



Exploring the Characteristics and Population Trends of Pote Goats in the Lowland Region of Madura Island

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ABSTRACT: This research aims to examine the productivity characteristics, structure, and dynamics of the Pote Goat population, a local Indonesian breed in Bangkalan Regency, Madura Island, East Java Province. The study was conducted on smallholder farms from September 2022 to January 2023. The study encompassed 139 respondents who participated as research subjects, contributing a total of 867 female and male Pote Goats of varying ages. To capture a comprehensive understanding, descriptive methods involving surveys and interviews were employed. The data collection process utilized the purposive sampling technique. The research findings indicate that the Pote Goat population consists of 65.17% females and 34.83% males. The adult male to female ratio is 1:12.20. The annual natality rate is 131.61% (70.78% females, 60.83% males). The kids mortality rate is 8.07% per year (5.77% females, 2.31% males). The mortality rate for goats of various ages is 9.34% (6.57% females, 2.77% males). The NI is 122.27% per year (64.20% females, 58.07% males). The migration rate is 37.37%, and the emigration rate is 12.34%. The average litter size ranges from 1.76±0.54 to 1.98±0.47 head per birth, increasing with the age of the doe. The types of births include twin births (73.48%), single births (14.70%), triplet births (10.39%), and quadruplet births (1.43%). The DPI values range from 30.14 to 33.91 kg per year, increasing with the age of the doe. The kids harvest rate is 291.15% per year.

KEYWORDS: Livestock Productivity, Pote Goat, Population Structure and Dynamics.

INTRODUCTION

East Java boasts a wealth of local goat genetic resources (LGR), encompassing plant materials, animals, and microorganisms capable of transmitting traits across generations (Amam et al, 2022). Notable examples of these LGRs in East Java include the Pote Goat (East Java Provincial Livestock Department, 2019), Kacang Goat (Kusmiati et al, 2020), Senduro Goat (Palayukan et al, 2020), and Etawah Crossbred Goat (Susilorini et al., 2017). In 2022, the goat population in East Java reached a substantial count of 3,897,185, contributing 20.09% to Indonesia's overall goat population of 19,397,960 (Directorate General of Livestock and Animal Health, 2022). Pote Goat is a local goat breed native to Madura Island and can be easily found in all districts of Bangkalan, consisting of 18 sub-districts. Pote Goats in limited numbers can also be found in Sampang, Pamekasan, and Sumenep districts. Pote Goats are primarily utilized for meat production, as a means of religious offerings, a source of organic fertilizer, and as savings. Since 2020, goat farmers in Arosbaya district, Bangkalan Regency, have started utilizing Pote Goats for milk production.

The origin and ancestors of Pote Goats are still uncertain. The current tentative assumption is that Pote Goats is the result of crossbreeding and selection of white color between Ettawa crossbred Goats and Kacang Goats (East Java Provincial Livestock Department, 2019). The Pote Goat, a local breed indigenous to Madura Island, flourishes abundantly throughout the various districts of Bangkalan, comprising a total of 18 sub-districts. While primarily concentrated in Bangkalan, Pote Goats can also be found in limited numbers in Sampang, Pamekasan, and Sumenep districts. Renowned for their exceptional meat quality, Pote Goats are widely utilized for religious offerings such as qurban, aqiqah, walimah, and tasyakuran ceremonies, as well as serving as a valuable source of organic fertilizer. Additionally, in recent years, goat farmers in the Arosbaya district of Bangkalan Regency have embraced the use of Pote Goats for milk production, showcasing their versatility and adaptability to different agricultural practices.

