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Feasibility of karisjaya egg-laying chicken agribusiness (case study approach)

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ABSTRACT
Agribusiness is a unitary business activity that includes one or the entire production chain, product processing, and marketing, broadly concerning agriculture. This study aimed to calculate the feasibility of an independent laying chicken agribusiness that experiences production fluctuations. The study's results stated that the operating costs required for 10 years are IDR. 921,080,000. The income received by the laying chicken farmer Mr. Cucu Suryana in carrying out his laying chicken agribusiness is IDR 603,474,200 per two years of production. The NPV using a social discount rate of 18% shows that the NPV in strata I is IDR 74,808,684. The IRR shows a result of 21.24% using the Social Opportunity Cost of Capital (SOCC) of 18.00%; this means that IRR > SOCC, the investment made by farmers will return within 3.11 years, and Net B/C is 1.21%. So, the effort is worth continuing.
KEYWORDS: Business Feasibility, Acceptance, Expenditures, Operating Costs, Laying Chicken

ABSTRAK
Agribisnis merupakan suatu kesatuan kegiatan usaha yang meliputi salah satu atau keseluruhan dari mata rantai produksi, pengolahan hasil dan pemasaran yang ada hubungannya dengan pertanian dalam arti luas. Tujuan penelitian ini adalah untuk menghitung kelayakan agribisnis ayam petelur mandiri yang mengalami fluktuasi produksi. Hasil penelitian menyatakan bahwa biaya operasi yang dibutuhkan selama 10 tahun dalah sebesar Rp. 921.080.000. Pendapatan yang diterima oleh peternak ayam petelur Bapak Cucu Suryana dalam melakukan kegiatan usaha peternakan ayam petelur yaitu sebesar Rp. 603.474.200 per dua tahun produksi. NPV menggunakan social discount rate 18% menunjukkan bahwa NPV pada strata I adalah Rp. 74.808.684. IRR menunjukkan hasil 21,24% dengan menggunakan Sosial Opportunity Cost of Capital (SOCC) sebesar 18,00%, ini berarti IRR > SOCC, investasi yang dikeluarkan oleh peternak akn kembali dalam jangka waktu 3,11 Tahun, Net B/C adalah 1,21%. Maka usaha tersebut layak diteruskan.
KATA KUNCI: Kelayakan Usaha; Penerimaan; Pengeluaran; Biaya Operasi; Ayam Petelur

1. INTRODUCTION

Laying chicken production increased from 2015 to 2019, with the largest increase reaching 58% or 654,115 tons in 2017, but in 2020, laying chicken production decreased by 6% or 244,456 tons (BPS, 2021). The decline in laying chicken production was caused by excessive supply from laying chicken companies and suppliers, resulting in decreased purchasing power (Wirabrata, 2019). The laying chicken business has a business pattern based on its own or external capital, which supplies and sells. The risks incurred are borne by themselves, and businessmen tend to use their capital regarding their business. Still, egg distribution requires cooperation with other parties as a marketing medium to achieve optimal revenue (Iskayani et al., 2016).

The chicken poultry consisted of layer chickens and broiler chickens. That business has two patterns: independent patterns and partnership patterns. Independent patterns result in the supply of production facilities and marketing activities being carried out by oneself so that the risks incurred are borne by oneself, while partnership patterns are patterns that are built based on cooperation agreed upon by both parties, both from the company as the core and the farmers as plasma (Febrianto et al., 2019).

Karisjaya's egg-laying chicken agribusiness, especially in Tasikmalaya City, has a location for developing egg-laying chickens at the farm owned by Mr. Cucu Suryana, who holds an essential position in development in the poultry sector. This can be seen from the company's good and smooth operation, managed by ± 12,500 heads in 2021. Until now, he has maintained his business in Bungursari, Tasikmalaya City, West Java Province.

The risk accepted by farmers is the high price of input (Ramadhan et al., 2018). Egg-laying chicken agribusiness is located in each district in Tasikmalaya City. Tchicken, regarding the number of egg-laying chickens in the Cibunigeulis area, Bungursari District, Tasikmalaya.

