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Characteristics of Farmers in Etawah Crossbreed (PE) Goat Breeding Center of Banyumas Regency, Indonesia

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ABSTRACT

This study aims to determine the population structure and productivity of goats in the Peranakan Etawah (PE) goat breeding stock area in Banyumas Regency. The research was conducted in Gumelar Subdistrict, involving 75 registered farmers selected through census and purposive sampling methods. The results show that the farmer profile is characterized by an average age of 57.17 years, with 65.33% having an elementary school education level. Goat rearing serves as a synergistic supplementary business for 65.33% of the respondents who are primarily crop farmers. The population structure is dominated by female goats at 66.2% compared to male goats at 33.8%. Reproductive performance results include a litter size of 1.87 kids, a pre-weaning mortality rate of 9.92%, and a calving interval of 9.13 months. Production performance shows a birth weight of 2.78 kg and a weaning weight of 15.73 kg. It is concluded that the population is dominated by productive age groups, and the performance is classified as good, although the lack of youth participation remains a challenge for sustainability.

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INTRODUCTION

Goat farming offers several key advantages, such as fast growth rates, low investment costs, and simple daily management (1). People have been raising goats (*Capra hircus*) since ancient times as a reliable source of meat, milk, skin, and fiber (2). In developing countries like Indonesia, rural smallholder farmers frequently rely on goat farming as their primary profession. Beyond providing food, goats act as a financial asset that helps farmers increase their income and overall well-being (3). Today, local goats have grown into a highly promising livestock commodity, especially in areas with ideal conditions like Banyumas Regency in Central Java. Specifically, within this regency, Gumelar District is widely recognized as a highly strategic Etawah Crossbreed goat breeding center.

The Etawah Crossbreed (PE) is a cross between the Indian Etawah and the native Indonesian Kacang (4). It is characterized by a large frame of 75–100 cm in height and an average weight of 40 kg for males and 35 kg for females. They are easily identified by their black-and-white coats, convex faces, and distinctly long ears. Because they possess substantially larger udders than other dairy breeds,

such as the Saanen or Jawarandu, Etawah Crossbreed Goats are highly prized as dual-purpose livestock for meat and milk. Daily milk production ranges from 0.5 to 1 liter per head. Furthermore, this milk is packed with essential nutrients like fats, lactose, proteins, and minerals. Therapeutically, it offers superior health benefits over cow's milk and is often used to aid in treating asthma, hepatitis, tuberculosis, anemia, and digestive problems (5).

Despite this potential, consumers' demand for goat meat still falls behind chicken and beef (6). Many Indonesians treat it mainly as a substitute product, mostly due to its relatively high price and limited availability in the market. However, from a nutritional standpoint, goat meat is highly beneficial. It is packed with protein and contains 50-65% less fat compared to beef. With cholesterol levels sitting at just 5-39 mg per 100 grams, goat meat is actually a healthier alternative for people on strict low-fat diets (7).

Looking at the big picture, expanding the production of livestock commodities like meat, milk, and eggs is crucial to meet the public's need for animal protein and improve human capital (8). As part of the country's progress, livestock development plays a major role in national growth (9). The main goals include enhancing human resources, sustaining the environment, bringing in foreign exchange, and lifting communities out of poverty (10,11). However, a significant gap remains, as the success of these goals in a breeding center depends heavily on empowering the local farmer community (12) , raising the welfare of the farmer and directly increasing their everyday income is essential for sustainable progress (13). Therefore, this study aims to analyze the demographic profile of PE goat farmers in Gumelar District, providing essential baseline data to support farmer empowerment and the sustainable development of the breeding center.

MATERIALS AND METHODS

Research Objectives

The research targets were Etawah Crossbreed (PE) goat breeding farms recorded in the livestock group data in Gumelar Subdistrict, Banyumas Regency. The use of the census method for 75 registered farmers is highly appropriate for a localized breeding center study to ensure complete data representativeness.

Data Collection Method

This study provides a robust framework by combining primary and secondary data. Primary data were collected through a survey and a non-experimental method. The survey method involved conducting observations, interviewing farmers, and taking direct measurements of the Etawah Crossbreed Goats in Gumelar Subdistrict. Secondary data were obtained from government reports and relevant institutional records to strengthen the geographical and administrative context.