Ensuring the sustainability of Pote Goats and optimizing the well-being of the local population necessitates meticulous management practices. Initiating this process involves conducting phenotypic characterization, as recommended by the Food and Agriculture Organization (FAO, 2012). Urgent phenotypic characterization efforts should encompass the collection of morphometric data and the comprehensive characterization of productivity (Hassen et al, 2012). Productivity data pertaining to



goats on farms or within specific regions play a crucial role in evaluating farm performance, facilitating production planning, enhancing productivity, and formulating agricultural and environmental policies (Musa et al., 2021); (Kosen and Polat, 2021); (Mounirou et al., 2021). Similarly, data pertaining to goat dynamics and population structure within farms or specific regions are invaluable for production planning, animal health management, efficient resource allocation for land and feed, marketing strategies, and the development of agricultural and environmental policies (Gao et al., 2012); (Nsoso and Chabo, 2014); (Sultana et al., 2014). In light of these considerations, a comprehensive study focusing on the productivity characteristics, dynamics, and population structure of Pote Goats in Bangkalan is imperative.

MATERIALS AND METHODS

Material, Time, and Research Location

The research spanned from September 2022 to January 2023, taking place at a community livestock farm situated in Bangkalan Regency. A total of 139 respondents participated in the study, with 867 Kambing Pote (Pote Goats) serving as the research subjects, comprising 565 females and 302 males. The research was conducted across eight sub-districts, namely Galis (exhibiting low livestock density), Modung, Bangkalan, Arosbaya, Tanah Merah, and Tragah (with moderate livestock density), as well as Labang and Kamal Districts (characterized by high livestock density). The entire Bangkalan region is classified as a lowland area, ranging from 2 to 100 meters above sea level. The ambient air temperature varies from 22° to 34 °C, accompanied by a relative humidity ranging between 68% and 83%. Annual rainfall in the area falls within the range of 1,200 to 1,800 mm, with an average of 80-120 rainy days per year (BPS Bangkalan, 2023).

Methodology

a. Preliminary Study, consisting of:

1. Field survey, conducted through interviews and observations to obtain initial information about the population and distinctive characteristics of Pote Goats that differentiate it from other goats (Ettawa crossbred and Kacang, among others).
2. Literature review, conducted to obtain references related to Pote Goats in Bangkalan and Madura Island.

b. Observed Variables in Pote goats include:

1. Pote goats productivity, including litter size, doe productivity index (DPI), and kid harvest.
2. Population dynamics and structure, including birth rate/nativity, death rate/mortality, natural increase, migration and emigration rates, percentage of females (kids, young, and adult), and percentage of males (kids, young, and adult).

c. Data Collection:

1. Primary data, obtained through interviews with farmers and direct observations of Pote Goats. Sample data were collected using purposive sampling technique (Sugiyono, 2018).
2. Secondary data, obtained from relevant sources such as books, journals, and others.

d. Data Analysis:

The research data was analyzed descriptively and presented in the form of averages and standard deviations (Sudarwati et al., 2019) for litter size. Other data were calculated using formulas and presented in percentage form.

RESULTS AND DISCUSSION

Population Structure of Goat Pote

A population denotes a collective of living organisms that share common characteristics and inhabit the same geographical region at a specific period, capable of engaging in normal reproduction (Sari et al., 2021). Population structure, on the other hand, pertains to the arrangement of individuals within a species that reside or occupy a distinct area during a given timeframe. In the context of livestock, population structure encompasses adult males and females, young males and females, as well as male and female kids. The variables associated with livestock population structure can be computed using the following formula, as outlined by Kutsiyah (2017) and Adhianto et al. (2019):

$$\text{Adult males (\%)} = \frac{\sum \text{adult males}}{\sum \text{population}} \times 100\%$$

$$\text{Adult females (\%)} = \frac{\sum \text{adult females}}{\sum \text{population}} \times 100\%$$



$$\text{Young males (\%)} = \frac{\sum \text{young males}}{\sum \text{population}} \times 100\%$$

$$\text{Young females (\%)} = \frac{\sum \text{young females}}{\sum \text{population}} \times 100\%$$

$$\text{Male kids (\%)} = \frac{\sum \text{male kids}}{\sum \text{population}} \times 100\%$$

$$\text{Female kids (\%)} = \frac{\sum \text{female kids}}{\sum \text{population}} \times 100\%$$

The results of the population structure data analysis in Bangkalan Regency are shown in Table 1. Based on Table 1, the population of Pote Goats in Bangkalan Regency is dominated by females, accounting for 65.17%, while the remaining 34.83% are male goats. The population structure of female Pote Goats consists of 35.18% adult females, 16.15% young females, and 13.84% female kids. The population structure of male Pote Goats consists of 18.34% young males, 13.61% male kids, and only 2.88% adult males. According to Nuhu et al., (2014), the ideal population structure on a goat farm or breeding area is when the number of adult goats is balanced with the number of young goats. This can create a stable population condition and improve the reproductive ability and livestock production.