Karisjaya egg-laying chicken farm in early 2017 carried out production activities with independent capital so that the farmer also bore the costs incurred and risks the laying chicken bear from preparation to marketing the chickens. Instead of raising laying chickens using the partnership method (Fadhil, 2017; Mi'raj et al., 2021; Siddiq & Nur, 2023).

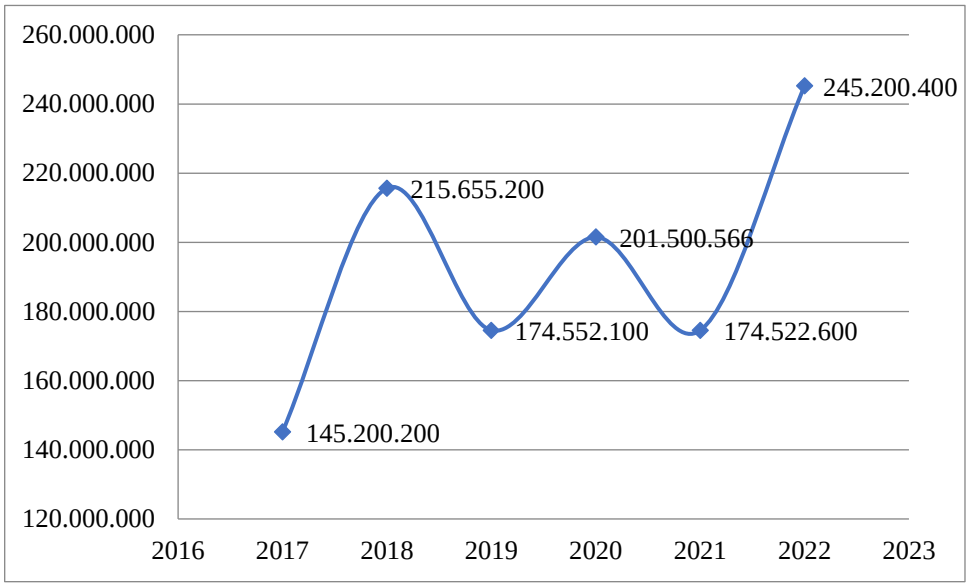

Figure 1. Income Growth. Source: Karisjaya Layer Chicken (2023)

The table shows a decline for 2 consecutive years caused by changes in cost burdens, so a feasibility calculation is needed to help Karisjaya in making decisions about the egg-laying chicken agribusiness plan that will be carried out. Regulation of the Minister of Agriculture of the Republic of Indonesia Number 31 / Permentan / OT.140 / 2/2014 concerning profitability to assess the size of a company's profit or determine whether a business is feasible to be implemented (Mappa et al., 2022). Thus, reviewing and re-examining the feasibility of the Karisjaya egg-laying chicken agribusiness is necessary. This research is limited to financial feasibility. This research does not consider the market, technical, and managerial aspects.

2. MATERIALS AND METHODS

2.1. Study Area

As a case study approach, the research location was conducted at the single enterprise of Karisjaya egg-laying chicken agribusiness in Cibunigeulis, Bungursari District, Tasikmalaya City. The research location was chosen purposively because the research subjects could provide support in the form of research data that could support the research. This research started from September 2023 to January 2024.

2.2. Research Design

The research design uses the descriptive analysis method. The analysis method collects, classifies, analyzes, and implements available data (Gani & Amalia, 2014). This analysis technique determines the income, revenue, and production costs of Karisjaya egg-laying chicken. Operationalization of variables used in this study which can be operationalized as follows:

1. Investment costs

   Investment costs are incurred to obtain fixed assets the company will use to run its business activities. The details of investment costs are.

   a. Land rent: Land rent is a surplus of income above the cost of land that allows land production factors to be utilized.
   b. Making chicken coops: This is the process by which chickens will produce eggs to be distributed to the market.
   c. Purchase of chicks (DOC): Purchase of laying chicken seeds ready to produce good eggs.
   d. Purchase of livestock equipment: Providing supporting tools on laying chicken farms.

e. Battery: This tool measures farm temperature and other things.
f. Feeding place: This is one of the chicken or poultry agribusiness equipment that provides chicken and poultry feed in a modern way.
g. Socket: This tool connects electrical lines for farm heaters.
h. Jug: This tool puts chicken eggs so they do not break.
i. Bucket: It is used to draw water from the well, pour it into the barrel, and move water from the tap or water reservoir to remain in the barrel and the water hole.
j. Drum: It is used as a place to store composting or can be used for dead poultry or feed.

