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BREEDER SATISFACTION WITH SERVICE QUALITY AND SUCCESS IN ARTIFICIAL INSEMINATION IN THE NATIONAL COW PREGNANCY PROGRAM

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ABSTRACT: We conducted this research at Kadipiro village, Jumapolo sub-district, Karanganyar regency, between 9 January and 9 February 2019. We aimed (1) to assess breeder satisfaction at Kadipiro village with service quality and artificial insemination and (2) to determine the level of artificial insemination success at Kadipiro village. We used descriptive, quantitative methods and collected data by observation and interview using a questionnaire. We analyzed the data with importance–performance analysis (IPA) and customer satisfaction index (CSI). Our results indicated satisfaction among all farmers toward the inseminator's performance based on the CSI at 0.87%, the quality of success in artificial insemination based on the conception rate at 65.15% (a fertile category), percentage of non-return rate at 65.90% (a good category), and a calving interval at, on the average, 13 months (the ideal category). We therefore concluded that the farmers were very satisfied with the services provided by the inseminator. Our results suggested that the inseminator needed to improve the service attributes in quadrant I.

INTRODUCTION

One of the most familiar livestock products among the public is beef. The demand for beef as a protein source has been steadily increasing along with both the increasing awareness among the public of the importance of a balanced diet and the rapid growth of the population, particularly in Indonesia. In 2016, the beef consumption level of the Indonesian people reached 0.008 kg/capita/week, and in 2017, it reached 0.009 kg/capita/week (BPS, 2017).

With the increase in beef consumption comes an increase in the demand for beef; to overcome the imbalance between beef demand and availability, an

increase in beef production in Indonesia is necessary to prevent beef scarcity in the future and to reduce beef imports. Artificial mating, or artificial insemination (AI), is a strategy for overcoming the increasing demand for beef through self-breeding.

AI is an extremely helpful technology for breeders to increase beef cattle reproduction. According to Susilawati (2011), the main objective of AI is to improve the genetic quality of beef cattle available to the breeder by utilizing the semen of qualified and superior beef cattle. AI was introduced in Indonesia by a researcher from Denmark, Prof. B. Seit, in the 1950s, and performed at the Faculty of Veterinary Medicine, IPB, Bogor, for the purpose of livestock development. In 2017, central Java province started to apply the UPSUS SIWAB program—a national cow pregnancy program.

The beef cattle population in the Jumapolo sub-district reached 4.254 cows in 2016 (BPS, 2017). Kadipiro village is one of the villages where the beef cattle industry has been growing steadily every year. The beef cattle activity in this region keeps expanding because it is supported by a favorable climate with temperatures of 18℃–31℃. According to Ahmad and Sugiarto (2014), each animal is suited to a specific environmental temperature, which conforms to the condition of its body (*comfort zone*). The ideal temperature for beef cattle industry ranges from 20℃ to 27℃.

The cattle breeders in Kadipiro village apply AI to increase the population of their beef cattle. The breeders prefer using AI to natural mating because the region has few superior bulls, making artificial mating the more efficient option.

The success of AI is highly affected by four interrelated and inseparable factors—selecting the acceptor cattle, testing the semen quality, accuracy of estrus detection by the breeder, and the inseminator's skills. The skills of both the inseminator and the breeder spearhead AI application, and its success in the field depends on both responsible parties. The breeder naturally expects both satisfactory service from the inseminator and successful AI. Based on these factors, the breeder's satisfaction with AI service quality and its success requires further research.

MATERIAL AND METHOD

Location and time of the research

We conducted the research between 9 January and 9 February 2019 at Kadipiro village, Jumapolo sub-district, Karanganyar regency, Central Java.

Research methods

We used a descriptive quantitative method. Quantitative analysis approaches the problem of the research with numerical data and statistical programs. Creswell (2014) suggested that quantitative research examined an objective theory by testing correlations among variables.