Table 1. The Population Structure of Pote Goats in Bangkalan

No	Subdistrict	Final Population	Population Structure (%)								Male to Female Ration in Adults
			Male				Female				
			Kids (<3 Months)	Young goats (3-12 Months)	Adult (>12 Months)	Total	Kids (<3 Months)	Young goats (3-12 Months)	Adult (>12 Months)	Total	
1	Galis	96	7.29	19.79	2.08	29.17	10.42	29.17	31.25	70.83	15.00
2	Modung	37	0.00	56.76	2.70	59.46	0.00	18.92	21.62	40.54	8.00
3	Bangkalan	142	12.68	20.42	4.93	38.03	23.94	12.68	25.35	61.97	5.14
4	Arosbaya	31	16.13	38.71	3.23	58.06	16.13	9.68	16.13	41.94	5.00
5	Tanah Merah	104	32.69	7.69	3.85	44.23	12.50	17.31	25.96	55.77	6.75
6	Tragah	286	10.49	14.34	1.40	26.22	11.89	16.43	45.45	73.78	32.50
7	Labang	43	27.91	11.63	0.00	39.53	20.93	9.30	30.23	60.47	0.00
8	Kamal	128	9.38	18.75	4.69	32.81	11.72	11.72	43.75	67.19	9.33
Total		867	13.61	18.34	2.88	34.83	13.84	16.15	35.18	65.17	12.20

Source: Primary Data (2023)

Table 1 reveals an unfavorable population structure among Pote Goats, with a significant imbalance observed between adult and young females. The scarcity of young females available for replacement, attributed to the high costs involved or the culling of females, poses a risk to the population and threatens the continued existence of Pote Goats. Similarly, the population structure of young and adult male Pote Goats displays a pronounced imbalance. Nevertheless, goat farmers still perceive it as relatively secure due to the 1:12.20 ratio of adult males to females. Rout et al., (2020) suggest that the ideal male to female ratio for breeding activities should be 1:10, or even 1:5, although the common ratio tends to be 1:25. In Bangkalan, goat farmers typically sell their male livestock as soon as they reach the suitable age, thus avoiding challenges in providing adequate feed as the population expands. Some goat farmers in Bangkalan opt to retain male goats until they are appropriate for sacrificial purposes during the Idul Adha festival, in anticipation of obtaining the best price.



Population Dynamics of Pote Goats

Livestock populations are subject to continuous changes as time progresses. The dynamics of these populations are shaped by various factors, including births, deaths, culling, imports, exports, and the initial population size. A profound comprehension of population dynamics holds significance in shaping the practices and approaches of farmers, as they transition from traditional farming methods to industrial-scale operations. Population dynamics serve as crucial parameters for regulating mating systems, managing mating processes, and ensuring the overall maintenance of goat populations (Jesajas et al., 2022).

Birth Rate (Natality) of Pote Goats

Natality represents the inherent capacity of a population to expand its numbers through reproductive processes. The birth rate serves as a valuable metric for evaluating the fertility of livestock within a specific geographical region. Kids born during specific periods can be utilized as replacements for breeding stock or as sources of meat and milk production (Harmoko, 2021); (Sari et al., 2021). The occurrence of a rainy or dry season does not appear to influence the frequency of parturition in goats. Wurlina et al. (2017) propose that goats ideally give birth twice a year, facilitated by a gestation period of approximately 140 days (or 4.7 months), or alternatively, undergo three parturitions within a two-year timeframe. The formula for calculating the birth rate is as follows (Kutsiyah, 2017); (Adhianto et al., 2019):