Clarity of Study Area

The research was specifically conducted in Gumelar Subdistrict, which is administratively divided into 10 villages. This breakdown adds necessary geographical context to the study as a designated source area for PE goat breeding stock.

Research Variables

1. Population Structure: Includes the classification by sex (male and female) and age groups (young, juvenile, and adult).
2. Reproductive Performance: Measured through litter size, pre-weaning mortality, and calving interval (interval between litters).
3. Production Performance: Evaluated based on birth weight (minimum 24 hours after birth) and weaning weight.

RESULTS

Goat and Farmer Population

Gumelar District is home to 3.715 goat farmers who collectively manage 17.727 goats. The Etawah Crossbreed (PE) goats dominate this population, making up 14.058 heads (79.30%). Table 1 shows the detailed distribution of these goats across the 10 villages in Gumelar District.

Table 1. The distribution of Etawah crossbreed goats across the village

No	Village	Number of Farmers	Number of Livestocks
1.	Cilangkap	183	1215
2.	Cihonje	606	2780
3.	Paningkaban	559	2404
4.	Karangkemojing	427	1636
5.	Gancang	110	456
6.	Kedungurang	134	771
7.	Gumelar	644	3612
8.	Tlaga	500	2822
9.	Samudra	303	1050
10.	Samudra Kulon	249	981
	Total	3715	17727

Note: PE = Etawah Crossbreed. Data sourced from primary field observations (2025). The total population comprises 17,727 heads managed by 3,715 individual farmers. he data indicates that Gumelar village has the highest goat population, accounting for approximately 20.4% of the total distribution in the region.

Currently, there are seven active PE Goat Farmer Groups operating in five villages within Gumelar. As shown in Table 2, these groups consist of 75 registered farmers managing a combined total of 456 goats. These 75 farmers served as the primary respondents for the detailed census study.

Table 2. PE Goat Farmer Groups

No	Name of Farmer Group	Number of Farmers	Number of Livestock
1.	Bondo Mertani	15	114
2.	Tunas Mukti	15	74
3.	Satoguno	15	106
4.	Argo Minda Lestari	11	56
5.	Pegumas	4	19
6.	Pesmag	10	57
7.	Petramas	5	30
	Total	75	456

Note: Data reflects the membership and livestock holdings within formal PE goat farmer groups. The average group size is 10.7 members, with a mean ownership of 6.08 heads per farmer within these organized clusters, suggesting a higher concentration of livestock compared to independent smallholders.

Characteristics of PE Goat Farmers

Age of The Farmers

In the Banyumas Regency's PE goat breeding center, the respondents' average age was 57.17 ± 9.91 years (Table 3).

Table 3. Age of The Farmers

No.	Age Group	Number of Farmes (n)	Percentage (%)
1.	≤40 years	7	9.3%
2.	41-50 years	9	12.0%
3.	51-60 years	31	41.3%
4.	>60 years	28	37.3%
	Total	75	100%

Note: Farmer age categories are classified based on productive work stages. Data indicates a dominance of older demographics, with approximately 78.6% of farmers aged over 50 years, suggesting potential challenges in long-term agricultural regeneration.

The data reveals a farming population heavily dominated by individuals in their mature and elderly years, with the majority (41.3%) in the 51-60 age group. This distribution highlights a critical "lack of youth participation" in the local goat breeding sector, which poses a challenge for the long-term sustainability of the breeding center.

Educational Background of The Farmers

The educational background of the PE goat farmers is heavily concentrated at the basic education level. As presented in Figure 1, the overwhelming majority (64%) of the respondents only completed elementary school.

