PRODUCTION AND INCOME RISK IN TWELVE PRODUCTION PERIOD OF BROILER PLASMA FARM IN SOUTH SULAWESI

by Basir Paly

Submission date: 12-Apr-2023 07:39AM (UTC-0400)
Submission ID: 2062449908
File name: RODUCTION-PERIOD-OF-BROILER-PLASMA-FARM-IN-SOUTH-SULAWESI_1.pdf (990.92K)
Word count: 8045
Character count: 42581

PRODUCTION AND INCOME RISK IN TWELVE PRODUCTION PERIOD OF BROILER PLASMA FARM IN SOUTH SULAWESI

Basir Paly, Leunard.O.Kakisina, Andi Suarda,Jumriah Syam, Astati, and Awaluddin

Abstract

This study was aimed to determine the production and income risk of broiler plasma. This study was conducted over 6 months, in South Sulawesi, Indonesia. Sampling was conducted in three stages (1) the determination of the two samples in district level that have the largest broiler plasma farms, (2) the determination of plasma that maintain about 5,000-7,000 broilers, and (3) the determination of plasma randomly.Total samples observed were as many as 60 in twelve production periods. Data were collected by interview and observation of the production documents such as mortality, culture length, harvest weight, feed intake, FCR, PI, input prices, broiler prices, and total production cost. Data analysis was performed by using variance, standard deviation, Z-score, and the lower limit of income.The results showed that the risk of production was 27%, which means that each plasma productionperiodis always faced 27% of risk. The risk of income was1,032%, which means that any additional expected income by IDR 1, plasma will facerisk byIDR 1,032. Lower limit of income (L) received by plasma as many as IDR -27,923,896 showed that the highest loss that will be faced by plasma in the future will be as many as IDR -27,923,896.

Keywords: Risk, Production, Income, Broiler, Plasma.

INTRODUCTION

The broiler meat commodity has a very important role in meeting the needs of animal food products in Indonesia. The population increase, the income level, and the public welfare are the driver of this increased demand for animal products. As local beef commodities grow slowly, it is very difficult to expect to keep pace with this demand.Since the 1990s until 2016, Indonesia is still importing a growing number of beefs and cows(Pusdatin, 2015). This import has faced quota restriction challenge and is also intended for supplyingcertain market shares such as hotel and restaurant industry. As a result, the demand for beefs in the middle and lower market segmentsis still difficult to meet. As this supply limitation has an impact on the increase of beef price,many beef consumers is switched to be broiler meat consumers (Hadini et al., 2011). Therefore broiler meat has becoming an alternative substitution to keep pace with the growing demand for beef in Indonesia.

The prediction of chicken meat demand for household consumption in 2015 is estimated at 4.50kg/capita/year, and is projected to increase by average of 1.56% to 4.69 kg/capita/year in 2016-2019 (Pusdatin, 2015).

This condition makes broiler chicken farms have excellent prospects to be developed, both in large and small-scale farms. This development can be done with independent business pattern (self-management) as well as a partnership. The independent business pattern requires large capital as capital investments, production costs and marketing collateralsare borne by breeders.

In contrast with the partnership, where chicken coopsand equipment infestationcosts, DOC seeds and labor are borne by breeders while feed cost, vaccines and medicines, as well as marketing collateral borne by the partner companies. As lack of capital, then the partnership pattern is more attractive to farmers than independent business pattern (Fitriza et al., 2012; Daryanto, et al., 2015; Widjayanti, et al., 2016).

There are two businessmen who work together in partnership that are the partner company which is sometimes referred to as "partners" and the breeder called "plasma". The legal basis for the implementation of the broiler breeding business partnership is Government Regulation No. 44 of 1997 on cooperation between small businesses and medium/large businesses accompanied by sustainable development with regard to the principles of mutual need, mutual reinforcing, and mutual benefit. Mutual need means partners need the production and plasma needs raw materials supply and guidance from partners. Mutual reinforcing means both plasma and partners are equally concerned about moral responsibility and business ethics. Mutual benefit means that both plasma and partners gain increased income and business continuity.

- *Basir Paly is PhD in Department of Animal Husbandry, Science and Technology Faculty Alauddin State Islamic University in Makassar, Indonesia. Email; basirpaly@gmail.com*
- *Leunard. O. Kakisinais PhD in Department of Agribusiness, Faculty of Agriculture, Pattimura University, Maluku, Indonesia.Email: leunard_k@yahoo.com*
- *Andi Suarda Department of Animal Husbandry, Science and Technology Faculty Alauddin State Islamic University in Makassar, Indonesia. Email; etta.adda@yahoo.com,*
- *Jumriah Syam Department of Animal Husbandry, Science and Technology Faculty Alauddin State Islamic University in Makassar, Indonesia. Email; 77syam@gmail.com,*
- *Astati Department of Animal Husbandry, Science and Technology Faculty Alauddin State Islamic University in Makassar, Indonesia. Email;astati76@gmail.com,*
- *Awaluddin Deparment of Management, Economic and Bussiness Faculty, Alauddin State Islamic University in Makassar, Indonesia. Email; awalawaluddin133@gmail.com*

Partners play a role to provide services and technical guidance on cultivation, to provide or supply means of production, to help the administration management and to market the production, while plasma has a role to provide land, chicken coops, equipment, Day Old Chick (DOC) seeds, and labor (Siregar , et al., 2014). In a written agreement, it is said that partners sell inputs on credit to plasma and purchase plasma production.After the entire production is sold, then the plasma is obliged to make payment of all means of production that have been provided by a partner. The excess of payment is a benefit for plasma. In South Sulawesi, there are approximately 2,235broiler plasma farms(broilerplasma production), including 515 plasma (23%) in the research site with varied numbers or broilersownership scale (Department of Animal Husbandry and Animal Health, 2016).

This business is also has a high risk, so inflict loss to businessmen (Fariyanti, et al., 2012, Sotic and Radenko, 2015). In several literatures, the term of risk and uncertainty are often used simultaneously. However, scientifically the term of risk and uncertainty are two different concepts. The opportunity of an eventcan be determined by businessmen based on historical data or business management experience. The existing of risks generally brings negative impact to the business. Uncertainty shows the opportunity of unknown event by businessmen as decision maker (Brady, 2016). The ignorance of an opportunity or an event by businessmen may be caused by lack of information both historical data and experience auditing from businessmen in every challenging event.

Therefore,this study was aimed to investigate data and information on production and income risks of broilers plasma farm. This study are based on risk definition by Fariyanti, et al., 2012, Sotic and Radenko, 2015 who stated that there are a variation or fluctuation of mortality, production, input-output prices, income and loss on the same unit production scale.