Sampling method

We sampled data in this research with *probability sampling*, using *simple random sampling*. Because the individuals in the research population were recognizable, the numbers required for the sample were taken using Slovin's equation:

$$n = \frac{N}{1 + Ne^2}$$

Notes:

n = sample size

N = population size

e = inaccuracy percentage due to sampling error is still tolerable (0.1).

Using the equation, the minimum number is calculated as follows:
$n = \frac{313}{1+313(0,1)^2} = \frac{313}{4,13}$ = 75 respondents

Data analysis

In our quantitative data analysis, we used the importance–performance analysis (IPA) and the customer satisfaction index (CSI) methods and the Likert scale.

Importance–performance analysis (IPA)

IPA is used to gain information about the breeder's satisfaction with the service quality provided by the inseminator by measuring expectations and implementation. The breeder's expectation level of service quality provided by the inseminator is how important the service variables provided by the inseminator are to the breeder. The importance level of service quality is the importance of service variables as assessed by the customer. Each attribute is scored from 1 to 4.

According to Aswan et al. (2016), the equation for the suitability level of the respondent is

Tki = $\frac{Xi}{Yi} \times 100\%$

in which

Tki = suitability level of respondent

Xi = weight of breeder's assessment of service quality by the inseminator.

Yi = weight of breeder's assessment toward the expectation level of the inseminator's indicator.

Customer satisfaction index (CSI)

CSI is intended to analyze the satisfaction level of the cattle breeder with the service quality provided by the inseminator and success of the AI. According to Aswan et al. (2016), the measurement of the CSI is required because the result of the measurement serves as a reference to determine the target in the future.

The measurement method of the *CSI* includes the following steps:

1. Determine *mean important score (MIS)* and *mean satisfaction score (MSS)*:

MIS = $\frac{\sum_i^n=1Yi}{n}$ and MSS = $\frac{\sum_i^n=1Xi}{n}$

in which

n = number of respondents

Yi = expectation value of the –i indicator

Xi = performance value of the –i indicator

2. Determine *weight factors* (WF)

WF = $\frac{MISi}{\sum_{i=1}^{p} MISi} \times 100\%$

in which

P = numbers of the expectation attributes

3. Determine *weight score* (WS),

WS = Wfi × MSSi

4. Determine *customer satisfaction index* (CSI)

CSI = $\frac{\sum_{i=1}^{p} WSI}{HS} \times 100\%$

RESULT AND DISCUSSION

General conditions of the research location

Kadiprio village covers an area of 417,790 Ha at an altitude of 550 m above sea level. It lies between 110° 40″ and 110° 70″ east longitude and 7° 28″ and 7° 46″ south latitude. Kadipiro village has an average rainfall of approximately 2500 mm/year and a tropical climate, with temperatures between 19℃ and 27℃.

Among four regencies in central Java (Wonogiri, Karanganyar, Grobogan, and Kebumen), Karanganyar regency has funded self-supporting AI services by accepting incentives from the State Budget funding agency (APBN) 2019 to the value of approximately Rp 20.000,-. The remaining support and infrastructure of UPSUS SIWAB in the regency/municipality were stock allocated by the end of the year to be utilized in the following year. Several items were addressed to optimize the implementation of UPSUS SIWAB in Karanganyar regency in 2019; these included providing and utilizing means and infrastructures (frozen semen, liquid N2), operating costs for implementation of UPSUS SIWAB, technological guidance (Bimtek) of the technical officer (AI, PKB, officers who handled the semen), providing fodder forage, controlling the productive beef slaughtering, monitoring and reporting on the UPSUS SIWAB, and implementing continual SPIP (the Government Internal Controlling System).

Characteristics of the breeders as respondents

Age (years old)	Amount (person)
25–35	6
36–50	30
51–65	25
>65	14
Total	75

As we show in the table above, 80% of the respondents were categorized as productive and considered to work well and optimally in breeding cattle. This conforms to the statement by Mulyawati et al. (2016), who reported that the productive age of the cattle breeder ranges from 24 to 60 years.