$$Natality = \frac{\sum kid\ birth}{\sum population} \times 100\%$$

The birth rate of Pote Goats in Bangkalan Regency is documented to be 131.61% per year, as presented in Table 2. Upon examining Table 2, it becomes evident that the average birth rate of female Pote Goats stands at 70.78%, surpassing the male birth rate of only 60.83% within the population. Notably, Modung District (24.44%) and Tanah Merah District (73.85%) exhibit the lowest birth rates, attributable to their primary focus on livestock fattening rather than conservation, reproduction, and breeding purposes. In contrast, Labang District records the highest birth rate at 271.43%, potentially attributed to a significant number of female breeding goats under farmers' care, an emphasis on breeding activities, and the abundant availability of Legume Lamtoro as the primary feed source for local farmers.

Table 2. Birth Rate and Mortality Rate of Pote Goats

No	District	Initial Popouation	Final Population	Birth Rate (%)			Mortality Rate of Kids (%)			Mortality Rate (%)		
				Male	Female	Tot	Male	Female	Tot	Male	Female	Tot
1	Galis	59	96	42.37	64.41	106.78	0.00	2.08	2.08	1.04	4.17	5.21
2	Modung	45	37	17.78	6.67	24.44	5.41	0.00	5.41	5.41	0.00	5.41
3	Bangkalan	78	142	71.79	74.36	146.15	3.52	5.63	9.15	4.23	6.34	10.56
4	Arosbaya	13	31	69.23	84.62	153.85	0.00	6.45	6.45	3.23	6.45	9.68
5	Tanah Merah	65	104	32.31	41.54	73.85	4.81	6.73	11.54	4.81	6.73	11.54
6	Tragah	162	286	64.20	84.57	148.77	2.10	5.59	7.69	2.45	6.29	8.74
7	Labang	14	43	142.86	128.57	271.43	0.00	6.98	6.98	0.00	6.98	6.98
8	Kamal	67	128	94.03	95.52	189.55	1.56	9.38	10.94	1.56	10.94	12.50
Total		503	867	60.83	70.78	131.61	2.31	5.77	8.07	2.77	6.57	9.34

Source: Primary Data (2023)

Enhancing the birth rate in goats requires implementing various strategies, as emphasized by Purbowati and Nurhajati (2019) and Syahrudin et al. (2019). This involves ensuring that the feed and nutrition provided to the livestock meet their requirements, promoting overall health and disease prevention through regular veterinary care, utilizing high-quality breeding stock with desirable traits, and maintaining a clean and healthy environment. By adopting these measures, goat farmers can optimize



fertility, promote reproductive health, and ultimately increase the birth rate of their livestock, leading to improved productivity and sustainable breeding outcomes.

Mortality Rate in Pote Goats

Mortality refers to the number of animals that die within a population during a specific period of time (Sari et al., 2021). Mortality in kids is the largest factor affecting low livestock productivity. Low mortality is crucial in livestock farming (Destomo et al., 2020). Kids mortality generally occurs in three periods: at birth, before weaning, and after weaning. The pre-weaning period is particularly critical. The high mortality rate in kids is caused by the lack of attention from farmers to pregnant mothers until they give birth (especially regarding feed intake and nutrition), twin births, and limited colostrum produced by the mothers (Kaunang et al., 2013). Mortality in twin births is higher than in single births, and female kid has a higher mortality rate compared to male kid (Santosa and Wintarsih, 2018). The formula to calculate the mortality rate is as follows (Kutsiyah, 2017; Adhianto et al., 2019):

$$Mortality = \frac{\sum kid\ death}{\sum population} \times 100\%$$

The analysis results of mortality rates in Pote Goats for kids and total mortality are shown in Table 2. According to Table 2, the kids mortality rate in Pote Goats is 8.07% of the population. Female cemp mortality is higher (5.77%) compared to male kids mortality (2.31%), consistent with the findings of Santosa and Wintarsih (2018). The highest kids mortality rate, at 11.54% of the population, occurs in Tanah Merah District, while the lowest is in Galis District, with a mortality rate of 2.08% of the population. The high kids mortality in Tanah Merah District is likely related to the focus on fattening in livestock farming. When a female gives birth during the fattening phase, the kids born may receive less attention from the farmers.

