

EXPLORATION OF BREEDING STOCK AMONG THE BALI CATTLE IN DOMPU REGENCY, WEST NUSA TENGGARA PROVINCE, INDONESIA

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ABSTRACT

The native Indonesian beef cattle, also known as Bali cattle, have exterior, genetic composition, and the ability to adapt to various environments. According to the Indonesia National Standard (INS) of breeding stock, Bali cattle are with superior inherited characteristics which make them fulfill the specific requirements to be developed and classified as breeding stock. Dompu is one of the regencies in the West Nusa Tenggara Province, with a large natural grazing area, therefore, it has the prospects of being used for the development of Bali cattle. Based on this background, the purpose of this study was to assess the percentage of breeding stock based on INS 2020 in Dompu Regency. The study was conducted between January 2019 and July 2020, involving a total of 50 female cattle, aged 3-6 years old, kept by smallholder farmers. The exterior parts were recorded, then, the height, body length, and breast circumference were manually measured using a ruler and measuring tape. These were then compared with the Indonesian National Standard for determining the breeding stock. Based on the results, 48% had shoulder height, 2% had body length, and 2% had chest circumferences above the INS. Considering the reddish skin color, backline, and buttocks and legs white color, 100% of the animals showed exterior parts similar to the INS. The average age range of the farmers which was between 20-50 years was a determining factor in the development of small-scale cattle. Conclusively, Dompu Regency has the potential as the development area of Bali cattle. However, additional cow breeding stock is needed to maintain its phenotypic offspring because only 2% of Bali cattle breeds are currently available in the community farms.

Key words: Bali Cattle breeding stock, Indonesia National Standard, Dompu Regency Indonesia

INTRODUCTION

Bali cattle (*Bos sondaicus*) are native Indonesian cattle, one of the genetic resources that need to be protected. This cow is famous in the world because it has several advantages, including having good adaptability to bad environments, such as areas with high temperatures, low quality of feed, and others. Also, the fertility rate (fertility) of Bali cattle is very high compared to other cattle, reaching 83% without being affected by the quality of feed (Darmadja, 1980). Bali cattle have spread to almost all regions in Indonesia, including Java, Sumatra, Sulawesi, Kalimantan, Bali, and Nusa Tenggara.

One of the provinces that develops Bali cattle is West Nusa Tenggara (NTB), the population of which reaches 916,560 cows and contributes to the development of national beef cattle. One of the districts that have contributed to the development of Bali cattle in NTB is the Dompu Regency with a cow population of 96,205 heads (BPS NTB, 2017). With an area of grazing area of 2324.6 km² (11.53%), this district is a potential area for the development of Bali cattle. With an area of 2,321.55 km² of Dompu district and a population of only about 200,000 people, there is still a large area for cattle development. Geographically, Dompu Regency is located between 117 ° 42' - 118 ° 30' East Longitude and 5 ° 54' -8 ° 04' South Latitude.

In general, the geographical condition of Dompu Regency can be illustrated that some areas are way to hilly areas with a land slope of 15-40% and above 40% of 49.97% of the area, 18.48 5 flat areas and 31.55 sloping areas. % of the area. Dompu Regency is an area with a tropical climate with an average rainy season from October to April, during the dry season the temperature is relatively low, ranging from 20 °C– 30 °C during the day and below 20 °C at night. Sourced from rainfall data from the Dompu Regency Food Crops Agriculture Office from 1984 to 1992, it can be seen that the annual average rainfall was 1,038.73 mm, with the number of rainy days as many as 77 days.

Based on the potential for livestock development, there is still quite a large amount of land available, so the nursery business is more directed at Sumbawa Island (Dompu Regency) through a mini-ranch investment pattern and a pasture-based cattle breeding business partnership, the pattern of raising cattle in Dompu Regency is carried out extensively, the cattle are released free in the public pasture.

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Beef is one of the foods from livestock that has a major contribution to meeting the animal protein needs of the Indonesian people. So far, domestic beef production has not been able to meet the needs of the community there tends to be a growing shortage of tofu from year to year.

The main problem that causes the inability of beef self-sufficiency in Indonesia, including in NTB, especially in Kabupaten Bima, is the declining level of production and productivity of smallholder cattle.

