Economic Valuation of Sentul Chicken in the Framework of Providing Incentives and Sustainability of Animal Genetic Resources (AnGR) in Ciamis District, West Java

Rinari Agrian Firdaus[1]*, Andre Rivianda Daud[2] and Indrawati Yudha Asmara[2]

[1]Master Student in Animal Science, Faculty of Animal Husbandry, Universitas Padjadjaran, Sumedang, Indonesia
[2]Faculty of Animal Husbandry, Universitas Padjadjaran, Sumedang, Indonesia
***Corresponding author email: rinari19001@unpad.ac.id**

Abstract. The purpose of this study was to examine the economic valuation of Sentul chicken to determine the amount of incentive farmers should receive. A survey method has been conducted as the research methodology. The research location was determined purposively, namely in accordance with the research objectives, on the basis of several considerations, the location where the research was located was the Sentul chicken development center where there were active farmer groups. A total of 39 farmers who had a minimum of 100 Sentul chickens/year were censused to become respondents. Data collection was carried out in May - August 2022. The data were analyzed by the contingent valuation method (CVM) using the willingness to accept (WTA) approach in the bidding game. The WTA value sought is the Total WTA (TWTA) and Mean WTA (EWTA) which are converted into incentive values for farmers. Multiple regression analysis has been applied to investigate any significant factors that affected the WTA value. The study results show an estimated total WTA value of IDR 191,220,000 per year and an estimated WTA value of IDR 178,974.36 per chicken per year. Education, experience, land area, income, livestock orientation, and pride are WTA factors that impact farmers, as income (0,024) and pride (0,000) become the most influential factors. Efforts to conserve Sentul chickens can be realized using the incentives indicated by a high WTA value. Therefore, policy makers can conserve Sentul chickens using an incentive approach.

Keywords: contingent valuation, economic valuation, income, pride, willingness to accept

Abstrak. Penelitian ini bertujuan menganalisis valuasi ekonomi ayam sentul untuk mendapatkan nilai insentif yang diinginkan peternak. Metode penelitian yang digunakan adalah metode survey. Lokasi penelitian ditentukan secarara purposive yaitu sesuai dengan tujuan penelitian, atas dasar beberapa pertimbangan lokasi tempat penelitian adalah sentra pengembangan ayam Sentul yang terdapat kelompok tani yang masih aktif. Sebanyak 39 peternak yang mempunyai ayam Sentul minimal 100 ekor/tahun di sensus untuk menjadi responden Sebanyak 39 peternak yang mempunyai ayam Sentul minimal 100 ekor/tahun di sensus untuk menjadi responden. Pengumpulan data dilaksanakan pada bulan Mei - Agustus 2022. Data dianalisis dengan metode Contingent Valuation (CV) menggunakan pendekatan Willingness to Accept (WTA) dengan cara bidding game. Nilai WTA yang dicari adalah Total WTA (TWTA) dan Rata-rata WTA (EWTA) yang dikonversikan menjadi nilai insentif untuk peternak. Adapun faktor-faktor yang mempengaruhi besar atau kecilnya nilai WTA dianalisis menggunakan analisis regresi berganda. Hasil penelitian menunjukan bahwa nilai total WTA sebesar Rp 191.220.000/tahun dan nilai rataan WTA sebesar Rp 178.974,36 /ekor/tahun. Faktor WTA yang mempengaruhi peternak adalah pendidikan, pengalaman, luas lahan, pendapatan, orientasi beternak, dan kebanggaan. Dari semua faktor tersebut yang berpengaruh terhadap WTA adalah pendapatan (0,024) dan kebanggaan (0,000). Upaya pelestarian ayam Sentul dapat diwujudkan dengan pemberian insentif yang ditunjukkan dengan nilai WTA yang tinggi. Oleh karena itu, pemangku kebijakan dapat melakukan konservasi ayam Sentul dengan pendekatan insentif.

Kata kunci: valuasi kontingen, valuasi ekonomi, pendapatan, kebanggan, *willingness to accept*

Introduction

Indonesia has a diverse range of animal genetic resources, including local chicken. A study shows Indonesia is one of the countries with the most domesticated animals which reported by Bekisar, Gaga', Pelung, Kukuak and others (Ulfah et al., 2015). Local chicken is a livestock commodity that plays an economic and social role, particularly for

people in rural areas, and is a component of National Biological Genetic Resources. Although exotic breed chickens are becoming more prevalent, local chickens are still reserved because they have advantages over exotic breed chickens, such as very distinct meat and eggs and market prices that are more stable.