RESEARCH METHODS

Location, Time and Data Sources

This study was conducted on broiler plasma farm in Gowa and Maros Districts. The choice of location was done intentionally (purposive) with the consideration that in this two districts there was the largest plasma and broiler population in South Sulawesi. Total plasmas in South Sulawesi was around 1,560, spread over 24 districts/cities. In Maros, there were325 plasmas (20.83%) with a population of 2,340,000 broilers, while in Gowa there were 308 plasmas (19.74%) with a population of 2,371 broilers. The study was conducted over 6 months, 3 months in the rainy season (January to March 2016) and 3 months in the dry season (April-June 2016). The data used in this study were primary data and secondary data.The primary data obtained from direct observation and interview with plasma and partner companies. While secondary data, such as a partner company divisions reports, the production summaries, financial and accounting reports, marketing reports, sales reports, journals, online databases, institutional farms owned by the government, and the Central Statistics Agency (BPS).

Population and Sample

The population in this study wasbroiler plasma farms. Sampling was performed in three stages. The first stage was the sample at the level of regions/districts, in this case two districts that have the largest number of plasma were selected. The second phase was the determination of plasma that maintains 5,000-7,000 broilers. At this stage, there were about 122 plasmas in Maros District and 108 plasmas in Gowa District. The third stage was sampling selection of 30 plasmas in Maros District and 30 plasmas in Gowa District.Thus,total samples observed in this study were 60 plasmas. The fourth stage was interview with partner companies that operate in the research area. The interview was intended to obtain confirmation and description associated with production and income risks experienced by the plasmas.

Research Variables

The variables were observed in this study are presented in Table 1.

Table 1. Aspects and Research Variables

Aspect	Variable
1. Production	Total population, numbers ofDOC, amounts of feeds, numbers of vaccines and medicines, the spacious of chicken coops, numbers of chicken coop equipments, numbers of labors, mortality, the age of maintenance, the average age of harvest, the weight of harvest, disease, and weather
2. Fixed costs	Depreciation of chicken coops and chicken coopequipments, the installment of loans, and and the tax of business license
3. Production Cost	The prices of DOC, feeds, vaccines and medicines, the cost of labor, the cost of heater, taxes and charges
4. Revenue	The price of sales, numbers of sales, the reward FCR, and other incomes.

Data Analysis Techniques

There are several measures of risk such as variance value, deviation standard, and variationcoefficient (Nto and

Nwaru 2011; Gusti, and I.G.A. Eka, 2015; Gunay, 2015). These three measures are related to each other and the variance value is the determinant for other measures. For example, deviation standard is the square root of the variance while thevariation coefficient is the ratio ofdeviation standardwith the return expectation value from broiler plasma farm. Thus, both production and incomeriskswere measured through the variance, deviation standard, and variance coefficient. Then, both risks weremeasured with the analysis of the Z-score equation 6 to determine the production risks (Aloy and Pratheepan, 2015). Meanwhile, Z-score equation 12 was used for determining the lower limitof income/BL (Arwita Primalia, 2013). The values needed in the Z-score analysis were calculated using the equation formulas of 1, 2, 3, 4, and 5, while the results of the lower limit of income (BL) analysis were calculatedusing the equation formula of 7,8,9,10, and 11, and it can be seen in Table 2.

Table 2. The Equation Formulasto Determine the Production and Income Risks of BroilerPlasma Farm

No	Equation and Criteria	Where
	An equation to determine the risk of production	
1.	*Performance Index (PI)* $PI = \frac{(100\% - \%M)(HW)}{FCRxAH}$ Criteria: the lower is the better IP	M : Mortality (%) HW : harvest weight (kg/chicken) FCR : Feed Rasio Convertion AH : Average Age at Harvest (day)
2.	Mortality (%) $\sum M = \frac{\sum IP - EP}{IP} x\ 100\%$ Criteria: the lower is the better M	IP : Initial Population EP : End Population
3.	Average Weights for sale/AW (kg/ Chicken) $AW = \frac{\sum AW}{\sum P}$ Criteria: the lower is the better AW	∑AW: Total AW (kg) ∑P : Total Population (Chicken)
4.	Feed Conversion Ratio (FCR) $FCR = \frac{\sum WF - RF}{\sum P}$ Criteria: the lower is the better FCR	WF: Total Feed Given (kg) RF : Remaining Feed (kg) ∑P : Total Population (chicken)
5.	Average Age at Harvest/ AH (day) $AH = \frac{\sum hx \sum p}{\sum p}$ Criteria: the lower is the better AH	∑AH : Total age at harvest (days) ∑hx: the weight of sold broilers (kg) ∑p :total population of sales (Chicken)
6.	Z-Score $Z = \frac{x - \overline{x}}{s}$	x : a Value $\overline{X}$: Standard Values S : Deviation Standard
	An equation to determine the risk of income/profit	
7.	Profit Π = TR-TC →TR = P x Q Criteria: the larger/higher is the better	π : Profit, TR : Total Revenue TC : Total Cost, P : Price/kg chicken Q : Quantity of sold broilers
8.	Expected Return $R_i = p_{i1R_{i1}} + p_{i2}R_{i2} + p_{i3}R_{i3+} \dots\dots + p_{im}R_{im}$	Pij : Opportunities of an event (I; j) R_{ij} : *Return*
9.	Variance $\sum \sigma i^2$ = Pi1(Ri1 - R1)² + Pi2 (Ri2 -R2)² + Pi3(Ri3 -R3)² +⋯+Pim (Rim - Rm)² Criteria: the lower/smaller is the better	Pij : Opportunities of an event (I; j) Rij : *Return* Ri : *Expected return*

10.	Deviation Standard $\delta = \sqrt{\delta i^2}$	σ2 : *Variance* (IDR/Periode)
11.	*Variation Coefficient* $CV = {}^{\sigma_i}/_{Ri}$ Criteria: the lower/smaller is the better	σ : *DeviationStandard* (IDR/Period) Ri : *Expected Return* (IDR/Period)
12.	Lower Limit of Income (L) L = Ri – 2 σ. Criteria: the lower is the better	Ri : *Expected Return* (IDR/Period) σ : *DeviationStandard*(IDR/Period)

RESULTS AND DISCUSSION

1. Production Risks and Source of Production Risks

Performance Index (PI) is a parameter measure commonly used in assessing the success of broilerfarm in partnership. PI value was calculated using the first equation formula (1). While the main indicators forming the IP value is the mortality rate that was calculated using the second equationformula (2); body weight at harvest was calculated using third equation formula (3); Conversion Feed Ratio (FCR) was calculated using the fourth equation formula (4), and the average harvestage was calculated using the fifth equation formula (5). PI value was obtained by using the first formula (1) (see Table 3).Table 3 shows that the average weight of harvest in the first period was 1.44 kg/chicken, mortality was 6.35%, the average age of harvest harvesting was 31, 55 days, FCR and PI was 2.25 and 189.97 respectively. With the same interpretation, it can be conducted on the second to twelfth production period data presented in Table 3. Overall, during the period of twelve production, broiler plasma farm was obtained an average PI by 312.52. This PI value was derived from an average harvest weight of 1.64 kg/chicken, the average mortality of 5.65%, the average harvest age of30,31 day, and the average FCR of 1.66.