2. Operational costs
Operational costs are costs required by the company to carry out business activities. These costs include salary interests, commissions, team member benefits, equipment, repairs, and rental costs.
a. Feed: Feed is a source of energy and material for the growth and life of living things. The most essential substance in feed is protein.
b. Electricity: Electricity is energy that can be distributed through conductors in the form of cables. The presence of electric current is due to the electric charge flowing from the positive channel to the negative channel. In human life, electricity plays a very important role. Electricity in poultry agribusiness is used as lighting.
c. Vitamins: Vitamins play a role in maintaining and increasing body strength. Vitamins play a role in improving livestock health, especially in production.
d. Vaccines: Animal vaccination is vaccination or giving vaccines to animals to help the animal's immune system develop protection against disease.
e. Medicines: Medicines are preparations that can treat animals, relieve symptoms, or modify chemical processes in the body, including biological preparations, pharmaceutics, premixes, and natural animal drug preparations.
f. Gas: As a medium for producing fire.
g. Maintenance of mother chicken (Labor): Labor is anyone who can do work to maintain laying chicken.

3. Egg production
Laying chickens have the potential to produce more than 500 eggs within 700 days (100 weeks). When chickens reach the age of 140 days, this production can reach 50%; when they reach the peak age, the maximum layer production can reach 98%.

4. Selling price
The selling price is the value reflected in the price list, retail price, and the price is the final value received by the company as income or net price

5. Revenue
Revenue is the total income the producer receives in the form of money obtained from the sale of goods produced.

6. Business Profit
This is the profit obtained by the company. The profit is the amount of total income minus the production or operational costs incurred by the company. Profit is also often known as profit.

7. Net Profit:
Net profit is the profit remaining after deducting all costs associated with business operations, including taxes. Net profit is the most accurate measure because it considers all costs associated with business operations.

2.3. Data Analysis

1. Cashflow

Cash flow is a financial report needed to track every cash inflow and outflow to produce an excellent financial analysis of whether there is an increase or decrease in the Karisjaya Egg-Laying Chicken Agribusiness during a period to finance the business activity process (Table 1).

2. Operational Cost

Operational costs are costs required by the company to run business activities. These costs include feed, electricity, vitamins, vaccines, medicines, gas, and maintenance of the mother chicken (labor).

Table 1. Cashflow Karisjaya Egg-Laying Agribusiness

Description	Year									
	1	2	3	4	5	6	7	8	9	10
Investment Cost										
1. Land Rent	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
2. Making Chicken Coops	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
3. Buying Chicks (DOC)	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
4. Buying Farming Equipment	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
a. Battery	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
b. Feeder	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
c. Drinker	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
d. Socket	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
e. Jug	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
f. Bucket	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
g. Semawar	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Operational Cost	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
a. Feed	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
b. Electricity	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
c. Vitamine	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
d. Vaccine	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
e. Medicine	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
f. Fuel	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
g. Maintenance of Chicken (Labor)	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
TotalOperational Cost (B)	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Egg Production	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Selling Price	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Revenue	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Business Profit	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR
Net Profit	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR	IDR

3. Income

Income can be in the form of goods and money from industry and other people, measured based on the prevailing money at that time, which is a person's survival directly and supports daily needs indirectly (Wibowo, 2009). Income from the Karisjaya agribusiness is from egg sales. The formula for income in agribusiness is:

$$\mathbf{\Pi = TR - TC} \quad (1)$$

Where:

Π : Income of egg sales

TR : Total Revenue of egg sales

TC : Total cost of egg production

4. Egg-laying Agribusiness Feasibility Analysis

The data used is on the amount of income, loans, and investments made by farmers. Data processing is analyzed using the following equation (Santa et al., 2020).

