

INNOVATION ADOPTION OF GOOD FARMING PRACTICE IN SHEEP FARMING BUSINESS IN Gegerbitung District, Sukabumi Regency

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Abstract. Most of the people in Gegerbitung Subdistrict work as farmers and breeders. This study aimed to determine the level of Good Farming Practice (GFP) implementation as a form of innovation adoption in sheep farming in Gegerbitung Subdistrict, Sukabumi District. The method used was descriptive qualitative with primary data collection through questionnaires and interviews, and secondary data from literature. This study examined four aspects of GFP: facilities, production, environmental conservation, and supervision. The results showed that the implementation of GFP in the facilities and production aspects was quite good, with achievements of 71.82% and 76.06%, respectively. The environmental conservation aspect is still low at 41.67%, while the supervision aspect is quite good at 75.00%. Overall, the level of innovation adoption through the application of GFP in sheep farming in Gegerbitung Subdistrict reached 66.55%, which is classified as sufficient, but still needs improvement, especially in the aspects of environmental management and utilization of feed technology. This research is expected to be a reference for farmers and the government in increasing the productivity of sheep through a more optimal application of GFP.

Keywords: Good Farming Practice; Innovation Adoption; Sheep Farming Business

1 Introduction

Sheep is an important livestock commodity that is commonly raised by rural communities because it has several advantages, such as being easy to adapt to the environment, rapid breeding, requiring relatively low capital investment, and can be used as a form of savings. However, the sheep rearing system in Indonesia is still mostly traditional and small-scale, with 3 to 5 head ownership and simple maintenance methods. Access to feed is also limited and often relies on nature. This has an impact on low productivity and the inability of sheep livestock to meet the increasing national meat needs.

One of the fundamental problems is the lack of optimal implementation of Good Farming Practice (GFP). In Sukabumi Regency, the sheep population has decreased from 472,939 heads in 2022 to 304,133 heads in 2023 according to BPS data for Sukabumi Regency (2023)[1], reflecting the absence of a significant increase in population due to traditional management. The GFP was compiled to improve the quality of breeding methods and to be an effective guide for sheep farming to increase population and production, ensure meat quality, create jobs, and improve the welfare of farmers [2].

Gegerbitung District is one of the central sheep farming areas in Sukabumi Regency with a total of 3,817 sheep, 88 farmer groups, and 975 breeders [3]. However, the implementation of GFP in this region is still not optimal, especially in terms of facilities, production, environmental conservation, and supervision. Several characteristics of breeders, such as age, education level, experience in livestock farming, and the number of livestock owned, also affect the application of innovation in the livestock business.

This research has a contribution in providing a real picture of the level of GFP implementation at the level of smallholder farmers, which has not been studied specifically in Gegerbitung District. In addition, the results of this research are expected to provide a basis for mentoring strategies and policy formulation in order to encourage more productive, sustainable, and standard-compliant livestock farms.

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In line with the research of A. Theodoridis, et al (2021) [4] uncovering the most efficient sheep farms in applying best practices optimally. These practices include innovations in feeding, effective marketing strategies, livestock breeding programs, and the economic performance of the livestock sector.

The purpose of this study is to determine the level of implementation of Good Farming Practice in sheep farming in Gegerbitung District, Sukabumi Regency, as well as to identify aspects of GFP that have and have not been optimally implemented by farmers.

2 Mehtod Research

2.1 Population and Sampling Techniques

According to S. W. Purwanza, et al. (2022) [5] The population should be mentioned how many and the area is the object of each study. The purpose of the population is to enable researchers to determine the number of samples taken. Samples are a portion of the population taken using the sampling method.

The population in this study is all sheep farmers in Gegerbitung District, Sukabumi Regency. The method of determining the sample used is non-probability sampling, namely the purposive sampling method. According to Sugiyono (2020) [6], purposive sampling is the process of determining the number of samples to be studied by considering several desired criteria. The sample was determined based on considerations such as age, education, livestock population, family dependents, and length of livestock business. The number of respondents sampled in this study was 30 livestock farmers.

2.2 Instruments and Data Collection

This study uses a qualitative descriptive approach. The data used consists of primary and secondary data. Primary data was obtained through questionnaires, interviews, direct observations in the field, and recording of sheep farmer activities in Gegerbitung District. Meanwhile, secondary data was obtained from literature reviews, including data from the Central Statistics Agency, related agencies, digital books, and relevant scientific articles.