Table 3. Actual Performance Index of Plasma

Production Period	Average Harvest Weight (kg/chicken)	Average Harvest Age (days)	Mortality (%)	FCR	Plasma PI
1	1.44	31.55	6.35	2.25	189.97
2	1.69	29.15	4.55	1.45	380.59
3	1.58	28.75	5.66	1.56	333.41
4	1.77	29.55	4.18	1.56	368.86
5	1.55	32.75	7.53	2.12	206.92
6	1.45	31.87	7.33	2.13	198.41
7	1.50	34.57	7.55	2.11	189.93
8	1.75	29.77	4.19	1.42	398.03
9	1.70	28.52	4.75	1.54	367.72
10	1.80	28.65	4.17	1.51	398.46
11	1.75	29.15	5.05	1.50	379.01
12	1.47	30.65	7.15	1.31	338.90
Average	**1.62**	**30.41**	**5.65**	**1.66**	**312.52**

Table 4. Reference Standard Performance Index of Partner Company

Production Period	Average Harvest Weight (kg/chicken)	Average Harvest Age (days)	Mortality (%)	FCR	Partner PI
1	1.44	31.55	4.35	1.76	248.05
2	1.69	29.15	4.25	1.56	355.85
3	1.58	28.75	4.45	1.56	336.61
4	1.77	29.55	4.15	1.57	365.69
5	1.55	32.75	5.05	1.85	242.91
6	1.45	31.87	4.75	1.78	243.46
7	1.50	34.57	4.15	1.85	224.81
8	1.75	29.77	5.25	1.42	392.24

9	1.70	28.52	4.75	1.46	388.88
10	1.80	28.65	5.25	1.47	404.96
11	1.75	29.15	4.75	1.52	376.20
12	1.47	30.65	5.15	1.65	275.70
Average	**1.62**	**30.41**	**4.69**	**1.62**	**321.28**

Furthermore, Table 4 showsthat the PI value of the partner company with the same calculation process as shown in Table 3. The PI value of the partner company is an ideal standard as the reference or comparison in broilerplasma farm. The averagevalue of harvest weight and the average value of harvest age in Table 4 has the same value as in Table 3.

However, the different isin mortality, FCR and PI value. Therefore, the reference for plasma here are the mortality, FCR and PI value. It means that broiler plasma farm has to try to reduce mortality as small as possible to achieve the FCR and PIstandard. Nevertheless, the plasma production of broiler farm were often incompatible with the reference standard of the partner company.It can be explained from table 4 thatif the results of the average harvest weight and average harvest age of the first broiler production period respectively were 1.44 kg/chicken and 31.55 days, the average of mortality should be 4.35% (instead of 6.35%), so that the plasma will reach the FCR standard by 1.76, and PI standard by 248.05 standard (instead of FCR standardby 2.25, and PI standard by 189.97 as shown in Table 3).

Criteria to be considered is that the lower is the mortality and the FCR value, the higher is PI value achieved. Furthermore, the same interpretation can be performed on the data from the second to twelfth production period as shown in Table 4. Overall, during the whole twelve production period, partner broiler farmobtained the average PIvalue by 321.28. Based on the data in Table 3 and Table 4, it is shows that there is a difference or deviation of PI value caused by differences in mortality and FCR.Z-Score method is the method used to calculate the average deviation standard of plasma PI to standard PI from partner company calculation results. By using the sixthequation formula(6), the calculation of plasma PI deviation PI to plasma standard PI is presented in Table 5.

Table 5 shows the calculated deviation and risk based on the PI value. By using the seventh equation formula (7) about the expectation value, so that over 12 observation periods, it was acquired IP expectation value of 312.52 that have been obtained from plasma over 12 consecutive production periods.Furthermore, by using the eighth (8) and ninth (9) equation formula, the variance value of 1188.32 was obtained. Variance value and deviation standard are used to determine the degree of variability in the data of the original data unit with the criteria that the higher the variance value, the more variation of the data (Arwita, 2013). By using the tenth equation formula (10), the variation coefficient of 0.11 was obtained that indicates the deviation level of plasma PI to partner company standard PI. Moreover, the value of 0.2726 or 27% was obtained by transforming the z-score value to Table Z.This value can be interpreted that the production risk facing by the plasma in broiler partnership is about 27%, which means that each plasma production period is always encountered a 27% possibility of risk.

This risk occurred because of the PI deviation against the average standard PI of partner company caused by a high mortality rate and a low harvest weight of broilers at the broiler plasma farms.

Table 5. Deviation and Risk Calculation Based on Z-Score Method

Production Period	Standard/PartnerPI	PlasmaPI	(PlasmaPI-Standard PI)	(PlasmaPI-Standard PI)^2
1	248.05	189.97	-58.08	3372.86
2	355.85	380.59	24.75	612.36
3	336.61	333.41	-3.19	10.20
4	365.69	368.86	3.17	10.08
5	242.91	206.92	-35.99	1294.92
6	243.46	198.41	-45.05	2029.56
7	224.81	189.93	-34.87	1216.15
8	392.24	398.03	5.79	33.52
9	388.88	367.72	-21.16	447.60
10	404.96	398.46	-6.50	42.22
11	376.20	379.01	2.80	7.87
12	275.70	338.901	63.20	3994.14

Average	321.28	312.52	Total	13071.47
Expected PI= Average Plasma PI				312.52
Variance (σ^2)=∑/(12-1)				1188.32
Deviation Standard (σ)=√σ^2				34.47
Coefisien Variation=σ/Expected PI				0.11
Z-Score=Expected PI-Average standard PI/σ			-	0.60
Risks (Score Z)				27%

South Sulawesi, is one of the provinces in Indonesia which lies in $0^0$12'- 8^0South Latitude and $116^0$48'- $122^0$36