The overall goat mortality rate is 9.34% of the population, with higher mortality in females compared to male goats, at 6.57% and 2.77%, respectively, in line with the findings of Santosa and Wintarsih (2018). The mortality rate in Pote Goats is lower than in PE goats (10-15%) but higher than in Saanen goats, which is only around 4-7% (Das et al., 2016); (Sahoo and Das, 2018).

Natural Increase (NI) of Pote Goats

The livestock population on a farm or in a particular area is influenced by slaughtering, deaths, exports, and natural increase. Population structure, natural increase, birth and death rates, and the availability of replacement livestock are essential factors to ensure the sustainability of livestock in a region (Adhianto et al., 2019). The determining factors for natural increase in goats are the environment, sex, age, nutrition, health, and management practices (Wahyono et al., 2017); (Prayitno et al., 2020). The formula to calculate natural increase (Putra and Sarbaini, 2017); (Kutsiyah, 2017) is as follows:

$$\text{Natural Increase (\%)} = \text{Kid birth (\%)} - \text{Kid death (\%)}$$

The analysis results of the Natural Increase (NI) of Pote Goats in Bangkalan Regency are shown in Table 3, with a rate of 122.27% per year. According to Table 3, the NI of females is higher (64.20%) compared to males (58.07%). The highest natural increase is found in Labang District, at 264.45%, while the lowest is in Modung District, at 19.04%. The goat birth rate in Labang District is 271.43%, while the mortality rate is only 6.98%. In Modung District, the birth rate is only 24.44%, while the mortality rate is 5.41% (Refer to Table 2). The value of NI in an area is more meaningful when high natality is accompanied by low mortality (Kusuma et al., 2017).

Table 3. Natural Increase (NI), Migration Rate, and Goat Pote Emigration Rate

No	District	NI (%)			Migration Rate (%)			Emigration Rate (%)		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Galis	41.33	60.24	101.57	25.00	17.71	42.71	10.42	10.42	20.83
2	Modung	12.37	6.67	19.04	81.08	10.81	91.89	32.43	13.51	45.95
3	Bangkalan	67.57	68.02	135.59	16.90	18.31	35.21	6.34	4.23	10.56
4	Arosbaya	66.00	78.16	144.17	16.13	6.45	22.58	25.81	0.00	25.81
5	Tanah Merah	27.50	34.81	62.31	17.31	9.62	26.92	19.23	10.58	29.81
6	Tragah	61.75	78.27	140.02	16.43	19.58	36.01	0.70	3.15	3.85



7	Labang	142.86	121.59	264.45	6.98	6.98	13.95	0.00	0.00	0.00
8	Kamal	92.47	84.58	177.05	18.75	24.22	42.97	0.78	3.13	3.91
Total		58.07	64.20	122.27	20.18	17.19	37.37	7.15	5.19	12.34

Source: Primary Data (2023)

Migration and Emigration Rates of Goat Pote

Migration (livestock exiting) and emigration (livestock entering) from and to a farm or region also affect the livestock population. The formula for calculating migration and emigration rates (Kutsiyah, 2017); (Adhianto et al., 2019) is as follows:

$$Migration (\%) = \frac{\sum \text{livestock exiting}}{\sum \text{population}} \times 100\%$$

$$Emigrasi (\%) = \frac{\sum \text{livestock entering}}{\sum \text{population}} \times 100\%$$

