Sustainability: Management of Raising Peranakan Etawa Goats in Toari District, Kolaka Regency, Indonesia

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ABSTRACT

The sustainability of livestock farming plays a crucial role in maintaining ecological and economic balance in a region. The primary focus in this context is the management of Peranakan Etawa Goat farming, which is the main subject of this article. The aim is to delve into the practices of Peranakan Etawa Goat husbandry management and its impact on the sustainability of farming in the Toari District, Kolaka Regency. This research was conducted in the villages of Ranojaya, Wonua Raya, and Rahabite, Kolaka Regency, from April to July 2023, with location selection adapted through purposive sampling. The observed variables include the management of Peranakan Etawa Goat husbandry, covering aspects such as breeding, feeding, housing, and husbandry systems. The collected data are presented in tables and percentages and analyzed descriptively. Findings indicate that the practices of Peranakan Etawa Goat husbandry management in the Toari District tend to involve purchasing breeding stock, feeding with foliage, and utilizing elevated pens with intensive husbandry systems.
INTRODUCTION

Livestock sustainability is a critical aspect of maintaining ecological and economic balance in a region (Aku et al., 2021). One example of livestock sustainability that needs attention is the management of Peranakan Etawa Goat husbandry. In the Toari District, Kolaka Regency, Peranakan Etawa, Goat farming is a key pillar of the local economy. However, challenges such as climate change, increased market demand, and shifts in consumption patterns require appropriate management strategies to ensure the sustainability of livestock farming.

In this context, the management of Peranakan Etawa Goat husbandry plays a crucial role in sustaining the farming enterprise. Factors such as proper feeding, disease control, and animal healthcare are the main focus in efforts to enhance productivity and animal welfare (Abadi et al., 2021). Through a holistic and sustainable approach, farmers in the Toari District can optimize the economic and ecological potential of Peranakan Etawa Goat farming.

Furthermore, the role of technology and innovation in livestock management is also an important highlight. The implementation of information technology, data management systems, and modern husbandry methods can assist farmers in improving the efficiency and effectiveness of their farming management (Aku et al., 2022). Collaboration among the government, research institutions, and stakeholders can help provide the necessary resources and support to promote the adoption of technology and innovation in the Peranakan Etawa Goat farming sector.

However, the challenges faced in maintaining the sustainability of Peranakan Etawa Goat farming in the Toari District are not insignificant. Factors such as market access, climate change, and government policies need to be seriously considered to ensure the continuity of farming enterprises. Therefore, this article aims to delve deeper into the management of Peranakan Etawa Goat farming in the context of livestock sustainability in the Toari District, Kolaka Regency, and provide recommendations and strategies that can be implemented to maintain the sustainability of these farming enterprises.

LITERATURE REVIEW

Previous studies have highlighted the importance of sustainability in the context of livestock farming, particularly in animal husbandry management. Research by Badaruddin et al., (2022) indicates that efficient and sustainable feed management has a positive impact on livestock productivity and welfare. These findings provide a strong foundation for further research on the management of Peranakan Etawa Goat husbandry, considering its significant role in the local economy.

However, the literature also highlights the challenges faced in maintaining the sustainability of farming, especially in rural areas. Research by Pagala et al., (2023) shows that factors such as climate change and limited access to resources are major obstacles to achieving farming sustainability. The implications of these findings reinforce the urgency of identifying management strategies that are suitable for local conditions, such as those in the Toari District, Kolaka Regency.
In the context of Peranakan Etawa Goat husbandry management, research by Sahaba et al., (2018) underscores the importance of animal healthcare as an integral part of farming sustainability strategy. These findings emphasize the need for a holistic approach to farming management, which prioritizes animal health aspects.

Additionally, the literature also indicates that the application of technology and innovation in farming management can be key to enhancing sustainability. Studies by Suparman et al., (2018) found that the adoption of information technology and data management systems can assist farmers in optimizing livestock management and improving farming efficiency.

However, research specifically focused on the management of Peranakan Etawa Goat husbandry, especially in the context of farming sustainability in the Toari District, Kolaka Regency, is still limited. Therefore, this research is expected to make a significant contribution to filling this knowledge gap, as well as providing guidance and recommendations for stakeholders in improving farming sustainability in the region.

METHODS

Research Location and Time
This research was conducted from April to July 2023 in the Toari District, specifically in the villages of Ranojaya, Wonua Raya, and Rahabite in Kolaka Regency. The research locations were determined using purposive sampling, considering that these areas are among the centers of Peranakan Etawa Goat production.