'East Longitude, and also has two seasons, that are dry season and rainy season. The dry season occurs from April to September, while the rainy season occurs from October to March. March to April are the transition months from the rainy season to dry season, while September to October are the transition months from the dry season to the rainy season. These transition months also cause quite extreme changes in the weathers which is too hot or too cold.This condition was a source of the emergence of production risks such as relatively high diseases and mortality. Common diseases in this transitional season were diseases that interfere with the chicken respiratory system such as CRD (Cronic Respiratory Disease) and ND (New Castle Disease). This is in line with the research results of Arwita (2013) in West Sumatera region, Indonesia and Bachaya et al.,(2015) in the Punjab region-Pakistan as well as research results of Olanrewaju et al., (2015) in Ilorin, Kwara-Nigeria. Plasma has made several efforts to minimize the risks, including the installation of a fan for good air circulation and the provision of medicines and vitamins to increase broiler endurance performance. Tabel 6 presents the performance of broiler plasma production based on season.Based on Table 6, some variables can be explained such as culture length (days), mortality (%), average day production (kg/chicken), feed intake (kg/chicken), FCR, and PI. Culture length in the rainy season wasrelatively 2 days longer (31.17 days) than in the dry season (28.50 days). This difference results in the amount of feed intake in the rainy season which was relatively higher (0, 31 kg/chicken) than in the dry season. If the population of broiler plasma is 7,000 broilers and is excess of 0.31 kg/chicken in feed intake, the difference in the amount of feed intake isapproximately 1,550 kg. If this amount is converted to the average feed price of IDR 6,500/kg, its value is IDR 10,075,000.

Table 6. Performance of Broiler Plasma Production Based On Season

Production Months	Season	Production Day (day)	Harvest Weight (kg/ Chicken)	Mortality (%)	Feed Intake (kg/Chicken)	FCR	PI
Production Period of 1,5,6,7 and 12 occur in the wet months (October to March)	Rainy	31.00	1.44	6.35	2.25	3.240	189.97
	Rainy	32.00	1.55	7.53	2.12	3.278	206.92
	Rainy	31.00	1.45	7.33	2.13	3.081	198.41
	Rainy	34.00	1.50	7.55	2.11	3.168	189.93
	Rainy	30.00	1.47	7.15	1.31	1.932	338.90
Average		31.60	1.48	7.18	1.98	2.940	224.83
Production Period of 2,3,4,8,9,10, and 11 occur in the dry months (April-September)	Dry	29.00	1.69	4.55	1.45	2.457	380.59
	Dry	28.00	1.58	5.66	1.56	2.457	333.41
	Dry	29.00	1.77	4.18	1.56	2.754	368.86
	Dry	29.00	1.75	4.19	1.42	2.476	398.03
	Dry	28.00	1.70	4.75	1.54	2.625	367.72
	Dry	28.00	1.80	4.17	1.51	2.720	398.46
	Dry	29.00	1.75	5.05	1.50	2.632	379.01
Average		28.57	1.72	4.65	1.51	2.589	375.15

The average mortality in the rainy season was6.83% while mortality in the dry season was 4.58% with a 2.25% differences. If the population ofbroiler plasma is 7,000 with 2.25 % differences in mortality rates,plasma will lose 112.5 broilers in the rainy season. If the value is converted to a DOC purchase price, its value is about IDR 787,500. This value may be relatively small if it is calculated partially. However, if the depleted DOC has spent numbers of feeds, medicines, labors, and others, the value will be even greater.

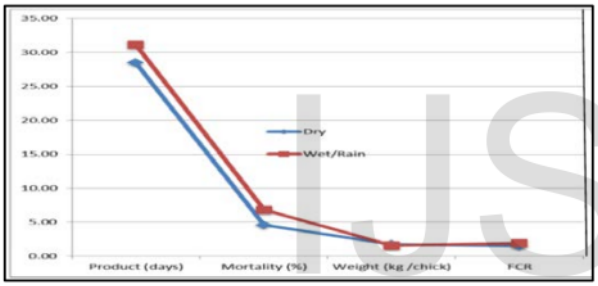
FCR value in the rainy season was 1.90, which is 0.39 higher than FCR in the dry season (1.51). As the lowerthe

value is the better FCR, the value of FCR in the dry season is good. FCR is directly related to feed conversion.It was needed approximately 2.89 kg of feed for a broiler average harvest weight of 1.53 kg/chickenin the rainy season, while it wasneeded approximately 2.58 kg of feed for the

higher broileraverage harvest weight (1.72 kg/chicken) in the dry season.

Furthermore, the plasma PI value in the rainy season was an average of 250.52 and the standard PI value of partner company was321.28.There was a shortage of approximately 70.76 points, resulting in plasma did not obtain performance reward from partner company. Meanwhile, the plasma PI Value in the dry season was an average of374.51, which is there wasan excess of approximately53.23 points, and resulting in plasma obtained performance reward as much as IDR 1,700 per chicken. If the population amounted to 5000 broilers, the plasma will obtain reward as much as 5000 x IDR 1.7000 = IDR 8,500,000. This result differs from the research resultof Pinto (2011) conducted in Bogor, West Java, that wasreported that the highest probability of a source of risk is space density by 33.7%, disease by 33% and climate change by 12.5%.

Figure 1a illustrates that culture length, mortality, harvest weight, and FCR in the rainy season display the higher curve than the curve of the dry season. As a result, the average PI value in the rainy season is lower than in the dry season (Figure 1b). Out of 12 Production periods, 5 periodsoccurred in the rainy season, and 7 periods in the dry season.The average PI in the dry season showeda better result compared to the rainy season. There are exceptions in the eleventh production period occurred in the rainy season (October-November), that has given the PI value of 379.01, or 57.28 points above the standard PI value of a partner company (321.28). Therefore, the eleventh production period occurred in the rainy season obtained reward of IDR 1,700 per chicken from partner company. This data illustrates that although the effects of the rainy season are difficult to avoid, they are possible to minimize.



