Original Article

Ongole Crossbreeds conservation with the existence value approach and the willingness to pay farmers in Yogyakarta Indonesia

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Abstrak

Tujuan: Tujuan dari penelitian ini yaitu mengidentifikasi dan mengukur *existence* usaha serta menganalisis *Willingness to Pay* peternak untuk menjaga keberadaan Sapi Peranakan Ongole.
Metode: Penelitian dilakukan di Kelompok Taruna Mandiri Kecamatan Ngemplak Kabupaten Sleman dengan pertimbangan merupakan kelompok ternak Sapi Peranakan Ongole yang mempunyai jumlah anggota terbanyak di Kabupaten Sleman. Penentuan responden secara sensus sebanyak 40 peternak. Pengumpulan data dilakukan melalui wawancara dengan menggunakan kuesioner sebagai instrumen penelitian. Identifikasi eksistensi usaha meliputi ketersediaan input, perkembangan output, dan aksesibilitas penunjang Sapi Peranakan Ongole digunakan skala Likert. Pengujian konsistensi item pernyataan diuji validitas dan reliabilitasnya. Metode *Contingent Valuation* digunakan untuk mengestimasi *Willingness to Pay* peternak dalam mempertahankan usaha.
Hasil: Nilai keberlanjutan usaha dari eksistensi input (0,896), output (0,985), dan penunjang (0,885) masuk kategori tinggi. Nilai WTP terbesar yaitu pembelian ternak betina muda dengan nilai rerata sebesar Rp 14.500.000/ekor, diikuti pengolahan limbah sebesar Rp11.509.000/tahun dan asuransi induk sebesar Rp 40.000/ekor/tahun. Agregat nilai WTP kelompok sebesar Rp 1.350.000.000/tahun.
Kesimpulan: Kelompok ternak dapat mempertahankan keberadaan Sapi Peranakan Ongole karena dukungan eksistensi usaha, pemanfaatan limbah kotoran untuk peningkatan pendapatan, dan kemauan membayar peternak. Di sisi lain dukungan pemerintah untuk memberikan subsidi pada sistem pembibitan serta program Sapi Indukan Wajib Bunting (SIWAB) tetap dipertahankan untuk menjaga keberadaan Sapi Peranakan Ongole.

Kata Kunci: Eksistensi usaha; Nilai keberadaan; Sapi peranakan ongole; *Willingness to pay*

Abstract

Objective: The objective of the research was to identify and measure the value of existence, thus to analyze the Willingness to Pay farmers to keep the existence of Peranakan Ongole cattle.
Methods: The research was conducted in Taruna farmer's group, Ngemplak District, Sleman Regency with the consideration that it is a Peranakan Ongole cattle group which has the largest number of members in Sleman Regency. Determination of respondents by census was as many as 40 farmers. The data was collected through interviews using a questionnaire as a research instrument. The identification of the existence of the business includes the availability of inputs, the development

of outputs and the accessibility of supporting Peranakan Ongole cattle by using a Likert scale. Validity and reliability are used to test the consistency of statement items. The Contingent Valuation method is used to estimate the Willingness to Pay farmers in maintaining their business.

Results: The value of business sustainability from the existence of input (0.896), output (0.985), and support (0.885) is in the high category. The largest WTP value is the purchase of young female cattle with an average value of IDR 14,500,000/head, followed by waste treatment of IDR 11,509,000/year and heifer insurance of IDR 40,000/head/year. The aggregate value of the group's WTP is IDR 1,350,000,000/year.

Conclusions: Livestock groups can maintain the existence of Peranakan Ongole cattle because of the support of business existence, utilization of dung waste to increase income, and Willingness to Pay farmers. On the other hand, the government's support to provide subsidies and SIWAB (Sapi Indukan Wajib Bunting) programs or its extension mandatory cattle breeding must persist to maintain the presence of Peranakan Ongole cattle.

INTRODUCTION

The growth of the cattle population in Indonesia is slow. It is at a rate of 2 to 3 percent per year. On the other hand, there are restrictions on importing feeder cattle. As a result, the supply has not been able to meet the consumption. Therefore, efforts are needed to maintain the presence of local cattle, one of which is Peranakan Ongole cattle.

