

COMPARATIVE FEASIBILITY ANALYSIS OF MODERN AND TRADITIONAL SYSTEM OF BROILER CHICKEN FARM BUSINESS

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ABSTRACT

Feasibility study is a study assessing a project to be undertaken in the future. This research aimed to analyze whether the broiler business by partnership pattern at Prospek Mitra Lestari (PML) was feasible to be continued. This research analyzed two models of cage that is traditional cage (open) with a scale of 10,000 and modern cage (close) with a scale 14.500 and decided whether they were financially feasible or not. In addition, this research aimed to compare between traditional cage and modern cage with estimation for one year (six harvest times) and to analyze which cage had better feasibility in order to provide recommendations or suggestions to the breeders or young breeders. Sensitivity analysis was based on current input and output data from breeder in 2012. The feasibility study of chicken broiler farm cage partnership with traditional and modern cage with the next ten year estimation showed that the modern cage was better than the traditional cage. It can be seen from the values of NPV, IRR, PP, B/C, GPM and ROI. Sensitivity analysis shows that traditional cage is more sensitive to price changes than modern cage. It is shown in the traditional cage with the capacity of 10,000 produces smaller values, indicating that it is sensitive to cost increase by 2% and to selling price decline of chicken by 1,7%. The recommendations from this study include inputs to farmers in selecting a modern cage since it is more feasible than the traditional cage for long periods of time, while the traditional cage is more viable than the modern cage if the farmer wants a shorter investment time

Keywords: Feasibility studies, Broiler, modern and Traditional cage

ABSTRAK

Kelayakan merupakan studi menilai proyek yang akan dikerjakan di masa mendatang. Penelitian ini bertujuan untuk menganalisis apakah usaha ayam broiler dengan pola kemitraan pada Prospek Mitra Lestari (PML) layak untuk diteruskan. Penelitian ini menganalisis dua model kandang tradisional (open house) dan kandang modern (close house) dengan skala yang berbeda, yaitu 10.000 dan 14.500 layak atau tidak secara finansial, selain itu penelitian ini bertujuan untuk membandingkan antara kandang tradisional dan kandang modern dengan estimasi selama sepuluh tahun untuk memberikan rekomendasi atau masukan pemilihan kandang kepada peternak atau peternak pemula. Analisis sensitivitas didasarkan pada data penerimaan dan pengeluaran terbaru dari peternak pada tahun 2012. Kelayakan usaha ayam peternakan broiler pola kemitraan kandang tradisional dan kandang modern dengan estimasi sepuluh tahun ke depan menunjukkan bahwa kandang modern paling layak dibandingkan dengan kandang tradisional. Hal ini dapat dilihat dari nilai NPV, IRR, PP, B/C, GPM dan ROI kandang modern lebih besar dibandingkan kandang tradisional. Analisis sensitivitas menunjukkan bahwa kandang tradisional sangat sensitif terhadap perubahan harga dibandingkan dengan kandang modern, hal ini ditunjukkan pada kandang tradisional kapasitas 10.000 ekor menghasilkan nilai terkecil yaitu peka terhadap kenaikan biaya sebesar 2% dan penurunan harga jual ayam sebesar 1,7%. Rekomendasi dari penelitian ini adalah masukan kepada peternak dalam memilih kandang, yaitu kandang modern lebih layak dibandingkan kandang tradisional jika untuk jangka waktu yang lama, sedangkan kandang tradisional lebih layak dibandingkan kandang modern jika peternak menginginkan waktu investasi yang lebih pendek.

Kata kunci: studi kelayakan, ayam broiler, kandang modern dan terbuka

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INTRODUCTION

In developing its farm, Jember gives priorities to increase its farm production, job opportunity, farmer welfare, agribusiness and optimization in natural resource exploration. Broiler chicken is an opportunity and added value for Jember to increase its income (PAD-local revenue) and social welfare, and the local potency supports this condition as it is known that Jember consists of a farmland area; therefore, it has enough areas to breed chicken.

Jember people generally have good enthusiasm to breed chicken as can be seen from the data from Ministry of Farm of East Java that from 2005–2012 showing that broiler chicken production increased from 6.125 to 162.844 chicken in Jember (Ministry of Farm of East Java, 2013). There are two types of broiler chicken farms in Jember i.e. independent and partnership farms, and there are some companies that apply partnership system including Prospek Mitra Lestari (PML), Ciomas, Patriot, SMS and Sawahan. PML had 105 members in its partnership system in 2012, and the chicken population in each farmland is approximately 3,500 DOC.