Aprilyanti (2017) reported that the (younger) productive age usually delivers higher productivity than the old workforce because of their physical weakness and limitations.

Sex

Sex	Number (persons)
Male	65
Female	10
Total	75

This condition is commonly found among breeders, particularly in Indonesia, where livestock farming is dominated by men, a tendency due to the more dominant roles played by men in the livestock business because the man is considered to be the head of the breeder's household. There were 10 female respondents; some of whose husbands worked in Jakarta, and some of whose husbands had passed away. Three of the women just controlled the operation but were not involved in the cowshed because they had workers who took care of livestock farming.

Number of family dependents

Number of family dependents	Number (persons)
0	0
1 to 2	9
3 to 5	47
>5	19
Total	75

According to Purwanto and Taftazani (2018), family dependants refer to the number of family members who are still considered as dependants of the family—both siblings and relatives—who live in the household but have not

yet worked. The more dependants the family has, the harder the responsible one in the family will work in managing the business.

Education level of the breeder

Education level	Number (persons)
Not graduated from elementary school	7
Elementary school	30
Junior high school	15
Senior high school	12
Diploma	4
Scholar/bachelor	7
Total	75

The education level of the breeder is significant because more highly educated individuals more easily adopt innovation, whereas those with lower education levels usually adopt traditional livestock farming systems and are resistant to innovation. Mulyawati et al. (2016) reported that the higher the education level of the breeder, the higher the level of livestock farming will be because educated breeders will more easily adopt innovation and change their way of thinking and will solve problems wisely.

Scale of business

Scale of business (animals)	Number (persons)
<3	57
3–10	17
>10	1
Total	75

The table shows that 76% were small-scale breeders and that the scale of the beef cattle business in Kadipiro village was still small because beef cattle farming in this village was generally a side business. Additionally, the breeders still faced a lack of capital to invest in more cattle. As reported by Hastang and Asnawi (2014), cattle farming is a household business of farmers with limited capital, workforce, and management.

Other professions of beef farmers

Kinds of professions	Number (persons)
Farmer	42
Skilled laborer	4
Entrepreneur	9
Civil servant	5
Private employee	4
Merchant	6
Housewife	5
Total	75

The table above shows that the cattle breeders in Kadipiro village had diverse professions. Of the cattle breeders, 56% worked as farmers because, in general, the cattle breeders lived in a village where most of the population worked as farmers.

Period of beef cattle farming

Period of beef cattle farming	Number (persons)
2–5 years	9
5–10 years	11
>10 years	55

The table above shows that, in general, the cattle breeders had bred cattle for a long time. Only 12% of the respondents had bred cattle for less than 5 years.
Cattle breeders with a longer period in beef cattle farming understandably had more experience. According to Utami et al. (2016), the knowledge and skill of the cattle breeder with experience in cattle maintenance management conferred better cattle farming abilities on the breeder.

Assessment of level of interest and performance

We assessed the level of interest and performance of the inseminator by assessing the attitudes of the beef cattle breeder individually toward the service attributes of AI. We individually measured the breeders' administration of service attributes, which we categorized into three groups as follows: service attributes of production means, technical services, and services a the result of AI. Those three groups comprised 15 attributes of service used for assessment in this research. Based on Table 1, the actual performance accepted by the breeder did not conform to the expectation of the breeder because of the performance of most of the servicing attributes of the inseminator being lower than the desire of the beef cattle breeders. Suitability value of 100% or more indicates that the available attributes conformed to the desire of the cattle breeders.

Based on the result of suitability analysis on the attribute of price per AI injection, the lowest suitability score was 63.60%. This was due to the very low performance score of the attributes, although these attributes had a high level of interest for the cattle breeder. The low score for performance attributes was due to the lack of any discount for the cattle breeder or guarantee of success of the AI.

