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Investment Advantages of Broiler Production Using the Partnership System: A Study in Indonesia

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ABSTRACT

Purpose: *Broiler business with independent pattern in Minahasa Regency, North Sulawesi often experiences problems with input and output price fluctuations. Therefore, farmers try to collaborate in partnership with companies that have better capital and technology. An evaluation needs to be carried out whether partnership model of broiler businessin North Minahasa, North Sulawesi Province is financially beneficial or not.*

Research Method: *The research was a case study performed in UD. Matuari Waya, the only broiler farming entities in District of Kalawat, Regency of North Minahasa, of which was partnered with a national-scale husbandry company, Charoen Phokpand Ltd. Data were analyzed through business feasibility scope using analysis of investment criteria and sensitivity model.*

Findings: *Partnership model was financially beneficial to be developed further, by NPV value of IDR.1,487,877,624 (US$101,909.43), net B/C, of 1.219, internal rate of return of 63.18% and the payback period within 1 year & 7 months. Moreover, the result of sensitivity analysis shows that: if price of broiler declined about 15% and operational cost was increased of 12%, the broiler business could still be performed. Nonetheless, whereas broiler's production declined for 10%, this partnership was non-feasible to be developed since the value of NPV was negative and net B/C was lower than 1.*

Research Limitations: *This study was constrained by the limited broiler breeders with partnership pattern in Kalawat District as the region with the largest broiler population.*

Originality/Value: *The results provide new information on business development standards for broiler chicken partnerships in the context of a decline in output price, decrease of broiler production and an increase in inputs price.*

Keywords: *Feasibility, Investment, Partnership, Profit, Sensitivity, Broiler production*

INTRODUCTION

Broiler, one of the livestock commodities, is a favorite and well-liked type of chicken by public, since it has a delicious taste of its meat and high nutrition. Hence, broiler has a potency to be developed in terms of improving economy and fulfilling public's protein necessity (Alderson and Jordaan, 2007; Tuffour and Oppong, 2014; Maidala *et al.,* 2017;). Broiler, in addition, has been turned as one of the primary commodities in the sub-sector of livestock developed in Indonesia, and according to Statistik Peternakan Indonesia (2019), the average consumption of broiler per capita in Indonesia, in 2018, was 5.683kg, an increase of 11.22% than 2017, 5.110 kg/capita/year. Whereas, viewed from production of broiler in Indonesia, it was dominated by 12 provinces, including North Sulawesi Province, greatly contributing to national production of

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broiler at a 3.64%, while the biggest contribution came from Province of West Java, which was about 40.20%. Outside Java, the contribution of national production of broiler was averagely 585 thousand tons. Nationally, in addition, the significant increase of broiler production outside Java occurred in 2018, which was 5.81%, improving from 0.14% in 2016 to 2.08% in 2017

