



**The Relationship between Farmer Characteristic and Knowledge towards the
 Successfulness of Cattle Artificial Insemination (AI) in Aceh Besar District**

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Abstract

The purpose of this research was to identify the relationship of characteristic and knowledge of farmers to the successful of artificial insemination (AI) in Aceh Besar Districts. The number of respondents is 93 people from twenty three districts in Aceh Besar, selected purposively as the sample of this research. The instruments used in this research are questionnaire and direct observation in the field, while the observed variables are: farmer characteristics, farmer knowledge and artificial insemination result. The results of this research revealed that the characteristics and knowledge of the farmers were good and showed a real relationship to the successfulness of AI in Aceh Besar Districts. The average service per conception (S / C) in Aceh Besar Districts during 2017 was 1.32 while the conception rate (CR) was 86.36%. The results were in accordance with the standard of general guidance of Upsus Siwab Year 2017.

Keywords: Artificial Insemination, characteristics, knowledge, service per conception (S/C), conception rate (CR).

Background

Since 2016, Indonesian government has launched a program for increasing cattle reproduction (UPSUS SIWAB). This program was supported by the regulation from Ministry of Agriculture number 48/Permentan/PK.210/10/2016 to accelerate the program of increasing population of pregnant cattle and buffalos in Indonesia. UPSUS SIWAB is an integrated project, intended to fulfill the needs of food from animal source by conducting artificial insemination (AI) or intensifying natural breeding by applying reproductive management system. This program is expected to improve population, quality, and productivity of cattle and buffalos in Indonesia (Dirjen PKH, 2017).

Artificial insemination is one of the techniques in reproduction to improve livestock genetic quality, to prevent reproductive diseases outbreak, to enhance the efficiency of superior male use, and to decrease the cost of maintaining stud for insemination (Dwiyanto and Inanoe, 2009). Herawati et al. (2012) reported that the successfulness of AI was affected by many

related factors, such as breeding management, ovulation detection, semen quality, body condition score (BCS), and inseminator expertise. Furthermore, the characteristic and active participation of farmers and also inseminator play significant role in making this program successful (Soeharsono et al. 2010).

A good relationship between farmers and inseminators is very important in this program. The ability of farmers to detect ovulation can help the inseminators to inseminate appropriately. The farmers are also expected to make a report if female cows are in ovulation (Umam et al. 2012). Indicator for successful AI is the conception rate and non- return rate in a certain period of time (Herdis, 2007). Conception rate is the percentage of pregnant cow in the first insemination, determined by pregnancy test in 40 to 60 days after insemination. The successfulness of AI is also related to number of service per conception (S/C). The normal S/C value is between 1,6 – 2,0 (Toelihere, 1985).

The aim of this research was to find out about the relationship of characteristic

and knowledge of farmers to AI through UPSUS SIWAB project in Aceh Besar District.

Materials and Methods

As many as 93 farmers in Aceh Besar District as respondent were determined by Slovin formula (Umar, in Nataatmaja and Arifin, 2008).

The data was obtained by surveillance and direct interview with the farmers. 93 purposive respondents were selected from 1374 total farmers which had their cows inseminated. The data was analyzed using SPSS 18.0 and Microsoft

Excel 2007. Correlation test was conducted to see the relationship between farmer characteristic and knowledge to the successfulness of insemination. Spearman test was carried out for X and Y variable for each category.

Results and Discussion
Farmers characteristic

Respondent characteristics observed including age, education, occupation, number of cows, and experience. The characteristic of respondent is provided in table 1.

Table 1. Respondent characteristic in Aceh Besar District (n=93)

Variable	Respondent character	Percentage
Age	• < 20 years	0.00
	• 20 - 40 years	34.41
	• 41 – 60 years	63.44
	• > 60 years	2.15
Gender	• Male	97.85
	• Female	2.15
Education	• Elementary School	6.45
	• Junior high school	27.96
	• Senior high school	47.31
	• Academy	13.98
	• University	4.30
Occupation	• Government employee	2.15
	• Entrepreneur	33.33
	• Farmer	12.90
	• Farm breeder	51.61
Status	• Owner	16.13
	• keeper	15.05
	• Both	68.82
Number of cows	• 1 – 5	64.52
	• 6 – 10	31.18
	• > 10	4.30
Duration of farming	• 1 – 5 years	50.54
	• 6 – 10 years	40.86
	• 11 – 15 years	7.53
	• > 15 years	1.08
Farming system	• Intensive	11.83
	• Semi Intensive	65.59
	• Extensive	22.58

From data in Table 1, we can see that most of the farmers in Aceh Besar District were in productive age, ranging from 40 –

60 years old (63.44%), followed by older farmers above 60 years old (21.5%). The reproductive age of 40 – 60 years old was

dominant in farming and developing Aceh cattle, compared to age group of 20 – 40 years old. According to Tarmidi (1992), age of 15 – 65 years is categorized as productive age with good working ability and good intellective. These conditions make the farmers have the capability to work and support his family economically and psychologically, and also the ability to control the emotion.