The analysis of migration and emigration patterns for Pote Goats in Bangkalan Regency is presented in Table 3, providing valuable insights. The overall migration rate is observed to be 37.37%, while the emigration rate stands at 12.34%. Notably, more goats are leaving than entering the population. Specifically, the migration of male livestock accounts for a higher percentage (20.18%) compared to females (17.19%). Similarly, the emigration of male livestock shows a higher proportion (7.15%) compared to females (5.19%). Modung District exhibits the highest migration and emigration rates, reaching 91.89% and 45.95% respectively, attributed to farmers in this district primarily raising goats for fattening purposes. In contrast, Labang District displays the lowest migration and emigration rates at 13.95% and 0.00% respectively, reflecting the focus of farmers in this district on breeding activities and the tendency to sell or dispose of the goats they produce. These migration and emigration patterns are influenced by various factors such as farming objectives (fattening or breeding), goat productivity levels, and the pursuit of business efficiency to maximize farmers' income (FAO, 2018); (IOM, 2019).

**Pote Goat Productivity
Litter Size**

Litter size refers to the number of kids born to per doe goats in a single birth. The litter size value determines the fertility rate of the doe goats. The higher the litter size, the more kids are produced, and consequently, the higher the farmer's profit (Parasmawati et al., 2013); (Prasita et al., 2015). A high litter size has the potential to increase mortality in newborns and impact their low birth weight. In some cases, it can be observed that the birth of more than two twin kids results in the failure of the cempem to receive colostrum from their doe (Sudrajat et al., 2021). The formula for calculating litter size (Wati and Saili, 2014) is:

$$Litter\ size = \frac{\sum \text{kids born}}{\sum \text{ewe goats}}$$

The results of the litter size analysis in Pote Goats in Bangkalan Regency are shown in Table 4. According to Table 4, the average litter size of Pote Goats is as follows: poel 1 is 1.76±0.54 per dam, poel 2 is 1.76±0.43 per dam, poel 3 is 1.88±0.48 per dam, and poel 4 is 1.98±0.47 per dam. The litter size of Pote Goats in poel 1 and 2 is relatively similar, and it increases as the age of the goats advances. In addition to the age of the doe, factors determining the litter size in goat livestock include breed, genetics, feed, health, and management of breeding and reproduction (Martin and Watson, 2013); (Afolayan et al., 2015); (Adewumi et al., 2017).

Table 4. Litter Size of Pote Goats

No	District	Age of Goats							
		Poel 1 (1-1,5 years)		Poel 2 (>1,5-2,5 years)		Poel 3 (>2,5-3 years)		Poel 4 (>3 years)	
		n	Average	n	Average	n	Average	n	Average
1	Galis	6	1.50±0.55	4	1.38±0.48	1	2.00±0.00	16	1.93±0.40
2	Modung	1	2.00±0.00	1	2.00±0.00	1	2.00±0.00	3	1.67±0.58



3	Bangkalan	4	2.00±0.00	8	1.63±0.52	4	1.50±0.41	16	2.18±0.44
4	Arosbaya	0	0	1	2.00±0.00	3	1.67±0.58	1	1.67±0.00
5	Tanah Merah	7	2.00±0.58	11	1.95±0.35	0	0	6	2.10±0.62
6	Tragah	9	1.44±0.53	25	1.76±0.44	19	1.86±0.5	66	1.92±0.50
7	Labang	1	2.00±0.00	1	2.00±0.00	4	2.27±0.72	7	2.04±0.47
8	Kamal	13	1.85±0.55	10	1.75±0.42	10	1.97±0.29	20	2.13±0.51
All Regencies		41	1.76±0.54	61	1.76±0.43	42	1.88±0.48	135	1.98±0.47

Source: Primary Data (2023)

The litter size of Etawah crossbred Goats ranges from 1.4 to 2.4 per birth, Senduro goats range from 1.3 to 2.6 head per birth, and Kacang Goats range from 1.2 to 2.2 head per birth (Hadisaputra and Hidayat, 2013). Based on this, it can be concluded that Pote goats have a litter size that is nearly the same as other local goats in Indonesia.

