

Determination of the Current Status of Buffalo Breeding in the Çaycuma District of Zonguldak

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Article History

Received:01.12.2022

Accepted: 21.06.2023

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Keywords

Water buffalo

Breeding

Feeding conditions

Buffalo products

Abstract

This study was carried out to determine the breeding practices, important income sources and the future of water buffalo farming in Çaycuma district of Zonguldak province. For this purposes, 36 breeders were determined from the villages of Çaycuma district to constitute the buffalo population in the region. It is predicted that these breeders in villages in different parts of the district will reveal the current situation of water buffalo breeding in Çaycuma district and have sufficient material for this. First of all, a survey study was conducted with the business owners through face-to-face interviews. In addition, the data of statistical institutions were used. The data were analyzed with the Proc Freq procedure in the SAS (2017) package program. The results showed that the average age of the breeders was over 50 and most of the breeders were breeding buffaloes due to the habit from the past. In Çaycuma region, buffalo milk, buffalo yoghurt and buffalo meat used in sausage production have been identified as the most important income sources of enterprises.

Introduction

Animal husbandry is one of the oldest cultural activities of mankind. Long before the only cultural animal husbandry, people benefited from animals in different ways for many years in order to continue their lives (Mazoyer and Roudart, 2010; Şahin, 2015). Water buffalo breeding has become an important livestock activity in Turkey in recent years. In Asia, water buffalo have played an important role in overall social development, thanks to their contribution to the workforce required for milk, meat, leather and agricultural activities. Buffalo forms part of the farmers' goods, assets and business. Not only that, in some societies it is a reliable "living bank" and an easy "convertible source of money" to serve the urgent needs of the rural masses (Nanda and Nakao, 2003).

The name of the water buffalo (Water Buffalo) in English is due to its natural behavior in general, lying in wetlands, rolling and wandering (Soysal, 2009). The word buffalo, whose English equivalent is "Buffalo", is not

generally described as a domestic animal, but as a part of zoos or natural life (Soysal, 2006).

Buffalo species are grouped as African wild buffalo and Asian buffalo. Domesticated and wild buffaloes, of which more than 70 different breeds are known, are divided into 2 groups as "River (River) Buffalo" and "Swamp Buffalo". The river buffalo group, which originated in India, is mainly bred to produce meat and milk, and they are combined productive breeds. Swamp buffaloes (Caraboa), on the other hand, are breeds that are not very suitable for milk production, are actually grown in China and Southeast Asia, and are used for labor as well as meat production (Atasever and Erdem, 2008; Sariözkan, 2011). The water buffalo species in our country originated from the Mediterranean water buffalo in the subgroup of the river water buffalo and is called the "Anatolian Buffalo" (Soysal et al., 2005; Sariözkan, 2011).

Anatolian water buffalo is grown for its three yields; meat, milk and labor. Most of the meat is used especially

for sausage making. Research on milk production demonstrates that controlled rearing and feeding conditions can significantly improve performance. Buffalo milk, on the other hand, is used to produce yoghurt and to make a very popular traditional product, "lüle cream" (Soysal, 2014).

A large portion of the world's buffalo population (195 million heads) is raised in South and Southeast Asia, particularly in India (56.56%), Pakistan (17.17%) and China (12.56%). 121 826 heads of the buffalo population in Turkey are bred mostly in the Central Black Sea Region, especially in the provinces of Samsun, Tokat, Çorum and Amasya (25%). Lactation milk yield, lactation period, birth weight of calves and daily live weight gain during fattening of Anatolian buffalo were found to be 800 – 1000 kg, 200 – 250 days, 30 kg and 550 – 600 g, respectively (Uğurlu, 2017).

The aim of this study is to determine the current situation of water buffalo breeding in the Çaycuma region of Zonguldak province, and to identify the conditions for improving water buffalo breeding in this district, and to create an infrastructure for future studies.

Materials and Methods

The research material consists of water buffalo breeders and their breeding knowledge and practices in the villages of Çaycuma district of Zonguldak province. The people dealing with buffalo breeding in this region were determined and a face-to-face survey was conducted with all breeders who agreed to answer the questions. The aforementioned questionnaires formed the material of our research.

The research was conducted in three different areas as questionnaire, personal interview and data collection. In the process of communicating with the breeders, support was received from the veterinarians working in the Çaycuma District Directorate of Agriculture and Forestry, and personal interviews were made with the breeders in line with their guidance, the shelters were examined, the behavior of the buffaloes was observed and photographs were taken.

