

Financial Feasibility of an Integrated Business Pattern for Laying Hens and Hybrid Corn on a Small Scale Business South Konawe Regency

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ABSTRACT

This study aims to analyze the financial feasibility of an integrated business pattern for laying hens and hybrid corn on a smallscale business in South Konawe Regency. The research variables are (a) investment costs; (b) fixed costs; (c) variable costs; (d) acceptance; and (e) income. The research data were analyzed by analysis of income (Pd), NPV, IRR, NBCR, PBP and BEP. The results showed that the monoculture business pattern in hybrid corn farming obtained the NPV value at the discount factor of 12% of Rp.49,952,913, the IRR of 28%, the Net B/C Ratio of 1.93 (>1), PBP for 5 years 8 month, and the production BEP is 3,193 kg and the price BEP is Rp2,448.33 and the laying hens business is obtained the NPV value at the discount factor of 12% is Rp101,629,457, the IRR is 28%, the Net B/C Ratio is 1.73 (>1), the of PBP for 4 years and 4 months and the production BEP of 9,528 racks and the price of BEP for Rp40,024. While the integrated pattern of laying hens breeders and hybrid corn farming obtained the NPV value at a discount factor of 12% of IDR 434,219,468, IRR of 55%, Net B/C Ratio of 3.51 (> 1) and PBP for 3 years 11 months, based on the investment criteria in the integrated business pattern of laying hens and hybrid corn shows a higher value when compared to the monoculture system with the assumption of a business age of 10 years.

Keywords: *integrated business pattern, for laying hens and hybrid corn, small scale business.*

1. INTRODUCTION

The business pattern that combines more than one farming optimally is able to provide higher profits than the monoculture business pattern [1]. The condition of farming and livestock business that farmers develop in general is still monoculture and increasing income is still difficult to achieve [2]. Farmers as business actors are still grouped as farmers in general, where their farming has not been managed in an integrated manner between sub-sectors [3].

This condition has an impact on farmers who have a land area of 0.5-1.0 hectares and have not utilized the land optimally, even though the management of livestock business through an integrated business with corn farming can minimize the risk of business failure

and increase farmer household income, both in the short and long term [4].

Increasing household income on the scale of people's businesses can be done through the application of an integrated pattern between livestock and plants, managed in the same land or on different lands [5]. The integrated pattern system of livestock and plants is a system that has the characteristics of the relationship between livestock and plant components in a farming activity in an area [6], [7]. Types of livestock and farming businesses that can be developed and provide benefits are laying hens and hybrid corn farming. The development of an integrated pattern of livestock and hybrid corn farming has not been fully carried out by farmers in South Konawe Regency, so it is necessary to analyze the feasibility of an integrated business of

laying hens and hybrid corn farming on a small scale business, both on different lands and in the same land. In the same way, so that breeders can find out the magnitude of the benefits obtained from an integrated business pattern between laying hens and hybrid corn farming.

South Konawe Regency is an area in Southeast Sulawesi Province that has the potential as a center for developing laying hens and corn plants. Corn crop production in 2020 is 33,823 tons with a harvested area of 8,405 ha or 4.02 tons/ha and a population of laying hens 154,040 with egg production reaching 811,944 kg. Laying hens farming and corn farming have good prospects for development, because the laying hens population is quite high by utilizing a small area of land and the use of livestock manure as organic fertilizer for plants can be realized [8], [9]. In addition, the biomass in hybrid maize agricultural waste can be used as a source of animal feed [10].

The business of laying hens can essentially meet the community's need for eggs as well as waste from livestock manure can produce fertilizer for corn plants [11]. Corn farming plays a role in meeting the need for food and animal feed which continues to increase every year [12]. The integration of farming corn and laying hens occupies a strategic position to be carried out continuously with the support of science and technology in accordance with the physical environment and socio-economic conditions of the local area, so it is necessary to conduct an in-depth study of the economic analysis of the integrated business pattern of laying hens and Hybrid corn farming on the scale of people's businesses to determine the feasibility of developing livestock businesses and farming run by ranchers in South Konawe Regency.

2. MATERIALS AND METHODS

The research was carried out in 2020 at the Bina Mandiri Trade Business, West Ranomeeto Sub-District, South Konawe Regency because it is an area that has a large population of laying hens compared to other regencies/cities as well as the largest egg supplier in Kendari City because the level of public consumption of eggs is quite high. Respondents in the study were laying hens and corn farmers who were determined by purposive sampling with an area of 1 hectare land ownership and 1000 livestock ownership during the maintenance period at pullet age.