In fact, condition of breeders shows that there are shortages taken place, such as capital procurement, changes of input and output price, human resource, and precise technology procurement for broiler farming (Elsedig *et al.,* 2015; Jaelani *et al.,* 2013; Rudra *et al.,* 2018; Rana *et al.,* 2012). From this, it is necessarily required to have cooperation in the form of partnership between broiler breeders and the company having a huge capital (Indarsih *et al.,* 2012; Nurtini *et al.,*2017; Singh *et al.,* 2018). It is performed by purpose to improve technical and economic performance of the broiler farm. Moreover, it can provide meat of broiler with guaranteed quantity, nutrition quality, and affordable price for consumers as well as profits for breeders (Tandogan and Cicek, 2016; Samarakoon and Samarae, 2012; Ike and Ugwumba, 2011; Rana *et al.,* 2012; Abdurofi *et al.,* 2017; Raut *et al.,* 2017). Regency of North Minahasa is a region having the biggest population of broiler farming in the Province of North Sulawesi. According to Badan Pusat Statistik Sulawesi Utara (2019), total of broiler population in Regency of North Minahasa was 4,508,180 broilers or 58. 43% from the total broiler population in the Province of North Sulawesi, with broiler's production and consumption respectively of 4,118,236 kg and 634,285 kg, meaning that 3,484,000 kg of broiler's meat were contributed by Regency of North Minahasa to sufficiently fulfill meat necessity in the Province of North Sulawesi and eastside of Indonesia. Kalawat District is the region with the largest broiler population among 10 Districts in North Minahasa Regency covering 25.67% of the total population of broilers. Almost all broiler breeders in this area carried out their business independently except UD Matuari Waya as the only small scale livestock business that cooperates with a partnership system with one of the national scale animal husbandry companies namely, the Charoen Phokpand Jaya Farm Ltd. UD Matuari Waya. is established in 2009, owned by Mr. Karel Sompotan, breeder, and located in the Village of Kalawat,District of Kalawat, North Minahasa Regency by ownership scale of 12.500 broilers. Specifically, an issue dealt with breeders is that input price of feeding and day old chick (DOC) and meat's price are sometimes inconsistent or fluctuated, so that it affects broiler production and income. Other problems, on the other hand, are diseases attacking broiler raised by UD.Matuari Waya. Consequently, it causes a decline of broiler's production and productivity, and, eventually, it results in a loss due to disease outbreak. To solve such issues, UD.Matuari Waya, since 2013, has cooperated with Charoen Phokpand Ltd, a national husbandry company that has a better capital and technology. By this partnership system, Charoen Phokpand Ltd provides day old chick (DOC) of broilers, feeds, medicine, technical and technology counseling, and various types of incentives, such as market incentive and achievement incentive, at which its value has been jointly agreed upon by both partnered companies. Breeders provide cage, equipment, heater, labor, and rice's husk. Based on previous researches, it shows that broiler production under partnership design was profitable enough, (Yusuf *et al.,* 2016; Khan and Afzal, 2018; Istanto *et al.,* 2010; Rasak and Hassan, 2014; Niswatin *et al.,* 2016; Nurtini *et al.,*2017).

However, there was no review evaluating the risk of decline of production at 10% and decreasing price of broiler's meat by 15% as well as increase of production inputs price by 12%. This is very important because broiler chicken farms in North Sulawesi have experienced problems with fluctuations in feed prices and broiler chicken production at the end of 2018 until early 2019, so that it will have an impact on breeders' incomes. Therefore, the aim of this research was to evaluate the profitability of broiler production under partnership model between UD.Matuari Waya and Charoen Phokpand Ltd, with regard to facts if partnership model of broiler business in North Minahasa, North Sulawesi Province was financially beneficial or not, and how effects of fluctuated price of input and output as well as production fluctuation act against business profit.

MATERIALS AND METHODS

Site, Sampling, Time, and Technique of Data Collection

The research location was in Kalawat District, North Minahasa Regency as the area with the largest broiler population. Subsequently selected purposely, UD Matuari Waya is the only broiler breeding business in Kalawat District with a business scale of 12,500 heads which cooperates in partnership with one of the national companies in the field of animal husbandry namely,Charoen Phokpand Jaya Farm Ltd.

This small-scale company has operated since 2009 and started cooperation with Charoen Phokpand Ltd since 2013. Then, data collection was done during June - August 2019 through depth interview with respondents, such as the owner of UD. Matuari Waya and employees, using questionnaire having been prepared and observing husbandry's site. Data collection consisted of primary and secondary data such as revenue and production costs, mortality rate of broiler chickens, selling price, weight of chickens when sold, sales of manure broiler in one production period, broilers population in North Minahasa Regency, broilers population in North Sulawesi Province, broilers' meat production and consumption per annum.

Data Analysis

To acknowledge profitability of partnership system in broiler production, analysis of investment criteria was utilized (Gittinger, 1986).