Sentul, Kedu, Nunukan, Pelung, and Merawang are local chicken breeds in Indonesia. Sentul chicken is a type of local chicken in West Java province that originated in the Ciamis district. According to Ciamis District Livestock Service Office (2022) the Sentul chicken population in 2019 was 105,242 chickens, 105,032 chickens in 2020, and 107,447 chickens in 2021. It tends to be stagnant and is expected to decline in 2020. Asmara (2014) confirms that Sentul chickens are at a higher risk of extinction than Kedu and Pelung chickens. Sentul chicken populations are declining and tend to stagnate, entailing conservation efforts to maximize the benefits of their genetic potential.

Considering its stagnant existence, the government, institutions, and related communities must pay attention. Without awareness and sustainable management, the existence of local chickens can be threatened, resulting in a decrease in population/breed numbers and even extinction (Kurnianto, 2017). The preservation of genetic resources is carried out by focusing on biological factors in livestock and the economic benefits of chicken farmers. The economic approach to the preservation and sustainability of Animal Genetic Resources (AnGR) is very effective because it will be easy to obtain public and government support. Conservation must assess commodities' economic contribution to farmers by using economic valuations to provide incentives to individuals or groups. Incentives are given based on economic valuation, which will later encourage chicken farmers to continue raising local chickens. It agrees with Mendes (2012), who states that alternative approaches to conservation through the provision of incentives or economic stimulus are very important for sustainable development.

The researchers used the Willingness to Accept (WTA) approach with the Contingent Value Method (CVM) to determine the incentive amount for preserving Sentul chicken following the background of the problems raised. The WTA approach was chosen because there is compensation for farmers participating in the Sentul chicken conservation program in Ciamis District. WTA is used to find out how much the minimum amount that farmers are willing to accept so that they are still willing to continue their business, farmers have a minimum WTA to continue making profits, and this minimum limit can be used as a reference for their reasons or choices in making decisions. Some factors influence the WTA value to preserve the Sentul chicken. These factors are social-economic status, capital capacity, and farmers' aims and objectives.

Materials and Methods

Direct interviews with respondents using a questionnaire were used to collect data. Respondents were gathered through a census of chicken farmers in the Ciamis district Area who were members of farmer groups. The census revealed 39 respondents who encountered the criteria of owning or keeping at least 100 Sentul chickens per year. The data was collected between May and July of 2022.

Data obtained from interviews were analyzed using the descriptive, contingent valuation, and multiple regression analysis. Microsoft Excel 2016 and IBM SPSS Statistics version 26 were used for the study.

CVM Analysis using the WTA approach Estimating Mean WTA (Jordan and Elnagheeb, 1993)

$$EWTA = \Sigma_{i=1}^{n} W_i Pfi$$

Explanation:

EWTA = Estimating mean WTA
Wi = Lower limit class WTA class-I
Pfi = Relative frequency class concerned
n = Total number class (interval)
i = Class (interval) WTA; i= 1, 2, 3

The total WTA can be used to estimate the entire WTA of the population with the formula Pearce and Turner (1989):

$$EWTA = \Sigma_{i=1}^{n} \frac{N}{n} P$$

Explanation:

TWTA = Farmers' willingness to accept
WTAi = Respondents' willingness to accept
N = Total sample of farmers
N = Σ sample of farmers who participate
I = Sample i=1,2…. k
P = Sentul chicken population for breed

Multiple regression, connecting the dependent, variable Y with several independent variables X1, X2, ... Xn has a general,formula (Ramanathan, 2002). The WTA value for every chicken farmer is different. It is influenced by a variety of factors. In this study, the following formula was used to determine the effect of these factors:

WTA= b0+b1X1+b0+b2X2+b3X3+b4X4+b5X5+b6X6+e

Explanation:

WTA= Value price of willingness to accept
X1 = Education
X2 = Experience
X3 = Land area
X4 = Income
X5 = Farming orientation
X6 = Pride
e = Error

Results and Discussion

Socio-economic Conditions of Sentul Farmers

The socio-economic conditions of chicken farmers in this study consist of education, experience, land area, income, farming orientation, and pride.