The decline in productivity is thought to be due to the decreasing level of reproducibility and genetic quality of smallholder cattle. The results of the study by Aman et al. (2006) showed that there had been a decrease in body sizes of breed cows in Kabupaten Bima. By comparing the results of research by Dwipa and Sarwono (1993). in 13 years (1993-2006). there was a decrease in body length of about 8%, shoulder height 3%, and chest circumference 3%. The decline in the level of reproducibility and genetics of cattle is thought to be caused by the poor management of smallholder cattle business, especially in maintaining the availability of qualified female and male breeds. Based on these problems, it is necessary to identify the grade of female Balinese cattle in Bima Regency according to real conditions in the field. The results of the identification of the grade of cows can be used as input for planning the development of breeding cows in Bima Regency and are used as a basis for consideration in determining the policy for releasing female calves out of the region.

For the sake of maintaining the performance and quality of Bali cattle, evaluation should always be carried out, including by assessing the exterior characteristics and body size of the cattle to see the growth or development of livestock. Exterior characteristics are an important trait (Allison, 2009), while body size indicates an important framework development in beef cattle selection and breeding programs (Bene et al., 2007). The results of the evaluation are used for livestock selection, standardization of livestock, and other essential production aspects.

literature review

Bali cattle are one of the native cattle breeds in Indonesia which are the direct domestication of wild bull (Martoyo, 2003). Bali cattle are developed, utilized, and preserved as a native livestock resource that has certain characteristics and can develop well in various environments in Indonesia. Bali cattle also have a fairly varied production performance and high reproductive capacity. Thus, the genetic resource of Bali cattle is one of the national assets which is germplasm which needs to be maintained and utilized sustainably because it has specific advantages. Bali cattle have also been included in the world's assets which are listed in the FAO list as one of the cattle breeds in the world (DGLS, 2003).

The physical characteristics of Bali cows are medium size, deep chest with good legs. Feather color brick red and dark brown. On the back, there is a black line along the back which is called the "eel line" (Williamson and Payne, 1983). Bali cattle have a characteristic that is not humped, generally all four legs and a white rump (Abidin, 2002). His calf is brick red (Susilorini et al., 2008).

Growth is a change in size which includes changes in live weight, shape, dimensions, and body composition including changes in body and organ components as well as chemical components (Soeparno, 2005). Ensminger (1969), states that the growth of livestock is seen among other things by increasing body size.

Body size is a component of growth as a result of an increase in the number of cells (Ledger, 1978 cit. Mu'in, 2008). Body size according to Irwin and Clayton (1977) that a good size consists of group 2 steers and ready-to-cut heifers. Body size data is very necessary for the preservation of livestock selection programs, some measuring data on body parts or bodies include body length, gumba height, hip height, chest circumference, and heat index.

RESEARCH MATERIALS AND METHODS

The research was carried out at the location of people's farms in Dompu Regency, West Nusa Tenggara in January 2019 - July 2020.

Theory

The Bali cattle used are 50 adult female Bali cows (3-8 years old) that are extensively reared in the grazing fields of the Dompu Regency smallholders.

Research methods

Type of Data

Data collection was carried out based on survey methods and data in the form of primary and secondary data. Primary data was collected through interviews and direct observation with breeders based on the contents of the questions in the questionnaire that had been prepared. Secondary data were obtained from literature studies, reports, publications, and other literature related to this research, as well as institutions/agencies involved in this research, such as the Central Bureau of Statistics, District Animal Husbandry Service.

Retrieval of farmer profile data

To find out the farmer profile and maintenance system, interviews were conducted with breeders. The criteria for breeders who are used as respondents are to have at least 2 adult Bali cows

Exterior characteristics data retrieval:

Look at the body color, but color, leg color, tail tip color, and the color of the eel line on the back.

Retrieval of body size data:

Parameters measured according to INS (2020) include:

1. Shoulder Height, measured from the highest point between the shoulders (withers) to the ground using a measuring stick in cm;
2. Chest circumference, measured in a circle around the chest cavity through the back of the hump and behind the shoulder joint (Os scapula) using a measuring tape in cm;
3. Body length, measured from the hump of the shoulder (scapula) to the tip of the pelvis (process spinous), expressed in cm.