Net Present Value analysis is used to know current value of business profit obtained in future by following formulation as hereunder:

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

where,

Bt :Total of gross revenue from business activity in year t

Ct :Total of gross expenditure from business activity in year t

n: Economic period (1,2,….n)

I: Discount rate

In addition, criteria used in assessing business activity are determined by as follows:

NPV >0 :Profitable entity

NPV <0: Non-profitable entity

NPV= 0: Such entity returns capital equal with expenditure expensed.

Benefit Cost Ratio (BCR) is a comparison in which, by such manner, the numerator consists of present value from total of net profit in year where net profit is positive, and comprises of present value of total of benefit cost in year, where net profit is negative.

$$B/C = \frac{\sum_{t=1}^{n} \frac{Bt - Ct}{(1+i)^t} \quad (Bt - Ct > 0) \quad \text{PV Bebefit}}{\sum_{t=1}^{n} \frac{Ct - Bt}{(1+i)^t} \quad (Bt - Ct < 0) \quad \text{PV Cost}} \quad \text{.....(2)}$$

The criteria are as hereunder:

B/C Ratio > 1 means that project is feasible or performable.

B/C Ratio = 1 means that project is even between its cost and benefit, so that it depends on decision-makers whether they will perform or not.

B/C Ratio < 1 means that project is not feasible or non-performable.

Internal Rate of Return can be calculated by following formulation (Kadariah, 1999), as hereunder:

$$IRR = DF1 + \frac{NPV1}{(NPV1 - NPV2)} (DF2 - DF1) \text{.....(3)}$$

where,

NPV1= NPV Positive is in the lowest extent of discount rate

NPV2= NPV Negative is in the highest extent of discount rate

DF1 = Discount rate of NPV1

DF2 = Discount rate of NPV2

Then, the criteria usually used in assessing an entity can be determined by as follows:

IRR >Cost of capital means that such entity is feasible and profitable.

IRR<Cost of capital means that such entity is not feasible and non-profitable.

Payback period displays duration (in years) of investment that can calculatedly return. This period shows that comparison between initial investment with yearly cash flow, calculated by following formulation (Gittinger, 1986),as below:

Investment value

$$\text{Payback Period} = \frac{\text{Investment value}}{\text{Proceed}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$\text{Payback Period} = n + \frac{a-b}{c-b} \text{ x 1 } year \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

where,

n = Last year where total of net cash flow has not cover initial investment.

a = Total of initial investment

b =Total of cash in year – n

c =Total of cash flow in year n + 1

The criteria, further, used is that if payback period < economic period of project, it is feasible. Contrastingly, if payback period > economic period of project, the project is non-performable or not feasible.

Sensitivity analysis is performed to know profitability of broiler business if there is a change of selling price of broiler at 15% and increasing cost of day old chick (DOC), feeds, medicines, vaccines and vitamins at 12%, then,broiler production decreases in 10%.

RESULTS AND DISCUSSION

Characteristics of Breeders

The broiler business farm run by UD. Matuari Waya in the Village of Kalawat, District of Kalawat, Province of North Sulawesi is owned by Karel Sompotan, 59 years old, and having a formal education as a Bachelor of Agriculture. He has started to cultivate broiler since 2005 by an entity scale of 200-300 broilers in 2009, and, later, established broiler production under UD.Matuari Waya, of which its entity scale was 5000 broilers. Since 2013, he has cooperated with Charoen Phokpand Ltd and started to develop his entity scale into 12,500 broilers up to now.

Farm Management under Partnership System of UD.Matuari Waya and Charoen Phokpand Ltd.

Within the partnership system in broiler production, it has been regulated that all types of cooperation between both jointly collaborated parties, including all rights and responsibilities and risk were bore upon respectively. Charoen Phokpand Ltd as main company has responsibility to provide livestock production infrastructures, covering of day old chick (DOC), feeds, medicines, technology counseling, and various types of incentive-such as market and achievement incentive, of which its value has been agreed upon by both partnered parties. Meanwhile, breeders provide cage and equipment, employees, heater and rice's husk. Specifically, under this system, several terms and conditions drafted in partnership agreement are agreed upon by both companies that perform the partnership.

