Extension methods in adopting reproductive biotechnology innovation for cattle breeding in Dharmasraya District, West Sumatera

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Abstract. A study had been carried out from May to July 2016 to evaluate the extension methods utilized in adopting process of reproductive biotechnology innovation for beef cattle breeding in Dharmasraya district, West Sumatra. Following a survey method, 40 farmers of using Artificial Insemination (AI) and 14 farmers of using Embryo Transfer (ET) were interviewed. Those farmers were chosen by quota sampling method and saturated sampling method respectively. Both primary and secondary data were analyzed by descriptive and quantitative approach using Likert scale. The results showed that extension methods operated by extension workers consisted of three types; home and farm visit; demonstration and campaign.

Keywords – Extension methods, Reproductive biotechnology, Cattle breeding.

1. Introduction

The gap between supply and demand towards livestock products tend to be greater in the near future. In the one hand, the number of population and their consciousness to consume food products with a higher level of nutritional value increase progressively. On the other hand, abundant local and natural resources potential in Dharmasraya district are not yet utilized properly. This position requires the efforts to accelerate of using potential resources by introducing biotechnological innovation, particularly in beef cattle breeding.

Dharmasraya in West Sumatra province figured out that its number of cattle heads tend to decrease. Although there was an intensified effort, reduction of number of beef cattle was 0.75 % in 2013. To a large extent, this figure was caused by beef cattle slaughter, even though in 2014, cattle number increase by 0.8 % [1]. Then, it was different with other districts in West Sumatra, Dharmasraya accept an introduction of reproductive biotechnology innovation in form of both of artificial insemination (AI) and embryo transfer (ET) for beef cattle breeding.

As [6] [7] [8] stated out that the introduction of reproductive biotechnology should be supported by co-existing institutional capacity, such as extension agents. An agricultural development and transformation could also be accelerated by both institutional capacity and human resources competencies. Within these framework, as [9] stated, there is a need for extension role to change beef cattle farmers’ behavior.

In particular, the rate of adoption of innovation by farmers is determined by the extension method. While, a number of extension methods is available, the appropriate method depends on local conditions. One should
consider several points to utilize an agricultural extension method, such as target conditions, employment, availability of time, business, emotional characteristics and types of innovation.

Thus, there is a need to evaluate the method of extension operated by extension workers in Dharmasraya District. This study was aimed at understanding the methods used by extension workers to disseminate both reproductive biotechnology for beef cattle breeding; AI and ET.

2. Research methods

This research was conducted from May to July 2016 in Dharmasraya District, West Sumatera. Particular location was at a transmigration settlement with a pilot project area of synchronized application of reproductive biotechnology innovation. Program was proposed by provincial Livestock and Animal Health extension services.

Both primary and secondary data collection was made relevant to the study objectives. Primary data was gained from interviewing the beef cattle farmers and in-depth discussion with related stakeholders. All beef cattle farmers adopted the AI and ET innovation became study population. Sample was counted by quota procedure to pick up 40 farmers of using AI and saturated sampling technique for 14 farmers of using ET.

Collected data analysis utilized a descriptive and quantitative analysis, using Likert scale to measure attitudes, opinions, and perceptions of a person or group about social phenomena. Measured variables were translated into research indicators, to arrange items of instruments that could be a statement or question [11]. The quantitative analysis then the answer was scored as follows:

1. Agree : Score 3
2. Doubtful : Score 2
3. Do not agree : Score 1

The collected data transformed into tabular form, and calculated based on their respective scores. Then its result was compared to "The Guidance on Identifying Technical Determinants of Animal Husbandry from [2], resulting following categories:

a. Good, the achieved percentage; 81-100%
b. Moderate, achieved percentage; 60-80%
c. Less, the achieved percentage below 60%

3. Result and discussion

The result showed that there were three types of methods of adopting reproductive biotechnology innovation among beef cattle farmers in Dharmasraya. Each method took into account the respective biotechnology adoption; AI and ET as follow;

3.1. Extension methods in adoption of innovation of Artificial Insemination (AI)

| Nu | Methods          | Indicator | Amount (n) | Total Score | Average Score (%) | Category |
|----|------------------|-----------|------------|-------------|-------------------|----------|
| 1  | Home and Farm Visit | Agree     | 32         | 96          | 85.71             | Good     |
|    |                   | Doubtful  | 8          | 16          | 14.29             |          |
|    |                   | Disagree  | 0          | 0           | 0.00              |          |
| 2  | Demonstrasion    | Agree     | 36         | 108         | 93.10             | Good     |
|    |                   | Doubtful  | 4          | 8           | 6.90              |          |
|    |                   | Disagree  | 0          | 0           | 0.00              |          |
| 3  | Campaign         | Agree     | 29         | 87          | 82.10             | Good     |
|    |                   | Doubtful  | 8          | 16          | 15.10             |          |
|    |                   | Disagree  | 3          | 3           | 2.80              |          |

Source: Research Results 2016.
3.1.1. **Method of home and farm visit**

The implementation of home and farm visit extension methods in the process of adopting AI innovation was supported by the related departmental policy. The authority institution put forward extension officers and inseminators at each sub-districts of centre for livestock health services. This centre was accomplished by cattle breeding Artificial Insemination Service. When beef cattle farmers inform extension workers that their cattle was being estrus, home and farm visit method was used by the related officers. [12] stated that these extension method were effective, due to the officers familiar with the targets. In particular, when the target has reached the stage of trying or implementing the innovation.

