The innovations transfer methods and model on cattle farmers in migrants' areas in Dharmasraya Regency, West Sumatra

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Abstract. The study aimed to identify the innovation transfer methods and model on cattle farmers in migrants' areas in Dharmasraya Regency, West Sumatra. The survey method used in this study with field observation support. The respondents determined by quota sampling as many as sixty farmers who joined in five farmer groups represent five migrants' areas with provision the farmers must have been the innovation transfer by the Extension Office. The data analysed quantitatively descriptive. The result showed that the transfer innovation methods conducted by the Extension Officer were mixed training methods (55%), field study method (100%), and direct meeting in rural office (100%). The innovation transfer model formed the participatory model (circle) in which the farmers identified the problems and then contacted the Extension Officer, researched with the Extension Officer and found the solution, thus solving the problems. It concluded that the innovation transfer methods did not use all innovation transfer methods, but they already used participatory models as innovation transfer models.

1 Introduction

In the foreseeable future, there is excellent potential for developing the livestock subsector, particularly in the cattle business. This situation is inextricably linked to the rising demand for livestock products due to the yearly population growth. In 2019, the Ministry of Trade of the Republic of Indonesia reported that it was anticipated that public beef consumption would rise by 6.01%. In contrast, beef production would only rise by 2.5% the following year. As a result, there is a 3.5% shortage of beef compared to the total demand.

In order to attain the frequently stated goal of meat self-sufficiency, stakeholders in livestock development must resolve the discrepancy between demand and supply by developing pertinent legislation. Meat self-sufficiency can be achieved if the cattle population increases. It can be achieved by maximizing the extension program in the central regions of beef cattle developing.

Dharmasraya Regency is one of the centres for developing beef cattle farming in West Sumatra Province. There are 42,356 head of cattle in this area, and there are 8,874 farmer households [1]. In comparison, there are sixty-one Field Extension Officers, with forty of

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them having the status of civil servants and twenty-one of them having the status of contract or free daily workers.

Through the field education that has been conducted, particularly in relation to various sorts of innovations in raising beef cattle, the agricultural extension officers have a responsibility in improving the knowledge, attitude, and abilities of beef cattle producers. The Law of the Republic of Indonesia number 16 of 2006 related to the agricultural, fishery, and forestry extension system states that one of the main functions of the extension system is to facilitate the learning process of agricultural and livestock business actors. As such, learning should proceed in accordance with this law.

The role of the facilitation mandated on the agricultural extension officers has not run optimally. It showed by the low innovation adoption by beef cattle farmers in this area. Based on preliminary research, the farmers adopted feed innovations to maintain *Indigofera zollingeriana*. In the reproductive aspect, it adopted Artificial Insemination innovation, and the environmental aspect was how to make organic fertilizer from farming waste. On the other hand, initiatives special efforts to make cows pregnant (UPSUS SIWAB Program) and People's Business Credit (KUR) were adopted.

The findings of this preliminary research revealed that the level of innovation adoption in several dimensions of the beef cattle industry had not been operating as predicted. Application of innovation transfer methodologies and models that were less applicable to the extension aim was one of the factors contributing to the low adoption rate. This issue is in line with Erythrina [2] who proposed that the dissemination model should be modified to account for the unique traits of farmers and their surroundings. Dissemination limitations, however, can also be brought on by other elements.

Based on the information above, this study aims to identify the method of disseminating innovation and formulating a model for the transfer of innovation in the beef cattle farming business in the Transmigration area of Dharmasraya Regency.

### 2 Material and methods

#### 2.1 Research location

The research was conducted in an intensively beef cattle farming developing area, and agricultural extension has been carried out related to innovations in raising beef cattle in Dharmasraya Regency.

#### 2.2 Research approach

The method of this research was used a survey method, Wirartha [3] said the A survey method is one that uses observation, data collection, and deductive reasoning to provide a broad picture of the subject under investigation and reliable information about the problem's subject.

#### 2.3 Data collecting

The primary data of the study were obtained from in-depth interviews (personal interviews) with respondents and key informants. Data from training, demonstrations, field meetings, village meetings, posters, farm visits, and model data were all collected as part of innovation transfer methods. Transfer of ideas including participative, vertical, and horizontal models. Secondary data was collected from the relevant agencies, including the type of innovation and the number of adopter in farmer groups.
2.4 Population and research sample

The population is beef cattle farmers in ex-transmigration areas, while the number of samples was determined using the Quota Sampling technique. Based on that technique, determined as many as sixty farmers from five groups of farmers representing five ex-transmigration areas of Dharmasraya Regency as respondents (see table 1).

Table 1. Distribution of research samples.

