac{\sum_{t=0/1}^n \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=0/1}^n \frac{B_t - C_t}{(1+i)^t}} \quad \text{where} \quad \frac{B_t - C_t > 0}{B_t - C_t < 0}$$

Assessment criteria :

Net B / C > 1: The business is financially feasible

Net B / C < 1: The business is not financially feasible

The Information on NPV and Net B / C Formulas:

B<sub>t</sub> = The benefits in year t

C<sub>t</sub> = The cost in year t

n = The Business Age

i = Discount rate (%)

t = The year or Economic Age of Business

IRR is a discount rate that produces an NPV equal to zero. A business is said to be feasible if its IRR value is greater than its opportunity cost of capital (DR). The Net IRR formula is as follows [3] :

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

The Information on IRR Formulas:

$i_1$  = Discount rate yang menghasilkan NPV positif

$i_2$  = Discount rate yang menghasilkan NPV positif

NPV<sub>1</sub> = Positive NPV

NPV<sub>2</sub> = Negative NPV

*Payback period (PP)* merupakan perhitungan terhadap lamanya periode waktu yang diperlukan oleh suatu usaha untuk dapat mengembalikan biaya investasi. The Net *Payback period* formula is as follows [4]:

$$\text{Payback period} = \frac{\text{Net Cash Investment}}{\text{Annual Net Cash Flow}}$$

### 3. Results and Discussion

The business feasibility analysis examined in this study consisted of management aspects, technical aspects, and financial aspects.

#### 3.1 Technical Aspects

UPJA Tani Makmur Gapoktan Surangganti is included in the developing towards professional UPJA because they have 11 units and 4 types of alsintan machine. The ownership table of the types and amount of agricultural tools and machinery owned by UPJA Tani Makmur is available in Table 1.

One of the superiority of UPJA Tani Makmur is having a Grain Seeder obtained from government assistance in 2018. In Banyuwangi there are 2 Grain Seeder machines from the government, it located in UPJA Tani Makmur and also in UPJA Kalibaru. Based on the total area of rice hatchery service users, the use of Grain Sedder Machine Services in UPJA Tani Makmur more developed. In 2018 the Grain Sedder Machine owned by UPJA Tani Makmur received a total of 103 hectares of rice seed hatching services, which not only covered the farmers in Rogojampi Sub-District area but also in Blimbingsari, Wongsorejo, Kabat, Banyuwangi, and Singojuruh.

One of the services offered by UPJA Tani Makmur is the seed nursery process using a grain seeder machine. The process of seed seeding with a grain seeder machine is a process of sowing rice seedlings in a tray using grain seeder. Grain Seeder requires the tray seedlings as a place to plant seeds. UPJA Tani Makmur currently has 1,500 trays of seedlings. For 1-hectare area, 180 trays are needed, and these trays are used as seed seedlings for 15 to 18 days. This grain seeder machine can accelerate the process of stocking up to 100 trays per day. The use of trays in the nursery can save the nursery area and can be done without disturbing the tillage process in the land so that acceleration of planting can be done, another advantage is that maintenance can be done more intensively so that it is free from plant-disturbing organisms and seed growth is more evenly distributed.

**Table 1.** Types and amount of Agricultural Tools and Machines owned by UPJA Tani Makmur Gapoktan Surangganti, Banyuwangi Regency

No	Nama Jenis Barang	Merk/ Type	The amount of	
			Alsintan Ownership	Informatin
1	Combine Harvester (medium)	Crown	1 (Unit)	Government Assistance in 2016
2	Combine Harvester (Big)	Yanmar	1 (Unit)	Government Assistance in 2018
3	Combine Harvester (medium)	Gunung Biru	1 (Unit)	Government Assistance in 2018
4	Hand Traktor	Quick	1 (Unit)	Government Assistance in 2017
5	Hand Traktor	Quick	1 (Unit)	Government Assistance in 2018
6	Hand Traktor	Quick	1 (Unit)	Government Assistance in 2019
7	Grain Seeder	Gatra	1 (Unit)	Government Assistance in 2018
8	Transplanter	Yanmar	1 (Unit)	Government Assistance in 2017
9	Transplanter	Yanmar	1 (Unit)	Government Assistance in 2017
11	Transportasi Roda Tiga	Viar	1 (Unit)	Swadana 2019
12	Transpertasiroda Empat	Mitsubishi	1 (Unit)	Swadana 2019

Source: Secondary and Primary Data (2019)

From several types of Alsintan owned by UPJA Tani Makmur, the data of the distribution scope and use of Alsintan UPJA Tani Makmur are shown in Table 2 below.