The data obtained in the study were tabulated, then analyzed using appropriate analytical tools to answer the problem, namely by projecting a financial feasibility analysis of laying hens business including: income (Pd), net present value (NPV), internal rate of return (IRR), net benefit cost ratio (NBCR), break event point (BEP) and payback period (PBP).

1. Revenue is the difference between receipts and expenses.

$$Pq = TR + TC$$

Description:

- P_q : Income (Rp)
- TR : Total Revenue (Rp)
- TC : Total Cost (Rp)

2. NPV is the present value of the difference between the total benefit and the total cost at a certain discount rate over the life of the investment.

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

Description:

- B_t = Project acceptance in year t (Rp)
- C_t = Project cost in year t (Rp)
- T = Capital used in the investment period (year)
- N = Project economic life (year)
- I = Investment loan interest rate (%)

Criteria:

- NPV > 0 worthy/profitable investment
- NPV < 0 investment is not worth/loss
- NPV = 0 the investment returns principal

3. Net B/C Ratio is the ratio between the positive present value (as the numerator) and the negative present value (as the denominator).

$$Net\ B/C\ Ratio = \frac{\sum_{t=0}^{t=n} (B_t - C_t)(DF)}{\sum_{t=0}^{t=n} (C_t - B_t)(DF)}$$

Description:

- B_t = Project acceptance in year t (Rp)
- C_t = Project cost in year t (Rp)
- I = Investment loan interest rate (%)
- N = Project economic life (year)

Criteria:

- Net B/C Ratio > 1 deemed worthy
- Net B/C Ratio < 1 deemed unworthy
- Net B/C Ratio = 1 considered retruns principal

4. IRR is the value of the discount rate that makes the Net Present Value (NPV) equal to zero (0).

$$IRR = I_1 + \frac{NPV^{(+)}}{NPV^{(+)} - NPV^{(-)}} (I_2 - I_1)$$

Description:

- NPV₁ = NPV at the highest discount rate (Rp)
- NPV₂ = NPV at the lowest discount rate (Rp)
- I₁ = Discout rate NPV 1 (%)
- I₂ = Discout rate NPV 2 (%)

Criteria:

- IRR > Bank interest then the investment is considered feasible
- IRR < Bank interest then the project is considered unfeasible
- IRR = Bank interest means returning principal

5. BEP is a condition when the operating results are equal to the issued capital.

$$BEP_{(Q)} = \frac{a}{(p-b)}$$

$$BEP_{(Rp)} = \frac{a}{(1-b/p)}$$

Description:

- A = Fixed cost
- B = Variable cost per unit
- P = Price per unit
- Q = Production quantity

accordance with the economic life of the equipment used, (2) the land used is own property, (3) the scale of the hybrid corn business (Bisi 2) is 1 hectare, (4) productivity is 6 tons/hectare, (5) harvested age is 3 months, (6) use of SP 100 kg/hectare fertilizer, 300 kg/hectare Urea fertilizer, 100 kg/hectare KCL, (7) The labor used is calculated in the HOK, (8) the production of by-products/waste of corn straw is 3.2 tons/hectare, and (9) the selling price of shelled corn is Rp. 4,600.

3. RESULTS AND DISCUSSION

3.1. Basic Calculations in Financial Analysis Projections

The basis of the calculations used in the analysis of the financial feasibility of an integrated business pattern of laying hens and hybrid corn on the scale of people's businesses in South Konawe Regency are as follows.

3.1.1. Hybrid Corn

The basic assumptions used for hybrid corn farming are (1) the operating age used is 10 (ten) years in

3.1.2. Laying Hens

The basic assumptions used for laying hens are (1) the age of the business used is 10 (ten) years according to the economic age of the cage building and the equipment used, (2) the land used is own property, (3) The business scale of laying hens is 1,000 heads, (4) the percentage of mortality during production of 5% is 50 heads, (5) productive chicken population of 85% is 855 tails, (6) the calculation of production in this business starts from the age of 24 weeks of chickens, (7) The age of the rejected chicken is 80 weeks, (8) the ratio of feed

Table 1. Cash Outflow (Cost) and Cash Inflow (Benefit) Projection of Hybrid Corn Farming Per Hectare Ten Years Period