a. NPV provides a projection of business or investment profits by calculating estimated future cash flows and adjusting them to current cash flows.

$$\mathbf{NPV} = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t} \quad (2)$$

Where:

Bt : Benefits in year t

Ct : Costs in year t
i : Discount interest rate (DF)
n : Economic life
t : Year t

b. Internal Rate of Return (IRR)

IRR is an indicator that determines the level of efficiency of an investment. IRR is a method to calculate the interest rate of an investment and equate it to its current value based on the calculation of net cash in the future period.

$$IRR = i1 + \frac{NPV_1}{NPV_1 - NPV_2} x\ (i2 - i1) \quad (3)$$

Where:
IRR : Internal Rate of Return
NPV 1 : NPV positive value
NPV 2 : NPV negative value
i1 : NPV positive value
i2 : NPV negative value

c. Payback Period (PP)

PP is a way to determine the length of time to return capital. Payback period calculations help companies make investment decisions. The shorter the payback period, the more the investment product is in demand. The reason is that the opportunity to turn capital is higher. The formula for calculating the Payback Period is as follows:

$$PP = \frac{\text{Remaining Investment}}{\text{current year process}} \quad (4)$$

Feasibility criteria:
a. If PP is shorter than the maximum payback period, the business is feasible to run
b. If PP is longer than the maximum payback period, the business is not feasible to run

d. Net B/C

Net B/C is the ratio between the number of positive NPV and the number of negative NPV. Net B/C shows how many times the benefits will be obtained from the costs that have been incurred. A project is declared profitable or feasible if the Net B/C Ratio value is more significant than one.

$$Net\ B/C = \frac{\sum PV+}{\sum PV-}\ \mathbf{100\%} \quad (5)$$

Where:
Net B/C : Net benefit-cost ratio
∑PV+ : Present value positive
∑PV- : Present value negative

Eligibility Criteria:
a. Net B/C > 1 business is feasible to run
b. Net B/C < 1 business is not feasible to run
c. Net B/C = 1 business has BEP

e. Sensitivity

A test of a decision to determine how much inaccuracy in using an assumption can be tolerated without making the decision invalid. Sensitivity analysis aims to see what will happen to the project analysis results if there is an error or change in the basis for calculating benefits or costs.

In operating a planned business, it is undeniable that price increases can cause errors in calculations or calculations that are different from reality. Sensitivity analysis examines the effects of two changes in factors on the NPV value that can occur during the production process. The two factors observed are

changes in input prices and production. Changes greatly influence the acceptance of laying chickens in production levels. Wchicken total production increases so do the NPV value, and vice versa.
Sensitivity analysis components:

a. Against changes in operating cost increases
   Because the price of operating costs that increase yearly is not satisfactory for farmers, it is clear from the trend of 5% of national chicken egg production (Kemendag, 2021) Whether this business is feasible.
b. Regarding changes in operating costs
   Fluctuating operating costs are also factors when chickens operate a roaring chicken business. So, if the operating costs decrease by 5%, it will be calculated based on the market supervision system and basic needs (Kemendag, 2021).
c. If you experience scenario 1 and scenario 2 simultaneously, is it a viable business?

$$Sensitivity = \frac{\text{Positively true}}{\text{Positively true + Negatively Fake}} \text{x}\mathbf{100}\% \quad (6)$$

3. RESULT AND DISSCUSSION

1. Egg-laying agribusiness characteristic of respondent

Karisjaya laying chicken farm is managed by Mr. Cucu Suryana, who is 58 years old and has a long business period of 17 years, starting from 1000 laying chickens to 12,000 laying chickens at the highest value. However, the average per year is 5,000 laying chickens. The laying chicken maintenance is planned in stages, with a maintenance period that increases within six months by 1,000 chickens. The results of the market aspect study show that the demand for egg products has a seasonal nature that occurs every year. This condition affects the amount of demand and makes the price of eggs fluctuate every year.