Peranakan Ongole Cattle has the potential as superior breeds and is the largest cattle population in Indonesia. Peranakan Ongole cattle is one of the local cattle that is not pure breeds and thus threatened its existence [1]. Farmer choose Peranakan Ongole cattle because its adaptable to hot climate, good reproductive ability, resistant to tick infection and skin diseases, and good feed conversion [2–4]. Population growth of Peranakan Ongole, especially the breeding system is low because it requires a long maintenance period [5]. Ongole crossbreed is a cross cattle between a steer Ongole (*Bos Indicus*) from India and a white heifer Java. This cattle must be maintained in order to keep the purity and sustainability according to the agro-ecosystem and local farmer preferences [6]. It is necessary to calculate the Willingness to Pay farmers as a form of appreciation for the environment [7].

Sleman District is one of the areas in the Special Region of Yogyakarta that has the largest Ongole crossbreed cattle population. The development of the area is strengthened by the Decree of the Minister of Agriculture Indonesia No.43/Kpts/PD.410/2015 January 16, 2015 concerning The designation of National Areas for Beef Cattle, Buffaloes, Goats, Dairy Cattle, Sheep and Pigs [8]. The regulation related to germplasm conservation is included in the Minister of Agriculture Regulation No.35/Permentan/OT.140/8/2006 that explains the identification, exploration and evaluation of Sustainable Development Goals according to the physical condition and livestock genetic resources. [9].

Ngemplak sub-district has the largest population of Ongole crossbreed as well as a pioneer in preserving Ongole crossbreed in Sleman Regency. Cattle farmer's groups specifically raise Ongole crossbreed for breeding and fattening systems. The number of beef cattle in this area in 2020 was recorded at 2469 heads [10]. Ngaliyan village Ngemplak Subdistrict in Sleman District has 40 farmer groups, one of which is called Taruna Mandiri. Taruna Mandiri is one of the groups in the advanced group category. Taruna Mandiri is one of the groups that trying to conserve the existence of Peranakan Ongole cattle through the establishment of colony cages and manure treatment to increase the economic value of the environment. The group persists in raising Ongole crossbreed despite the abundant number of imported cattle. The provision of government incentives from regional revenue budget funds in the form of incentives for pregnant heifer amounting to IDR 600,000 is currently dismissed. This is because the target for the increase in cattle breeding has not been achieved. Therefore, efforts are needed to maintain the existence of cattle.

Providing incentives for cattle based on nationality is beneficial, namely providing motivation for farmers to maintain their business [11]. Besides, the Artificial Insemination program can help farmers increase the population [12]. Based on the description above, it is necessary to identify and measure the value of existence, hence to analyze Willingness to Pay farmers to keep the existence of Peranakan Ongole cattle in Sleman District.

MATERIALS AND METHODS

Location and timeline

The selection of Sleman District as the research location is under the consideration that this area has potential cattle to be developed and there are many farmer groups which form a colony of cattle.

The location is determined by purposive sampling under the consideration that Ngaliyan has an Ongole crossbreed group called Taruna Mandiri. Taruna Mandiri applies an integrated biosystem model for cattle, agricultural crops and organic fertilizer management. The research was carried out for 2 months, starting from July to August 2021.

Materials

The research material is the Taruna Mandiri farmer's cattle groups. The sampling of farmers was carried out by census, and the respondents were as many as 40 farmers.

Methods

This research used pre survey and survey methods. The pre survey was carried out to determine the research location where the respondents live and they would be interviewed for primary data collection. The next step was a survey for all farmers by using a questionnaire through interview. To determine the Willingness to Pay, an exploratory study was conducted through in-depth interview with the management of the livestock group.

Data analysis

The existence value was identified and measured with 2 measurements, namely:
a. Identification of business existence from the aspect of input availability, output development and accessibility of supporting

Peranakan Ongole cattle villages using Likert scale with 5 ranges of statements, namely 5(SS), 4(S), 3(N), 2(TS), 1(STS) in which the validity and reliability of the question items have been tested. The availability of inputs was the identification of livestock ownership based on the composition of livestock types, both male, female, heifer and calf in head units and Animal Unit (AU), changes in the function of group pen land and utilization of production inputs (land, capital, livestock, labor). The development of output includes the development of production scale and sales volume as well as by-products with selling value, while accessibility includes the availability of water sources, road conditions, and market facilities.

b. The measurement of existence value is how much the farmers are willing to pay to maintain the presence of Peranakan Ongole cattle through the assessment of the farmer's Willingness to Pay based on aspects of input availability, output development, and accessibility of the Peranakan Ongole cattle. This approach asked farmers directly what is the maximum cost? that they are Willing to Pay for the benefits of having Peranakan Ongole cattle that they will receive. The steps taken in the approach include:

1) Setting Up the Hypotetical Market

At this stage, farmers were given an overview about the advantages of livestock, the benefit from conserving Peranakan Ongole cattle for increasing income and preserving livestock germplasm. It was intended that respondents can decide about the cost they are Willing to Pay for conserving Peranakan Ongole cattle. Based on this background, a hypothetical market is created with the following scenario:

If the existence of Peranakan Ongole cattle becomes extinct, it will be replaced by imported cattle from abroad whose availability of stock is limited because there are restrictions on imported cattle. In addition, the cost of imports is expensive and takes a long period of time to arrive and the quality assurance of brood stock or progeny is also unpredictable.

2) Getting bid value

The bid value in this study was obtained through in-depth interview

with respondents in the form of questionnaires to obtain the maximum value that the respondents wanted to pay for conserving Peranakan Ongole cattle. The technique used to get the bid value was through the bidding game. This technique was done by asking respondents repeatedly whether they want to pay a certain amount. The amount was increased or decreased depending on whether the respondent agrees to pay the previously offered amount. Bidding stopped when the respondent has met the estimated point of Willingness to Pay.

3) Measuring average value of WTP

The value is calculated based on the total auction value obtained in the previous stage and divided by the number of respondents. The average value of WTP was calculated by the formula:

$$E\ WTP = \sum_{i=1}^{n} Wi\ (Pfi)$$

Where:

E WTP = estimated average WTP of respondents (IDR)
Wi = WTP value - i (IDR)
Pfi = relative frequency – i
n = total respondent
i = respondent -i (i= 1,2,……,40)

4) Aggregating total WTP data

The calculation of the total WTP data aggregation was obtained by means of the WTP average value that has been obtained multiplied by the number of respondents. The total WTP calculation uses the following formula:

$$TWTP = EWTP \times Ni$$

Where:

TWTP = Total WTP value (IDR)
EWTP = estimated average WTP of respondents (IDR)
Ni = Total respondent

RESULTS

Characteristics of farmers

The characteristics of the farmers including age, formal and non-formal education, their experience in raising livestock, the number of

family members, and the type of work describe the potential of resources as one of the production inputs. Characteristics of respondents indicate that 80% of farmers are in productive age, formal education is equivalent to high school (60%). Farming experience in this area with the range of 1-5 years of experience is more than 40%, 17.50 % had 6 to 10 years and dominated by 42.50% of farmers who had more than 10 years of experience. The size of the house hold with 1-2 persons who live in this area is about 32.05%, while the category of more than 5 persons is the smallest (2.50%) and the largest category is 3 to 5 persons (65%). Farming activity is the main occupation in this area (62.50%). Other occupations are private employees by 10%, self-employed 2.50%, paid labor 2.50%, students 15%, and civil servants 7.50% (Table 1). Most of the farmers participate in fertilizer processing training activities to increase income in addition to livestock reproduction and seed selection. This is related to the number of families where family members also play a role in fertilizer processing and the use of fertilizer for planting vegetables so that they can carry out the integration of crops and livestock. Farming experience more than 10 years shows that the business can be relied upon to help household income in addition to the main job as a rice and horticultural farmer. The average livestock ownership was mostly young females of 1.18 ± 0.04 heads or 0.71 ± 0.02 UT (Table 2). Although the farmers choose the fattening system over breeding because of the relatively short maintenance period of 7.00 ± 0.21 months, some farmers have heifer and young females to maintain the population of PO cattle in the group. Based on the survey, the price of male PO cattle is IDR. 15,000,000/head, while the price of the heifer is IDR. 14,000,000/head. The price of males is higher because there are more carcasses than females. The presence of PO cattle must also be maintained because it is difficult to get them pregnant (Table 3), so many farmers rely on IB for population increase or it is better known as contract mating of IDR. 350,000/head until the female cattle are pregnant.

Measurement of existence value

a. Input the existence value
The category of existence of farming from input is high (Table 4).

Table 1. Characteristic of farmer

Component	Frequency (n=40)	%
Age		
Productive (16 to 65)	32	80.00
Non-productive (<16 and >65)	8	20.00
Formal education		
Elementary school	5	12.50
Yunior high school	8	20.00
High school	24	60.00
Graduate	3	7.50
Non-formal education		
Cattle farming	5	12.50
Reproduction	15	37.50
Fertilizer processing	20	50.00
Household size (number)		
1-2	13	32.50
3-5	26	65.00
>5	1	2.50
Farming experience (year)		
1 to 5	16	40.00
6 to 10	7	17.5
> 10	17	42.5
Main occupation		
Farmer	25	62.50
Private employee	4	10.00
Self-employee	1	2.50
Paid labor	1	2.50
Student	6	15.00
Civil servant	3	7.50

b. Output the existence value
   The category of existence of farming from output is high (Table 5).
c. Supporting infrastructure the existence value
   The category of existence of farming from support is high (Table 6).