Year	Investment Cost	Production Cost	Total Cost	Benefit	Net Benefit
0	66,150,000	-	66,150,000	-	- 66,150,000
1	-	14,690,000	14,690,000	32,400,000	17,710,000
2	-	14,690,000	14,690,000	36,600,000	21,910,000
3	1,150,000	14,690,000	15,840,000	36,600,000	20,760,000
4	-	14,690,000	14,690,000	36,600,000	21,910,000
5	-	14,690,000	14,690,000	36,600,000	21,910,000
6	1,150,000	14,690,000	15,840,000	36,600,000	20,760,000
7	-	14,690,000	14,690,000	36,600,000	21,910,000
8	5,000,000	14,690,000	19,690,000	36,600,000	16,910,000
9	1,150,000	14,990,000	16,140,000	36,600,000	20,460,000
10	-	14,690,000	14,690,000	36,600,000	21,910,000
Total	74,600,000	147,200,000	221,800,000	361,800,000	140,000,000

Table 2. Projection of Financial Feasibility Analysis of Hybrid Corn Farming Per Hectare for 10 Years Period Based on NPV, IRR, NBC ratio, PBP and BEP criteria

No	Investment Criteria	Unit	Eligibility Justification	Value Eamed	Description
1	NVP	Rupiah (Rp)	>0 (df 12%)	Rp 49,952,913	Worthy
2	IRR	Percent (%)	>12	28%	Worthy
3	NBCR	-	>1	-1.93	Worthy
4	PBP	Year	<10	5 Years 8 Months	Worthy
5	BEP	Kg	≤6,000 kg	3,193 kg	Worthy
		Rp	≤Rp 4,600	Rp 2,448.33	Worthy

per 100 kg is RK24 (31%) IDR 294,000: corn (47%) IDR 282,000: bran (22%) IDR 5,000, so the price per kg is IDR 6315, (9) the calculation of the need for feed per head/day is 110 grams, (10) manure is 150 grams/head/day in wet form, (11) egg production for 1 production cycle is 341,145 eggs, (12) eggs damaged by 0.25% or 1,056 eggs, (13) good eggs as much as Rp. 11,338 racks/ 340,146 eggs and (14) the selling price of eggs, manure and discarded chickens used is the average price valid for 4 (four) years (2017, 2018, 2019, 2020) with the selling price of eggs is Rp. 45,000, (15) the price of fertilizer is Rp. 20,000, and (16) the price of rejected chicken is Rp. 50,000.

3.2. Monoculture System

3.2.1. Hybrid Corn Farming

Corn is an important commodity in Indonesia, apart from being a staple food, corn is also an ingredient of poultry feed and raw material for processed industries.

About 55% of domestic corn needs are used for feed and 30% for food consumption [13]. The use of corn as a feed ingredient continues to increase while its availability is limited. To meet the food and feed needs, the Ministry of Agriculture seeks to increase corn production [14]. Efforts to increase production can be done by expanding the planting area, increasing productivity and improving technology [15]. The application of technology has been shown to increase farm productivity [16], [17] farmers' income [18], [19], to provide household food security [20]. Therefore, to find out the long-term income of hybrid corn farming through a monoculture system, it can be calculated based on the cash outflow (costs) and cash inflows (benefits) of hybrid corn farming. For more details are presented in Table 1 and Table 2.

The Net Benefit value presented in Table, 1 is based on the assumption that the revenue from the sale of corn in the form of seeds is the same every year, but the costs incurred by hybrid corn farming are different each year.

Table 3. Projected Cash Outflow (Cost) and Cash Inflow (Benefit) of South Konawe Regency in 2020

Year	Investment Cost	Fixed Cost	Variable Cost	Total Cost	Benefit	Net Benefit
1	2	3	4	5	6	7
0	153,850,000	0	0	153,850,000	0	-153,850,000
1	0	105,792,901	382,375,381	488,168,281	543,230,528	55,062,247
2	0	105,792,901	382,375,381	488,168,281	543,230,528	55,062,247
3	1,720,000	105,792,901	382,375,381	489,888,281	543,230,528	53,342,247
4	500,000	105,792,901	382,375,381	488,668,281	543,230,528	54,562,247
5	1,050,000	105,792,901	382,375,381	489,218,281	543,230,528	54,012,247
6	86,870,006	105,792,901	382,375,381	575,038,287	543,230,528	-31,807,759
7	22,400,000	105,792,901	382,375,381	510,568,281	543,230,528	32,662,247
8	500,000	105,792,901	382,375,381	488,668,281	543,230,528	54,562,247
9	220,000	105,792,901	382,375,381	488,388,281	543,230,528	54,842,247
10	1,050,000	105,792,901	382,375,381	489,218,281	547,163,528	57,945,247
Total	268,160,006	1,057,929,006	3,823,753,808	5,149,842,820	5,436,238,281	286,395,462