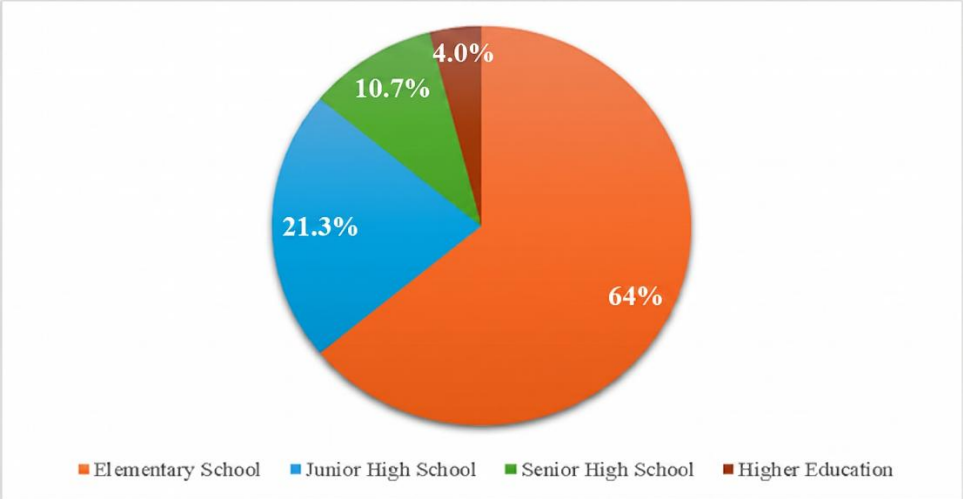

Figure 1. Educational Backgrounds of the PE Goat Farmers in Gumelar District

This high percentage of basic education indicates that the local breeding center is predominantly managed by farmers who likely depend more on inherited traditional practices and hands-on experience rather than academic innovation or modern technical knowledge.

Main Occupation of the Farmers

The primary occupational background is heavily concentrated in the traditional agricultural sector, with 65.33% of respondents relying on crop farming as their main livelihood (Figure 2).

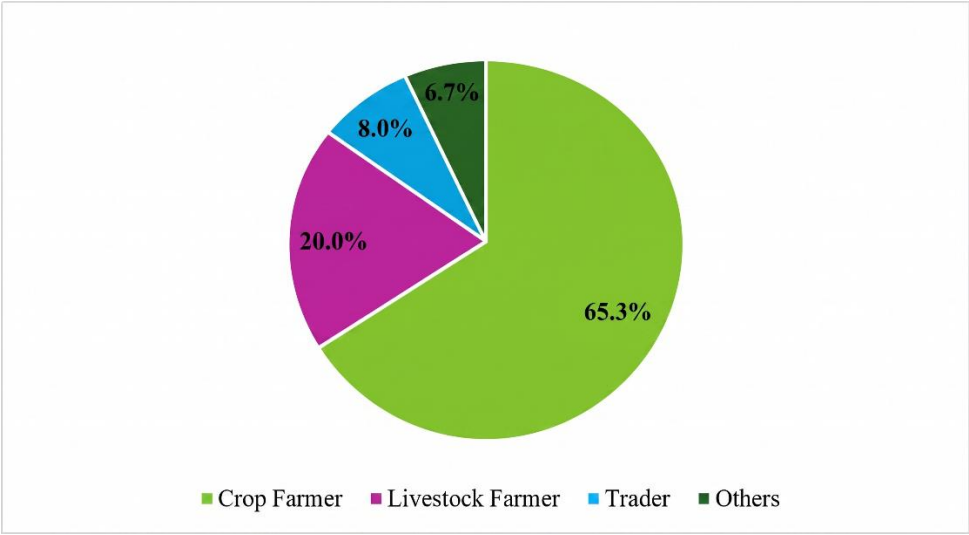

Figure 2. Main Occupations of the PE Goat Farmers in Gumelar District

This occupational trend indicates that within the local breeding center, goat rearing is managed as a "synergistic supplementary business." In this model, crop residues provide feed for the goats, while goat manure is utilized as organic fertilizer for the crops, creating a sustainable production cycle.

Family Size of The Farmers

The average family size of PE goat farmers in the Banyumas Regency breeding center is 4.17 ± 1.32 members (Table 4).

Table 4. Family Size of The Farmers

No.	Age Group	Number of Farmes (n)	Percentage (%)
1.	1-3 members	18	24.0%
2.	4-5 members	49	65.3%
3.	> 5 members	8	10.7%
	Total	75	100%

Note: n = 75. Family size refers to the total number of individuals living in a single household. The majority of respondents (65.3%) manage medium-sized households of 4–5 members.

The majority of the farmers belong to medium-sized households (4-5 members). This structure indicates a sufficient availability of household labor, which is essential for the daily management of goats in a traditional breeding system.

Farming Experience

In the PE goat breeding center of Banyumas Regency, the respondents have an average farming experience of 20.2 ± 10.7 years (Figure 3).