PML partnership system had a number of obstacles during its partnership period where the members did not want to increase their capacities, and the majority of them had a minimal scale of business. As many as 60 breeders still use the traditional cage because the modern cage requires higher investment. Broiler chicken farm is an alternative business to run because it only needs short period, small amount of land, and it can be run intensively with efficient capital and technology. (Zuraih et al. 2006). Broiler chicken farm is prospective enough, but it needs high investment, so that a feasibility analysis should be carried out. There are two types of cage, close and open house cages. This research used this analysis to find out whether broiler chicken farm in partnership system with two different types of cage is feasible to run if seen from the financial viewpoint.

We can also consider feasibility analysis as a planning because it is an important point to start and extend the farming, whether it is feasible or unfeasible. (Fante et al. 2001). Subkhie (2012) conducted research on feasibility of broiler chicken farming only by using scale differentiation and found that the highest NPV was at the highest scale i.e. with 22.000 chickens.

According to Sarianti (2008), the business requires feasibility research to anticipate financial risks faced by the breeders. Broiler chicken farms in PML partnership use modern and traditional cage, especially in Jember, and the prospect of this farming is good i.e. it is profitable. According to Daryanto (2012); however, broiler chicken farm is a farm sensitive to input cost and output price. Financial account is necessary to determine this farm which uses modern and traditional cage. Based on this, the problems of the research were how feasible this farm was based on financial analysis and what the result of financial analysis result comparison of the modern and traditional broiler farms was. The research used feasibility analysis of modern and traditional broiler farm approach to solve the problems, and it analyzed the financial feasibility and result of financial analysis result comparison.

Partnership system of PML was selected, and four breeding farms i.e. two from traditional system with 10.000 and 14.000 scales and two from modern system with 10.000 and 14.000 scales were studied.

METHODS

This research used primary and secondary data. The primary data included the report of profit, selling data, and operational costs from 2009 to 2012 from modern and traditional farming systems in Jember. The secondary data obtained from the articles, previous research results and broiler production from 2008 to 2012 from the farming statistics of East Java Province, Ministry of Farm of Jember, and from internet.

Data Analysis Method

a. Net Present Value (NPV)

Systematically, we can acquire NPV by using the following formula (Husnan, 2000):

$$NPV = \sum_{t=0}^n \frac{AFC}{(1+k)^t} - I_0$$

AFC : annual cash flow after tax
 I_0 : initial investment
k : discount rate
n : the expected life of the project
t : period Investment

b. Internal Rate of Return (IRR)

Investment rate is an interest rate after total net cash flow is multiplied by the discount factor or after the NPV is acquired. IRR is the maximum interest that farming activity can pay (Kurniasih, 2013). The formula is as follows (Brigham dan Houston, 2006):

$$NPV (\text{NetPresentValue}) = \sum_{t=0}^n \frac{CF_t}{(1+IRR)^t} = 0$$

- NPV : Net present value
- CF_t : Net cash flow
- IRR : Internal Rate of Return
- n : the expected life of the project

From the above formulation, the value NPV1 is obtained to determine trial and error method. From here, IRR value is between NPV positive and negative that is NPV=0. Therefore, IRR formulation becomes as follows (Brigham and Houston, 2006):

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

- IRR : internal rate of return
- I₁ : internal rate 1
- I₂ : internal rate 2
- NPV₁ : net present value result IR₁
- NPV₂ : net present value result IR₂

c. Payback Period (PP)

Payback period from an investment explain about the period of time where an investment will acquired the whole return. Sooner the return is, the more interesting the investment is (Rachadian et al. 2012). The formula is as follows (Brigham and Houston, 2006).

$$PP = \frac{\text{investasi awal}}{\text{Aliran kas bersih}} \times 365$$

d. Benefit Cost Ratio (B/C)

Benefit cost ratio formula is as follows (Gray et al. 1992):

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

- B_t : benefit in the year of t
- C_t : Cost the project in the year of t
- i : interest rate (%)

n : economic life of the project

e. Return on Investment (ROI)

ROI is a profitability ratio that measures the capacity of a company with all investment it has in total assets that it uses to acquire the return (Bhatoro dan Apsari, 2012). ROI can be acquired by the following formula (Riyanto, 2004):

$$ROI = \frac{\text{Net profit after tax}}{\text{Total asset}} \times 100\%$$

f. Gross Profit Margin

Gross Profit Margin can be acquired by the following formula (Syamsudin, 1996) :

$$GPM = \frac{\text{Operation income}}{\text{Sales}}$$

g. Switching Value Analysis

Gittinger (1986) states that variation in sensitivity analysis is switching value, and this switching value is to measure the maximum change. By using this value, the basic change in sensitivity analysis is found in analysis in which its changing value has been known empirically. Macro-economic factors of a region generally influence this change (Syafri, 2009).

Meat consumption in Indonesia is increasing because of the people's awareness to health. Jember is the regency with a large number of meat consumers; as a result, it gives some impacts on broiler farms that require high investment. There are two types of broiler farms i.e. independent and partnership. Partnership constitutes a system that has a good prospect. In this study case, there were two types of cage i.e. modern and traditional, and it is possible to know the profit from the financial analysis (in Figure 1).