Table 4. Projection of Financial Feasibility Analysis of Laying Hens Farming in South Konawe Regency for a period of 10 years based on NPV, IRR, BC ratio, PBP and BEP criteria

No	Investment Criteria	Unit	Eligibility Justification	Value Earned	Description
1	NVP	Rupiah (Rp)	>0 (df 12%)	Rp 101,629,457	Worthy
2	IRR	Percent (%)	>12	28%	Worthy
3	NBCR	-	>1	1.73	Worthy
4	PBP	Year	<10	4 Years 4 Months	Worthy
5	BEP	Volume (Shelves)	<10,713 Shelves	9,528 Shelves	Worthy
		Price (Rp)	< Rp 45,000	Rp 40,024	Worthy

This is due to differences in the costs used for warehouse construction and equipment costs which are calculated based on economic life or duration of use, so that the cash-out flow value is different each year.

The NPV value of the hybrid corn farming cash flow (bisi 2) is positive at a discount factor of 12%, which is Rp. 49,952,913 for 10 (ten) years, IRR value of 28%, above the prevailing bank interest rate (12%), NBCR values are in the range of values > 1, namely 1.93 gf and the duration of the development of invested capital or PBP is 5 years 8 months, and Break Even Point (BEP) based on the production volume of 3,193 shelves and based on the production price of Rp 2,448.33, so that hybrid corn farming is financially feasible/profitable according to the criteria of NPV, IRR, NBCR, PBP and BEP. To reach the break-even point or BEP, the laying hens business at CV. Gali Putra must be able to sell their products as much as 135,602/kg with a selling price of Rp. 12,974/kg in one period [21]. The difference is influenced by the amount of fixed costs of the business itself [22]. The greater the number of fixed costs, the sales of their products are also increasing, in order to cover the fixed costs incurred [23].

3.2.2. Laying Hens Breeding Business

Feasibility is defined as a business that can provide financial and non-financial benefits according to the desired goals and is also carried out to find out estimates in funding and cash flow, so that it can be known whether or not the business is being run. The financial feasibility of a livestock business can be seen from the calculation of the cash flow of the business. Calculation of cash flow analysis, is divided into two, namely cash inflow (benefit) and cash outflow (cost). Therefore, the cash outflow (costs) and cash inflows (benefits) of laying hens on the scale of people's businesses in South Konawe Regency are presented in Table 3 and Table 4.

The Net Benefit value presented in Table 3, is based on the assumption that the revenue from the sale of eggs, manure and discarded chickens is the same every year, while the costs incurred in running the business are different each year. This is due to the difference in the cost of renovating the cage and the cost of equipment which is calculated based on the economic age or length of use, so that the cash out flow value is different every year.

Table 5. Projected Cash Outflow (Costs) and Cash Inflows (Benefits) of Integrated Business Patterns for Laying Hens and Hybrid Corn Farming in South Konawe Regency in 2020

Year	Investment Cost	Production Cost	Total Cost	Benefit	Net Benefit
0	220,000,000	0	220,000,000	0	-220,000,000
1	0	500,353,300	500,353,300	626,665,000	126,311,700
2	0	500,353,300	500,353,300	626,665,000	126,311,700
3	2,870,000	500,353,300	503,223,300	626,665,000	123,441,700
4	500,000	500,353,300	500,853,300	626,665,000	125,811,700
5	1,050,000	500,353,300	501,403,300	626,665,000	125,261,700
6	88,020,006	500,353,300	588,373,306	626,665,000	38,291,694
7	22,400,000	500,353,300	522,753,300	626,665,000	103,911,700
8	5,500,000	500,353,300	505,853,300	626,665,000	120,811,700
9	1,370,000	500,353,300	501,723,300	626,665,000	124,941,700
10	1,050,000	500,353,300	501,403,300	630,598,000	129,194,700
Total	342,760,006	5,003,533,000	5,346,293,006	6,270,583,000	924,289,994

