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Sido Makmur Srandakan Bantul Livestock Farmer's Group Readiness to Utilize Fermented Feed to Increase Income

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ABSTRACT

The research aims to analyze the group's understanding and readiness in utilizing fermented feed preservation and income analysis, specifically focusing on the selection of a location within the Sido Makmur group in Srandakan District, Bantul Regency. The sample was selected as a convenience sample of as many as 17 out of 80 members who were willing to be interviewed. The research was conducted in a quantitative descriptive manner. Primary data was collected through direct interviews using a questionnaire tool. The primary data collected include respondent characteristics, land ownership, and readiness to utilize feed preservation. The results show that most farmers of productive age with formal education equivalent to high school have received training in feed preservation; their main occupation is farming. The forage potential comes from agricultural waste, plantations, grass, and legumes. Farmers are willing to provide fermented feed to livestock (82.50%) and interested in selling fermented feed (76.47%) in the form of drums with a capacity of 50 kg made by farmer's group (47.06%), created by individual (70.59%) and plastic packaging (41.18%) Income from fermented feed in drum was IDR 37,970 and plastic was IDR 35,970. Selling price and product quality are essential factors in selling fermented feed. Fortunately, to support product quality, packaging and labelling support is needed.

Keywords: fermented feed, selling price, Sido Makmur farmer's group

INTRODUCTION

Sido Makmur is the name of a livestock group in Babakan Hamlet, Poncosari Village, Srandakan, Bantul, Yogyakarta, with a Registration number Reg. 02010117 NAK. The group built their communal cage on land rented from the village treasury. The Livestock populations consist of 32 cows, 11 goats, and five sheep. The Sido Makmur group has a sufficient source of animal feed. In addition to having forage land, which is village treasury land covering an area of 3,150 m^2, the location of the group's cage is not far from productive rice fields that can be planted all year round. In addition, this livestock group is also allowed by the village to use the banks of the Progo River to plant grass forage. Babakan Hamlet is included in the estuary coast, which has heterogeneous geographical conditions. The area is around 38,399 ha, including 18,979 ha of yards, 16,295 ha of rice fields, and the banks of the Progo River with an area of about 3,125 ha (Murtaza, 2023). Farmers from outside the area purchase grass from the group, and members of this group sell to them in the dry season. However, during the rainy season, demand drops, even though the stock is abundant. Excess stock during the rainy season presents an opportunity to produce silage through fermentation, a preservation method that can be sold during the dry season. It is predicted that in the future, the growth of ruminant livestock will increase because the supply of beef cattle in Indonesia is negative. In 2022, the beef cattle supply will be -258.68 thousand tons (Directorate General of Livestock and Animal Health, Ministry of Agriculture of the Republic of Indonesia, 2022), so ruminant growth is needed. The trend of livestock without a fence also creates an opportunity to sell preserved forage. Fermented feed, such as silage or fermented complete feed, can last up to one year or more with the proper packaging record, good airtightness, and no leakage. Several previous studies have shown that fermentation, in addition to preservation, also provides additional benefits for livestock. Fermentation in feed and complete feed increases cow body weight gain (Pakpahan and Restiani, 2019; Li *et al*., 2021), improves the palatability and digestibility of feed (Irwansyah and Junaedi, 2019), and, besides that, the metabolites produced during the fermentation process have a positive effect by improving the morphology of the

gastrointestinal tract and improving the immune system (Ashayerizadeh *et al*., 2018). For feed fermentation sales business activities, it can originate from Babakan BUMDES, which has been involved in sand mining and operating tourist villages. The BUMDES has fostered several MSMEs. Some farmers are also suppliers to BUMDES, providing livestock and concentrated feed. Therefore, this study aims to analyze the understanding and readiness of the group regarding the utilization of fermented feed preservation and income analysis within the Sido Makmur group.

MATERIALS AND METHODS

The research location in Sido Makmur is a livestock group in Babakan Hamlet, Poncosari Village, Srandakan, Bantul, Yogyakarta. The research was conducted in September and October 2024. The research subjects were 17 respondents from the livestock group "Sido Makmur," selected using a convenience sampling method based on their willingness to participate in the interview. Data analysis was carried out in a quantitative descriptive approach. Primary data was taken through direct interviews with farmers using a questionnaire tool. The data included the characteristics of the respondents, land ownership, readiness for using feed preservation, and chemical content to determine the quality of the fermented feed produced by the group. The analysis was carried out in the biochemistry laboratory of the Faculty of Animal Science at Universitas Gadjah Mada. This analysis is crucial in supporting the quality of the by-product produced by the group.