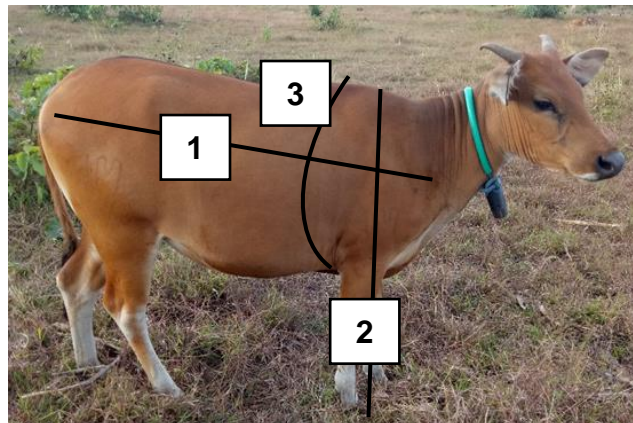


Figure 1. Illustration of body measurement: 1) body length (BL); (2) shoulder height (SH); (3) chest size (CS).

Data analysis

Data on farmer profiles and exterior characteristics were processed descriptively quantitatively and qualitatively. Body size was analyzed descriptively quantitatively to obtain the mean value and standard deviation. Then compared with the size of the gumba height, body length, and chest circumference according to the Indonesian National Standard in 2020. The percentage of body size that exceeds the standard in the three standard body sizes according to INS is calculated. Statistical analysis calculations were performed using the Statistical Product and Service Solution (SPSS) version 23.0 personal computer software.

RESULTS AND DISCUSSION

Breeder Profile

Profiles of breeders obtained from the results of research in Dompu District, West Nusa Tenggara Province are presented in Table 1.

Table 1. Profiles of breeders in Dompu District, West Nusa Tenggara Province

Parameter	Dompu Regency
Number of breeders	50
Age (%)	
<30-39	64,00
40-49	24,00
>50	12,00
Livestock experience (%)	
<9	54,00
10-19	26,00
>20-30	20,00
Level of education	
Not school	22,00
SD	30,00
SMP	30,00
SMA	12,00
D3/S1/S2	6,00
Production system	
Fattening	0
breeding	0
Fattening / breeding	100
Maintenance objectives (average) *	
Savings	3,00±0,00
Fertilizer	1,00±0,00
Workforce	1,00±0,00
Origin of livestock	
Buy	18,00
Noisy system	0
Inheritance	60,00
Aid	22,00
Maintenance system	
Extensive	100
Semi intensive	0
Intensive	0
Mating system	
Natural mating	100
Artificial insemination	0

* Grouped by importance: 3 = very important, 2 = important, 1 = not important.

The characteristics of the farmers in the Dompu area presented in Table 1.

The age of the farmers with the extensive Dompu rearing system ranges from 30-50 years. The statistical analysis results showed that the age of breeders in Dompu with higher maintenance at the age of 30-39 years with a percentage of 64.00%, on the contrary at the age between 40-49 years with a percentage of 54.17%. In the Dompu area, with extensive maintenance, it is higher at a young age. The farmer's age is in line with Sirajudin's research (2017), which states that smallholder farms with younger age will have the ability to increase raised cattle production. The age factor greatly influences work productivity, both as a farmer and cattle breeder (Ansar 2014). Furthermore, young farmers are usually easier to receive information and counseling (Nazlah, 2008).

Experience in farming is an essential factor in increasing good maintenance to increase livestock production (Waris et al., 2015). Based on the farming experience, farmers with 9 years experience were 51.06%; the rest have 10-30 years or above. The experience in raising livestock is obtained from the parents and generally continues with raising their own. Sirajudin (2017) states that the more experienced, the more knowledge is achieved so that running a livestock business can improve.

The education level is still relatively low; most farmers do not go to school and only graduate from elementary school or junior high school, although some breeders also have a graduate educational background. Budisatria et al. (2019) reported that small farmers only have a low educational background; more than 75% of farmers only completed primary and secondary school. Agus

and Widi (2018) state that small farmers are the most vulnerable stakeholders in Indonesia's beef cattle production system. Smallholders often have limited access to the inputs, information, and services they need to foster a better future. They need to be continuously empowered in technology inputs, financial support, information, and markets. Haq et al. (2019) suggest that farmers with a higher education level will implement innovation more quickly. Conversely, those with low education tend to avoid innovation. The level of education will also directly affect the mindset and behavior in their business. Under these conditions, there is a need for continuous guidance (Santosa, 2001).