Table 6. Projection of Financial Feasibility Analysis of Integrated Business Patterns for Laying Hens and Hybrid Corn Farms for a Period of 10 Years

No	Investment Criteria	Unit	Eligibility Justification	Value Earned	Description
1	NVP	Rupiah (Rp)	>0 (df 12%)	434,219,468	Worthy
2	IRR	Percent (%)	>12%	55%	Worthy
3	NBCR	-	>1	3.51	Worthy
4	PBP	Year	<10	3 Years 11 Months	Worthy

The NPV value of the laying hens business cash flow is positive at a discount factor of 12%, which is Rp. 373,88,194 for 10 (ten) years, IRR value of 65%, above the prevailing bank interest rate (12%), the NBCR value is in the range of values > 1 which is 4.21 and the duration of the development of invested capital or PBP is 2 years 3 months, and Break Even Point (BEP) based on the production volume of 9,584 shelves and based on the production price of Rp 36,403, so that the laying hens business is financially feasible or profitable according to the criteria of NPV, IRR, NBCR, PBP and BEP. Large operating income does not always reflect a high level of business efficiency [24]. A business can be declared feasible or still in the level of efficiency if the value of the same acceptance is greater than the total cost [25].

3.3. Integrated Business Pattern for Laying Hens and Hybrid Corn Farming

Sustainable agricultural development should be carried out evenly, in order to contribute to the realization of food security [26], [27]. The integrated business system of laying hens and hybrid corn farming by laying hens and hybrid corn farmers can provide higher incomes than monocultures.

The net benefits obtained from the integrated business pattern of laying hens and hybrid corn farming are able to provide a higher income which reaches Rp. 924,289,994 for 10 (ten) years. High Net Benefit in this integrated business pattern is based on the calculation of Cash Outflow (Cost) and Cash Inflow (Benefit) together, so that it is able to provide a Net Benefit value, when compared to monoculture systems on the same business scale. This also provides benefits for the high value obtained on several investment criteria NPV, IRR, NBCR, and PBP, as presented in Table 6.

The NPV value of the cash flow pattern of the integrated business of laying hens and hybrid corn farming is positive at a discount factor of 12%, which is Rp. 434,219,468 for 10 (ten) years, IRR value of 55%, above the prevailing bank interest rate (12%), the NBCR value is in the range of values > 1 which is 3.51 and the duration of the development of invested capital or PBP is 3 years and 11 months, so that the laying hens farming business with hybrid corn farming (Bisi 2) is financially feasible/profitable according to the criteria of NPV, IRR, NBCR, and PBP. The calculation of the interest rate used is 14%, the NPV value is Rp. 330,116,743, Net B/C is 1.67, IRR is 37.87% and PP for 2.7 years at the Sunju Mandiri laying hens business in Sunju Village, Marawola Sub-District, Sigi Regency [28].

4. CONCLUSION

Based on the description above, it can be concluded that the feasibility of an integrated business pattern for laying hens and hybrid corn plants on a small scale

community business in Konawe Selatan Regency will deductively increase the effectiveness and efficiency of production in the form of increasing production yields and decreasing production costs. When viewed from the aspect of financial feasibility, the results of the study indicate that the monoculture business pattern in hybrid corn farming is obtained by the NPV value at the discount factor of 12% of Rp. 49,952,913, the IRR value of 28%, the Net B/C Ratio value of 1.93 (>1), PBP for 5 years and 8 months, and BEP production is 3,193 kg and BEP is priced at Rp. 2,448.33. The laying hens business obtained an NPV value at a discount factor of 12% of Rp. 101,629,457, an IRR value of 28%, a Net B/C Ratio of 1.73 (>1), a PBP value for 4 years 4 months and a production BEP of 9,528 shelves and BEP costs Rp 40,024. Meanwhile, the integrated pattern of laying hens breeders and hybrid corn farming obtained the NPV value at a discount factor of 12% of Rp. 434,219,468, IRR value of 55%, Net B/C Ratio 3.51 (>1) and PBP value for 3 years 11 months, based on the investment criteria in the integrated business pattern of laying hens and hybrid corn shows a higher value when compared to the monoculture system with the assumption of a 10 year business life.

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