Pote goats are a relatively prolific Indonesian local goat breed, capable of giving birth to 1-4 head per birth, as shown in Table 5. According to Table 5, it is evident that Pote Goats are predominantly twin births (73.48%), followed by single births (14.70%), triplet births (10.39%), and quadruplet births (1.43%). Female goats named poel 1, poel 2, poel 3, and poel 4 were found to give birth to 3 head per birth, while the birth of 4 head per birth was only observed in poel 3 and poel 4. Ideally, dams and kids with twin (two, three, and four) births can be recommended for government purchase to be managed in technical implementation units (TIU) or purchased privately to be included in breeding farms, enabling the Pote Goat breeding program to be carried out properly and effectively.

Table 5. Birth types in Pote Goats

Litter Size	Age of Goats								Total	
	Poel 1 (1-1,5 years)		Poel 2 (>1,5-2,5 years)		Poel 3 (>2,5-3 years)		Poel 4 (>3 years)		n	%
	n	%	n	%	n	%	n	%		
1	12	29,27	14	22,95	5	11,90	10	7,41	41	14,70
2	27	65,85	46	75,41	32	76,19	100	74,07	205	73,48
3	2	4,88	1	1,64	4	9,52	22	16,30	29	10,39
4	0	0,00	0	0,00	1	2,38	3	2,22	4	1,43
	41		61		42		135		279	

Source: Primary Data (2023)

Doe Productivity Index of Pote Goats

The Doe Productivity Index (DPI) is a measure of the doe's ability to produce kids per year. Doe with high DPI values indicate that the goats have good genetic potential to produce kids with high weaning weights in a shorter period each year. The determinants of doe productivity index value are the weaning weight of kids, litter size, and kidding interval. Female dams have a high DPI value when they have a short kidding interval, high litter size, and high weaning weight of kids (Kartiko et al., 2021). The formula to calculate DPI (Wati and Saili, 2014) is as follows:

$$DPI = Weaning\ Weight \times Litter\ Size \times \frac{12}{Kidding\ Interval}$$

The results of the analysis of Pote Goats' DPI in Bangkalan Regency are shown in Table 6. Based on Table 6, the average value of Pote Goat DPI for poel 1 is 30.14 kg, poel 2 is 30.14 kg, poel 3 is 32.20 kg, and poel 4 is 33.91 kg. In addition to being influenced by the interaction of genotype and environmental factors, the average DPI of Pote goats is positively correlated with the maturity age of their doe (Nafiu et al., 2020).



Table 6. Doe Productivity Index of Pote Goats

No	Districts	Weaning Weight (90 days)	12/KI	Age of Goats							
				Poel 1 (1-1.5 years)		Poel 2 (>1.5-2.5 years)		Poel 3 (>2.5-3 years)		Poel 4 (>3 years)	
			12/8	Litter Size	DPI	Litter Size	DPI	Litter Size	DPI	Litter Size	DPI
1	Galis	13.50	1.5	1.50±0.55	30.37	1.38±0.48	27.94	2.00±0.00	40.50	1.93±0.40	39.08
2	Modung	10.00	1.5	2.00±0.00	30.00	2.00±0.00	30.00	2.00±0.00	30.00	1.67±0.58	25.05
3	Bangkalan	9.00	1.5	2.00±0.00	27.00	1.63±0.52	22.01	1.50±0.41	20.25	2.18±0.44	29.43
4	arosbaya	10.00	1.5	0.00	0.00	2.00±0.00	30.00	1.67±0.58	25.05	1.67±0.00	25.05
5	Tanah Merah	10.00	1.5	2.00±0.58	30.00	1.95±0.35	29.25	0	0.00	2.10±0.62	31.50
6	Tragah	13.64	1.5	1.44±0.53	29.46	1.76±0.44	36.01	1.86±0.5	38.05	1.92±0.50	39.28
7	Labang	16.65	1.5	2.00±0.00	49.96	2.00±0.00	49.96	2.27±0.72	56.71	2.04±0.47	50.96
8	Kamal	14.03	1.5	1.85±0.55	38.93	1.75±0.42	36.83	1.97±0.29	41.46	2.13±0.51	44.82
	All Regency	11.42	1.5	1.76±0.54	30.14	1.76±0.43	30.14	1.88±0.48	32.20	1.98±0.47	33.91

