System application of artificial insemination technology to the welfare level of cattle breeders in Merauke

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Abstract. The potential for developing cattle in Merauke requires a touch of technology to increase its population and production. The purpose of this study was to determine the role of artificial insemination technology (AI) on improving the welfare of cattle breeders. The method in retrieving data is divided into data types ie qualitative and quantitative data, as well as primary and secondary data. This research was conducted in 3 districts in the district of Merauke, the data were processed statistically using descriptive analysis in the form of averages and standard deviations. Sampling is done by purposive sampling using 90 cattle breeders. The results showed that AI process carried out on average more than 1 time and the level of breeders' satisfaction with the AI was good, the use of AI was able to increase the population, production and selling value of livestock and the welfare of breeders. The highest increase in breeder welfare occurs in the Semangga, Tanah miring, and Kurik region with an average value of 12% - 15% with AI technology utilization rates reaching 78%.

1. Introduction

Merauke is a district in the eastern part of Indonesia that has the potential to be developed as a center for cattle breeders, based on the regulation of the director-general of animal husbandry and animal health in 2016, Merauke as one of the districts to strengthen native/local beef cattle breeding in eastern Indonesia. Increased production and population of cattle need to be a serious concern, this is due to the increasing demand from consumers according to the report of the district livestock and livestock health services of Merauke, that the consumption of beef from Merauke until the end of 2017 reaches 1.3 million kg, beef consumption in Merauke is still competing with deer meat [1]. Consumer increase in beef is not followed by an increase in population and livestock production, this can trigger price stability in consumers. Therefore, the government takes action to improve the quality of human resources in the field of livestock, such as the application of artificial insemination technology (AI), to breeders in the region of Merauke with the aim of increasing population and production.

The technology of artificial insemination (AI) has several obstacles caused by breeders' errors in detecting lust, as well as the accuracy of the inseminator. According to [2] that the AI program in Merauke there are still obstacles, one of which is the value of service per conception (S / C) 1.8 caused by various factors including climate, breeders' ability to detect lust to inseminator ability. The ability of breeders to determine the cattle estrus is one of the most important determinants for AI success to reach
According to [4] artificial estimation training should be given to AI technicians so that they can reduce errors and failure of artificial insemination. Increasing breeders 'resources by knowing the importance of artificial insemination programs should be able to influence breeders' income. The strategy to increase production and population using reproductive techniques has also been carried out by [5] that the use of reproductive technology such as artificial insemination can increase the potential benefits. Therefore, there is a need for information about the factors of artificial insemination technology programs that are able to provide welfare for breeders to increase.

2. Methods

2.1. Time and place
The research was conducted in October 2018 - March 2019, in 3 districts, i.e., Semangga, Tanah Mirirng, Kurik, the selection of research sites based on the highest number of cattle populations and the program of artificial insemination took place consistently.

2.2. Materials and instrument
As many as 90 respondents were breeders who had participated in an artificial insemination program in cattle. The variables observed include the success rate of the AI, an increase in the number of population, an increase in the sale value of livestock and an increase in welfare as measured by income per sale of cattle.

2.3. Data analysis
Data processed in non-parametric statistics using descriptive analysis in the form of averages and standard deviations.

3. Results and discussion
The results of the interview study showed that the success rate of AI service per conception (S / C) on the average of the three districts was 1.6 - 1.9 as in Figure 1. The results of this study are in line with the research of [2] that the average yield of S / C in the Semangga, Tanah Miring, and Kurik is 1.7. A good S / C value for the artificial insemination technology program is 1, meaning that cattle only need 1 AI for pregnant

![S / C data](image)

**Figure 1.** S / C data of three districts n= 30 respondents, SM: Semangga District, TM District: Land Miring, KR: Kurik District

S / C results from this study are included in normal conditions, according to [6] that normal S / C ranges between 1.5 - 2, high S / C caused by many factors including the detection of improper lust, feed, stress and inseminator skills. Breeders who take the artificial insemination program have increased...
knowledge and their own level of satisfaction looking at AI results, even though S/C is more than 1. Figure 2 shows that the level of satisfaction of the breeder after his cattle is successful in AI and shows signs of pregnancy until birth.

Figure 2. Breeders' satisfaction with artificial insemination technology n = 30, SM: Semangga District, TM: Tanah Miring District, KR: Kurik District

The level of satisfaction of breeders is closely related to the results of artificial insemination, several types of cattle in AI with different types of livestock including Bali x cattle PO, Simental cattle x cattle PO. The purpose of cross-breeding with the AI is to get better results and be superior to environmental stress or superior in feed consumption so as to increase production, that one of the objectives of crossing cattle is to get of spring capable resistant to stress. In addition, some breeders choose to rely on natural mating without spending money. However, for breeders insufficient categories to be dissatisfied, most do not get enough information and knowledge about AI, so the success rate is low. This is in line with the findings of [7] stating that breeders who do not know information about AI will feel dissatisfied and sufficient towards AI services.