**Table 2.** The Distribution Scope and Use of Alsintan UPJA Tani Makmur in 2016-2019

No	Type of Alsitan	Land Area (Ha)				Information
		2016	2017	2018	2019 up to May 2019	
1	<i>Hand Traktor</i>	-	6	27.5	14.6	The coverage of UPJA covers several sub-districts, such as: Rogojampi, Blimbingsari, Kota, Banyuwangi, Wongsorejo, Singojuruh
2	<i>Grain Seeder</i>	-	-	103	80	
3	<i>Transplanter</i>	-	5.25	87	43.9	
4	<i>Combinne Harvester</i>	28	82	121	61.1	

Source: Secondary and Primary Data (2019)

### 3.2 Management Aspects

UPJA Tani Makmur is a pre and post harvest agricultural equipment and machine service business. UPJA was established on September 5, 2016, with NBHI No and is under the auspices of the Surangganti Farmers Group (Gapoktan). UPJA Tani Mamur is led by the UPJA Manager, which has a number of staff consisting of Administrative staff, Technicians, and Hand Tractor Operators, Grain Seeder, Rice Transplanters and Combine Harvester Operators. The organizational structure chart of UPJA Tani Makmur Gapoktan Surangganti is shown in **fig 1**.

The UPJA Tani Makmur activities outside its functional process are mainly renting out the Alsintan service including (1) Regular monthly meetings of the management in order to improve knowledge and services to farmers with agricultural extension guidance: (2) Establish and enhance partnerships with other parties (Gapoktan inside and outside the sub-district) , seed breeders, providers and producers of agricultural production facilities, insurance, and transportation services); (3) Periodically repairing all damaged machineries; (4) Carrying out general and financial recording

and administration from planning, implementation to telephone; (5) Having an active role in the success of the planting acceleration program and the Farmers' Farming Insurance (AUTP).