Source: Primary Data (2023)

The productivity index of PE Goats is 21.56±1.97 kg (Negara et al., 2014) and 32.35±8.41 kg (Kartiko et al., 2021). The productivity index of Senduro Goats is 50.87±23.43 kg (Budiarto, 2018). The productivity index of Bligon and Kejobong Goats is 20.10±5.90 kg and 21.46±7.60 kg, respectively (Budisatria et al., 2021). The productivity index of Pote Goats is 30.14 - 33.91 kg per year, which is almost the same as the productivity index of PE Goats, higher than the productivity index of Bligon and Kejobong Goats, but lower than the productivity index of Senduro Goats. The main factors contributing to the generally low value of DPI in Indonesian goat farming are traditional management practices, lack of attention to production inputs, and unstructured breeding and selection systems. For instance, the variations in feed availability across different regions can influence the nutrient conversion by the mother into fetal weight, which ultimately affects the weaning weight (Sumartono et al., 2016).

Kids Harvest of Pote Goats

Kids harvest refers to the number of kids that can be harvested in a population at a given time. The determinants of kids harvest are the number of parents, the number of kids born, the number of kids that died, and the kidding interval (Wati and Saili, 2014). Kids harvest and litter size can be increased by maintaining parents that frequently give birth to twins and accompanied by more intensive maintenance management to reduce pre-weaning kid mortality. Kids harvest can also be increased through the application of flushing technology in the field of feed (Budisatria et al., 2017). The formula for calculating kidsharvest (Wati and Saili, 2014) is:

$$Kids\ harvest = \frac{(\sum kids\ born - \sum kids\ died) \times 100\%}{number\ of\ doe} \times \frac{12}{KI}$$

The results of the kids harvest analysis of Pote Goats in Bangkalan Regency are shown in Table 7. Based on Table 7, the kids harvest of Pote Goats is 291.15% per year, with the lowest kids harvest in Modung District (168.75% per year), and the highest kids harvest in Arosbaya District (540% per year). When compared to the kids harvest of Kacang Goats in Konawe Utara as reported by Wati and Saili (2014), which was 167.71% per year, the kids harvest of Pote Goats in Bangkalan Regency is much higher.

Table 7. Kids Harvest of Pote Goats

No	District	NI x 100%	Number of Doe	12/KI	Kid Harvest (%)
1	Galis	6100.00	30	1.50	305.00
2	Modung	900.00	8	1.50	168.75
3	Bangkalan	10100.00	36	1.50	420.83



4	Arosbaya	1800.00	5	1.50	540.00
5	Tanah Merah	3600.00	27	1.50	200.00
6	Tragah	21900.00	130	1.50	252.69
7	Labang	3500.00	13	1.50	403.85
8	Kamal	11300.00	56	1.50	302.68
Se-kabupaten		59200.00	305	1.50	291.15

Note: $NI = (\sum \text{kids born} - \sum \text{kids died})$

Source: Primary Data (2023)

CONCLUSION

The population of Pote Goats consists of 65.17% females (35.18% adults, 16.15% young, and 13.84% kids) and 34.83% males (18.34% young, 13.61% kids, and 2.88% adults). The male-to-female adult ratio is 1:12.20. The natality rate is 131.61% per year (70.78% females, 60.83% males). The kids mortality rate is 8.07% per year (5.77% females, 2.31% males). The mortality rate for goats of various ages is 9.34% (6.57% females, 2.77% males). The net increase is 122.27% per year (64.20% females, 58.07% males). The migration rate is 37.37%, and the emigration rate is 12.34%. The average litter size ranges from 1.76 to 1.98 per dam, increasing with the age of the female. Twin births are the most common (73.48%), followed by single births (14.70%), triplets (10.39%), and quadruplets (1.43%). The DPI value ranges from 30.14 to 33.91 kg per year, increasing with the age of the female. The kids harvest rate is 291.15% per year.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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