Revenue of Broiler Breeder

Revenue derived from broiler production is a difference of selling result of broiler, incentive

of feed conversion ratio (FCR), selling of rice's husk with operational cost bore by both joint companies or profit-sharing system. The finding of this research reveals that broiler selling by plasma company was based on the rate of mortality at 6%, an average final weight of broiler of 1.7 kg/broiler, selling price of US$ 1.26/kg. Then, selling result per broiler was US$.2.15, while the harvest was performed by Charoen Phokpand Ltd from breeders for each period of broiler production.

Based on above data in Table 01, it shows that revenue of broiler's breeders within one production period was, totally, US$ 26,690.65. In a year, there were 6 production periods, comprising of January-February, March-April, May-June, July-August, September-October and November-December, respectively.

During the approach of National Holidays, such as Ied Fitri or Christmas, price of broiler usually increases, determined by the main company, since there is an increasing demand from consumers. Then, revenue derived from incentive of feed conversion ratio (FCR) is a difference from total of feeds and final weight of broiler. Whereas, final weight of broiler achieved by breeders was under its standard (1.75), so they obtain an incentive of US$ 0.15 multiplied by broiler's weight. Moreover, the selling of rice's husk is an additional revenue of breeders in each period, where it was obtained 600 sacks, turned as compost by the price of US $ 0.51/sack.

Expenditure of Investment

UD Matuari Waya has invested since the beginning of establishment for fulfilling all necessities in broiler production. Investment expensed by joint company comprised of cage, equipment, and electricity installation. Economically, the rate of cage period is 10 years, and the equipment is 5 years in average (Chang, 2007). For entity scale of 12,500 broilers, the area of cage established by joint breeder was 1,100 m^2 with the price of US $23.97/$m^{2.}$.Further, the equipment included food and drink tools, heater, water tank, tarpaulin, scales, bucket, electric generator and 12-kg-gas tube. In detail, cost of investment for broiler production run by UD.Matuari Waya during one period is presented in following Table 02.

Operational Cost

Partnership model of broiler production has two types of financing, comprising of both joint and individual operational cost (UD Matuari Waya and Charoen Phokpand Ltd).

Table 01: Revenue of breeders per production period

Number	Type of Revenue	Total (US$)	Percentage (%)
1	Selling of broiler	24,298.36	91.03
2	FCR Incentive	2,084. 05	7.80
3	Selling of rice's husk	308. 24	1.17
	Total of revenue	26,690.65	100.00

Table 02: Investment cost of UD Matuari Waya

Number	Type of investment cost	Total (US $)	Percentage (%)
1	Cage	26,.369.86	88.24
2	Equipment	3,101.88	10.38
3	Electricity installation	410.96	1.37
	Total of investment cost	29,882.71	100.00

The component of joint operational cost has been agreed by both companies, plasma and main company collaborated since the signing date of partnership agreement. Various types of operational cost are depicted in the Table 03 as hereunder:

The result of this research based on Table 03 exhibits that cost of feeds were a component of production cost (73.80%), cost of day old chick (DOC) (25.22%), and cost of medicines (0.98%). Type of day old chick (DOC) used was SR-707. In addition, feeds were derived from BR-1, mainlyfor chicken's age ≤ 20 days (starter period) and BR-2 for chicken's age ≥ 20 up to harvest period (Gandhi and Sutanto, 2017). Price of feeds in the starter phase was US$0.53 per kg and price for the finisher phase wasUS$0.51 per kg. Total of feeds required for chicken in each period was 2 kg/head. Cost of medicines, vaccines, and vitamins were relatively small since they were not given every day and the mechanism of feeding was through broiler's drinking system. Specifically, the cost of medicines, vaccines, and vitamins were US$ 0.09/head. This finding is strengthen by the result of Ike and Ugwumba (2011) stating that successful broiler production was depended on some significant production factors such as feeding, day old chick (DOC), and medicines, of which feeding had a portion of 68% in the structure of production cost in the broiler production at North Onitsha, Nigeria