The main instrument in this study is a questionnaire prepared to measure the extent of the implementation of Good Farming Practice (GFP), which includes four aspects: provision of facilities, production activities, environmental conservation, and monitoring process. In addition, the questionnaire also includes the characteristics of farmers as supporting variables. In this study, the Guttman scale was used to assess participants' responses. As stated by (Sugiyono, 2020) [6] The Guttman scale is used to elicit a definitive response from respondents. This means that there are only two intervals, namely "agree-disagree", "yes-no", "true-wrong", "positive-negative", and "never-never". This measurement approach allows for the preparation of questions in a multiple-choice format, with the highest score given a score of 1 and the lowest given a score of 0. For example, the answer 'yes' is given a score of 1 and 'no' is given a score of 0.

2.3 Variable Operationalization

(GFP) for sheep and goats is an appropriate guide in the practice of raising livestock. The purpose of this guideline is to increase the quantity, production yield, and effectiveness of livestock, as well as improve the quality of livestock products (meat) and strengthen the availability of food from domestic farms, create jobs, increase farmers' income and welfare and encourage livestock

exports, especially commodities such as goats and sheep. The main variable in this study is the level of implementation of Good Farming Practice (GFP) which refers to (Decree of the Minister of Agriculture Number 41 of 2001). The aspects of GFP observed include: Facilities, such as cage construction, water supply and supporting equipment. Production processes, such as seed selection, reproduction, feeding, and disease control. Environmental conservation, such as waste management. Supervision, such as recording business data and supervision from agencies.

2.4 Data Analysis Techniques

The data was analyzed in a qualitative descriptive manner through three stages, namely data reduction, data presentation, and conclusion/verification. The analysis is carried out with the help of Microsoft Excel software to simplify data processing and improve the accuracy of the results. The assessment of the level of GFP implementation is calculated based on the percentage score of the total questions of each aspect.

The formula for determining score intervals refers to the Guttman scale approach as follows:

A guide to scoring and scoring using the Guttman scale approach. The guidelines for determining the assessment and scoring are as follows:

There are two answer options. For example, there are three question items. The lowest score is given 0 (for an answer that is considered incorrect), while the highest score is 1 (for a correct answer). The minimum score is obtained from the lowest value multiplied by the number of questions, i.e. $0 \times 3 = 0$ (or 0%). Meanwhile, the maximum score is calculated from the highest score multiplied by the number of questions, which is $1 \times 3 = 3$ (or 100%).

Scoring for objective criteria is done using a general formula. The formula is:

Interval (I) = Range of values (R) divided by the sum of categories (K)

The range of values (R) is obtained from the maximum score minus the minimum score, which is $100 - 0 = 100\%$

The number of categories (K) is the number of classifications of objective criteria of a variable, namely two categories: "Sufficient" and "Less" So, Interval (I) = $100 \div 2 = 50\%$

The evaluation criteria are determined by dividing the highest scores into intervals. If the score reaches more than or equal to 50%, then it is rated Sufficient. If the score is less than 50%, then it is categorized as Low.

The final score (%) is obtained by the formula:

$(\text{total score obtained} \div \text{maximum score amount}) \times 100\%$

This assessment is applied to each aspect of GFP to determine the level of adoption of innovations in each respondent.

3 Results and discussion

3.1 Characteristics of breeders

According to M. A. Kurniawan, et al (2021) [7] The characteristics of sheep farmers in Gegerbitung District include age, gender, marital status, education, number of livestock ownership, number of family dependents, and length of business. Based on the results of a survey of 30 respondents, the majority of farmers are over 50 years old (60%), male (100%), married (100%), and have basic education/equivalent (60%). In terms of livestock ownership, as many as 40% of farmers raise

between 6-10 sheep. Most (80%) have family dependents between 1–3 people, and 47% of respondents have been in the livestock business for 1–10 years.

This data shows that farmers are dominated by elderly men, with low educational backgrounds and small-medium business scale. This characteristic is one of the challenges in the development of livestock businesses that are oriented to GFP standards, because the adoption of innovation is closely related to the level of education and access to technological information according to G. Gunawan, et al. (2019) [8].