RESULTS AND DISCUSSION

Characteristics of breeders and livestock ownership

The characteristics of the respondents indicate that they possess the potential to carry out livestock maintenance effectively. The average age of group members fell within the productive age range (54.06 ± 7.27 years), with the majority of group members having an education equivalent to high school (52.94%). Most farmers have participated in feed processing training (82.35%), with the primary purpose of raising livestock being to increase family income, in addition to side businesses (41.18%), as not all respondents have farming as their main job. The cattle raised include PO, Simmental, and Limousin, which are typically fattened in small-scale systems with 1 to 2 heads per farmer and maintenance for 3 months. Small-scale ownership of 3–5 goats or sheep, which are in great demand, is the Bligon, Ettawa Crossbred Goat, Sapera, and Boer goat for the reason that capital turnover is fast and sales are relatively quicker.

Table 1. Respondent characteristic

Component	X ± SD	%
Age (years)	54.06 ± 7.27	
Gender		
Man		94.11
Woman		5.89
Formal education (%)		
Elementary school		0.00
Junior high school		11.76
High school		52.94
College		28.63
Non-formal education		
Participate in feed processing training		82.35
Not following		17.65
Number of family members (people)	4.00±1.86	
Main occupation		
Farmer Breeder		58.82
Other		41.18
Purpose of breeding		
Family income		41.18
Side business		41.18
Savings		17.64

Goats and sheep are widely raised in Indonesia, which is predominantly Muslim, for religious ceremonies and culinary purposes, so the sales opportunities are also fast (Sujarwanto et al., 2024). Garut sheep are chosen for a breeding system with an average ownership of 1-2 heads because farmers can raise their broodstock to increase flock size and produce high-quality offspring, which can be sold at a higher price. Garut sheep have high genetic quality, production, and reproductive traits (Adiati & Rusdiana, 2022).

Plant ownership

The types of plants that can be used as raw materials for animal feed come from agricultural waste, plantations, grasses, and legumes. Plants are planted in rice fields, tegal, banks of the Progo River, and village treasury land. The feeding system for livestock is cut and carry, and feed is given twice a day, in the morning and evening. The widely available and varied local feed raw materials can support the manufacture of formulated feed to increase livestock productivity and income (Ragasa et al., 2022). For example, the combination of Manihot and elephant grass produced the highest cattle ADG of 0.23 kg/day (Cowley et al., 2020). The use of legumes and trees is essential to be carried out for feed cost efficiency (Adegoke & Abioye, 2016). Complete feeding can stabilize rumen fermentation, thereby enhancing nutrient utilization (Beigh et al., 2017). The use of cultivated forage can reduce methane emissions with a reduction value of between $165 (IDR 2.678.528) and $240 USD (IDR 3.909.710) (Dey et al., 2022). Grass silage reduced emissions by 11 kg of CO2e/t of FPCM and labour income by €463, or equal to IDR 8.810.385 (Middelaar et al, 2014).

Local feed crops that have not been utilized can be leveraged as a new business opportunity through the manufacture of silage and straw containing urea in small-scale agriculture (Makkar, 2016).

Table 2. Types and areas of cultivated plants

Plant Type	Area (m^2)
Agriculture	
Oryza sativa, Zea mays, Manihot esculenta	1000
Plantation	
Saccharum, Cocos nutifera, Artocarpus heterophyllus	450
Grass	
Elephant grass	400
Brachiaria mutica	600
Pennisetum purpureum cv Thailand	700
Gama Umami	800
Legumes	
Gliricidea sepium, calliandra, leucaena leucocephala	100
Indigofera	1000

Availability of supply and sale of fermented feed

Table 3. Availability of feed fermentation

Question	n	%
Are you willing to give feed through feed fermentation?		
Yes	14	82.35
Not	3	17.65
If you are willing, the reason is		
Practical, time-saving, labour-intensive	8	47.06
Can be for stock	3	17.65
Durable	2	11.76
Feedland available	1	5.88
If you are not willing, the reason		
It takes time to find grass	2	11.70
Fear that the cattle will not eat	1	5.88

Question	n	%
Are you interested in selling feed in the form of feed fermentation?		
Yes	13	76.47
Not	4	23.53
If you are willing, the reason		
Increase revenue	7	
Abundant feed land	3	41.17
Promising business opportunities	3	17.65
If you are not willing, the reason		17.65
Self-feed priority	4	100,00
Father chooses a drum or a plastic holder.		
Plastic	7	41.18
Drum or barrel	10	58.82
Reasons to use drums		
Durable	7	41.17
Durable and easy to carry	3	17.68
Desired drum capacity		
25 kg	4	23.53
50 kg	8	47.06
100 kg	5	29.41
Fermented feed can be made regularly.		
Make your own	12	70.59
Creating a group together	5	29.41
How to provide feed raw materials to a group		
Taking from the group's land and own land	3	17.65
Retrieving from the group land and forests	1	5.88
Renting land and making tools for planting plants	1	5.88
If created with a policy group or group rule that you want		
1-door sales	3	17.65
There is a levy on the group	1	5.88
Members feed correctly	1	5.88
How to maintain the quality of feed raw materials		
Looking for forage that is high in nutrition and fresh	12	70.59
Implement group rules	1	5.88
Anaerobic fixed place	2	11.76
Making feed according to the correct composition	5	11.77

The willingness of farmers to provide fermented feed to improve feed availability, saving time and energy. On the other hand, fermented feed can offer more advantages than feeding forage without fermentation. The income from raising cattle for three months with fermented feed is IDR 3,090,000.00, while with the provision of field forage it is IDR 1,440,000.00 (Rasyid *et al*., 2018).