Picture. 1a. Production risks due to weather

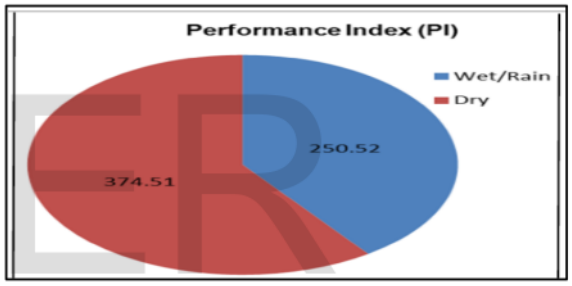


Figure 1b. PI comparison between the rainy season and the dry season

2. Income Analysis

a. Revenue

In calculating the income of broiler plasma farm, the level of revenue and total expenditure in each period of production should be known. Total revenue of broiler plasma farm was calculated by using the eleventh equation formula (11), while net income was calculated using the twelfth equation formula (12).Based on Table 7, it can be explained that the total revenue of broiler plasma farm was obtained from the sale of broilers, feces/manure, sacks and FCR bonus. The average revenue for all 12 plasma production period (S) was derived from broiler sales of IDR 196,072,415, frees/manure sales of IDR 3,014,110, feed sacksof IDR 2,070,206, and FCR reward of IDR 8,447,792. The average total revenue of plasma for all 12 periods was IDR 209,604,522.

The sales revenue of feces/manure and sacks has no connection with the plasma core business, so it is a non-operating revenue. Broiler feces/manuresinthe research site were used as a substitute for factory fertilizer in cultivating farmers' crop. Feces/manure price is lower than factory fertilizer price. Thus, it is preferred by many farmers. Sacks are feed packaging made of plastic material with a capacity of 50 kg of feed. In every period of production, plasma soldapproximately 650 sacks of feed at a price of IDR 3,000 per sack. FCR Reward is a partner company reward for the performancegained by plasma production. Values range between IDR 500-2000 per broiler chickens, measured basedon the plasma Performance Index (PI) in eachproduction period.

Table 7. Total Revenue (TR) of Broiler Plasma Farm

Period	Chicken Prices	Faces/Manure	Feed Sacks	FCR Bonus	Total
1	150,508,800	2,763,750	1,125,000	5,226,000	159,623,550
2	176,309,250	2,764,165	1,210,000	8,025,000	188,308,415

3	203,346,000	2,767,343	2,763,778	12,870,000	221,747,121
4	222,621,750	2,850,779	2,764,247	12,577,500	240,814,276
5	174,142,500	2,936,730	1,155,000	5,350,000	183,584,230
6	159,344,850	3,039,956	1,210,000	4,186,400	167,781,206
7	181,083,750	3,146,810	1,305,000	5,615,000	191,150,560
8	233,296,875	3,257,421	2,850,836	13,500,000	252,905,131
9	234,763,200	3,257,437	2,936,788	7,233,600	248,191,026
10	238,500,000	3,257,454	3,039,986	7,287,500	252,084,940
11	218,575,000	3,257,471	3,146,842	11,865,500	236,844,813
12	160,377,000	2,870,000	1,335,000	7,637,000	172,219,000
Average	**196,072,415**	**3,014,110**	**2,070,206**	**8,447,792**	**209,604,522**

b. Production Costs

Table 8 presents the total production cost (TC), which is the sum of the fixed costs (FC) and variable costs (VC). Table 9 shows the fixed costs (FC), which are the sum of depreciation charges (chicken coops and equipments) and loan installment from the Bank.While Table 10 presents the variable costs (VC), which are the sum of the feed cost, DOC cost, vaccine and medicine cost, labor cost, gas heater/broder cost, tax and retribution cost. Taxes paid by plasma consist of property tax, business tax and income tax, while the retributioncharges consist of business licensing services. If the tax is governed by the Law of State, the retribution is set by local government regulations.

Table 8. Total Production Costs (TC) of Broiler Plasma Farm

Period	Fixed Cost		Variabel Cost		Total Cost	
	IDR	(%)	IDR	(%)	IDR	(%)
1	15,724,450	8.74	164,143,434	91.26	179,867,884	100.00
2	16,149,826	10.46	138,219,219	89.54	154,369,045	100.00
3	16,094,089	8.63	170,497,272	91.37	186,591,361	100.00
4	16,862,763	8.58	179,658,403	91.42	196,521,166	100.00
5	17,122,607	9.17	169,504,585	90.83	186,627,192	100.00
6	17,966,323	10.16	158,787,536	89.84	176,753,859	100.00
7	18,236,673	9.50	173,691,041	90.50	191,927,714	100.00
8	19,002,258	9.78	175,294,125	90.22	194,296,383	100.00
9	19,481,709	9.89	177,418,113	90.11	196,899,821	100.00
10	20,498,413	10.07	183,019,865	89.93	203,518,278	100.00
11	21,111,108	11.12	168,793,607	88.88	189,904,715	100.00
12	19,926,147	13.90	123,396,159	86.10	143,322,306	100.00
Average	**18,181,364**	**10.00**	**165,201,946**	**90.00**	**183,383,310**	**100.00**

Table 9. Fixed Costs of Broiler Plasma Farm

Period	Depreciation(IDR)		Credit Installment (IDR)	Total (IDR)
	Chicken Coop	Tool		
1	10,123,800	3,245,650	2,355,000	15,724,450
2	10,250,348	3,261,878	2,637,600	16,149,826
3	10,378,477	3,278,188	2,437,425	16,094,089
4	10,848,103	3,284,744	2,729,916	16,862,763
5	11,338,980	3,334,015	2,449,612	17,122,607
6	11,852,068	3,370,689	2,743,566	17,966,323
7	12,293,558	3,407,767	2,535,349	18,236,673

8	12,751,493	3,411,175	2,839,590	19,002,258
9	13,405,007	3,414,586	2,662,116	19,481,709
10	14,092,014	3,424,830	2,981,570	20,498,413
11	14,814,229	3,435,104	2,861,775	21,111,108
12	13,275,550	3,445,409	3,205,188	19,926,147
Average	**12,118,636**	**3,359,503**	**2,703,225**	**18,181,364**

c. Net Profit

Net profit or net earnings/income is the positive difference between revenue and expenses and taxes. The net profit is generally presented in the income statement by comparing the incomeswith costs.The positive difference between total revenue with total cost is called net income, while the negative difference is called a loss. Based on this definition, the net income calculation of broiler plasma farm is presented in Table 11. Table 11 shows that out of 12 production period of broiler plasma farm, 8 period gained net profit and 4 periods gained loss. Total losses on all four periods respectively were (IDR)-20,244,334 in the first period; - 3,042,962 in the fifthperiod; -8,972,653 in the sixth period; and -777.154 in the seventh period. However, from all 12 production periods, broiler plasma farm obtained positive net profit as much as an average of IDR 26,221,212. Table 11 also shows the net profit/income expected by plasma at each period of production in the future. This expected return was obtained from the average net income of the entire observation period. Thus, it is precisely termed as historical return, or the actual return. Historical returns have occurred in nature, while the expected return has not yet happenned. However, historical and actual returns are very important to be used as the basis for determining the level of expected return and risk that will occur in the future. Therefore, based on historical and actual return as shown in Table 11, broiler plasma farm expected net profit as the expected return as much as an average of IDR 26,221,212 in each production period in the future.