3.2 GFP Implementation Rate

The implementation of Good Farming Practice is measured based on four main aspects: facilities, production processes, environmental conservation, and supervision. Full results are presented in Table 3.1.

Table 3.1 Based on the Rate of Implementation of GFP in the Aspect of Facilities

Indicators	Sum	
	Person	%
Location		
Have you paid attention to the environment and topography	24	80%
Water preparation and description		
Does provide water	10	33%
Have you provided a cage lighting device	27	90%
Stable building		
The construction of the cage is made of wood/bamboo	30	100%
The roof of the enclosure is made of tile/zinc/asbestos	30	100%
The enclosure has sewage drainage/drainage	9	30%
The cage has good circulation	30	100%
Livestock equipment and machinery		
What is having equipment and drinking cattle	24	80%
Have sanitary equipment (gloves, spray bottles, fur brushes etc.)	13	43%
Is it carrying out disease control and treatment	30	100%
Have other production support equipment	10	33%

3.2.1 Aspects of Means

In the aspect of facilities described in Table 3.1, the discussion includes location, water supply and lighting, cage buildings, and livestock equipment and machinery. According to D. Pinardi, et al (2019) [9] The design of each building must pay attention to the environment and topography so that the dirt and waste produced do not pollute the environment. Most sheep farming locations in Gegerbitung District have paid attention to environmental and topographic factors, for example such as cages that are quite far from their place of residence and have paid attention to the height and slope of the land to prevent natural disasters such as landslides and floods with a percentage of 80%.

Farmers in Gegerbitung District in terms of water supply and lighting, only 33% of farmers provide clean water for their livestock. This lack of water supply can be a major obstacle because the availability of water is essential for the health and productivity of livestock. However, some farmers do not provide water directly because they rely on fresh forage that contains a lot of water, so it is considered sufficient to meet the liquid needs of livestock. Meanwhile, in terms of lighting, as many as 90% of farmers have provided lighting equipment in the cage. Adequate lighting of the cage is helpful in maintaining security, especially to prevent theft of livestock, guard against wild animal attacks and facilitate activities at night. For farmers who have not provided lighting, it is generally due to limited access to electricity at the cage location.

The cage building in Gegerbitung District uses a stage cage type, as much as 100% made of wood and bamboo because these materials are easy to get and cheap. The roof of the cage is also 100% made of tiles, zinc, or asbestos, quite effective in protecting livestock from bad weather. However, only 30% of the cages have drainage, as some farmers still manage waste manually without special channels. Air circulation in the cage is good, as many as 100% or all respondents have adequate cage ventilation. According to L. Purnamasari, et al. (2018) [10] Optimal air distribution in the cage affects the health condition of livestock.

According to R. A. Lubis, J. Ilm. Mhs. Pertan (2022) [11] Agricultural extension workers facilitate or accelerate the application of technology by farmers and communication of farmers' demands to government agencies for certified and high-quality agricultural seeds, tools and machinery (Alsintan). Livestock cage equipment and machinery are one of the supports for livestock businesses, almost all farmers in Gegerbitung District already have 80% of livestock eating and drinking equipment or 24 people out of 30 respondents, showing a fairly good awareness of the basic needs of livestock. However, only 43% of farmers have sanitary equipment such as gloves or sprayers, which serve to keep the cages and livestock clean. Regarding disease control efforts, all farmers have 100% carried out control and treatment of sick livestock, showing high concern for the health of livestock. Finally, only 33% of farmers have additional equipment to support production, such as hair shearers or milking tools, which shows that most livestock businesses are still modest.

Table 3.2 Based on the Rate of Implementation of GFP in Production Aspects

Indicators	Sum	
	Person	%
Seed selection		
Do you already know how to select seedlings in general	30	100%
Reproduction		
Married as adult sex	30	100%
Knowing the characteristics of sheep	30	100%
Know how long lamb is roasted for 25-40 hours	21	70%
Knowing the sheep feeding cycle of 17-21 days	26	87%
Sheep give birth once every 7 months	19	63%
Feeding		
Feeding is carried out 2 times a day	30	100%
The use of forage feed	30	100%
Use of silage feed (fermentation)	2	7%
Animal health		
Livestock are suffering from disease	3	10%
Do you like to do disease prevention	30	100%

3.2.2 Production Aspects

The application of production aspects in GFP in Table 3.4 is based on seed selection, livestock reproduction, feeding, and animal health. Based on the data, all respondents (100%) already know how to select livestock seeds in general, by paying attention to physical conditions such as the health of the reproductive organs and the body free from defects.