2. Operational Cost

Operational costs are required to run production activities and are routinely incurred during production (Purnama et al., 2021). For more details on the operational costs incurred by laying chicken farmers, see Table 3.

Table 2. Operational Costs

No	Description	Unit	Amount	Price/Unit (IDR)	Production year I - IX
1	Feed	Kg	21.000	4.153	87.213.000
2	Vitamine/month	Unit/ 1.000 chicken	21	5.000	105.000
3	Vaccine/semester	Bottles	2	1400.000	840.000
				20.000	
				420.000	
4	Medicine/3 months	Unit/ 1.000 chicken	3	150.000	450.000
5	Labor	Month	7	500.000	3.500.000
	Total (IDR)				**92.108.000**
	2 years Production (IDR)				**184.216.000**
	10 years (IDR)				**921.080.000**

Based on Table 2, it is known that the operating costs for two years of production are 184,216,000 IDR. Operating costs are costs required by poultry to run business activities. These costs include feed, electricity, vitamins, vaccines, medicines, gas, and maintenance of parent chickens (labor). Operating costs are very sensitive to changes, especially the price of feed and others constantly fluctuate; this will affect the increase in operating costs. The operating costs required for 10 years are 921,080,000 IDR.

3. Investment Cost

Investment costs are incurred to finance business activities at the beginning of the business, and the amount is quite large. Below are the investment costs for Karisjaya egg-laying Chicken Agribusiness.

Table 3. Investment Coasts

No	Description	Volume	Unit	Price/Unit (IDR)	Amount (IDR)
1	Land rent	10	Year	4.500,000	45,000,000
2	Making a chicken coop	1	Pcs	36,000,000	36,000,000
3	Purchase of chicks (DOC)	1,000	Chicken	5,000	6,000,000
4	Purchase of livestock equipment				-
	Battery	1,000	Pcs	6,400	6,400,000
	Battery feeder	25	Bar	15,000	375,000
	Battery drinker	80	Lente	11,000	880,000
	Open feeder	20	Pcs	23,000	460,000
	Open drinker	20	Pcs	15,000	300,000
	Socket	80	Pcs	2,000	160,000
	Jug	20	Pcs	2,000	40,000
	Bucket	4	Pcs	20,000	80,000
	Drum	2	Pcs	150,000	300,000
	Open	1	Pcs	200,000	200,000
	Semawar	1	Buah	120,000	120,000
	Hose	3	Meter	10,000	30,000
5	Maintenance of chicks (DOC) Until the chicken is ready to lay eggs				
	Husk	60	Sack	1.500	90.000
	Electricity	3	Month	30.000	90.000
	Feed (starter and grower)	10.000	Kg	5.000	50.000.000
	Vitamins	1.000	Chicken	4.000	4.000.000
	Vaccines	1.000	Chicken	4.000	4.000.000
	Gas	10	Gallon	15.000	150.000
	Labor	5	month	500.000	2.500.000
	Total Investment Cost				**157.175.0**

4. Income

Karisjaya farm income is from egg sales. Operating income is operating income minus total costs. Income can be in the form of goods and money from poultry and other people, measured based on the currency in force at that time, which is a person's direct survival and supports daily needs indirectly (Santa et al., 2020).

Table 4. Income

Commodity	Unit	Production	Sale Price/kg (IDR)	Revenue (IDR)
Eggs	Kg	25.974	20.000	519.474.200
Chicken	Kg	2.000	22.000	44.000.000
Manure s	Lump sum/year	2	20.000.000	40.000.000
	Total revenue (Rp)			603.474.200

Based on Table 4, the income from egg-laying chicken farmers in carrying out egg-laying chicken agribusiness activities is IDR. 603,474,200 per two years of production, but if for 10 years, it is 3,017,371,000 IDR. The following is the business income received by Karisjaya in carrying out egg-laying chicken agribusiness activities.

$$\pi = TR - TC$$
$$= 603.474.200 \text{ IDR} - 184.216.000 \text{ IDR}$$
$$= 419.258.200 \text{ IDR}$$

The income received by farmers in running an egg-laying chicken agribusiness during one production period is 419,258,200 IDR if there are no diseases that attack the chickens and cause a decrease in egg production.