3.1.2. **Method of demonstration**

The usage of demonstration method in extension has been well implemented in Albiotechnological innovation services in Dharamasraya District. The effectiveness of this method was supported by the extension process, which carried out on the farmers’ group basis. In particular where the number of cow was relatively large enough to have AI demonstration. Then extension workers could provide materials and assistance for handling postAIprocess, pregnant period and calving delivery. [3] [10] explained that demonstration is one of agricultural extension methods to prove a better farming result.

3.1.3. **Methods of campaign**

The study showed that the application of campaign method in the adoption of Artificial Insemination (AI) innovation was in good category, with average score was 82.10%. The success of campaign method was caused by the hard work of extension workers in preparing the activities, including funding, human resources and informing related stakeholders. [3] [10] stated that to work with campaign method, requires an appropriate preparation.

3.2. **Extension method in adopting Embryo Transfer (ET) innovation**

| Nu | Methods                  | Skor   | Amount (n) | Total Score | Average Score (%) | Category |
|----|--------------------------|--------|------------|-------------|-------------------|----------|
|    | Home dan Farm Visit      | Agree  | 14         | 42          | 100               | Good     |
|    |                          | Doubtful | 0        | 0          | 0.00             |          |
|    |                          | Disagree | 0     | 0          | 0.00             |          |
|    | Demonstration            | Agree  | 14         | 42          | 100               | Good     |
|    |                          | Doubtful | 0        | 0          | 0.00             |          |
|    |                          | Disagree | 0     | 0          | 0.00             |          |
|    | Campaign                 | Agree  | 13         | 39          | 95.12             | Good     |
|    |                          | Doubtful | 1      | 2          | 4.88             |          |
|    |                          | Disagree | 0    | 0          | 0.00             |          |

Source: Research Results 2016.

3.2.1. **Methods of home and farm visit**

The implementation of home and farm visit method was well implemented, due to the the number of participated farmers was selected by extension workers. The objective was to achieve an optimal result and process of adopting ET innovation. Normally, before adopting an innovation, farmers calculate its profit and benefit based on their experience. [4] revealed that the sequence of farmers’ interests of innovation attributed to innovation adoption was profit, cost, complexity, suitability, energy and time savings, and description.
3.2.2. Method of demonstration

The demonstration method has been applied appropriately by extension workers due to a relatively first-hand character of ET innovation. ET was introduced to beef cattle farmers at Dharmasraya District in 2012. [5] stated that the advantages of the demonstration method was its ability to see a new method put into practice. Thus there was no need for high trust between farmers and extension workers.

3.2.3. Methods of campaign

The method of campaign has been also implemented by extension workers in conveying ET innovation in Dharmasraya District. This was proved by the fact that 92.86% of respondents agreed the method used in ET adoption process. The figure indicated that the use of campaign method was in good category. Based on guidance of [2] standard, the minimum limit of good category was more than 81% of respondents agreed on the statement. The highly participation rate of farmers in the extension method was the main reason why campaign method could be operated well by officers.

3.3. Extension method in adopting the reproductive biotechnology (Artificial Insemination/AI and Embryo Transfer/ET) innovation

The study proved that home and farm visit method of has been well implemented by extension workers in Dharmasraya District in assisting farmers to adopt reproductive biotechnology innovation, where 92.86% of respondent agree. The result also showed that the demonstration and campaign methods have been operated well by the extension staff. These were proved by the percentage of average score for demonstration and campaign was 96.55% and 92.67% respectively.

| Nu | Methods           | Reproductive Biotechnology Innovation AVERAGE Score (%) | Reproductive Biotechnology Average Score (%) | Category |
|----|-------------------|---------------------------------------------------------|---------------------------------------------|----------|
|    |                   | AI Average Score (%) | ET Average Score (%) |                             |          |
| 1  | Home and Farm Visit | 85.71            | 100                   | 92.86                      | Good     |
| 2  | Demonstration     | 93.10            | 100                   | 96.55                      | Good     |
| 3  | Campaign          | 82.10            | 95.12                 | 86.61                      | Good     |
|    | Average Score (%) | 86.97            | 98.37                 | 92.67                      | Good     |

Source: Research Results 2016.

The total scores on extension methods utilized in the adoption of reproductive biotechnology innovation in Dharmasraya Regency was 92.67%. These three types of extension methods (home and farm visits, demonstration and campaign) have been well implemented by extension workers in processing disseminate of reproductive biotechnology innovation AI and ET in the study area.

4. Conclusion

Extension workers in Dharmasraya District of West Sumatera have utilized properly three types of extension methods; home and farm visit, demonstration and campaign to assist beef cattle farmers in adopting reproductive biotechnology innovation, namely Artificial Insemination (IB) and Embryo Transfer (ET).

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