Based on Table 1, the education level of chicken farmers in this research location can be categorized as middle level. Based on this, they are more adaptive to accept developed innovations. For example, they already understand the research objectives by answering questionnaires about giving incentives. Chicken farmers with a high level of education will find it simple to implement good husbandry practices. The younger the farmers are, the more eager they are to learn new things, and as a result, they will try to accelerate the proper treatment of development programs. According to the percentage of age in this study, they were still classified as productive age, indicating that interest in raising Sentul chickens remained high (Aini et al., 2018; Akimi and Ariadi, 2018). According to Nurdayati et al. (2021), increasing the farmer age resulted in a 3.4% decrease in farming motivation, a very small percentage, implying that increasing the farmer age resulted in a decrease in passion.

Members of farmer groups in Ciamis Regency raise livestock for one to twelve years. Table 1 shows the average is 4.6 years of experience. In this research location, the chicken farmers had not started the livestock business when they joined the group. Farming chicken experience is important in determining success and improving livestock business development. This is in accordance with the opinion of Makatita and Isbandi (2014) that the longer a person's experience in raising livestock, the more knowledge will be obtained so that they can determine the mindset in making decisions.

Table 1. Socio-economic of Sentul farmers

Variable	Frequency	Percent (%)
Education		
No education	0	0
Elementary school	4	10
Junior high school	8	21
High school	21	54
Diploma	2	5
Bachelor	4	10
Experience (years)		
<4	22	53,8
4-8	11	28,2
>8	7	17,9
Land area (m^2)		
< 140	10	26
140 - 200	11	28
201 – 350	6	15
> 350	12	31
Income (IDR/year)		
< IDR 5.000.000	14	33
IDR 5.000.000 – IDR 25.000.000	21	54
>Rp. 25.000.000	5	13
Livestock orientation		
following associations	5	12,8
hobby	4	10,3
savings	3	7,7
income	12	30,8
conservation	15	38,5
Pride		
<3	4	10,3
3 – 3,5	17	43,6
3,6 – 4	5	12,8
4,1 – 4,5	4	10,3
> 4,6	9	23,1

Table 1 shows that the most of farmers have land area <350m2. Having enough livestock property land is essential for chicken farmers in managing their business as it stimulates them to be more creative. Land area is one of the production factors that is used to earn good quality farm and livestock. It contributes a lot to livestock farming as they are considered the result which depends on how large the land area is used (Arimbawa and Widanta, 2017).

Income is the amount of money received by an individual in return and is very beneficial for daily life directly and indirectly (Hutabarat et al., 2021). The chicken farmer's income is obtained from the reduction between revenue and production costs among DOC, feed, vaccine, workers, transportation, and electricity. Most of the income is from live chickens weighing 0.8 – 1.2 kg, DOC, and egg sales profit. The respondents' annual income ranges from IDR 755,700 to IDR 133,169,714, with an average of IDR 15,833,396. The income of Sentul chicken farmers in Ciamis Regency is mostly IDR. 5,000,000 – IDR. 25,000,000. This income is classified as low because the Sentul chicken business is only used as a side business; out of 39 farmers, only ten make Sentul chicken their main business. This is in accordance with the opinion of Eko et al. (2014)

that the Sentul chicken farming business is used as a side business by breeders, or breeders are not serious about running the Sentul chicken business. The result shows that the average farming orientation is 3.72. It indicates that most Sentul chicken farmers have begun to consider income and the sustainability of their businesses.

In this table 1, it can be seen that most of the Sentul chicken farmers are passionate in preserving as it has 38,5%, following by income with 30,8%, following associate friends with 12,8%, hobby has 10,3% and the last is savings which has 7,7%. This indicates that the majority of Sentul chicken farmers have begun to consider income and the sustainability of their business. Sentul chicken has a wide variety of farming orientation but it is integrated in a livestock group organization. The function of the livestock group is to provide a learning and teaching environment for its members. Learning in the group is aimed at increasing the knowledge, abilities, and attitudes of business actors while at the same time encouraging more unified collaboration. On the other hand, the existence of livestock groups is an effort to increase productivity and develop their ability to overcome the dangers, difficulties, obstacles, and disturbances they face when running their livestock business (Alkadafi, 2014; Dewi and Rahmani, 2022)

Several questions and stories were translated into numbers to produce these results. The average value of pride is 3-3.5, it indicates with various existing constraints, farmers in the Ciamis district can be proud of raising Sentul chickens. The chicken farmers' pride in Sentul chicken is a great way to secure the Indonesian chicken breed population. It will continue to grow and increase if farmers have pride in Sentul chicken.