Table 10. Variable Costs of Broiler PlasmaFarm

Period	Total FeedCost (IDR)	DOC Price (IDR)	Vaccine and Medicine Price (IDR)	Labor Wage	Heater Gas	Taxes and Retribution	Total BV
1	115,139,232	29,004,300	6,532,500	3,135,600	5,231,226	5,100,576	164,143,434
2	89,395,119	29,692,500	6,687,500	3,210,000	4,547,500	4,686,600	138,219,219
3	110,265,672	36,630,000	8,250,000	3,960,000	5,610,000	5,781,600	170,497,272
4	120,795,703	35,797,500	8,062,500	3,870,000	5,482,500	5,650,200	179,658,403
5	119,262,735	29,692,500	6,687,500	3,210,000	5,430,250	5,221,600	169,504,585
6	109,644,433	29,043,150	6,541,250	3,139,800	5,311,495	5,107,408	158,787,536
7	120,960,576	31,163,250	7,018,750	3,369,000	5,699,225	5,480,240	173,691,041
8	113,659,875	37,462,500	8,437,500	4,050,000	5,771,250	5,913,000	175,294,125
9	117,372,657	36,496,800	8,220,000	3,945,600	5,622,480	5,760,576	177,418,113
10	122,526,990	36,768,750	8,281,250	3,975,000	5,664,375	5,803,500	183,019,865
11	111,770,512	34,659,750	7,806,250	3,747,000	5,339,475	5,470,620	168,793,607
12	71,650,029	30,275,250	6,818,750	3,273,000	6,000,500	5,378,630	123,396,159
Average	**110,203,628**	**33,057,188**	**7,445,313**	**3,573,750**	**5,475,856**	**5,446,213**	**165,201,946**

Table 11.Net Income and Expected Return of Broiler Plasma Farm

Period	Revenue(Rp)	Total Cost (Rp)	Net Profit/Income(Rp)	Expected Return
1	159,623,550	179,867,884	-20,244,334	26,221,212
2	188,308,415	154,369,045	33,939,370	26,221,212
3	221,747,121	186,591,361	35,155,760	26,221,212
4	240,814,276	196,521,166	44,293,110	26,221,212
5	183,584,230	186,627,192	-3,042,962	26,221,212
6	167,781,206	176,753,859	-8,972,653	26,221,212
7	191,150,560	191,927,714	-777,154	26,221,212

8	252,905,131	194,296,383	58,608,748	26,221,212
9	248,191,026	196,899,821	51,291,204	26,221,212
10	252,084,940	203,518,278	48,566,662	26,221,212
11	236,844,813	189,904,715	46,940,098	26,221,212
12	172,219,000	143,322,306	28,896,694	26,221,212
Average	**209,604,522**	**183,383,310**	**26,221,212**	**26,221,212**

d. IncomeRisk

Income risk can be detected through the variance analysis equation formula (8), deviation standard equation formula (9), and variation coefficient equationformula (10). Results of variance analysis between actual and expected return are presented in Table 12.By using the eighth formula (8), the variance value of 732,923, 178,782,117 were obtained. This variance value illustrates the distribution of data and explains that the greater is the variance, the greater is the deviation value, so that the greater is the risk faced by broiler plasma farm. Deviation standard of 27,072,554 was also obtained through table 10. Deviation standard is a measurethat describes the level of data deviation from the average value. The greater is the deviation (dispersion) of average data from its original data, the greater is the risk. Meanwhile the value of variation coefficient was obtained by 1.032%. This value describes thecomparison between the deviation standard and the average value and is useful to describe the distribution of the data from its counted average value. Variation Coefficient Values obtained by broiler plasma farm was 1,032. It shows that the risk borne by the plasma is as much as 1,032% of the return value obtained by breeders. This means that every IDR 1 return received by breeders, the risk will be as much as 1,032. This value is quite moderate because it only has a possibility of loss as much as 3.2 % (1-1.03.2 = 3.2%).

Table 12. Variance Diversity Value of Broiler Plasma Farm

Period	Actual Return (Rij)	ExpectedReturn (Ri)	(Rij-Ri)	(Rij-Ri)^2
1	-20,244,334	26,221,212	-46,465,546	2,159,046,958,002,530
2	33,939,370	26,221,212	7,718,158	59,569,964,281,208
3	35,155,760	26,221,212	8,934,548	79,826,140,466,161
4	44,293,110	26,221,212	18,071,898	326,593,503,825,204
5	-3,042,962	26,221,212	-29,264,174	856,391,884,029,409
6	-8,972,653	26,221,212	-35,193,865	1,238,608,131,403,120
7	-777,154	26,221,212	-26,998,366	728,911,773,293,538
8	58,608,748	26,221,212	32,387,536	1,048,952,514,041,840
9	51,291,204	26,221,212	25,069,992	628,504,521,047,148
10	48,566,662	26,221,212	22,345,450	499,319,148,633,839
11	46,940,098	26,221,212	20,718,886	429,272,221,008,584
12	28,896,694	26,221,212	2,675,482	7,158,206,570,707
Total				8,062,154,966,603,290
Variance (σ^2) =(∑ /(12-1))				732,923,178,782,117
Deviasi Standard(σ)= √σ^2)=√832314259755803				27,072,554
Variation Coefficient = Deviation Standard/Expected Value				1.032
Lower Limit of Income (L) = (Ri) – (2 x Deviation Standard)				-27,923,896

e. Lower Limit of Income

Based on data in Table 10, lower limit of income can be calculated by using the twelfth equation formula (12). The lower limit of income shows the lowest value of net income that may be received by the breeders. If the L value is equal to or greater than zero, the breeders will not suffer losses. However, if the L value is lower than zero (negative), the breeders will suffer losses. Lower limit value of income (L) of broiler plasma farm was as follows:Lower Limit of Income (L) = Expected Return (Ri) - (2 x Deviation Standard)
= £ 26,221,212- (2 x 27,072,554)
= £ -27,923,896

Lower limit value of income (L) received by plasma farm was IDR -27,923,896. This value indicates that the lowest possibility of risk or the lowest loss that will be faced

bybroiler plasma farm in the future will be as much as IDR-27,923,896 (ceteris paribus). Lower limit value of income obtained by this farm was quite large. This was due to the large deviation standard value (27,072,554), so that the risks faced by broiler plasma farm were also relatively high (27%).