Besides ages, the respondents were also characterized by gender. In general, gender is associated with occupation and productivity. In this study, male respondents were more dominant (97.85%) compared to female respondent (2.15%) as farmers. This is correspond to Suradisastra (2008) which stated that males were more required in physical activity, while females were more involved in qualitative activity or as a decision maker. But it does not mean that females cannot participate in a high physical situation.

Based on education character, most of respondents were graduated from senior high school (47.31%), followed by junior high school (27.96%), academia (13.98%), elementary school (6.45%), and university (4.30%). The lower education of farmers, the more difficult for them to accept new innovation and new technology, they only do what has been done by their forefather (Wirdahayati, 2010). But low education does not always mean low knowledge, because the learning process is not always from formal education, it can also obtained from informal education.

The occupation of the respondents were varied, farm breeder was the main occupation of respondents (50.61%), followed by entrepreneur (33.33%), farmer (12.9%), and government employee (2.15%). Education and occupation affected the learning process of respondents. The high level of education and occupation are correlated to the ability of accepting new information from instructors, inseminators, or from mass media. All of this information will help the respondents understand more about farming, especially the importance of

insemination. Educational level also will influence the productivity of farmers (Mosher, 1987).

In farming experience characteristic, most of the farmers in Aceh Besar District just started farming from 1 – 5 years (50.54%), followed by longer period from 6 – 10 years (40.86%), and 11 – 15 years (7.52%). Only 1.08% of respondents had been farmers for over 15 years. It showed that the less experience farmers were more dominant, which will result in difficulty to learn from field case and hardship in receiving new technology, either as a single farmer or as a group. Santoso et al. (1983) has reported that the experience was a significant factor for farmers in considering and choosing livestock.

The number of cows owned by respondents in Aceh Besar District was ranging from 1 – 5 cows (64.52%), 6 – 10 cows (31.18%), and more than 10 cows (4.3%). This result showed that the ownership of respondents was rather low; this was because farm breeder was not their main occupation. This is correspond to the report by Tawaf (1994) that beef cattle farm in Indonesia mostly run by individual farmer which own only 1 – 4 cows per family.

The farming management system in Aceh is relatively good, most of the respondents have applied semi intensive farming system (65.59%), intensive system (22.58%), and only a few respondents had extensive system (11.83%). Semi intensive system indicated that the farmers feed their cows regularly and have them enclosed at night. The farmers also have their own grassland as feed source for their cows.

Farmer's Knowledge

Farmer's knowledge was measured by the comprehensive understanding of farmer towards ovulation signs, observation time, duration of ovulation, AI technique including benefits, factors effecting successfulness of AI, and time to do AI. This data is provided in Table 2.

Table 2. Farmers' knowledge about ovulation, AI, and insemination time

Category	Grade	Percentage
▪ Knowledge about ovulation	▪ Good	25.81
	▪ Moderate	33.33
	▪ bad	40.86
▪ Knowledge about AI	▪ Good	45.16
	▪ Moderate	29.03
	▪ Bad	26.88
▪ Ability to determine the right time for AI	▪ Good	21.25
	▪ Moderate	62.5
	▪ Bad	16.25

The farmers' knowledge about ovulation is still low; only 25.81% could answer the questions about ovulation signs including the presence of discharge, anxiety, and low appetite. Respondents of 33.33% only recognize the presence of discharge. About 40.86% of respondents perceived about behavioral changes such as anxiety, noisy, and loss of appetite. It means that the farmers did not check all the ovulation signs thoroughly. This is probably due to lack of counseling from related service offices, so a regular and intensive counseling is necessary for farmers to understand the ovulation signs completely. In a way, it will increase the successfulness of AI. If the breeding is conducted naturally, it will inherit the negative characters to the offspring (Mirza et al. 2008).

The respondents' knowledge about AI was categorized as good (45.16%), moderate (29.03%), and bad (28.61%). The farmers understand if their cattle are

ovulation, they should contact the inseminators and put the cattle in a cage. About conception time, 21.25% respondents had good understanding about it, 62.50% had only moderate understanding, and 16.25% had very little knowledge about conception. It could contribute negatively to AI program. Conception time is the time to do conception either naturally or artificially. The right time for AI is nine hours after the first sign appears until six hours after the signs disappear (Toelihere, 1993). The poor knowledge about conception time is a serious matter and should be solved by workshops and trainings.