Table 4. Feed fermentation sales

Question	n	%
Feed fermentation sales		
Neighbor	11	64.70
Other Farmers	4	23.53
Contacts outside the district	2	11.77
Essential factors in the sale of fermented feed		
Selling price	12	70.59
Feed certification	2	11.77
Weight, packaging type, and labelling	3	17.64

Question	n	%
How to sell		
Contacting the buyer's home	14	82.35
Calling buyers	3	17.65
Problems in the sale of fermented feed		
Constraints on sales permits	2	11.76
Fermentation failure (not 100% successful)	3	17.65
Most breeders use natural feed	12	70.59
Strategies to make feed sales profitable		
Quality products	10	58.82
Priced	5	29.41
Appropriate ration formulation	2	11.77

Based on Table 4, it can be seen that farmers consider that the selling price is an essential factor in the sale of fermented feed compared to packaging, labelling, and product certification. It is therefore necessary to introduce the importance of the benefits of product packaging and labelling. Packaging is essential in maintaining product safety, while labelling provides buyers with information about instructions and use, thereby expanding the product market (Kusumastuti et al., 2022). A major issue affecting feed sales is that the majority of farmers still use fresh, non-fermented feed (70.59%) and do not produce fermented feed (17.65%).

Table 5. Analysis of fermented feed sales income (IDR/drum) or (IDR/plastic)

Types of components	unit	Price	Total
Revenue			
Sales of fermented feed	50	1,500	**75,000**
Total revenue			75,00
Cost			
Raw materials per 50 kg			
Grass (kg)	50	500	25,000
Drops (ml)	0.5	12,000	6,000
Inocular (ml)	0.1	300	30
Chopper (1200 kg per 60 minutes, 2.2 KWH)	1	2,000	2,000
Plastic	1	2,000	2,000
Labor	1	5,000	5,000
Total cost			39,030
Total income/ plastic			35,970
Total income/drum			37,970

The estimated income obtained in the manufacture of fermented feed assumes a price of IDR 1,500/kg and a capacity of 50 kg, according to the farmer's wishes of IDR 37,970/drum or IDR 35,970/plastic. Drum exchange methods, such as gas cylinders, are practical compared to drum packaging. This is in line with Kusumastuti et al. (2022), who found that complete feed with the drum method provides additional income for Etawah crossbred goat farmers in Samigaluh, Kulonprogo. Packaging and labelling, in addition to supporting biotechnology, also increase competitiveness and productivity (Lokko *et al*., 2018).

Feed fermentation not only preserves high-quality feed ingredients for long-term use but also degrades toxins, anti-nutrient factors, and harmful microorganisms in low-quality ingredients (Day *et al*., 2020). The nutrient composition of forage before and after fermentation is not significantly different. The purpose of fermentation is preservation by growing acid-producing bacteria, generally lactic acid bacteria (LAB), so that during fermentation, LAB grows and produces lactic acid, which causes the pH to drop. The decrease in pH inhibits the growth of decaying bacteria or destroyers of forage feed. The data in Table 6 shows that during

fermentation, there is an increase in lactic acid production, so that the pH drops. The decrease in pH is suspected to inhibit decomposing bacteria so that the nutrient composition does not change much. The results of the analysis show that farmers' anxiety that livestock do not want to eat fermented feed can be avoided.

Table 6. Feed nutrient content before and after fermentation

Component	Before fermentation	After fermentation
Dry material (%)	44.56	47.87
Organic matter (%)	90.66	91.28
Crude protein (%)	15.83	13.45
Crude Fibre (%)	31.99	35.06
Crude Fat (%)	0.737	1.56
PH	6.12	4.35
Lactic acid content (%)	0.25	0.89
Ammonia (%)	49.84	45.35

Source: Analysis in the Laboratory of Biochemistry, Faculty of Animal Science, Universitas Gadjah Mada

Figure 1. Fermented feed in a drum

Figure 2. Fermented feed in plastic

Figure 3. Making fermented forage

CONCLUSION

Farmers are willing to provide fermented feed to livestock and are interested in selling fermented feed in the form of a 50 kg capacity drum, which is independent because it is durable. The estimated sales revenue, in the form of drums, is IDR 37,970, and for plastic, it is IDR 35,970. Selling price and product quality are essential factors in the sale of fermented feed. Therefore, to support product quality, it is necessary to socialize the benefits of packaging and labelling.

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