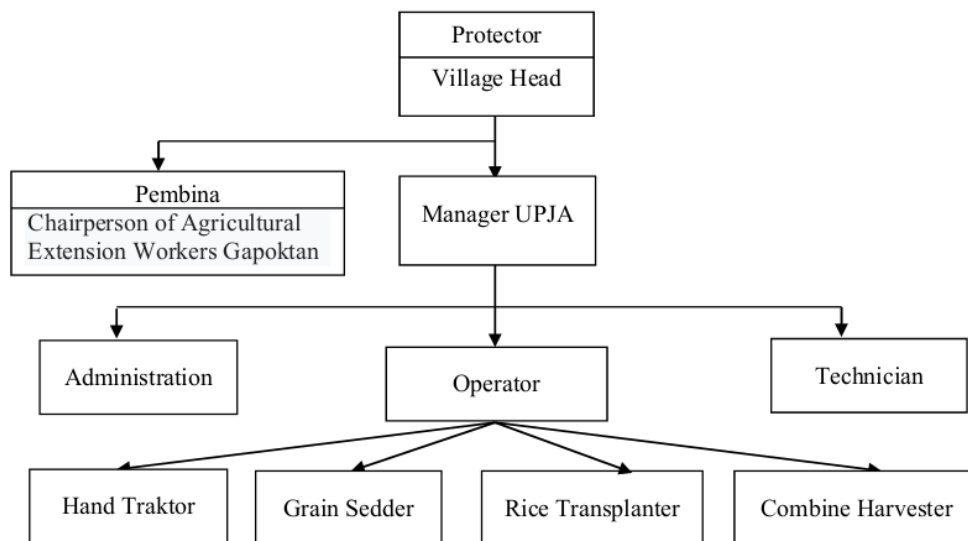


Figure 1. Organizational Structure of UPJA Tani Makmur Gapokktan Surangganti

### 3.3 Business Feasibility of the Financial Aspects

The business feasibility of the financial aspect used to see the level of feasibility in the business finance sector. It using the investment feasibility attributes in the form of Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BC Ratio) and Payback Period. The assumptions used in this study are: (1) The business age is set for 13 years that is determined based on the economic age of the largest assets owned by UPJA, called grain seeder and Large Combine Harvester; as much as 7% interest rate of People's Business Credit (KUR) in BRI Bank was used as the discount rate in this study. The initial capital used in this business is around Rp. Rp. 2,108,253,000, - which is a grant from the Government (APBN) in the form of agricultural equipment and machinery provided, namely Combine Harvester, Hand tractor, Grain Seeder and Transplanter. UPJA Tani Makmur proposed a proposal to the Banyuwangi Government to procure agricultural equipment as a form of its support for modern agriculture. The procurement of agricultural equipment and machinery carried out gradually from the third trimester in 2016, 2017, 2018 and the first trimester in 2019. UPJA owners felt that they needed capital from the outside because the prices of agricultural equipment were very expensive, ranging from Rp. 17,500,000 - Rp. 550,000,000/peaces. So UPJA carries out some activities using the agricultural equipment provided by Banyuwangi Government and UPJA utilizes the profits derived from the performance of the agricultural equipment as a capital for other operational activities.

The NPV is 9,846,511,16 which means that based on the investment made, the current value is Rp 123,581,013.32, - because the NPV value is positive, it can be concluded that the company's financial performance on the NPV valuation ( Net Present Value) is at a feasible level. The results of the financial feasibility analysis show that the Net Benefit Cost Ratio (Net B/C) value is 1.01, which means that each Rp 1 as the cost occurred, the company will get a benefit / profit of Rp 1.07. So the Net BC value of UPJA Tani Makmur is > 1, it can be concluded that the financial performance of the Net B/C assessment at a feasible level.

The Payback Period value is 11.85, which means UPJA Tani Makmur business takes 11.85 years from 2016 as a base year calculation to return the total business investment, so it can be interpreted that UPJA Tani Makmur Business can cover investments incurred within 12 Years 10 Month 10 days. This value is still below the projection year (17 years), it concluded that the financial performance of the Payback Period assessment at a feasible level.

The IRR (Internal Rate of Return) value is 7.74%, which means that the investment rate of return that has been invested in UPJA Tani Makmur Business is 7.10%. IRR value is above the assumed interest rate of 7%, it can be concluded that the financial performance of IRR (Internal Rate of Return) assessment at a feasible level.

The calculation values above are obtained based on financial data from 13 years projection in 2016-2028. These are the details projection:

- a. The calculation of operational costs that directly support production activities such as Labor Wages, Raw Material Costs in the form of Solar for Combine Harvester and Hand tractors and BBM for Transplanter, The Costs for utilizing Grain Seeder such as Seed Costs, the Media and seed Care, also the transport for Equipment and machine is based on the amount of paddy fields to be worked on. So that, the assumption of the projected increase is based on 2016 and 2018, so for the next 9 years the projected increase in paddy area uses projected increase in agricultural land area between 10% -25%
- b. Projected increase in acreage capacity based on 2017 and 2018 baseline data using a projected increase in agricultural land area between 5%-10%.
- c. The projected increase in the selling price of services assumed to be fixed annually. This was taken based on the base year 2016 and 2018 baseline that did not change.

Generally, based on the analysis results of financial performance of UPJA Tani Makmur <sup>2</sup> in the form of NPV (Net Present Value), Net Benefit Cost Ratio (Net B/C), <sup>12</sup> the comparison of Payback Period with the return business investment, and the comparison of IRR (Internal Rate of Return) with the prevailing discount rate at 7%, shows that the analysis results of financial aspects performance of UPJA Tani Makmur can be categorized as feasible to develop.

#### 4. Conclusion

UPJA Tani Makmur Gapoktan Surangganti is included in the developing towards professional UPJA because they have 11 units and 4 types of alsintan machine. One of the superiority of UPJA Tani Makmur is having a Grain Seeder obtained from government assistance in 2018. UPJA Tani Makmur is a pre and post harvest agricultural equipment and machine service business. UPJA was established on September 5, 2016, with NBHI No and is under the auspices of the Surangganti Farmers Group (Gapoktan). UPJA Tani Mamur is led by the UPJA Manager, which has a number of staff consisting of Administrative staff, Technicians, and Hand Tractor Operators, Grain Seeder, Rice Transplanters and Combine Harvester <sup>2</sup> operators. Generally, based on the analysis results of financial performance of UPJA Tani Makmur in the form of NPV (Net Present Value), Net Benefit Cost Ratio (Net B/C), <sup>12</sup> the comparison of Payback Period with the return business investment, and the comparison of IRR (Internal Rate of Return) with the prevailing discount rate at 7%, shows that the analysis results of financial aspects performance of UPJA Tani Makmur can be categorized as feasible to develop.

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