In reproduction, all respondents (100%) knew the time of mating of cattle when they were sexually mature and the characteristics of sheep's lust. However, only 70% of respondents knew the length of sheep (25-40 hours) and 87% knew the sheep sheep cycle (17-21 days). In addition, 63% of respondents know that sheep give birth once every 7 months. This condition shows that the adoption of innovations in reproductive management still needs to be improved, especially in understanding the duration of sexual reproduction and the reproductive cycle.

In feeding, all respondents (100%) have fed twice a day and used forage feed. However, only 7% of respondents use fermented feed (silage), which shows that the adoption of innovations in the use of feed technology to improve nutritional quality is still low. According to R. Billyardi, et al. (2016) [12] Silage is one of the solutions that can maintain the availability of animal feed, especially in the dry season. In animal health, 10% of farmers reported that their livestock were experiencing disease, while 100% of respondents had carried out disease prevention, showing the awareness of farmers in maintaining the health of livestock.

Table 3.3 Based on the Level of Implementation on Environmental Conservation Aspects

Indicators	Sum	
	Person	%
Environmental conservation		
Does it have a sewage disposal	4	13%
Is it doing sewage treatment	21	70%

3.2.3 Environmental Conservation Aspects

Data shows that as many as 13% of farmers in Gegerbitung District have manure waste shelters. This figure is still relatively low, indicating that awareness among farmers about the importance of waste storage to prevent environmental pollution needs to be increased. According to A. Marzuki, et al (2020) [13] The processing of sheep manure into solid organic fertilizer (POP) through training and counseling can increase farmers' knowledge in waste management that is environmentally friendly and economically valuable. Manure waste collection is essential to keep the farm area clean and prevent the spread of disease. Good waste storage can facilitate the management and utilization of waste as an organic fertilizer that is beneficial for agriculture.

As many as 70% of farmers report that they treat waste waste. Waste treatment includes various actions such as fermentation for composting or biogas. Effective management not only helps reduce the negative impact of waste on the environment, but it can also provide additional economic benefits for farmers through by-products such as the manufacture of organic fertilizers.

Table 3.4 Based on the Degree of Implementation of GFP in Aspects of Supervision

Indicators	Sum	
	Person	%
Supervision		
Have you received supervision, monitoring and evaluation from the local agency or the Sukabumi Regency Livestock Service	26	87%

Do you do recording such as <ul style="list-style-type: none"> • Data on the population of livestock reared • Data on the type of feed given and feed consumption • Vaccination and medication schedule • Drugs and vaccines used • Livestock mortality data • Where the cattle were purchased • Data on livestock incoming/exiting 	19	63%
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3.2.4 Aspects of Supervision

Based on the data in the table, supervision in Gegerbitung District by the Sukabumi Regency Livestock Service or local agencies has included supervision, monitoring, and evaluation by related agencies. According to Z. Fitrian (2016) [14] The Animal Husbandry Service is tasked with providing guidance and developing the livestock sector. The purpose of this task is for farmers and groups of farmers to understand and implement good and standardized livestock practices. Of the total respondents, as many as 26 people (87%) reported that they had received such supervision and evaluation. This shows that the majority of farmers have engaged in an intensive monitoring process to ensure high standards in livestock practices. In addition, from the recording aspect, it was recorded that 19 people (63%) of respondents had recorded important data related to their livestock, such as livestock population data, vaccination, and reproductive data. According to T. E. Susilorini, et al. (2025) [15] explained that increasing farmers' understanding of the importance of production and monitoring standards, such as livestock growth targets and reproductive management, is a first step in encouraging awareness of systematic recording in GFP practices. This recording is an important part of the adoption of innovation in the livestock sector, as it supports more controlled, measurable, and efficient livestock management.