Willingness to Accept (WTA)

The calculation of the WTA Bid value is carried out in 2 stages. The first one is to analyze the maintenance production costs for raising and breeding livestock, including buying DOC, buying feed, buying breeding stock, transportation, and electricity costs in IDR/unit/year units. The second one sets the bid class from minimum production cost to maximum production cost. This method obtained a first bid value is IDR 30,000/unit/year, second bid IDR 100,000/unit/year, third bid IDR 170,000/unit/year, fourth bid IDR 240,000/unit/ year, fifth bid IDR 310,000/unit/year.

WTA value of IDR 240,000 is the value most chosen by farmers (26%), followed by IDR 310,000 (23%), IDR 30,000 (23%), IDR 170,000 (15%), and the last one is IDR 100,000 (13%). Most farmers choose high-offer WTA, meaning conserving Sentul chickens in the Ciamis district requires a high monetary value.

The WTA value demanded by breeders is relatively high. Determining the size of WTA selection based on individual farmers. It agrees with Fu et al., (2022), who state that farmers can decide which WTA to choose in pricing for profit.

Table 2. The total value of WTA

WTA Bidding Value (IDR/chicken/year)	Amount of Farmer		Total chicken population (unit)	Total WTA (IDR)
	Frequency	Percent (%)		
30,000	9	23	268	8,040,000
100,000	5	13	87	8,700,000
170,000	6	15	101	17,170,000
240,000	10	26	184	44,160,000
310,000	9	23	365	113,150,000
Sum	**39**	**100**	**1005**	**191,220,000**

The determination of WTA will depend on the farmer's condition, the financing of livestock production facilities issued by the farmer will determine the value of WTA, and the determination of WTA aims to cover production costs incurred. This result shows that if the WTA value's high, all farmers must be stimulated to raise Sentul chickens.

The total WTA value is obtained from the multiplication between the requested WTA value with the total Sentul chicken population raised for breeding purposes. The total WTA (Table 2) is IDR 191,220,000 per year, demonstrating that if the government, as a policymaker, desires to conserve Sentul chickens through the program offered by researchers, they must pay an incentive fee of IDR 191,220,000 per year or IDR 4,903,077 per farmer per year. It agrees with Lindhjem et al., (2014), who state that the WTA value is used to estimate conservation costs. In addition, this value can also be used to measure the benefits produced (Cicia et al., 2003). Huang et al. (2019) argue that the CVM method with the WTA approach is the only option for obtaining non-use values and using values directly.

The minimum WTA in this research is IDR 4,903,077, this value. These incentives are expected to increase the productivity and motivation of farmers to continue raising Sentul chickens in a sustainable business. Incentives in the form of money are also expected to meet the daily needs of farmers, so they can focus on raising Sentul chickens. Incentives in the form of money are also expected to meet the daily needs of farmers, so they can focus on raising Sentul chickens. In addition to the necessities of daily living, incentives can also be an added value for production costs such as hatching machine tools, buying feed, buying DOC, and adding breeding stock.

According to the result, the average WTA requested by Sentul chicken farmers is IDR 178,974.39 per chicken per year, and the mean production cost is 105,605.037. This production cost is obtained from analyzing the production costs of raising livestock and breeding, including buying DOC, buying feed, buying breeding stock, transportation, and electricity costs in IDR/unit/year units.

According to Table 3, the annual difference between production costs and the average WTA is IDR 73,369 per chicken. The difference is significantly reaching 59% due to the increased number of bids requested by the chicken farmers. Farmers choose a high offer based on rising production costs, particularly for feed concentrates, corn, and bran. Feed is the most expensive component of chicken farming production costs. Tumion et al. (2017) state that feeds costs can account for up to 77% of total production costs.

Analysis of Factors Affecting WTA

In this study, WTA becomes the dependent variable influenced by six independent variables: education, experience, land area, income, farming orientation, and pride. Table 3 shows R2 values as the interplay between dependent and independent variables reach 65.9 percent, without including other factors that are not independent variables. The significance value of the formula is at the 0.00 level or the value of $\alpha<0.05$.

Table 3. Comparison value of WTA to production costs

Mean WTA (IDR per chicken per year)	**Mean Production Cost** (IDR per chicken per year)	**Price Gap** (IDR per chicken per year)	**Total WTA Value** (IDR per year)	**Number of Incentives Received** (Farmer per year)
178,974.036	105,605.037	73,369	191,220,000	4,903,077

Table 4. Factors Affecting WTA

Independent Variable	Coefficient	Sig	VIF
Constant	551,333.905	0.000	
Education	-1,767.059	0.680	1,088
Experience	4,218.957	0.370	1,978
Land Area	35.304	0.406	1,472
Income	-58,394.118	0.024	1,701
Farming Orientation	-8,098.752	0.409	1,529
Pride	-96,511.527	0.000	2,198
R^2	65.9%		
Adj R^2	58.2%		
Sig	0.000		