RESULT

Analysis Result of Modern and Traditional Cage Investment

The feasibility analysis in this research used the criteria of NPV, IRR, B/C, PP, GPM and ROI, and it was based on the projected data of the 10 year period and used

10% discount rate. Investment feasibility is emphasized in NPV method because it is concerned with money value (Sasrawan, 2011). Table 1 shows the result of feasibility analysis of modern and traditional cages.

Based on the feasibility analysis result in Table 1, the farming with modern and traditional cages was feasible to develop. NPV of all cages was positive, and the highest NPV was in the modern cage with 14.500 chickens. NPV means that investment at the beginning of the year will have value in the future. IRR of all cages was beyond the discount rate of 10%, and the highest IRR is in modern cage with 14.500 chickens.

B/C of all cages was >1 indicating that the farming using modern and traditional cages gives profits during the project period. The highest B/C was in modern cage with 14.500 chickens showing that the cage managed the cost properly. PP value indicates how long the investment will return. PP value of all cages was > economic period so that modern and traditional cages were feasible. The most immediate return of this investment was about 2 years and six months or 15 periods of livestock harvest in modern cage with a scale of 14.500 chickens.

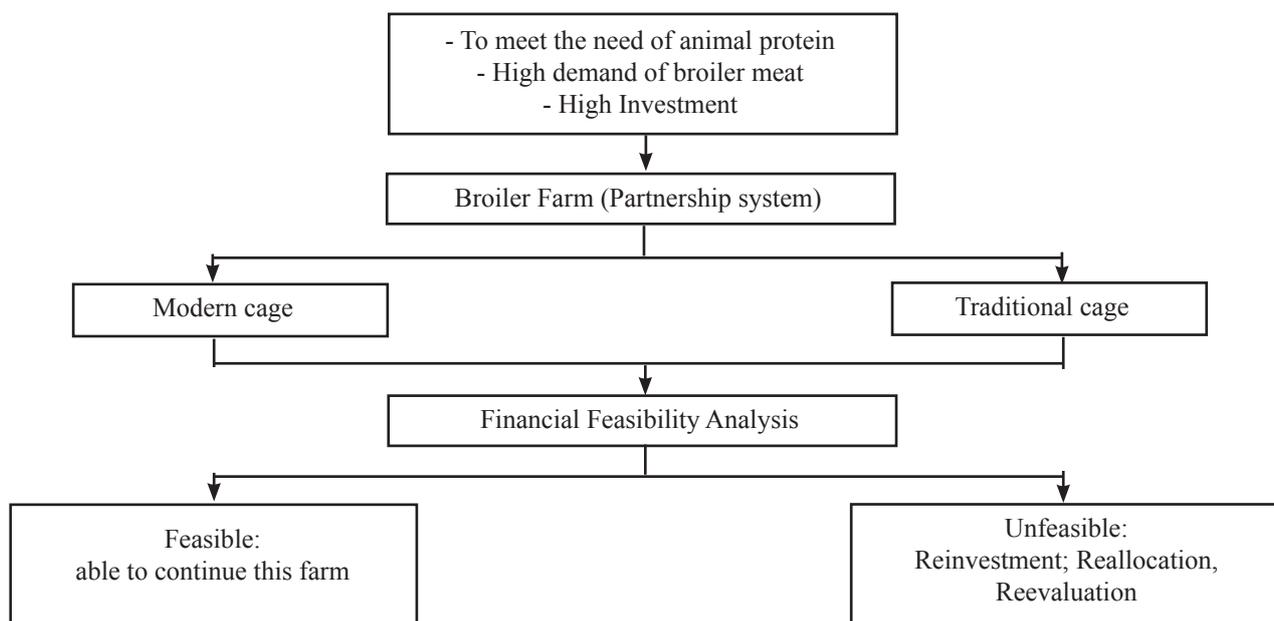
GPM indicates that the higher the GPM is, the higher the gross profit is. The GPM analysis result showed that modern and traditional cages for farming are feasible, but the smallest GPM of 4% was in traditional cage with 10.000 chickens. It is because of the high cost so that it is less efficient. The highest GPM value is in modern cage i.e. 12% with a capacity of 14.500 chickens.

ROI is used to analyze how much the profit percentage earned to the investment cost spent. ROI value of all cages was > 1 so that it was feasible to develop. The highest ROI is in modern cage that is 18% with a capacity of 14.500 chickens.

Sensitivity Analysis (Switching Value)

The research used switching value to analyze the operational cost and price increase. This analysis aimed to measure the sensitivity of an activity if the condition changes. The research used it until the NPV was close to 0 and IRR was 10%, and it assessed the sensitivity based on cost and price data in 2012. Table 2 shows the sensitivity analysis result.