Table 1. Suitability score between the levels of interest and performance on each attribute

No.	Service attributes of artificial insemination (AI)	Score of performance	Score of interest	Score of suitability (%)
1	Price per injection of AI	173	272	63.60
2	Price of medicine and vitamins	185	261	70.88
3	Straw availability	194	250	77.6
4	Availability of medicine and vitamins	180	262	68.70
5	Appearance of the inseminator	259	245	105.71
6	Attitude of the inseminator	255	261	97.70
7	Skills of the inseminator	227	269	84.38
8	Punctual arrival time	185	263	70.34
9	Ease of contact with the inseminator	223	260	85.76
10	Honesty of the inseminator	260	260	100
11	Equipment completeness	242	262	92.36
12	Success of AI	205	300	68.33
13	Productivity of AI results	237	270	87.77
14	Calf appearance	235	265	88.67
15	Recording cattle	223	260	85.76

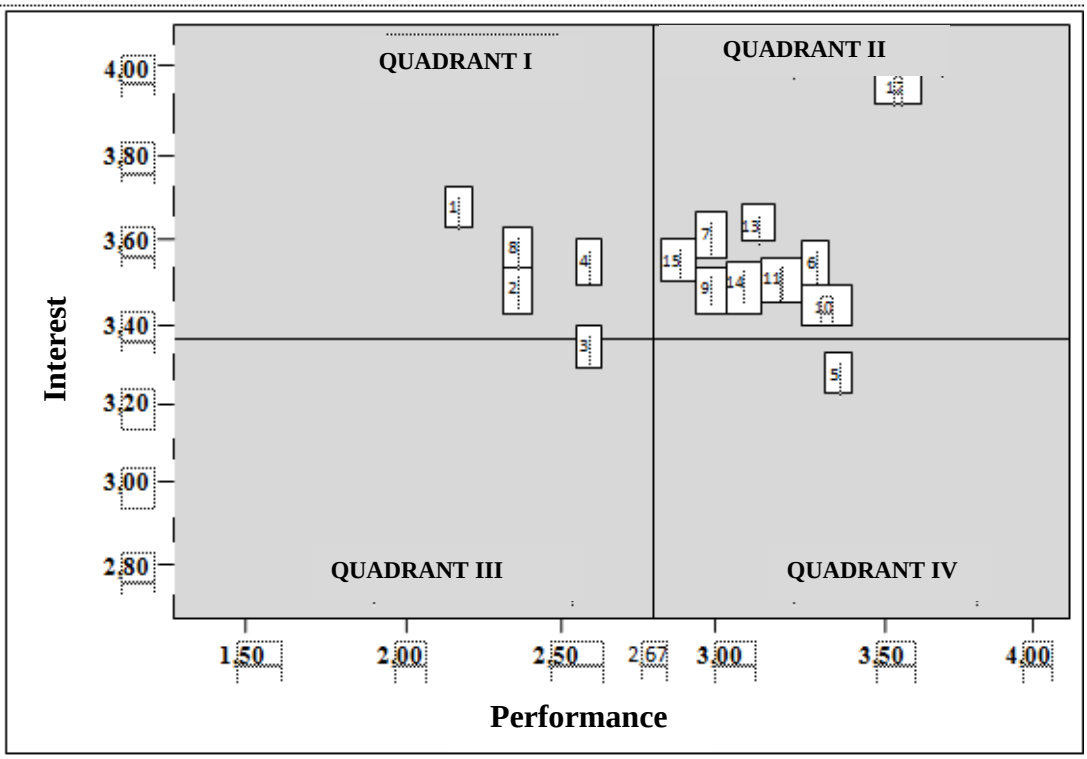
Calculation of *importance performance analysis* (IPA)

Through the analysis, we identified items that required improvement by the inseminators to satisfy the cattle breeders. We present the 15 attributes investigated in this research in proper order from 1 to 15 as follows: price per injection of AI, price of medicine and vitamins, straw availability, availability

of medicine and vitamins, appearance of the inseminator, attitude of the inseminator, skills of the inseminator, punctual arrival time, ease of contact with the inseminator, honesty of the inseminator, equipment completeness, success of AI (S/C), productivity of AI results, calf appearance, and recording cattle.