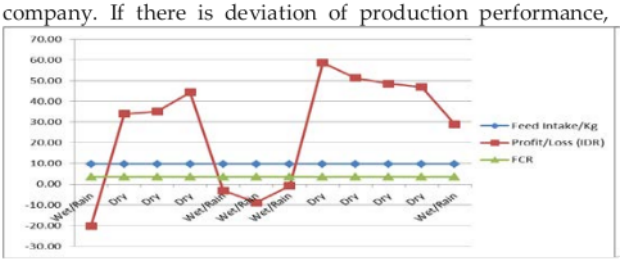
f. Profits Risk

The aim of broiler plasma farm is profit, but the risks faced by plasma makes no maximum profits. Risks can come at any time, and difficult to avoid. If the risk overrides the broiler plasma farm, the plasma will suffer significant losses. Nonetheless, plasma still continue their business and expect to achieve better profits in the next period.Figure 2a explains

that the behavior of feed intake curve (kg) and FCR curve is relatively stable throughout the 12 period of production. In contrast to the profit/loss curve, in the rainy season (wet/rain) this curve is below the original point (zero) resulted in plasma loss. Five periods out of 12 production periods occurred in the rainy season and 4 periods of those 5 periods suffered losses.

Furthermore, Figure 2b displays the broiler revenue prices, production costs and profit/loss curve. All of these three curves have the same behavior, that is they experienced a steep decline in the breeding period in the rainy season. This phenomenon shows that the most significant income risk faced by plasma is caused by the climate or season. It means thatthe risk of income suffered by plasma is not due to fluctuations in input prices and broiler price, but due to the influence of production risks caused by the change of the season (weather and climate).

Losses suffered by plasma also affects the partner company. If there is deviation of production performance, performance index (PI) is high, then the partner company will conduct an evaluation of broiler plasma farm. An evaluation was conducted on chicken coops condition, water quality and human resource performance. In addition, the core company will add chicken coop extra break time so that it is completely free from endemic viruses and diseases in the previous period. If a deviation occurs during 3 consecutive productions, the partner company will assist in finding the solutions to the plasma prior to terminate the partnership.Solution should be considered for risk is increasing the understanding of risk management so that plasmas have the ability to identify, measure, and manage risk. Experts like Achoja and Okoh, (2013); Iheke and Igbelina, (2016), Vinanda et al., (2016) and Nabinta, et al (2016) strongly advocated a solution like this.Although climate and weather risks can not be avoided, it can be managed and minimized. Several attempts were often conducted by plasma in the rainy season such as putting up the weather barriercurtains, and keeping the chicken coops temperature with a fan and heater broder. It is proved that four periods of 5 periods in the rainy seasonsuffered losses and 1 period gained benefit.In any business activities there must be uncertainty that leads to risk, including the business activities ofbroiler plasma farm. Therefore, plasma challenge in the future is to understand the risk management so that plasma is able to identify, measure, and manage risk.Risk identification is intended to determine the risky events whether caused by weather or maintenance systems.



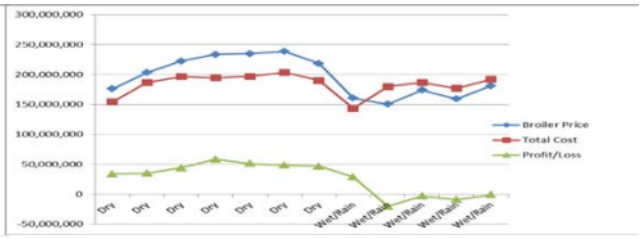


Figure 2a. The behavior of feed intake and FCR curvesFigure 2b. The curve of broiler price revenue, production costs and profit

Furthermore, plasma can perform the measurement or assessment of the identified risks to determine the magnitude of the risk of any activities performed.Plasma can assess the risk based on the ability with simple techniques. For example, by measuring the risk impact with qualitative measurement (low, medium, high). The results of this risk assessment then will become the basis for plasma in determining the attitude towards incoming risks.The possible choice of attitude that could be done is to stop activities that cause risks and to determine the new action immediately (reduction) that relatively reduces the risk impacts. Plasma also has the right to propose that partners to share some risks or particular risks. The next alternative is plasma accepts the risk with relatively minor impact. Basically, there are many attitude may be performed by plasma towards the risksoccurred in the business, if they consistently engage in risk management.

ACKNOWLEDGEMENT

This work is supported by the Department of Agribusiness, Faculty of Agriculture, Pattimura University, Maluku, Indonesia with Department of Animal Husbandry, Science

and Technology Faculty Alauddin State Islamic University in Makassar, Indonesia. Januari 2016

CONCLUSION

1. Production risk faced by broiler plasma in partnership with partner companies was approximately 27%, which means that each plasma production period of plasma is always faced with a risk of 27%. This risk occurred due to the large variance or deviation of plasma PI value against the average standard PI of partner companies. This difference was contributed by a high mortality rate and the low harvest weight of broilers in production period in the rainy season.
2. Income Risks faced by plasma was as much as 1.032%, which means that any expected additional income by IDR 1,plasma will face risk by IDR 1,032. While the lower limit of income (L) received by the plasma was IDR -27,923,896. It means that the highest risk of losses that will be faced by plasma in the future will be IDR -27,923,896. This income Risk was contributed by the production risk, while the production risk was occurreddue to the influence of climate and weather in the rainy season.

REFERENCES

Achoja Felix Odemero and Okoh Rosemary Ngozi, 2013.Stochastic Risk Volatility Forecasting in Poultry Agribusiness in Delta State, Nigeria. Turkish Journal of Agricultural and Natural Sciences 1(1): 1-9, 2014.

Aloy Niresh, J.and Pratheepan, T. 2015. The Application of Altman's Z-Score Model in Predicting Bankruptcy:Evidence from the Trading Sector in Sri Lanka. International Journal of Business and Management; Vol. 10, No. 12; pp; 269-275.

Arwita Primalia, 2013. Analisis Risiko Usaha Peternakan Ayam Broiler Dengan Pola Kemitraan dan Mandiri Di Kota Sawahlunto/Kabupaten Sijunjung (Skripsi). Departemen Agri-bisnis Fakultas Ekonomi dan Manajemen Institut Pertanian Bogor.

Bachaya Hafiz Allah, Rao Zahid Abbas, Muhammad Asif Raza, Zafar Iqbal, Tauseef Ur Rehman, Wasim Baber, 2015. Existence of Coccidiosis and Associated Risk Factors in Broiler Chickens in Southern Punjab, Pak Vet J, 35(1): 81-84.