Based on these values, the formula of this multiple regression is:

WTA= 551,333 – 1,767.059X1 + 4,218.957X2+35,304X3 – 5,8394.118X4 – 8,098.752X5 – 96,511.527X6

There are six factors that influence WTA: education, experience, land area, income, farming orientation, and pride. The data from table 4 conducts every independent variable has a VIF value < 10, meaning that it is not indicated as a multicollinearity; in this case, it is not related between two or more variables. Income (0.024) and pride (0.000) are significantly influenced factors.

There is a symbol (-) in the income variable, which means that with each increase in farmer income, the value of the WTA requested decreases and vice versa. From the data shown, every farmer with a low-income value requires high expenses to meet the needs of livestock and daily life. According to (Priyambodo et al., 2016), low-income farmers will demand a higher offer to cover living expenses and production costs.

The pride factor is denoted by the symbol (-), which means that for every increase in the value of farmer pride of Sentul chickens, the WTA value requested is reduced, and vice versa. Chicken farmers with an excellent sense of pride will make concessions for Sentul chickens and continue to raise them even if the livestock business is unsatisfactory. Despite not receiving the demanded equal incentive, most Sentul chicken farmers will continue to farm and preserve Sentul chicken.

The level of education, experience, land area and farming orientation is not influenced on the WTA value. This is due to the less varied answers to the questionnaires that have been made. The results were not varied because most of the breeders had secondary level education, with the majority having experience in farming for 4 years. In addition, almost all the land area owned is uniform, namely <350m2. The various orientations of raising livestock but accommodated by farmer groups make the farmers have an understanding about raising Sentul chickens. It is these factors that cause the WTA value to be insignificant.

Conclusions

The requested WTA value by Sentul chicken farmers is sufficiently high, with an average of IDR 178,974.36 per chicken per year, a total WTA value of IDR 191,220,000 per year, and a total incentive earned for farmers of IDR 4,903,077 per person per year. Income and pride significantly become influencing factors on WTA. Based on these results, efforts to conserve Sentul chickens can be realized using the incentives indicated by a high

WTA value. Therefore, policymakers can conserve Sentul chickens using an incentive approach.

Acknowledgment

A word of gratitude was conveyed to Ciamis district service and staff who had permitted to conduct this research. Moreover, the researcher thanked all Ciamis district groups involved in Mandala Lesvara Cooperatives who had assumed information in the research process.

References

Aini, EN, I Isnaini, S Sukamti, and LN Amalia. 2018. Pengaruh Tingkat Pendidikan Terhadap Tingkat Kesejahteraan Masyarakat di Kelurahan Kesatrian Kota Malang. Technomedia Journal. 3(1 Agustus):58-72.

Akimi, A, and R Ariadi. 2018. Motivasi Peternak Dalam Budidaya Domba Di Kelompok Tani Sido Maju I Desa Ngablak Kecamatan Ngablak Kabupaten Magelang. Jurnal Pengembangan Penyuluhan Pertanian. 15(28):32-43.

Alkadafi, M. 2014. Penguatan Ekonomi Masyarakat Melalui Pengelolaan Kelembagaan Badan Usaha Milik Desa Menuju Asean Economic Community 2015. Jurnal El-Riyasah. 5(1):32-40.

Ardiyana, M, C Sumantri, S Murtini, and T Sartika. 2018. Keragaman Gen NRAMP-1 dan INOS pada Ayam Sentul Seleksi. Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan. 6(2): 48-52.

Arimbawa, PD, and A Widanta. 2017. Pengaruh Luas Lahan, Teknologi, dan Pelatihan Terhadap Pendapatan Petani Padi Dengan Produktivitas Sebagai Variabel intervening Di Kecamatan Mengwi. E-Jurnal Ekonomi Pembangunan Universitas Udayana. 6(8):1601-1627.

Asmara, IY. 2014. Risk status of selected indigenous chicken breeds in Java, Indonesia: Challenges and opportunities for conservation. Disertasi., Graduated School, Charles Darwin University Australia.

Ciamis District Livestock Officer. 2022. Laporan Produksi Komoditi Peternakan Dan Perikanan Tahun 2019-2021. In: DPK Ciamis (ed.). DINAS PETERNAKAN DAN PERIKANAN KABUPATEN CIAMIS, Kabupaten Ciamis Jawa Barat. Obtained on August 2022

Cicia, G, E D'Ercole, and D Marino. 2003. Costs and Benefits of Preserving Farm Animal Genetic Resources From Extinction: CVM And Bio-Economic Model For Valuing A Conservation Program For The Italian Pentro Horse. Ecological Economics. 45(3):445-459.