The results showed that with the role of artificial insemination technology applied by breeders for 3 years able to provide an increase in population until now the number of cattle in 30 respondents reached 236 AI results from an average of 3-6 productive sires per person such as table 1.

Table 1. Results of AI of various cross-species of cattle n = 236

| Area | Type of cattle | average (SD) |
|------|----------------|--------------|
|      | BL x BL        | BL x PO      | BL x SI      | PO x PO      | PO x SI      | 7,58        |
| SM   | 6              | 12           | 23           | 15           | 80           | 7,08        |
| TM   | 12             | 10           | 23           | 10           | 79           | 4,77        |
| KR   | 10             | 15           | 18           | 12           | 77           | 23,33       |
| average | 9,33         | 12,33        | 21,33        | 12,33        | 23,33        |

Info: SM: Semangga District, TM: Tanah Miring District, KR: Kurik District, BL: Bali cattle, PO: PO cattle, SI: Simental cattle, SD: standard deviation.

The results of the study in table 1, it can be seen that the average breeder wants the results of crossing or the accuracy of the breeders in AI are PO x SI cattle, this can be understood because the community believes that the results of the cross will produce superior and posture cattle. According to [8] the results of crossing PO and SI cattle have better body weight and growth if compared with SIMPO x SI crossings. But on the other hand, SI cattle have not been able to adapt well to the environment that is quite hot, so that the cross between PO x SI so far has not been able to produce maximum production. The cross between Bali x SI cattle has a distinctive impression for breeders, this finding is in line with opinion [9]
that the crossing of Bali x Simental cattle is better when compared to Bali x cattle limousine, Bali x beef cattle PO. In addition, that with a cross between a PO x SI cattle has a fairly high selling price offer, so this factor leads some breeders to cross it. The average income from selling these cattle crosses reaches 3 million - 4.4 million per young female and 4.5 - 5.5 million per young male, this is when the price of cattle is increased by 15.2% when compared to crossing local cattle (inbreeding) without artificial insemination. [10] that PO cattle breeders who join the AI program have higher profits.

4. Conclusion
Increasing the welfare of breeders occurs after using artificial insemination technology, the results of crossing of cattle between PO x SI cattle are highest followed by cattle BL x SI, this is one measure of the success of AIs in improving welfare in the Semangga region, Tanah Mirirng, Kurik lands the average value reaches 12% - 15%, with AI technology utilization rate reaching 78%.

References

[1] Nurcholis and Muchlis 2018 Preliminary study of the reproductive nature of deer (cervus imorensis) in community management ijmet 9 192–7
[2] Nurcholis N and Salamony S M 2019 Performans Reproduksi Sapi Lokal yang Toleran Terhadap Iklim di Merauke J. Peternak. Indones. 21 27–33
[3] Crites B R, Vishwanath R, Arnett A M, Bridges P J, Burris W R, McLeod K R and Anderson L H 2018 Conception risk of beef cattle after fixed-time artificial insemination using either SexedUltra™ 4M sex-sorted semen or conventional semen Theriogenology 118 126–9
[4] A M 2018 Artificial Insemination and Ist Economicial Significancy in Dairy Cattle Rev. Int. J. Res. Stud. Microbiol. Biotechnol. 4 30–43
[5] Barrientos-Blanco J A, Thompson N M, Widmar N J O, Wolf C A and Snyder L U 2018 Expected value of crossbred dairy cattle artificial insemination breeding strategies in virgin heifers and lactating cows Livest. Sci. 211 66–74
[6] Ihsan M N and Wahjuningsih S 2011 Penampilan reproduksi sapi potong di Kabupaten Bojonegoro Ternak Trop. J. Trop. Anim. Prod. 12 74–7
[7] Sirajuddin S N, Said M I, Syawal S and Alwi J 2014 Perception Of Livestock Farmers Group Members to artificial insemination in Cattle at Soppeng Regency, South Sulawesi Province Jiip 1 219–26
[8] Susanti I, Ihsan M N and Wahjuningsih S 2015 Pengaruh bangsa pejantan terhadap pertumbuhan pedet hasil IB di wilayah Kecamatan Bantur Kabupaten Malang Ternak Trop. J. Trop. Anim. Prod. 16 41–7
[9] Depison D 2010 Performans Anak Hasil Persilangan Induk Sapi Bali dengan Beberapa bangsa Pejantan di Kabupaten Batanghari Provinsi Jambi J. Agriper 10 37–41
[10] Monintja M Y, Oley F S, Sondakh B F and Oroh F N S 2015 Analisis Keuntungan Peternak Sapi Peranakan Ongole (Po) Yang Menggunakan Inseminasi Buatan (Ib) Di Kecamatan Tompaso Barat ZooteC 35 201–9