The IPA Matrix comprises four quadrants—namely, quadrant I (main priority), quadrant II (maintain achievement), quadrant III (low priority), and quadrant IV (exaggerated). Those quadrants are separated by a point of intersection, which is derived from average values of interest and performance.

The IPA method targets mainly quadrant I, which contains attributes of service that are considered important by the cattle breeder. In our study, however, they did not conform with the expectation of the cattle breeder because their performance was not good enough. We applied the quadrant analysis to assess attributes in quadrants I, II, III, and IV, as well as their implications for the results. In Figure 1, we present attributes in each quadrant.



Calculation of the cattle breeder satisfaction index

We measured breeder satisfaction as a whole by calculating the CSI, to obtain the value of which we calculated the *mean importance satisfaction (MIS)* score and the *mean satisfaction score (MSS*). In Table 2, we present the calculation results of the *CSI* for the service provided by the inseminator.

Table 2. Results of calculation on the *customer satisfaction index* (CSI)

No.	The attribute of service on AI	MIS	WF	MSS	WS
1	Price per injection of AI	2.31	5.27	3.63	0.19
2	Price of medicine and vitamins	2.47	5.63	3.48	0.20
3	Straw availability	2.59	5.91	3.33	0.20
4	Availability of medicine and vitamins	2.40	5.48	3.49	0.19
5	Appearance of the inseminator	3.45	7.88	3.27	0.26
6	Attitude of the inseminator	3.40	7.76	3.48	0.27

7	Skills of the inseminator	3.03	6.91	3.59	0.25
8	Punctual arrival time	2.47	5.63	3.51	0.20
9	ease of contact with the inseminator	3.00	6.85	3.47	0.24
10	Honesty of the inseminator	3.47	7.91	3.47	0.27
11	Equipment completeness	3.23	7.37	3.49	0.26
12	Success of AI (S/C)	2.73	6.24	4.00	0.25
13	Productivity of AI results	3.16	7.21	3.60	0.26
14	Calf appearance	3.13	7.15	3.55	0.25
15	Recording cattle	2.97	6.79	3.47	0.24
	Total	43.80			3.52
	CSI				87.89

Based on the results of the calculation, attributes that required improvement in terms of performance, to improve the satisfaction indexes, were those with scores lower than the *total weighted score* of 3.52. Based on the results of the cattle beef breeders' assessment of the performance of the inseminators' services, the CSI score was 87.89%. This score ranges between 0.81 and 1.00, which means that on the whole, cattle breeders were satisfied with the performance provided by the inseminator.

The success of AI

The success level of AI is a percentage of impregnation that can be achieved during the implementation of AI, usually recognized by some indicators of success as *conception rate*, *service per conception*, and *calving interval*, and the NRR (Non- Return Rate) technique is used mostly to recognize the success of AI implementation. Based on our results, of 132 broodstock that had undergone AI, the impregnation rate, or CR, was 65.15% and the S/C was 1.63—very good scores conforming to Fanani et al. (2013), who reported that a good CR reaches 60%–70%, with good results based on the CR.

The result of NRR calculation was 65.90%; according to Wahyudi et al. (2014), a good score for NRR was 79.53 ± 18%. On the basis of this statement, we concluded that the NRR score in Kadipiro village was good, because it still fell within the range 79.53 ± 18%.

Based on Table 3 above, the average calving interval was 13 months. According to Rusdi et al. (2016), the ideal calving interval is 12–13 months, including the interval between calving and the first post-calving mating. Based on this finding, the calving interval reflecting the fertility of the cattle in Kadipiro village is still ideal.