Dewi, AC, and NAB Rahmani. 2022. Pengaruh Luas Lahan, Kelembagaan Dan Tingkat Pendidikan Terhadap Kesejahteraan Kelompok Petani Ternak Sapi Potong Dengan Modal Sebagai Variabel Moderasi di Desa Paya Bakung, Kabupaten Deli Serdang. Ekonomikawan: Jurnal Ilmu Ekonomi dan Studi Pembangunan. 22(2):125-138.

Eko, HF, HN Noor, and R Roesdiyanto. 2014. Kinerja Ekonomi Usaha Ayam Sentul Di Kabupaten Ciamis (The Economic Performance Sentul Chicken of Enterpises in Ciamis District). Jurnal Ilmiah Peternakan. 1(3):865-873.

Fu, H, Y Peng,L Zheng, Q Liu, L Zhou, Y Zhang, R Kong and CG Turvey. 2022. Heterogenous Choice in WTP and WTA for Renting Land Use Rights in Rural China: Choice Experiments from the Field. Land Use Policy. 119: 1-15.

Huang, X, Cheng, L, Chien, H, Jiang, H, Yang, X, and Yin C. 2019. Sustainability of Returning Wheat Straw to Field to Hebei, Shandong and Jiangsu Provinces: a Contingent Valuation Method. Journal of Cleaner Production. 213: 90-1298

Hutabarat, S, A Sajow, SO Lombogia, and Z Warouw. 2021. Pengaruh Penyuluhan Terhadap Pendapatan Peternak Babi di Desa Kiawa Dua Timur Kecamatan Kawangkoan Utara. ZOOTEC. 41(1):205-213.

Jordan, JL, and AH Elnagheeb. 1993. Willingness to Pay For Improvements in Drinking Water Quality. Water Resources Research. 29(2):237-245.

Kurnianto, E. 2017. Sumber Daya Genetik Ternak Lokal. In: PROSIDING SEMINAR NASIONAL TEKNOLOGI AGRIBISNIS PETERNAKAN (STAP). p 23-33.

Lindhjem, H, Grimsrud, KM, Navrud, S and Kolle SO. 2014. The Social Benefits and Costs of Preserving Forest Biodiversity and Ecosystem Services. Journal of Environmental Economics and Policy. 4(2): 202-222.

Makatita, J, and SD Isbandi. 2014. Tingkat Efektivitas Penggunaan Metode Penyuluhan Pengembangan Ternak Sapi Potong di Kabupaten Buru Provinsi Maluku. AGROMEDIA: Berkala Ilmiah Ilmu-ilmu Pertanian. 32(2)

Mendes, I. 2012. Economic Valuation As A Framework Incentive To Enforce Conservation. Protected Area Management. Intech Open. Ankara, Turkey. doi: http://dx.doi.org/10.5772/50063

Nurdayati, N, NI Fidin, and S Supriyanto. 2021. Pengaruh Karakteristik Peternak Terhadap Motivasi

Beternak Kambing Perah. Jurnal Pengembangan Penyuluhan Pertanian. 17(32):121-136.

Pearce, DW, and RK Turner. 1989. Economics of Natural Resources and The Environment. Johns Hopkins University Press.

Priyambodo, AW, Harianto, and A Fariyanti. 2016. Analysis Farmer Willingness to Accept and Consumer Willingness to Pay in Batu Malang East Java International Journal of Science and Research (IJSR) 5(11)doi: 10.21275/ART20162815

Ramanathan, R. 2002. Analytical Methods: Introduction Econometrics with Application and Software. Harcourt College Publishers.

Tumion, B, VV Panelewen, A Makalew, and B Rorimpandey. 2017. Pengaruh Biaya Pakan dan Tenaga Kerja Terhadap Keuntungan Usaha Ayam Ras Petelur Milik Vony Kanaga Di Kelurahan Tawaan Kota Bitung (Study Kasus). ZOOTEC. 37(2):207-215.

Ulfah, M, Perwitasari, D, Jakaria, J, Muladno, M, and Farajallah, A. 2015. Multiple Maternal Origins of Indonesian Crowing Chickens Revealed by Mitochondrial DNA Analysis. Mitochondrial DNA. 1: 1-9.