Measurement WTP

The greatest value of WTP is the purchase of young females because they are used as a replacement for heifer in the breeding system (Table 7). Livestock insurance is a subsidy from the government to protect the existence of mortality. Manure waste treatment including compost with the label PON (Organic Fertilizer Ngaliyan), liquid fertilizer and biogas are also maintained to produce a high WTP value. Waste treatment that involves the youth organization is indirectly related to the presence of Ongole crossbreeds because apart from increasing income, it can also save fuel costs on cooking and lighting. The largest distribution of WTP is the appreciation to the farmers for maintaining

Table 2. Average livestock (IDR/farmer)

Type	Head	Animal unit
Heifer	1.15 ± 0.05	0.38 ± 0.01
Young male	1.00 ± 0.04	0.60 ± 0.02
Young female	1.18 ± 0.04	0.71 ± 0.02
Calves male	1.10 ± 0.05	0.28 ± 0.01
Calves female	1.11 ± 0.05	0.28 ± 0.01
Total	5.54 ± 0.23	2.25 ± 0.07

Table 3. Problems in Ongole crossbreed

Kind of problem	Frequency (n=40)	%
Difficult to get pregnant	26	65.00
Low selling price	36	90.00
PO cattle still have many local genes	13	32.50
The stock of cows in the barn is low	4	10.00
Slow growth	1	2.50

Table 4. Measuring class interval and determining the category of existence from input

No	Class interval	Motivation level
1	11-18.33	Low
2	18.34-25.67	Medium
3	25.68-33.01	High
	Total score	1292
	Mean score	32.3
	Category	high

Categorization

C = Xn – Xi / k, where C is class interval, Xn is maximum score, Xi is minimum score, and k is total class. Based on this calculation, the class interval value is 7.33.

the existence of Ongole crossbreeds that is as much as IDR. 20,000,000/farmer or in class 2 category. The total WTP which describes the Willingness of the Taruna Mandiri farmer group to maintain the presence of cattle is IDR. 13,500,000,000/year (Table 8).

DISCUSSION

Farmer of productive age have the potential to manage a business [13]. A farmer's age affects the efficiency in performing farm management decisions [14]. A higher level of education allows farmers to change their attitudes and behaviour to act more rationally [15]. Other research said that in cattle fattening business, most of the farmers had elementary school education (46.70%). This shows that literate people are more involved in the fattening business [16].

Experience is closely correlated with skill and application of technology. Farming experience is usually obtained from their parents and it is passed on from generation to generation. The long experience indicates that the knowledge and the skill of farmer have improved and they have better abilities [17].

Other research said that the average household in cattle farmers is 4 persons, suggesting that family labor was available to help manage the cattle operation. The smaller the size of the household, the smaller the costs incurred to meet the needs of the family, so that the results obtained can be used to increase the scale of business [18]. Besides farming, off-farm or non-farm wage work was common as a secondary job [18].

Table 5. Measuring class interval and determining the category of existence from output

No	Class interval	Motivation level
1	3 – 5	Low
2	6 – 8	Medium
3	9 – 11	High
	Total score	337
	Mean score	8.425
	Category	High

Categorization

C = Xn – Xi / k, where C is class interval, Xn is maximum score, Xi is minimum score, and k is total class. Based on this calculation, the class interval value is 2.

Almost all farmers own a heifer in order to keep the existence of Peranakan Ongole cattle. There are two types of investment on cattle farming, namely fattening and breeding. In general, farmers like to focus more on fattening because it takes shorter time than breeding. The pattern of cattle fattening from the present study indicated that 30% farmer practiced fattening only before special event like Eid Al Adha, 63.80% farmer practiced fattening round the year and others raise cattle as a savings. Fattening period was the most important factor because it measured profit percentage of the respondents [19]. Cattle breeding has a high risk because it is susceptible to disease and death. In addition, local cattle breeds have a lower selling price than Simental and Limousine cattle [20].