<table>
<thead>
<tr>
<th>No</th>
<th>Transmigration Area</th>
<th>Name of Group</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Karya Tama</td>
<td>Bhineka</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Koto Agung</td>
<td>Tirta Sari</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Sungai Atang</td>
<td>Harmonis</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Padang Bintungan</td>
<td>Sitiung Jaya</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Sungai Kalang</td>
<td>Usaha Maju</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

2.5 Data processing and analysis method

The data was analysed by quantitative descriptive analysis that showed frequency and percentage. The innovation transfer model data was analysed refers to Rhoades and Robert Model (figure 1) [4]:

![Innovation diffusion by Rhoades and Robert model.](image)

Fig. 1. Innovation diffusion by Rhoades and Robert model.

3 Result and discussion

3.1 Innovation transfer method in beef cattle farming

The result showed that the Extension Officer used three methods in innovation transfer. They combined field and direct meetings in rural office (100%) and training method (55%). innovation transfer method used by extension workers to beef cattle farmers in the transmigration area of Dharmasraya Regency is still limited to 3 methods, namely 55% using the training method, 100% using the field meeting method and the village meeting method.
These results showed that the Extension Officers tend to use methods aimed at fostered farmers who are joined in group or association groups. It happened due to the limited number of Extension Officers available, while the working area is wide and separated by a considerable distance. In accordance with the Regulation of the Minister of Agriculture (Permentan) of the Republic of Indonesia number 67 of 2016 [5], each Extension Worker in the Agricultural Extension Work Area (WKPP) can foster 8-16 farmers' groups. They scheduled to visit each farmers' group at least once every two weeks (Ministry of Agriculture 67 Years 2016).

The Dharmasraya Regency Agriculture Office [1] in Dharmasraya Regency Central Bureau of Statistics reported that there were 61 Extension Officers on hand in 2021, including 40 Extension Officers who had civil servant status and 21 Extension Officers who had contract status or were freelance daily workers. Existing Extension Officers provide guidance in a variety of disciplines, including food crops, horticulture, fisheries, and plantations, in addition to doing extension efforts in the cattle sector. It had an impact on the ability to visit all farmer groups, or even to only be able to do so every two weeks. According to Oyegbami's research [6], one of the greatest challenges to extension operations that affects the provision of extension services is the low ratio of farmer extension agents.

Extension services that only rely on direct meetings in rural offices and fields would be less effective in transferring innovation. It needs to be supported by other extension methods because the rural office and field meetings will only bring about changes in knowledge (cognitive) on the target of extension (farmers). To change the skill aspect (psychomotor), suitable extension methods, such as training and demonstration plots carried out through home visits or farming approaches, are needed. Farmers will see directly what and how to raise beef cattle efficiently and effectively through this relevant method. In line with Purnomo's et al. [7] opinion, the farmers' efforts to make technological innovations quickly reach the farmers are conducted through face-to-face meetings and business visits with the most effective extension methods, namely field experimental and demonstration plots (see figure 2).

![Fig. 2. Innovation transfer methods.](image)

### 3.2 Beef cattle farming business innovation transfer model

The result showed that the innovation transfer model created in the Dharmasraya Regency's transmigration area is a participatory model. It follows the farmer-to-farmer paradigm. According to this paradigm, farmers can recognize the concerns they are encountering, actively work with researchers and academics to find solutions, and then embrace those solutions after considering the findings of research to address their issues in greater detail. The innovation transfer model is depicted in the figure 3 below:
This model is pertinent to the transfer of numerous current innovations because, yet the extension target has not successfully adopted a number of innovations created by diverse producers. This circumstance is aligned with Syakir's et al. [8] opinion that several technological innovations produced by the Agricultural Research and Development Agency have not been adequately and broadly embraced.

Another advantage of this participatory innovation transfer model is that it familiarizes beef cattle farmers to be more independent in dealing with every problem they face while running a business, reducing dependence on other parties. It is undoubtedly advantageous in efforts to achieve food security. On the other hand, farmers are not proactive in finding solutions to their problems, which will have a destructive impact on the innovation adoption process. With the ability to identify these problems, farmers will also be able to find out what innovation needs are needed to solve them. Harta [9] said that the ability of farmers to adopt innovations affected by the attitude of farmers towards the innovations offered because attitudes will be able to change the farmer's perspective on the innovations introduced. Likewise, Muhyidin [10] opinion revealed that one factor that determines whether the leading actors adopt innovation is the farmers' attitude (see figure 4).

4 Conclusion

The innovation transfer method applied by Extension Officers to beef cattle farmers in the ex-transmigration area of Dharmasraya Regency uses the training method (55%), the field meeting (100%) and the rural office meeting method (100%). In contrast, other methods have not been applied. The innovation transfer model formed in beef cattle farming is the Participatory (circular) model, where farmers can identify problems, contact researchers, actively conduct research with researchers, produce solutions based on research results, solve problems according to solutions.
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