Operational cost expensed by UD. Matuari Waya is a fixed and variable cost. Fixed cost comprises of electricity, tax, purchasing of rice's husk, cage depreciation and equipment, while variable cost is labor cost. Annually, the total of operational cost expensed within six production periods by UD. Matuari Waya was US$.2,777.39, comprising of fixed cost ofUS$ 722.60and labor cost of US$. 2,054.79. In addition, UD. Matuari Waya employed five-contractual labors by salary of US$ 68.49/production period respectively.

Analysis of Investment Criteria

This analysis was performed to know whether investment project of broiler existing in the Village of Kalawat, Regency of North Minahasa was profitable or not. It was reviewed from various types of investment criteria analysis, such as Net Present value, B/C, IRR, payback period or break even point. After counting annual cost and revenue for five years of broiler chicken partnership business then NPV, IRR, B/C value is obtained. The calculation of cash flow investment of broiler in the UD. Matuari Waya became the base for determining business feasibility. Following, Table04 portrays the calculation result of Net Present Value, Internal Rate of Return, Benefit Cost Ratio and Payback Period

Table 03: Annual type and total of operational cost between UD. Matuari Waya and Charoen Phokpand Ltd

Number	Type of costs	Total of costs (US$)	Percentage (%)
1	Day old chick (DOC)	28,253.42	25.22
2	Feeds	82,681.94	73.80
3	Medicines, vaccines, and vitamins	1,094.18	0.98
	Total of operational cost	112,029.54	100.00

Table 04: The Calculation of Investment Criteria in the Partnership System of Broiler Production in the Village of Kalawat, Regency of North Minahasa

Number	Investment Criteria	Value
1	Net Present Value (US$)	101,909.43
2	Net Benefit Cost Ratio	1.219
3	Internal Rate of Return	63.18 %
4	Payback Period	1 year 7 months

From above result of investment criteria analysis, Table04 demonstrates that the partnership of broiler production between UD. Matuari Waya and Charoen Phokpand Ltd was financially profitable to be developed. This happened since net present value showed positive, net benefit ratio was more than 1 (one), and internal rate of return was higher than social discount rate prevailed in the Province of North Sulawesi, while the research was performed. During the conduct of research, social discount rate in commercial bank was 15.75%, and internal rate of return achieved was 63.18%. It means that partnership system of broiler production could be able to return loan capital up to above social discount rate prevailed at that time. Moreover, this partnership was able to return investment capital in a relatively short time, which was 1 year and 7 months, compared with entity's economic period.

Analysis of Sensitivity

It was done to acknowledge company's profit whereas there was a change of input and output price.

Broiler's Selling Price Dropped to 15 %

Whereas broiler's selling price declined up to 15%, performance of broiler production in the UD. Matuari Waya was presented in following Table 05.

Table 05 depicts that whereas selling price of broiler dropped to 15%, partnership model of UD. Matuari Waya was still profitable. However, payback period took longer, which was 3 years and 8 months. It could happen since NPV was positive, even though it was lower than NPV during stable price. Net B/C value was more than one, meaning that investment still provided profit. Though IRR value decreased of 39.12%, it could cover off cost of interest loan prevailed in commercial bank at 15.75%.This finding, then, was quite similar with Gandhy and Sutanto (2017), reporting that decreasing in broiler's selling price at 5% could still provide profit for broiler production, by its payback period during 3 years3 months.

Price of Day Old Chick (DOC), Medicines, Vaccines, and Vitamins Rose Up to 12%

Analysis result from effects of increasing price on day old chick (DOC), feeds, medicines, vaccines, and vitamins showed 12% against profitability of broiler production in the Village of Kalawat, Regency of Minahasa Utara. It can be seen from following Table 06.