5. Feasibility Egg-laying agribusiness

The feasibility of the Karisjaya egg-laying chicken farm business is shown in Table 5.

Table 5. Feasibility

Financial Criterium	Value	Classification
NPV (18%)	74.808.684 IDR	Feasible
IRR	21,24%	Feasible
Net B/C	1,21	Feasible
PP	3,11	years

1. Net Present Value (NPV)
   Net Present Value (NPV) is a present value from the benefit difference with cost on a specific discount rate (Hasbi & Tunggal, 2021). The discount rate was based on inflation in 2022 at 4% (P.Subarkah et al., 2022). The results of the NPV calculation using a social discount rate of 18% show that the NPV in stratum I is 74,808,684 IDR, and stratum II is 31,220,387 IDR at a 21% social discount rate. The egg-laying chicken agribusiness in each stratum is feasible to develop because the NPV value is more than 0 (zero). This aligns with the research (Oman et al., 2023) . Where the NPV value obtained is greater than 0, which is 32,241,500 IDR, it can be said that the business is feasible to run because it can cover the costs incurred by the farmers.
2. *Internal Rate of Return*
   The IRR calculation shows a result of 21.24% using the Social Opportunity Cost of Capital (SOCC) of 18.00%, which means that IRR> SOCC; thus, the project is feasible to work on. Ibrahim (2019) stated that if the IRR calculation result is greater than the Social Opportunity Cost of Capital (SOCC), it is said that the project/business is feasible to develop. If it is the same as SOCC, it means that the principal is returned, and below SOCC, the project is not feasible to be developed. This is also in line with the research (Elpawati et al., 2018). The IRR value obtained was 44.21%, so it can be concluded that the business is feasible to run because the value is greater than the bank interest rate.
3. *Payback Periode*
   Payback Period is a calculation to measure the period required to return the money invested from the annual cash flow generated by the investment project. Based on Table 2, it can be concluded that the investment issued by the farmer will be returned within 3.11 years. This means that the payback period is shorter than the maximum payback, so the broiler chicken agribusiness is feasible. This is in line with the research (Santosa et al., 2012), The PP value obtained was small from the age of the business activity project for 2 years or 10 months and 6 days, so it can be said that the business is feasible to run.
4. *Net B/C*
   The results of the Net B/C calculation of the laying chicken agribusiness in Bungursari District, Cibunigeulis Village, in Table 8, the results of the Net B/C calculation are 1.21; this shows that the egg-laying chicken agribusiness is feasible to be carried out. Based on the formula and calculation results above, if Net B/C> 1 means the project is feasible to be carried out; if Net B/C <1, it is not feasible, and if Net B/C = 1, the break-even point is reached, in this case, it depends on the investor. Research (Santosa et al., 2012), also showed consistent results, where the Net B/C value obtained was more than 1, which was 1.25, so the egg-laying chicken agribusiness was feasible because every Rp. 1- of production costs incurred would provide benefits of 1.52 IDR each

4. CONCLUSIONS

Based on the results of the data analysis and discussion presented, the following conclusions:

1. The operating cost of odd production years is 92,108,000 IDR. The operating cost required for 10 years is 921,080,000 IDR.
2. The production of eggs was 25.974 kg, and the selling price was 20.000 IDR/kg. The nonproductive chicken was 2.000 kg, the selling price was 22.000 IDR/kg, and the manures were 2 lumpsum/year sold @20.000.000 IDR.
3. The revenue received by the egg-laying chicken farmer was 603,474,200 IDR per two years of production, and the net profit was 419.258.200 IDR
4. NPV using a social discount rate of 18% shows that the NPV in stratum I is. 74,808,684 IDR. IRR shows a result of 21.24% using the Social Opportunity Cost of Capital (SOCC) of 18.00%. This means that IRR

was higher than the rate of return compared to SOCC, a relatively short payback period of less than 5 years. The investment issued by the farmer will be returned within 3.11 years, and Net B/C is 1.21 (greater than 1), So the business is worth running.

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