Population and Sample of the Study
The population used in this research consisted of female Peranakan Etawa Goats owned by farmers. The research samples included farmers who owned Peranakan Etawa Goats in the Toari District, namely in the villages of Ranojaya, Wonua Raya, and Rahabite in Kolaka Regency.

Sampling Technique
The sampling technique used was purposive sampling, where 10 villages were drawn randomly, resulting in the selection of 3 villages: Ranojaya, Wonua Raya, and Rahabite.

Data Collection Techniques
The types of data in this research included primary data and secondary data. Primary data were obtained directly from respondents, while secondary data were obtained from relevant agencies related to this research. Data collection techniques were conducted as follows: (1) Interviews involved direct question-and-answer sessions with respondents; (2) Observations were conducted by directly observing and documenting the objects under study; (3) Literature review involved gathering data through the study of books, scientific papers, and relevant documents related to this research.

Research Variables
The observed variables in the study include the management of Peranakan Etawa Goat farming: (1) Breeding stock, (2) Feed, (3) Housing, and (4) Husbandry system.
Data Analysis
The data obtained will be tabulated in the form of tables and percentages and then analyzed descriptively.

RESULTS AND DISCUSSION
General Overview of the Area
Toari District is situated in the Southern Peninsula of Kolaka Regency. Geographically, it is located in the southern part of Kolaka Regency. Toari District shares its borders as follows: to the north, it is adjacent to Watubangga; to the south, it borders Bombana Regency and South Sulawesi Province in the Bone Gulf; and to the east, it borders Bombana Regency.

Table 1. Goat Population Data in Toari District in 2023

<table>
<thead>
<tr>
<th>Village</th>
<th>Population Male</th>
<th>Population Female</th>
<th>Total (Tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranomentaa</td>
<td>112</td>
<td>685</td>
<td>797</td>
</tr>
<tr>
<td>Ranojaya</td>
<td>203</td>
<td>821</td>
<td>1024</td>
</tr>
<tr>
<td>Wonuaraya</td>
<td>171</td>
<td>741</td>
<td>912</td>
</tr>
<tr>
<td>Rahabite</td>
<td>166</td>
<td>578</td>
<td>744</td>
</tr>
<tr>
<td>Wowoli</td>
<td>286</td>
<td>681</td>
<td>967</td>
</tr>
<tr>
<td>Lakito</td>
<td>54</td>
<td>111</td>
<td>165</td>
</tr>
<tr>
<td>Horongkuli</td>
<td>28</td>
<td>65</td>
<td>93</td>
</tr>
<tr>
<td>Toari</td>
<td>36</td>
<td>73</td>
<td>109</td>
</tr>
<tr>
<td>Anawua</td>
<td>12</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td>Ranosangia</td>
<td>8</td>
<td>19</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1076</strong></td>
<td><strong>3796</strong></td>
<td><strong>4872</strong></td>
</tr>
</tbody>
</table>

Source: BPS, 2023

Administratively, Toari District in 2023 will consist of ten villages/subdistricts, includingi, Lakito, Ranommentaa, Wowoli, Anawua, Rano Jaya, Horongkuli, Wonu Raya, Rahabite, and Sangia. According to BPS (2023), Toari District is one of the areas that has the largest number of Peranakan Etawa goats (Table 1) in Southeast Sulawesi.

Peranakan Etawa Goat Seeds
The livestock kept by breeders in Toari District are selected based on the criteria and objectives of their maintenance. For seeds, superior sires and males are selected, both in terms of body shape and genetics. For the purpose of maintaining it as a milk producer, the selection of livestock does not need to be perfect; important means that it can produce milk. According to breeders, this is because livestock that have perfect body shape and genetics are quite expensive. Female have bodies, straight and strong le, wudders, and symmetrical shap Meanwhile, maleses are selected to have good virility characteristics, name,ly what can be seen from the male's lust when a female goat is present. Usually, livestockck that have good appetites always want to mate with female livestock. Sources of livestock seeds kept in Toari District are presented in Table 2.
Table 2. Sources of Peranakan Etawa Goat Seeds

<table>
<thead>
<tr>
<th>No.</th>
<th>Seed Source</th>
<th>Total (Breeder)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Private ownership</td>
<td>12</td>
<td>20,00</td>
</tr>
<tr>
<td>2.</td>
<td>Buy</td>
<td>32</td>
<td>53,33</td>
</tr>
<tr>
<td>3.</td>
<td>Help</td>
<td>16</td>
<td>26,67</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Research Results, 2023

The results of the research show that the purpose of raising Peranakan Etawa goats in Toari District is to save which can be sold at any time if there is a sudden need. Apart from that, rearing is also to obtain meat for sale if there are certain activities such as traditional events (akikah) and holidays (Idul Adha/Qurban).