Table 3. Data of calving interval of the beef cattle in Kadipiro village

Calving interval	Number (productive cows)	Percentage (%)
12–13 months	97	73.48
14–15 months	18	13.62
>15 months	17	12.9
Total	132	100.00

CONCLUSION

On the basis of our result, we concluded that the cattle breeders have on the whole been satisfied with the performance of the inseminator, as reflected in the CSI value, 87.89%. The success of AI based on the CR was 65.15%, a good result; the result of *service per conception* was 1.63, which means that cattle in Kadipiro village are categorized as fertile, with a good *non-return rate* of 65.90% based on the CI of 13 months on average, which is categorized as ideal.

REFERENCES

Ahmad, A. A & M., Sugiharto. (2014). Peta Pengembangan Sapi Potong di Kabupaten Banjarnegara. *Jurnal Eko Regional*. 9(2): 106-115.

Aprilyanti, S. (2017). Pengaruh Usia dan Masa Kerja Terhadap Produktivitas Kerja. *Jurnal Sistem dan Manajemen Industri.* 1(2): 68-72.

Aswan. K, Cepriadu, & Kausar. (2016). Tingkat Kepuasan Peternak Ayam Broiler Terhadap Pola Kemitraan Model Contract Farming di Kecamatan Kampar Kiri Tengah Kabupaten Kampar (Study Kasus PT. Pelita Trikencana Bersinar). *Jurnal Faperta*. 3(1): 1-16

Creswell, John.W. (2014). *Penelitian Kualitatif dan Desain Riset*. Yogyakarta: Pustaka Pelajar.

Fanani, S., Subagyo, Y.B.P., & Lutojo. (2013). Kinerja Reproduksi Sapi Perah Peranakan Friesian Holstein (PFH) di Kecamatan Pudak, Kabupaten Ponorogo. Fakultas Pertanian. Universitas Sebelas Maret. Surakarta. *Jurnal Peternakan*. 4(5): 23-45.

Hastang & A. Asnawi. (2014). Analisis Keuntungan Peternak Sapi Potong Berbasis Peternakan Rakyat di Kabupaten Bone. *Jurnal Ilmu-ilmu Peternakan*. 1(1): 240-252.

Mulyawati I.M, D. Mardiningsih & S. Satmoko. (2016). Pengaruh Umur Pendidikan Pengalaman dan Jumlah Ternak Peternak Kambing terhadap Perilaku Sapta Usaha Beternak Kambing di Desa Wonosari Kecamatan Patebon. *Jurnal Agromedia*. 34 (1):85-90.

Purwanto A & B. M. Taftazani. (2018). Pengaruh Jumlah Tanggungan terhadap Tingkat Kesejahteraan Ekonomi Keluarga Pekerja K3L Universitas Padjajaran. *Jurnal Pekerjaan Sosial*. 1(2): 33-34.

Rusdi. B, M. Hartono & S. Suharyati. (2016). Calving Interval pada Sapi Bali di Kabupaten Pringsewu. *Jurnal Ilmiah Peternakan Terpadu*. 4(4): 277-283.

Susilawati T. (2011). *Spermatologi*. UB Press. Malang.

Utami L. S, S. Baba, & S. N. Sirajuddin. (2016). Hubungan Karakteristik Peternak dengan Skala Usaha Ternak Kerbau di Desa Sumbang Kecamatan Curio Kabupaten Enrekang. *Jurnal Ilmu dan Teknologi Peternakan*. 4(3): 146-151.

Wahyudi L, T. Susilawati & N. Isnaini. (2014). Tampilan Reproduksi Hasil Inseminasi Buatan Menggunakan Semen Beku Hasil Sexing pada Sapi Persilangan Ongole di Peternakan Rakyat. *Jurnal Ternak Tropika*. 15(1): 80-88.