The sensitivity analysis result showed that farming system using modern and traditional cages was sensitive to cost and price fluctuation. The research used sensitivity analysis to show that the breeders had to pay their attention to this sensitive part of this farming (Syarif, 2011). A farming that uses traditional cage with a capacity of 10.000 chickens is sensitive to price fluctuation. It is indicated by the percentage which was on the lowest level, indicating that it was sensitive to cost increase by 2%, and price decrease by 1,7%. The modern cage had the highest percentage of sensitivity to cost increase by 12% and price decrease by 14%. In short, traditional cage is more sensitive to price fluctuation than modern cage.



Picture 1. Conceptual Frame

Table 1. Analysis result of feasibility analysis modern and traditional cage

Criteria	Scale and type of cage			
	14,500 Modern	14,500 Traditional	10,000 Modern	10,000 Tradisional
NPV	Rp1.100.218.647	Rp740.741.904	Rp645.328.729	Rp77.202.009
IRR	46%	33%	43%	17%
B/C	13%	11%	10%	3%
PP	2 year 6 month	3 year 7 month	2 year 8 month	4 year 4 month
GPM	12%	11%	11%	4%
ROI	8%	5%	6%	2%

Source: edited from PML data 2009–2012

Table 2. Analysis result of switching value of modern and traditional cage

Change	Scale and type of cage			
	14.500 Modern	14.500 Traditional	10.000 Modern	10.000 Traditional
Operational Cost Increasing	7%	1,8%	12%	2%
Chicken Price decreasing	6,3%	5,5%	14%	1,7%

Source: edited from PML data 2012

CONCLUSIONS AND RECOMMENDATION

Conclusions

The result of the feasibility analysis of farming partnership system using modern and traditional cages with capacity of 14.500 shows that this business is viable or feasible to develop. NPV of modern cage is positive i.e. Rp1.100.218.647, while that of the traditional cage is Rp740.741.904. IRR values of modern cage and traditional cage are 46% are 33% respectively, more than the discount rate of 10%, and the B/C analysis results of modern and traditional cage are 13% and 11% respectively. Based on the analysis, the payback periods of modern cage and traditional cage are 2 years and 2 months and 3 years and 7 months respectively, and this indicates that it is less than the estimation period of 10 years. GPM value of the modern cage is 12% and that of the traditional cage is 11%, and ROI analysis in the modern cage with capacity of 14.500 chickens is 8%, and traditional cage is 5%. Modern cage is sensitive to the increase of operational cost by 7%, and to the decrease of chicken selling price by 6,3% whereas the traditional cage is sensitive to the increase of variable cost by 1,8%, and to the decrease of chicken selling price by 5,5%.

The feasibility analysis result of farming in partnership system using modern and traditional cage, with capacity of 10.000 chickens, is feasible to develop.

NPV of modern cage is positive with Rp178.911.719, while NPV of traditional cage is Rp101.040.912. IRR of modern cage is 30% and traditional cage is 37% beyond the discount rate of 10%. B/C analysis >1 in modern and traditional cages is 8% and 4% respectively. Payback period analysis of modern cage is 2 years and 8 months. It means that it is less from estimation period of 5 years and from cage economical period of 8 years, while traditional cage is 2 years, less from estimation period and cage economical period of 5 years. GPM value of modern cage is 7% and traditional cage is 5%. ROI analysis in modern cage is 2,2% and traditional cage is 2,3%. Modern cage is sensitive to the increase of operational cost, that is 12%, and to the decrease of chicken selling price, that is 14%. Traditional cage is sensitive to the increase of variable cost that is 2%, and to the decrease of chicken selling price of 1,7%.

Feasibility analysis of broiler chicken farm in partnership system, by using modern and traditional cage, with estimation of 10 years in the future, indicates that modern cage is more feasible than traditional cage. We can see it from NPV, IRR, PP, B/C, GPM and ROI of modern cage that is higher than those of traditional cage. Sensitivity analysis indicates that traditional cage is more sensitive to price fluctuation than modern cage. It is found in traditional cage, with capacity of 10.000, that shows the lowest value, which indicates that it is sensitive to the increase of cost of 2% and to the decrease of chicken selling price of 1,7%.

Recommendations

The selection of the proper cage has a big influence on the production and profit. Capacity influences the result so that breeders should increase their production capacity up to 14.500 chickens. Both modern and traditional cages are profitable, but the breeders must know each system well so that they will not obtain loss in the production process. Traditional cage needs lower investment than modern cage, but for the economical period, modern cage needs longer time than traditional cage. Besides, modern cage is better than traditional cage in the cases of mortal rate of broiler chicken, chicken's weight and environment. Broiler chicken farm is very sensitive to the increase in operating expenses and decrease in the chicken selling price so that the breeders should carefully pay attention to the contract with the partnership company in order to avoid losses.

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