Farmers Participation

The farmers participation in AI program were measured by the activity of farmers in AI, the duration involved in AI program, the continuity in AI program.

Table 3. Classification of respondent farmer participation in Aceh Besar District during artificial insemination program (n=93)

Category	Category	Percentage
Livestock conception	• Artificial Insemination	64.52
	• Natural	35.48
Participation in AI program	• Never	4.30
	• < 1 year	19.35
	• 1 – 5 years	70.97
	• 6 – 10 years	5.38
Continuity in AI program	• None	10.75
	• Some	23.66
	• Entire cows	65.59

Farmer participation in livestock conception was relatively high; farmers took

part in AI program was 64.52%, while the farmer using natural breeding is 35.48%. It

indicated that the AI program launched by the government has been adopted by most of the farmers. The duration of farmer participation in the program was varied, about 70.97% had took part in the program for 1 – 5 years, followed by 19.35% for < 1 year, 5.35% for 6 – 10 years, and only 4.3% did not take part at all. The respondents which showed continuity in AI program was 65.59%, whilst 23.66% farmers only participates in some of program, and 10.75% farmers did not participate in the program.

The Successfulness Level of Artificial Insemination

Indicator for the level of successful in AI program was determined by the conception rate (CR) and service per conception (S/C), as stated by Feradis (2010). The data was obtained by direct interview with 93 farmers.

Average number for CR in Aceh Besar District during UPSUS SIWAB program from June – December 2017 was 86% (Table 3). This number was higher compared to the same program in Aceh Province in 2016 which was only 32.80%. The high SC number in Aceh Besar was supported by good inseminator skill, semen quality, farmers' ability to recognize estrus signs, and other factors such as farmers' participation and inseminator motivation (Hunter, 1995).

Service per conception (S/C) determines the fertility of female livestock. The results of this study showed that the average S/C of UPSUS SIWAB Program in Aceh Besar District during 2015 – 2016 was 1.74 (Diskesnak Aceh, 2016). This number is higher compared to the same program in Halmahera District of Maluku Province which was only 1.54, while in Sembong District it was 1.93 (Labetubun et al. 2014). Toelihere (1993) reported that the normal value for AI was 1.6 – 2.0. However, in Bali cattle the number was slightly higher, from 1.29 to 2.08 (Kusmadi, 1980 in Gusmeri 2006). Toelihere (1993) also stated that in the area where AI program is just introduced, the S/C number is between 2.0 – 2.5. In Aceh Besar District, the average S/C for familiarize area was 1.32 which was

considered as excellent, it was better than the standard issued by Directorate General for Husbandry in 1997, which was 1.6 (Koibur, 2005).

Relationship between Characteristic, Participation, Farmers' Knowledge, and the Successfulness of AI Program

The farmers' age showed correlation with CR value ($p < 0.05$) but with weak connection ($r = 0.046$). It means that the age affects the successfulness of AI. This is in line with Soeharsono et al. (2010) who stated that the older age of farmers, the easier to understand the importance of AI for developing their farms. The determined coefficient value (r^2) was 0.002, which means that the knowledge contributed partially to the successfulness of AI for 0.20%.

Educational level, main occupation, and number of livestock did not show any correlation to the successfulness of AI program. This is correspond to the statement of Baba et al. (2011) that farmers characteristic had negative effect on their perception about the government's program. Higher educational and cosmopolitan level of farmers will decrease their perception on government's program.

Duration of farming showed real correlation with CR value ($p < 0.05$) with weak connection ($0.200 \leq r < 0.399$). It tells that the farmers' experience affects the effectiveness of AI program, which is in line with Soeharsono et al. (2010) who stated that the experience of farmers enables them to accept new technology innovation for better future.

Farmers' participation, the duration, and the number of livestock did not correlate with the effectiveness of AI program ($p > 0.05$). Conversely, Baba et al. (2011) reported that participation had strong relationship with the successfulness of a program where the farmers and the instructors would communicate intensively to make the program success.

Conclusion

From the results, it can be concluded that:

1. Farmers characteristic in Aceh Besar District, including productive age,

education, experience, occupation, ownership, ability to detect estrus signs, and ability to determine conception time were considered good to support AI program.

2. UPSUS SIWAB Program in Aceh Besar District in 2017 was succeeded, with high CR value (86.36%) and low S/C value (1.32).
3. Educational level, occupation, number of livestock, knowledge and participation of farmers showed real correlation with the effectiveness of AI program. The experience and farming system did not show any correlation to the successfulness of AI program.

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