Brady, Michael Emmett, 2016. J M Keynes on the Definition of Uncertainty: Why Uncertainty must come in Degrees and has nothing to do with Ergodicity or Non Ergodicity. Scholedge International Journal of Management & Development (ISSN 2394-3378), Vol.03, Issue 01 (2016) pg;1-10.

Daryanto, Suprapti Supardi, dan Endah Subekti, 2015. Analisis Pendapatan Peternak Ayam Ras Pedaging Pola Kemitraan Inti-Plasma (Studi Kasus Peternak Plasma PT.Genesis di Kecamatan Grabag Kabupaten Magelang Jawa Tengah) Jurnal Mediagro, Vol. 11.No. 1. 2015. Hal. 92-105.

Dinas Peternakan dan Kesehatan Hewan Provinsi Sulawesi Selatan, 2016, Statistik Peternakan Sulawesi Selatan.

Downing, M. Melissa Rojas, A. Pouyan Nejad-hashemi, Timothy Harrigan, Sean A. Woznicki, 2017. Climate change and livestock:Impacts, adaptation, and mitigation. Climate Risk ManagementJournal.homepage: www.elsevier.com/locate/crm.1-19. Michigan State University.

Fariyanti, A., Tintin S., Netti T. 2012. Modul Risiko Agribisnis. Bogor: Institut Pertanian Bogor.

Fitriza, Y. T., F. T. Haryadi, dan S. P. Syahlani. 2012. Analisis pendapatan dan persepsi peternak plasma terhadap kontrak perjanjian pola kemitraan ayam pedaging di Provinsi Lampung. Buletin Peternakan. 36 (1) : 57-65.

Günay, Samet, 2015. Measuring the Financial Risk Level in Emerging and Developed Markets: Traditional and Alternative Methods. Asian Social Science; Vol. 11, No. 16; 2015, pp; 25-37.

Gusti, I Ayu Mas Widhyawati and I.G.A. Eka Damayanthi, 2015.Pengaruh Trading Volume, Market Value, dan Return Variance Pada Bid-Ask Spread. E-Jurnal Akuntansi Universitas Udayana 10.3 (2015): 763-777.

Hadini Hairil Adzulyatno, Sudi Nurtini, dan Endang Sulastri, 2011. Analisis Permintaan dan Prediksi Konsumsi Serta Produksi Daging Broiler Di Kota Kendari Propinsi Sulawesi Tenggara. Buletin Peternakan Vol. 35(3):202-207, Oktober 2011.

Iheke, O. R. and Igbelina, C. A. 2016. Risks Management In Poultry Production In Ikeduru Local Government Area Of Imo State, Nigeria. Nigerian Journal of Agriculture, Food and Environment. 12(1):67-74.

Keputusan Menteri Pertanian Nomor 940/Kpts/OT.210/10/1997 Tentang Pedoman Kemitraan Usaha Pertanian Menteri Pertanian.

Nabinta. R. T., Tijjani, A. R.,Muntaka. M., 2016.The Role of Extension Service in Risk Management in Poultry Production in Katsina Metropolis, Katsina State. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) Volume 9, Issue 3 Ver. I (Mar. 2016), PP 38-43.

Nto P. O. O., Mbanasor J. A. and Nwaru J. C., 2011.Analysis of risk among agribusiness enterprises investment in Abia State, Nigeria. Journal of Economics and International Finance Vol. 3(3), pp. 187-194,

Olanrewaju, R. M., S. L. Tilakasiri1 and E. A. Adeleke, 2015.Effects of Climate on Chicken Production in Ilorin, Kwara State, Nigeria. The Journal of Agricultural Sciences Vol. 11, No. 2, May 2016. Pp 88-96.

Peraturan Pemerintah Nomor 4 Tahun 1997 Tentang Kerjasama Antara Usaha Kecil dengan Usaha Menengah/Besar.

Pusdatin, 2015. Outlook Komoditas Pertanian Subsektor Peternakan "Daging Sapi". Pusat data dan informasi pertanian Kemeterian Pertani RI, Jakarta.

Pusdatin, 2015. Outlook Komoditas Pertanian Subsektor Peternakan "Daging Ayam". Pusat data dan informasi pertanian Kemeterian Pertani RI, Jakarta.

Rustiana Shailla and Eddy Hermawan, 2015. Analysis Rainfall Data Of Cru For The Determination Of Potentially Extreme Climatic Regions Indonesi. Prosiding SNSA, 2015 pp; 232-241.

Siregar, A. R. S. N. Sirajuddin, dan M. Ranggadatu, 2014. Hubungan Antara Skala Usaha dan Pendapatan Pada Peternak Ayam Pedaging Yang Melakukan Kemitraan Di Kabupaten Maros.JITP Vol. 3 No. 3, Juli 2014:166-169.

Šotić, Aleksandar and Radenko Rajić, 2015.The Review of the Definition of Risk. Online Journal of Applied Knowledge Management, Vol 3 Issue 3, pp. 17-26.

Utomo, H.R., H. Setiyawan dan S.I. Santoso, 2015. Analisis Profitabilitas Usaha Peternakan Ayam Broiler Dengan Pola Kemitraan Di Kecamatan Limbangan Kabupaten Kendal Animal Agriculture On Line at: http://ejournal-s1.undip.ac.id/Animal Agriculture Journal, 4(1): 7-14).

Vinanda Gita, Harianto, dan Lukytawati Anggraeni, 2016. Risiko Produksi Ayam Broiler dan Preferensi Peternak Di Kabupaten Bekasi. Jurnal Manajemen & Agribisnis, Vol. 13 No. 1, pp. 50-58.

Widjayanti Fefi Nurdiana dan Mohammad Rizal, 2016.Sistem Kemitraan Dalam Usahatani Peternakan Ayam Broiler Di Kabupaten Jember. Jurnal Manajemen dan Bisnis Indonesia Vol 2. No. 1: 31-45.

Yolanda Selvy dan Ardin, 2015. Oldeman Climate Projection 2011-2050 Based On Representative Concentration Pathway 4.5 And 8.5 Scenarios In Banten Region. Prosiding SNSA 2015, pp; 225-231.

PRODUCTION AND INCOME RISK IN TWELVE PRODUCTION PERIOD OF BROILER PLASMA FARM IN SOUTH SULAWESI

ORIGINALITY REPORT

7%	7%	3%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.ijser.org Internet Source	4%
2	Submitted to Higher Education Commission Pakistan Student Paper	3%
3	pinpdf.com Internet Source	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		