Table 05: Feasibility of broiler production as broiler's selling price dropped to 15%

Number	Investment Criteria	Value
1	Net Present Value (US$)	22,268.93
2	Net B/C	1.068
3	Internal Rate of Return (IRR)	39.12 %
4	Payback Period	3 years 8 months

Table 06: Feasibility of broiler production as input price rose up to 12%

Number	Investment Criteria	Value
1	Net present value (US$)	28,639.40
2	Net B/C	1.193
3	Internal rate of return (IRR)	44.76 %
4	Payback period	2 years 6 months

Table 07: Feasibility of broiler production as production decreased at 10%

Number	Investment Criteria	Value
1	Net present value (US$)	-1,908.57
2	Net B/C	0.774
3	Internal rate of return (IRR)	14.37 %

The analysis result from above, in the Table 06, shows that increasing of input price, or factors of production covering of day old chick, feeds, medicines, vaccines, and vitamins, at 12% experienced by broiler production of UD. Matuari Waya was still seemingly feasible or performable, since NPV value was positive, or US$ 28,639.40. Nonetheless, it was lesser than the initial value of NPV before an increasing of input price. This result was in same vein with other researches (Balamurugan and Manoharan , 2014). Further, net B/C value was higher than 1 (one), IRR was at 44.76%, higher than social discount rate prevailed at 15.75%. Another indicator of feasibility business was business capability to return investment capital within 2 years and 6 months.

Broiler Production Decreased at 10%

The analysis result using investment criteria displays that whereas broiler production decreased up to 10%, this partnership model was not continuously feasible to be executed by using value of feasibility indicators as seen in the Table 07.

The result as presented in the Table 07 indicates that whereas broiler production decreased at 10%, the broiler production of UD. Matuari Waya was not feasible to be developed, since it would result in a loss as shown by negative value of Net Present Value, or US$ - 1,908.57, and net B/C smaller than one. Thus, it is implied on necessary counseling from the main company, PT. Charoen Phokpand, to prevent any occurrence of risk of production decrease. This finding is in accordance with Shaikh and Zala (2011), but it shows a contradictory result with the work of Kalamkar (2012) and Varinder *et al.* (2010). It happened since the decrease of broiler production was due to disease outbreak, adversely effecting on declining revenue of broiler's selling. Hence, the company involved in partnership did not directly make new procurement of day old chick (DOC) before cage sterilization requiring 2 weeks until one month. In fact, such company had expensed for maintenance cost of cage, feeds, medicines, vaccines and vitamins, and labor's salary during production process. Therefore, the role of main company in this partnership system is highly significant in terms of technical counseling so that broiler is avoided from disease outbreak resulted on decreasing of business profit (Rasak and Hassan, 2014).

CONCLUSION

Financially, the broiler production of UD Matuari Waya, located in the Village of Kalawat, Regency of Minahasa Utara and acted as plasma company under partnership system with Charoen Phokpand Ltd, the main company, is profitable and feasible to be further developed since it had a positive value of net present value, more than one of net B/C, higher internal rate of return (IRR) than social discount rate prevailed in commercial bank.

Based on the result of sensitivity analysis, it shows that whereas there was decreasing of broiler's selling price at 15%, or increasing price of day old chick (DOC), feeds, medicines, vaccines, and vitamins at 12%, broiler production could still provide profit since it had positive value of NPV, higher value of IRR than social discount rate. However, if there was a decrease of broiler production at 10%, the broiler production of UD. Matuari Waya was not feasible to be developed since it had negative value of NPV and smaller value of net B/C than one and lower value of IRR than social discount rate. To avoid risk of loss from decreasing of broiler production, therefore, the role of main company, Charoen Phokpand Ltd is highly significant on both technical and technological advise for UD. Matuari Waya as partner company.

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