The main problem in breeding is that the heifer is difficult to get pregnant or has a high Service per Conception rate. It indicates that the fertility of cow is low. [21] The factors that

Table 6. Measuring class interval and determining the category of existence from support

No	Class interval	Motivation level
1	6 – 10	Low
2	11 – 15	Medium
3	16 – 20	High
	Total score	712
	Mean score	17.80
	Category	High

Categorization

C = Xn – Xi / k, where C is class interval, Xn is maximum score, Xi is minimum score, and k is total class. Based on this calculation, the class interval value is 4.

Table 7. Types of activities and value of WTP

Types	Minimum	Maximum	Mean
Purchase of livestock (IDR/head)			
heifer	10,000,000	17,000,000	13,500,000
young female	11,000,000	18,000,000	14,500,000
calf female	10,000,000	12,000,000	11,000,000
calf male	10,000,000	17,000,000	13,500,000
Insurance (IDR/heifer)	40,000	40,000	40,000
Waste treatment	18,000	23,000,000	11,509,000

influence Service per Conception are the knowledge of farmers, amount of concentrate, water supply system, lactation duration, and reproductive diseases. [22] The increase in S/C rate was caused by delayed estrus, silent estrus, ovulation, and reproductive diseases. Ideal Service per Conception range is from 1 to 2 [23]. It can be correlated with the age of puberty of Peranakan Ongole cattle. Most of the heifers reach puberty at the age of 1.50 to 2 years. Longer time of puberty indicate low reproductive performance [24].

Most of the farmers said that the selling price of Ongole cattle is lower than the crossbreed cattle. Ongole cattle has the lowest selling price, as well as cows from Brahman breeds. The main cows with the highest average selling price is Brangus which is a cross between Brahman Cattle and Aberdeen Angus cattle. Other cow breeds that have high selling prices were Lim-PO (Limousin- Peranakan Ongole cattle) and Sim-PO (Simmental- Peranakan Ongole cattle) [25]. The price of Peranakan Ongole cattle is generally lower than those of Simental and Limousine. This is due to lower body weight of PO than Simmental and limousine [26].

The main focus of government programs in beef cattle development is through Artificial Insemination with the aim of helping to increase beef cattle population growth and producing good quality cattle [27]. In this study, the Ongole crossbreed in farmer groups has a greater Willingness to Pay value than the Ability to Pay or income (IDR 3,000,000/ farmer/ month). This shows an interest in maintaining a high presence of Ongole crossbreeds. This is consistent with [8], that 93% of cattle farmers in Pujon Village have a Willingness to Pay that is greater than their Ability to Pay. This is because the awareness to utilize waste in biogas production is high. In addition to income factors that affect WTP is the socio-economic condition of farmers. [28] stated that gender and education of the head of the household are positively correlated with WTP [29] stated that the factors that affect farmers' Willingness to Pay are social awareness, counseling provided to farmers and location of farms. The higher the awareness of farmers with their social environment and the more strategic the location of the farmers, the higher the value of WTP will be. [30] stated that the WTP value of farmers is influenced by age, education, and knowledge of farmers and is related to the mindset of farmers in determining management systems in livestock businesses..

CONCLUSION

The farmer's group can defend the Ongole crossbreed. This is supported by the results of the assessment of business existence in terms

Table 8. Distribution and aggregate WTP of farmers

No	WTP class (IDR) (1)	Total (farmers) (2)	%	Total (1x2)
1.	10,000,000	1	2.50	10,000,000
2.	20,000,000	18	45.00	360,000,000
3.	30,000,000	5	12.50	150,000,000
4.	40,000,000	4	10.00	160,000,000
5.	50,000,000	5	12.50	250,000,000
6.	60,000,000	7	17.50	420,000,000
	Total	40	100.00	1,350,000,000

of input, output and support in the high category. The highest WTP is the purchase of young female cattle with an average value of IDR. 14,500,000/head, followed by waste processing for the manufacture of organic and liquid fertilizer, and also biogas of IDR. 11,509,000/year and heifer insurance of IDR. 40,000/head/year. Aggregates WTP of farmer's group is IDR. 1,350,000,000/year. WTP value was higher than ATP. This means that the appreciation of farmers for maintaining the presence of high PO cattle. To increase ATP, it is necessary to apply technology for managing livestock manure and agricultural waste for compost and feed production houses. On the other hand, government intervention is supported to provide subsidies to the breeding system and the Mandatory Sapi Indukan Wajib Bunting (SIWAB) program to maintain the presence of PO cattle.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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