**Peranakan Etawa Goat Feed**

Goats really need feed to grow and reproduce and the perfect feed contains complete protein, carbohydrates, fat, water, vitamins and minerals. Providing efficient feed and nutrition is the factor that has the greatest influence compared to other factors and is also a very important way to increase productivity.

Figure 1. Goat Animal Feed in Toari District

The results of the research show that the feed given by breeders to Peranakan Etawa goats in the Toari District is in the form of leaves, namely lamtoro leaves, cassava leaves and Gamal leaves. The feed for Peranakan Etawa goats in Toari District is presented in Table 3.

Table 3. Dominant Types of Feed Given to Goats Peranakan Etawa in Toari District

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Feed</th>
<th>Total (Breeder)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lamtoro Leaves</td>
<td>13</td>
<td>21,67</td>
</tr>
<tr>
<td>2.</td>
<td>Cassava Leaves</td>
<td>11</td>
<td>18,33</td>
</tr>
<tr>
<td>3.</td>
<td>Gamal Leaves</td>
<td>36</td>
<td>60,00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Research Results, 2023
Research findings indicate that the feed for Peranakan Etawa Goats is predominantly Gamal leaves (60%), followed by leucaena (21.67%) and cassava leaves (18.33%). Gamal is a type of leguminous plant that provides sustainable forage and possesses superior nutritional value in terms of protein, minerals, and vitamins, thus overcoming feed availability challenges throughout the year. The quality of gamal varies depending on factors such as plant age, plant parts, weather, and genotype. Its protein content is approximately 18.8%, which tends to decrease with plant age, while its crude fiber content increases.

Gamal leaves can be utilized as basal feed for goats or as a feed supplement through the ensiling process. However, the utilization of Gamal leaves has not shown significant improvement in livestock productivity, possibly due to insufficient essential nutrients, primarily protein, caused by anti-nutritional factors such as saponins and low palatability. Therefore, the optimization of livestock productivity through feed supplementation technology is necessary to address this issue.

Leucaena is one of the most versatile leguminous plants commonly grown in mixed cropping systems (agroforestry). It can provide fermentable nitrogen in the rumen and supply bypass protein in the small intestine. Utilizing fresh leucaena as a supplement for low-quality forage in goats indicates that approximately 65% of Leucaena protein is degraded in the rumen. In contrast, it is estimated that only 40% of Leucaena protein is degraded in the rumen when dry Leucaena is used as a supplement for sheep feeding similar to basal diets.

Bypass protein is crucial for ruminant animals because a significant percentage of rumen-degraded protein is absorbed as ammonia. If its concentration in the rumen is high, it can be lost through urine as urea. For goats in production, this inefficient protein utilization increases the importance of increasing the amount of protein bypassing to the intestine, which is more efficient. Approximately 20-30% of the protein contained in forage is bypass protein, but for growing or lactating animals, the bypass protein requirement reaches 32-40% of the total protein requirement.

Research on the utilization of cassava leaves as additional feed, especially for ruminant animals, has been widely conducted. Adding cassava leaves to elephant grass given to goats can increase feed consumption and weight gain. Substituting part of elephant grass with cassava leaves plays a crucial role, considering the lower quality of elephant grass compared to cassava leaves. The best ratio of cassava leaf supplementation with elephant grass is considered to be 1:2. The effect of cassava leaf addition on goat weight gain is 21.4 g/head/day with a supplementation of 1,000 g/day and 23.2 g/head/day with a supplementation of 1,500 g/day (cassava leaves are wilted for 24 hours before feeding to the animals). Adding 25% cassava leaves to a basic diet of rice straw and urea (100 grams of urea/kg of dry air rice straw) increases goat weight by 84 g/head/day while adding 50% cassava leaves to the same diet increases goat weight by 101 g/head/day.