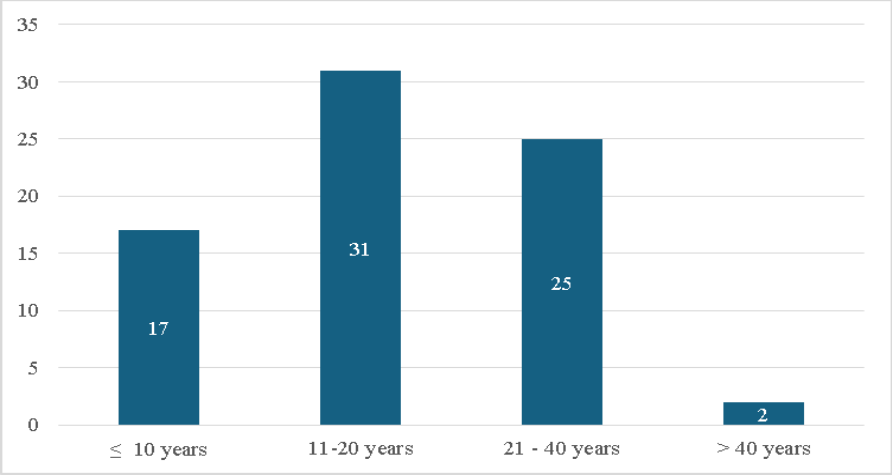

Figure 3. Farming Experience of the PE Goat Farmers in Gumelar Sub-District

The prevalence of long-term involvement, with an average of 20 years, clearly indicates that Etawah Crossbreed farming is a deeply rooted tradition in the district. This extensive hands-on experience provides a strong practical foundation for the community, although it often reinforces the reliance on traditional methods rather than modern technical innovations.

Population Structure and Livestock Productivity

Population Structure of Etawah Crossbreed Goats

The population structure in the Gumelar breeding center is strategically aligned for a source area of breeding stock. Based on the census, the population is heavily dominated by female goats (66.2%), which serves as the primary engine for population growth. A higher ratio of productive females ensures a steady supply of offspring, which is essential for maintaining the center's status as

a regional source of breeding stock. Furthermore, the presence of young goats (44.5%) indicates a high potential for future expansion.

Reproductive Performance

The reproductive performance of the Etawah Crossbreed (PE) goats in this study is classified as good. The average litter size was 1.87 ± 0.65 kids per birth, while the calving interval averaged 9.13 ± 1.54 months. These metrics demonstrate that the Etawah Crossbreed Goats have adapted well to the local intensive management system. However, there is still room for improvement in shortening the calving interval through targeted nutritional intervention during late gestation.

Production Performance

The production performance, indicated by the average birth weight of 2.78 ± 0.45 kg and weaning weight of 15.73 ± 3.21 kg, shows competitive results. These weights meet the standards for quality breeding stock. The success in achieving these growth metrics under a "synergistic supplementary business" model utilizing agricultural by-products proves the efficiency of the integrated farming system applied by the farmers in the Gumelar District.

DISCUSSION

Age Distribution and the Challenge of Sector Regeneration

Age is a highly practical indicator of a farmer's productive capacity, directly affecting their physical endurance for daily livestock operations (14). In the Banyumas Regency's Etawah Crossbreed (PE) goat breeding center, the respondents' average age was 57.17 ± 9.91 years. Despite leaning toward the senior demographic, this age still falls comfortably within the nationally recognized productive age group of 15 to 64 years (15). While mature farmers often possess emotional stability and wider social networks that facilitate access to capital (17, 18). This senior-dominated demographic highlights a critical "lack of youth participation" in the sector.

The downside of an aging farmer population is a potential lack of motivation to innovate. Older farmers frequently prefer established routines and are slower to adopt modern methods compared to their younger counterparts, who are generally more aggressive in pursuing technical advancements (16,19). For a designated breeding center like Gumelar, this regeneration gap poses a significant challenge for long-term sustainability. If this trend continues, the transfer of advanced breeding technologies may stall, hindering the center's ability to provide high-quality Etawah Crossbreed genetic resources at a national scale.

Formal Education Levels and Reliance on Traditional Knowledge

The majority of farmers (64%) only completed elementary school, a finding consistent with studies showing that rural livestock farmers often have limited formal education (14,15,17,20,21), A farmer's education level deeply shapes their management mindset; higher education typically leads to faster adoption of agricultural innovations and better navigation of industry challenges(20,22).