Table 3.5 Average Implementation Rate of GFP in Gegerbitung District

GFP Aspects	Present (%)
Means	71,82
Production	76,06
Environmental Conservation	41,67
Supervision	75,00
Total Average	66,55

According to H. S. P. Rahayu and Herawati (2021) [16] New types of inventions can influence farmers' choices in accepting change. These innovations are characterized by relative advantages namely *compatibility*, *complexity*, *trialability*, and *Observabilities*. Relative benefit is the benefit that a person receives when accepting change. This benefit can be an economic benefit or a cost income. The feasibility stage of change is the extent to which an innovation can be implemented by parties affected by the latest economic, environmental, and social conditions. Level *Complexity* is the type of complexity inherent in an innovation and whether the innovation causes difficulties in implementation so as to affect the adoption of the innovation. *Tryability* is the nature of an innovation that allows users to try, use, and apply the innovation so that users can give an assessment of the innovation. *Observabilities* is the nature of an innovation so that potential adopters of innovation can observe it, and the decision whether to adopt an innovation is made based on these observations. The dissemination of technological innovations to farmers is one of the roles and functions of agricultural extension workers, in order to advance farmers' agricultural

activities and affect the improvement of farmers' welfare in achieving the goals of agricultural development in the industrial era 4.0 which encourages farmers to achieve these goals by adopting and applying agricultural techniques.

These results are in line with the research of Yuniza et al. (2023) [2] which states that the adoption of GFP is greatly influenced by the characteristics of farmers and the availability of infrastructure. In addition, the research of Gunawan et al. (2019) [8] It also states that the frequency of counseling and the suitability of materials with the needs of farmers affect the success of innovation adoption. Overall, the rate of GFP implementation in Gegerbitung District is in the "adequate" category (66.55%). This shows that most farmers have adopted better farming practices, especially in the aspects of production and supervision. However, the aspect of environmental conservation is still low, which shows the need for support from agricultural extension workers and related parties to encourage the application of sustainability principles in livestock.

4 Conclusion and recommendation

Based on research and discussion, the characteristics of sheep farmers in Gegerbitung District include age, gender, marital status, education level, number of livestock ownership, number of family dependents, and experience in raising livestock. The majority of farmers are over 50 years old (60%), male (100%), married (100%), and basic education (elementary/equivalent as much as 60%).

The rate of implementation of Good Farming Practice (GFP) as a form of adoption of innovation in the livestock sector shows the following results: the aspect of facilities reached 71.82%, with most farmers having adopted innovations in the form of stage cages, good ventilation, and lighting equipment. However, the adoption of innovations related to the provision of water and sanitation devices is still low. The production aspect reached 76.06%, showing that farmers have adopted basic innovations in seed selection, reproduction, and routine feeding. However, the adoption of innovations in the use of fermented feed (silage) is still very low (7%) and the understanding of the fermentation cycle is not evenly distributed. The aspect of environmental conservation only reached 41.67%, indicating the low adoption of innovations in the management and storage of waste waste, although some farmers have used waste as organic fertilizer. The aspect of supervision has reached 75.00%, which shows a fairly good level of adoption of innovations in data recording and supervision acceptance from related agencies. Overall, the adoption of innovations in the implementation of Good Farming Practices in Gegerbitung District is quite sufficient, at 66.55%, but it still needs to be improved in terms of environmental conservation and the use of feed technology.

From the above conclusion, the researcher suggested that farmers in Gegerbitung District need to increase the adoption of innovations in the provision of clean water and cage sanitation, because this is important to maintain the health and productivity of livestock. Understanding of the cycle of birahi (17–21 days) and duration of birahi (25–40 hours) also needs to be improved so that livestock reproduction programs can run optimally. In addition, it is necessary to increase the adoption of innovations in waste management through the construction of waste storage facilities. The Livestock Service and related agencies are expected to strengthen the role of counseling in accelerating the adoption of innovation among farmers, especially in the use of fermented feed technology (silage), the implementation of routine and digital business registration, and sustainable management of the livestock environment. With the increase in the adoption of innovation, it is hoped that the sheep farming business in Gegerbitung District can be more productive, efficient, and sustainable.

The researcher would like to express his deepest gratitude to all parties involved and who have helped during the process of implementing and working on this research, both directly and indirectly. Especially to farmers in Gegerbitung District who have been willing to become respondents in this study.

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