Exterior characteristics

Table 2. Exterior characteristics of Bali cows in Dompu Regency

Variable	Total Percentage
Body color%	
Redness	100
Lower leg color%	
white socks shape	100
Butt color%	
White mirror shape	100
Backline color%	
Black	100
Tail tip color%	
Black	100

Based on the exterior characteristics (Table 2), it showed that the qualitative characteristics of cows in the Dompu Regency were fullfil the criteria according to the Indonesia National Standard (INS) 7651-4: 2020 values for Bali cows. The exterior characteristics can be used as the basis for identifying as Bali cattle.

Body sizes

Body measurements include height, body length, gumba height, and chest circumference of adult female Bali cows.

Table 3. Body sizes of Bali cows in Dompu Regency

Parameters	Cm
Height	123±30.05
Body length	101±4.01
Chest circumference	108±19.71

The mean and standard deviation of height, body length, and chest circumference can be seen in Table 3. The variations for height and chest circumference of cows in the Dompu Regency are large, while it is not large for body length. The variation in height was influenced by genetic. For chest circumference, it is more influenced by growth as age grows.

The body sizes in these research smaller compare to Hikmawaty et al. (2014), stated that the body length, chest circumference, and shoulder height averaged 119.75cm, 160cm, and 117cm.

Furthermore, Niam et al. (2012) stated that with increasing body weight, the chest circumference size would also increase and vice versa; increasing chest circumference will also increase body weight. Bali cows' body weight and body size are influenced by a good management system. Raising cattle is carried out extensively by providing forage from the native pasture (*umbaran* land= native language). Forage was also provided in pens. This raising method is in line with Rauf et al. (2015)'s opinion, which states that livestock productivity is strongly influenced by the feed and environmental temperature conditions. Mount (1979); Wijono et al. (2001); in Latulumamina (2013) suggests that the growth rate of livestock will decrease as a result of hot environmental conditions. Also, when there is a shortage of forage, it will cause weight loss, so feed improvement is needed to influence the cow's body condition.

Compared with the Indonesia National Standard (Table 3), the percentage of cows that exceeds INS is presented in Table 4

Table 4. Body sizes of adult Bali female cows in Dompu compare to Indonesia National standard

Variable	Indonesia National Standard		
	1st Class	2nd Class	3rd Class
Height	111	109	106
Body length	110	107	104
Chest circumference	151	145	139

Table 5. Percentage of Bali cattle body measurement more than Indonesia national Standard for Breeding Stock in Dompu Regency

Variable	% 1st Class	% 2nd Class	% 3rd Class
Height	48%	52 %	58%
Body length	2 %	8%	40%
Chest circumferences	2 %	2%	2%

The research results showed that in terms of height, the percentage of cows that have height exceeds the standard was the highest; there were 48% for 1st class, 52% for 2nd class, and 58% for 3rd class. In body length, only a small percentage can enter 1st and 2nd classes, 40% who enter 3rd class. What needs attention is that the percentage was very small to be the breeding stock in terms of chest circumference. Of the sample, only 2% could exceed the breeding stock standards for 3rd class, for the 1st and 2nd grades did not exist.

Based on these results, it was necessary to think about a program to improve cows' performance for its sustainability in the future.

CONCLUSION

Based on the research results, it is concluded that Bali cattle in Dompu Regency showed:

1. The farmer profile is dominated at a young age, whereas based on education level, respondents are dominated by those who do not go to school, primary school, and junior high school.
2. The external characteristics of Bali cattle in this location are still pure so that they can be used as a development area for Bali cattle and according to Indonesian national standards
3. Only 2% of the body size of adult Balinese cows meets Indonesian National standards for breed category 3 stock. Based on these results, it is necessary to develop livestock performance improvement programs.

SUGGESTION

1. Addition of adult female Balinese cows from smallholder farms in Dompu district
2. There is a need for an extension program to broaden the insights of people's farms who still do not understand good and correct maintenance management.

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