In Gumelar, the lower educational background restricts access to fresh information, making it harder for the community to embrace recent advancements (17,23). This indicates a recognized gap where the management of this breeding center depends more on inherited traditional practices and hands-on experience rather than academic or modern technical innovation. Overcoming this barrier requires intensive mentorship and practical extension services that translate complex scientific principles into traditional farming contexts.

Primary Livelihoods and Goat Rearing as a Secondary Enterprise

The fact that 65.33% of respondents are primarily crop farmers is consistent with findings that agriculture remains the core livelihood in rural communities (24,25). While goat rearing is often considered a secondary income source, this dual-profession model creates a "synergistic

supplementary business (26). Agricultural work directly supports the livestock business, as crop residues provide a steady and accessible forage source. In return, livestock waste is utilized as organic fertilizer for crops, creating a sustainable and integrated farming system (25). This synergy is a major strength of the Gumelar breeding center, as it optimizes resource efficiency and reduces environmental impact.

Demographic Structure and Family Involvement in Farm Operations

The average family size of Etawah Crossbreed (PE) farmers in this study is 4.17 ± 1.32 members. This figure is higher than the average of 3.30 ± 1.27 members reported in previous research (15), and contrasts with other studies where smaller families are maintained due to strategic land inheritance considerations (17). Socio-economic factors like family size are essential for the success and stability of a farming operation. While it naturally increases household living expenses, family size directly influences strategic decisions about resource management and finding alternative income sources(27). Essentially, the household size determines the amount of internal labor availability. In the Gumelar breeding center, larger families allow farmers to distribute daily tasks among household members, providing a crucial labor source to sustain the livestock business without relying on expensive external workers (15).

Practical Farming Experience as the Core Asset in Herd Management

The respondents in the Banyumas Regency breeding center possess an average farming experience of 20.2 ± 10.7 years. This duration is significantly longer compared to findings by (6–10 years) (14), (10.63 years) (15), where the majority had less than 10 years of experience (20). A farmer's practical experience is a vital component in evaluating overall livestock productivity. The longer individuals manage a farm, the more selective and strategic they become in executing operations and resolving daily challenges, which directly leads to improved animal productivity (19). However, while highly experienced farmers serve as invaluable role models (16), their long-term involvement often reinforces a reliance on traditional practices. In contrast, newer farmers exhibit a risk-averse attitude due to a lack of confidence in trying modern operational practices (16). This highlights a recognized gap: the need for continuous mentorship to bridge the gap between traditional wisdom and modern technical efficiency.

Relationship Between Farmer Characteristics and Management Systems

The relationship between personal characteristics such as age, education, and experience and herd size does not follow a strong, predictable pattern. Instead, the size of a farmer's herd is dictated by practical limitations: financial capital, family labor capacity, and land accessibility for forage. In terms of daily management, the farmers in Gumelar apply an intensive management system. Because the majority are primarily crop farmers, releasing goats poses a high risk of crop damage. Consequently, goats are kept continuously in elevated pens (kandang panggung) using a cut-and-carry feeding system. This creates a "synergistic supplementary business" model where agricultural by-products are optimized for feed.

Despite these management strengths, administrative farm management remains a significant challenge. Systematic livestock recording is rarely implemented, and most farmers rely on personal memory rather than formal tagging or written records. This lack of administrative discipline identifies a clear area for future development: professionalizing the breeding center through modern recording and data-driven management.

CONCLUSION

The Etawah Crossbreed (PE) breeding center in Gumelar District, Banyumas Regency, is characterized by a strong practical foundation but faces significant strategic challenges. The study reveals a critical "lack of youth participation," with the farming population dominated by the senior demographic (average age of 57.17 years). Furthermore, the heavy reliance on traditional knowledge,

stemming from a majority of farmers having only elementary education (64%), creates a barrier to the adoption of modern technical innovations and administrative discipline.

Despite these challenges, the breeding center possesses a "synergistic supplementary business" model where goat rearing and crop farming are integrated into a sustainable nutrient cycle. The population structure, dominated by female goats (66.2%), and the extensive practical experience of the farmers (average of 20.2 years) provide a robust basis for productivity. To ensure the long-term sustainability of the breeding center, it is essential to focus on professionalizing farm administration, introducing systematic livestock recording, and implementing targeted mentorship programs to bridge the gap between traditional wisdom and modern technical efficiency.

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