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## Exploring the relationship between physical measurements and body condition score in Sangamneri goats

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**Abstract**

Assessing body condition score (BCS) is vital in livestock management as it offers key information on health, nutritional status, and reproductive function. This research seeks to investigate the correlation between physical parameters and body condition rating in Sangamneri goats, a famous breed in certain agricultural areas. Our results indicate strong connections between BCS and certain physical characteristics, demonstrating the possibility of using basic physical metrics as dependable markers of body condition in Sangamneri goats. The findings have practical significance for managing Sangamneri goats by enabling early detection of nutritional shortages or health problems, enhancing feeding techniques, and enhancing herd performance. This research adds to the existing information on Sangamneri goats, promoting improved management techniques and enhancing the sustainability of this goat breed within agricultural systems.

**Keywords:** Body condition score, Sangamneri goats, physical measurements, livestock management, nutritional status, reproductive performance

**Introduction**

It is beneficial to the agricultural economy in situations when the cultivation of crops and dairy products is not profitable, such as in mountainous and semiarid regions. The rearing of goats is the ideal solution for people living in rural areas of developing nations since it has low starting costs, high fertility and fecundity, little needs for feed and upkeep, high feed conversion efficiency, a rapid return on investment, and low risk. An adept herbivore, goats like eating a wide variety of plants, including weeds, trees, and shrubs, among other types of vegetation. A wide range of roughages and fibres are metabolised by goats in an effective manner.

In the state of Maharashtra, Ahmednagar is the birthplace of the Sangamneri breed. This particular goat is distributed to the districts of Dhule, Nashik, Pune, and Solapur. Specifically, the production of milk and meat for commercial reasons is the primary emphasis of this type of goat. Long legs are a distinguishing feature of the Sangamneri, which is of a medium size. The hue of the coat may include a wide spectrum of patterns, including brown, black, and primarily white. This breed is characterised by having a face that is straight and hair that is short and coarse. Both sexes have horns that are oriented in an upward and backward direction. In order for a female sangamneri goat to reach the age when she may reproduce, it takes around 400 to 420 days. It has exceptionally high-quality meat and produces between one and two litres of milk per day. A sangamneri goat will cease lactating after a period of time ranging from 150 to 160 days. Between 100 and 125 kilogrammes of milk are produced by Sangamneri strains throughout the lactation process.

Goats may be evaluated using the body condition score (BCS), which is a method that is both rapid and simple, making it an excellent choice. It is possible to determine the overall health of an animal by examining its muscle mass as well as the proportion of body fat it has. Animals that are in poor physical condition may be exhibiting symptoms of starvation or any number of illnesses. If the animals are already in good shape, reduce their nutrition. The body's state may be affected by variations in the availability of nourishment. By analysing animals, manufacturers may be able to save a significant amount of money.

In the event that farmers are interested in optimising goat performance and market price, the BCS is a basic and practical technique that may aid them in modifying their management choices about the health of their animals as well as the quality and amount of their feed. There are two methods that may be used to evaluate the health of an animal: its live weight and its body condition rating. Observing the weight of an animal as it fluctuates on live scales is the most reliable method for determining the animal's overall health.

According to the BCS scale, goats and sheep may have scores ranging from 1.0 to 5.0. The slim BCS 1.0 animals do not retain any fat, in contrast to the obese BCS 5.0 animals that are seen in the images. It is usually accepted that animals are in good health if their BCS is between 2 and 3. It is common for the BCS to signal that there are issues with management or health when it dips below 2.0. In the context of normal therapy, a BCS of four or five is quite rare. The lumbar area, which includes the rib cage and sternum in addition to two projections known as the spinous process and the transverse process, is often the location where the lumbar spine (BCS) of goats is checked frequently. The process of appraising animals using BCS will take around ten to fifteen seconds once you get the hang of it. The BCS takes into consideration a variety of parameters, including the animal's nutrition, both current and historical, as well as regular care and health. For the purpose of determining the goats' levels of energy, the BCS takes measures of both their muscle and fat structures. In certain cases, the BCS may be influenced by the animal's physiological state. It is fine to have a mating score between two and three, but three is the best possible score for does. When they are carrying a kid, expectant moms should strive

to get a score of three. The BCS of a doe often decreases after she has been kidding and lactating. The insufficient nourishment that animals get during breastfeeding may force them to draw into their stored energy, which might result in an undesirable increase in body weight. Year (2012) in question I hope you are well, Girma and Alemu.

### Materials and Methods

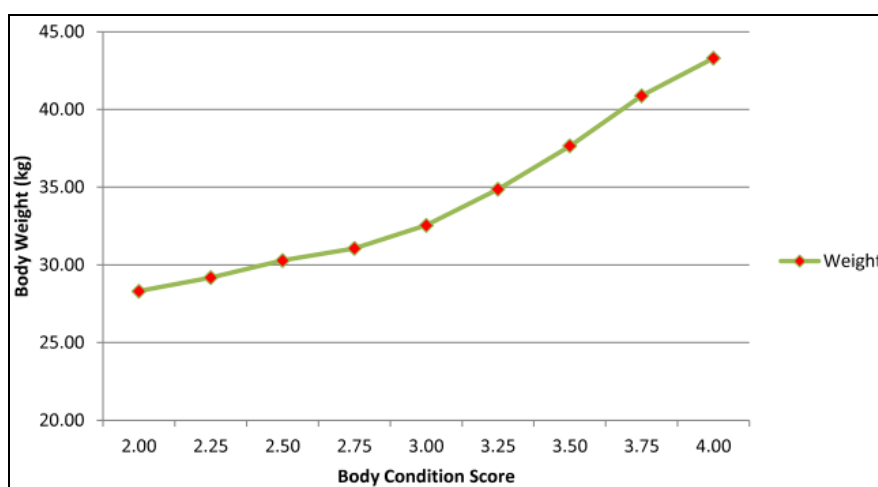
An technique to management that is considered to be semi-intensive is being used by the All India Coordinated Research Project on Goat Improvement. Goats may be fed for a period of three to four hours in the morning, and for a period of two to three hours in the afternoon. Sorghum, maize, silage, and pasture are some examples of the green and dry fodders that are being supplemented with concentrate. Other examples include sorghum. While we are in the barn, we feed the infants up to the age of six months. In times of severe weather, both adult goats and young goats are given enough protection.