These weight gains are higher than those of goats given a basic diet without cassava leaves (27 g/head/day). Sheep receiving a diet with the addition of 2 kg of wilted cassava leaves for 24 hours show the highest daily weight gain (67 g/head/day). The lower the addition of cassava leaves, the decrease in weight gain tends to decrease. The best cassava leaf
supplementation ratio with elephant grass for sheep is 1.7:2.0. Furthermore, it is also stated that a single sweet cassava leaf provision (without mixing with other ingredients) for 3 months does not cause clinical abnormalities. Adding 6 kg and 9 kg/head/day of cassava leaves to the basic diet resulted in daily weight gains of 283 g and 286 g/head/day, respectively. These weight gains are higher than those of the basic diet without cassava leaf supplementation, even when enriched with 65 g urea, which is 100 g/head/day. The high crude fiber content in cassava leaves limits their use as non-ruminant feed. Utilizing cassava leaves as additional feed for rabbits does not differ in weight gain compared to other supplementary feeds such as sweet potatoes or pasture grass. However, feeding a mixture of cassava leaves and elephant grass (1:1) can improve feed consumption better than feeding elephant grass or cassava leaves alone.

**Peranakan Etawa Goat Cage**

The cage is a home for livestock, and therefore, the cage must be made in such a way that it is comfortable for the livestock that live in it and for the farmer who keeps it. The Peranakan Etawa goat pen in Toari District is a stilt pen with cage plots divided based on livestock needs. The pens are divided into colony pens for keeping young goats and holding pens for pregnant and giving birth animals.

![Figure 2. Goat Breeding Pen in Toari District](image)

<table>
<thead>
<tr>
<th>No.</th>
<th>Cage Type</th>
<th>Total (Breeder)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stage Enclosure</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Cage Ground floor</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Research Results, 2023

Basically, the purpose of livestock pens is to protect the animals from predators, prevent them from damaging crops, provide a resting and sleeping area, serve as feeding and watering stations, facilitate mating and birthing, serve as a waste disposal area, aid in caring for sick animals, and allow for easier monitoring. Therefore, when establishing a pen, it's essential to consider its purpose and functions. Pens should be constructed to be strong and durable, tailored to the specific needs of the animals.
The research findings indicate that the pens used for Peranakan Etawa Goat husbandry in Toari District are elevated pens (100%). Farmers choose elevated pens because of the high temperatures and rainfall in tropical regions, the vulnerability of goats to wet floors, and parasite attacks. Thus, raised pens with sturdy and durable floors are the most practical option. Additionally, pens for Peranakan Etawa Goat husbandry are divided into pens for bucks and pens for does and their offspring. This division aims to address the individual needs of the goats.

**Maintenance System**

The livestock rearing system is one of the factors that influences the level of livestock productivity. Livestock rearing systems are divided into three types, namely extensive rearing systems without cages, intensive rearing systems where the rearing is carried out in cages and semi-intensive rearing systems, which are a combination of intensive rearing systems and extensive rearing systems. The Peranakan Etawa goat-rearing system in Toari District is presented in Table 5.

<table>
<thead>
<tr>
<th>No.</th>
<th>Maintenance System</th>
<th>Total (Breeder)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Intensive</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Semi-intensive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Extensive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>60</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Research Results, 2023

The results of research on the Peranakan Etawa goat rearing system in Toari District are an intensive rearing system (100%). An intensive rearing system is a rearing system that is carried out in which the entire life of the livestock is regulated by the breeder himself (Masrah et al., 2016). In addition, intensive maintenance systems require continuous grazing or no grazing (Satriawan et al., 2023). Animal feed is usually given in the morning and evening. The breeder's rearing system is carried out by separating young female goats until they are ready for breeding and males.

**CONCLUSIONS AND RECOMMENDATIONS**

The management of Peranakan Etawa Goat husbandry in Toari District plays a vital role in the development of the local livestock industry. One key aspect of this management is the source of breeding stock used. Farmers tend to purchase Peranakan Etawa Goat breeding stock from reliable sources to ensure the quality and productivity of the resulting livestock. Additionally, feed selection is also a crucial focus in this management. Farmers typically provide forage as feed, ensuring that the livestock receive adequate nutrition for
optimal growth and milk production. In addition to breeding stock and feed, the management of Peranakan Etawa Goat husbandry in Toari District also emphasizes the infrastructure of pens. Raised pens with an intensive husbandry system are commonly used. This system allows for better supervision of livestock conditions, optimizes space utilization, and reduces the risk of diseases. By utilizing appropriate technology and knowledge in pen management, farmers can enhance production efficiency and overall livestock welfare.

REFERENCES