A total of two hundred adult Sangamneri goats were selected at random for this investigation. Several measurements are obtained from the body of the Sangamneri goat, including the following: Total mass, body length, height of withers, chest girth, pectoral diameter, thigh size etc.

### Results and Discussion

#### The correlation between Sangamneri goat BCS and weight

This figure 1 provides a graphic representation of the correlation that exists between the body condition score and the body weight of Sangamneri goats.



**Fig 1:** Shows the rising trend in body weight as measured by BCS.

In Sangamneri goats, a body condition score of 2.5 was connected with a low body weight of 30.28 kg. On the other hand, scores of 3.0 (weighing 32.54 kg), 3.5 (weighing 37.65 kg), and 4.0 (weighing 43.30 kg) were considerably greater than the previous scores. A correlation was found between an increase in the physiological condition score and an increase in the inclination to gain weight, as shown by the findings. Conducted study on Avikalin sheep and found that the body weight of animals with different BCS levels increased in a linear way. The animals' body weights increased from 27.1 kg for BCS 2.5 to 28.3 kg for BCS 3.0 to 29.9 kg for BCS 3.5 to 35.7 kg for BCS 4.0 based on the BCS levels.

The weight of Sangamneri goats increased from 10.51 kilogrammes to 15.32 kilogrammes for every unit that was

changed in their physical condition score. It was discovered that Romney sheep lost between 6.89 and 7.78 kilogrammes of body weight for each unit of BCS change. On the other hand, discovered that Nellore sheep lost 7.3 kilogrammes of body weight. When it came to BCS 2.00 does, the smallest weight that was recorded was 28.30 kg, while the most weight that was recorded in BCS 4.00 does was 43.30 kg. It was shown that the body weight of the Sangamneri goat grew by 0.88, 1.10, 0.77, 1.49, 2.32, 2.79, 3.23, and 2.42 kilogrammes in comparison to the previous BCS.

**Sangamneri goat distribution according to body condition score:** Table 1 displays the distribution of the Sangamneri goat population according to the BCS.

**Table 1:** Goat condition score distribution

Body Condition Score (BCS)	Number of Goats	Percentage Distribution
2.00	28	14.00
2.25	23	11.50
2.50	43	21.50
2.75	23	11.50
3.00	34	17.00
3.25	22	11.00
3.50	07	03.50
3.75	05	02.50
4.00	15	07.50

It was found that there were 28, 23, 44, 23, 34, 22, 07, 05, and 15 does with BCS values of 2.00, 2.25, 2.50, 2.75, 3.00, 3.25, 3.50, and 4.00 percent, respectively. The percentage distribution of these does was as follows: 14.50%, 11.50%, 21.50%, 3.00, 3.25, 3.50, and 4.00 percent, respectively. Does with a BCS of 2.50 were found to be the most prevalent among Sangamneri goats, according to the findings. This was followed by does with BCSs of 3.00, 2.00, 2.25, 2.75, 3.25, 4.00, 3.50, and 3.75.

#### Determinant coefficient

As shown in Table 2, the coefficients of determination that were anticipated for the regression of body condition score on body length, height at wither, chest girth, abdominal girth, and thigh circumference are shown.

**Table 2:** Determination coefficients for physical parameters and body weight regression using BCS

Sr. No.	Parameters	Coefficient of Determination (R <sup>2</sup> )
1	Body weight	0.70
2	Body length	0.10
3	Height at wither	0.06
4	Chest girth	0.26
5	Abdominal girth	0.11
6	Thigh circumference	0.32

It can be shown in Table 2, the body condition score of the Sangamneri goat was responsible for seventy percent of the variation in the prediction of body weight. The corresponding coefficients of determination (R<sup>2</sup>) for the regression of body length, height at wither, chest girth, abdominal girth, and thigh circumference on body condition score were 0.10, 0.06, 0.26, 0.11, and 0.32 percent, respectively. These coefficients were found in the table below. Based on the findings, it was shown that the body condition score was responsible for 10, 06, 26, 11, and 32 percent of the variance in the forecasts of height at wither, chest girth, thigh circumference, and abdominal girth, respectively.

#### Conclusion

Goats of the Sangamneri breed weighed an average of 32.41±0.34 kilogrammes. With regard to the measurements of body length, height at wither, chest girth, abdominal girth, and thigh circumference, the mean values were 60.47 ±0.31, 71.14 ±0.34, 75.20 ±0.35, 78.97 ±0.44, and 27.96 ±0.20 cm, respectively. The standard deviations for these measurements were also mentioned. There was a significant difference in the BCS of the Sangamneri goat, which ranged from 2.00 to 4.00. With the exception of the goat's body weight, which had a stronger correlation with its body condition score (BCS) to a

higher degree, the goat's physical attributes had a poor connection with its body condition score ( $p<0.01$ ).

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