In the survey, 57 questions were asked to the breeders about the contribution of buffalo products to the family economy, the care, feeding and breeding of animals.

The data obtained as a result of the survey were analyzed with the Proc Freq method in the SAS (2017) package program.

Results and Discussion

The study was conducted by going to the enterprises of 36 farmers engaged in water buffalo breeding in the district. The age distribution of the surveyed breeders is given in Figure 1. Accordingly, it was determined that the breeders were between the ages of 25 and 83, the average age was 53, and 3%, 19%,

25%, 17% and 36% of them were 21-30, 31-40, 41-50, 51-60 and 61 years old and over. It has been determined that the buffalo breeders are predominantly 61 years old and over, while the breeders younger than 30 years old are very few.

The livelihoods of the breeders are given in Figure 2. 22% of the water buffalo breeders (8 people) in the district declared their livelihood as only animal husbandry, 3% (1 person) stated that they have additional income from plant breeding besides animal production, and 75% of them were working for official institutions or are private sector employees, besides animal husbandry.

When we look at roughage production (Figure 3), while 12 of 36 farmers do not produce forage crops, 24 of them produce barley, wheat, clover, corn, oats and vetch. Breeders produce; 9% corn only; 25% oats only; 9% wheat and corn; 13% wheat and oats; 8% clover and oats; 8% corn and oats; 8% corn and vetch; 4% wheat, clover and oats; 4% wheat, corn and oats; 8% corn, oats and vetch; 4% produces barley, wheat, clover and corn.

The state support status of breeders is given in Table 1 and Figure 4. Breeders benefit; 39% from only brood buffalo supports; 50% from brood buffalo and brood cattle supports; 3% from milk production, brood buffalo and brood cattle supports; 3% from brood buffalo, brood cattle and forage plant supports; 5% benefit from milk production, brood buffalo, brood cattle and fodder plant supports. All 36 breeders benefit from brood buffalo supports.

Membership status of breeders' associations is given in Table 2. While 17% of the breeders belong to the Buffalo Breeder Association; 8% to the Cattle Breeder Association; 5% to the Dairy Producers Association; 3% to the Buffalo Breeders and Dairy Producers Association; 3% of the Cattle Breeders and Dairy Producers Association, 64% are not members of any association. As it can be seen from the survey results, the majority of the water buffalo breeders did not become members of the Buffalo Breeders Association for various reasons, and some of the breeders who became members canceled their memberships.

Figure 5 shows the number of buffaloes by age. There were a total of 559 buffaloes in 36 breeders surveyed, of which 51% were cows, 21% female calf, 17% male calf, 6% bull and 5% heifer. As can be seen in Figure 5, cows constitute half of the water buffalo presence, and this is because they are used for a long time in breeding and most of the income in buffalo is derived from dairy products. When we evaluate the current buffalo situation according to their gender, 77% of them are females and 23% are males.

89% of the 36 breeders answered the age at first calving as 31-36 months, 11% as 37-43 months (Figure 6). No breeder expressed the options of 24-30 months

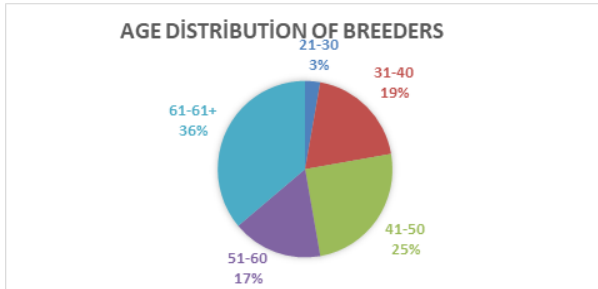


Figure 1. Age distribution graph of the breeders participating in the survey

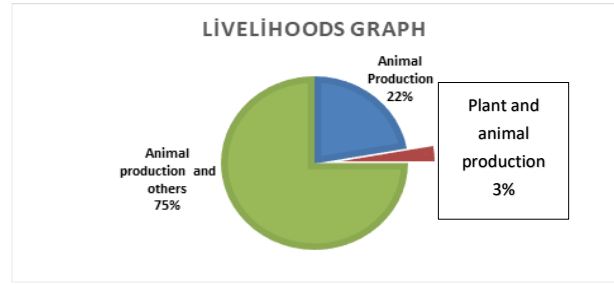


Figure 2. Livelihoods graph of breeders

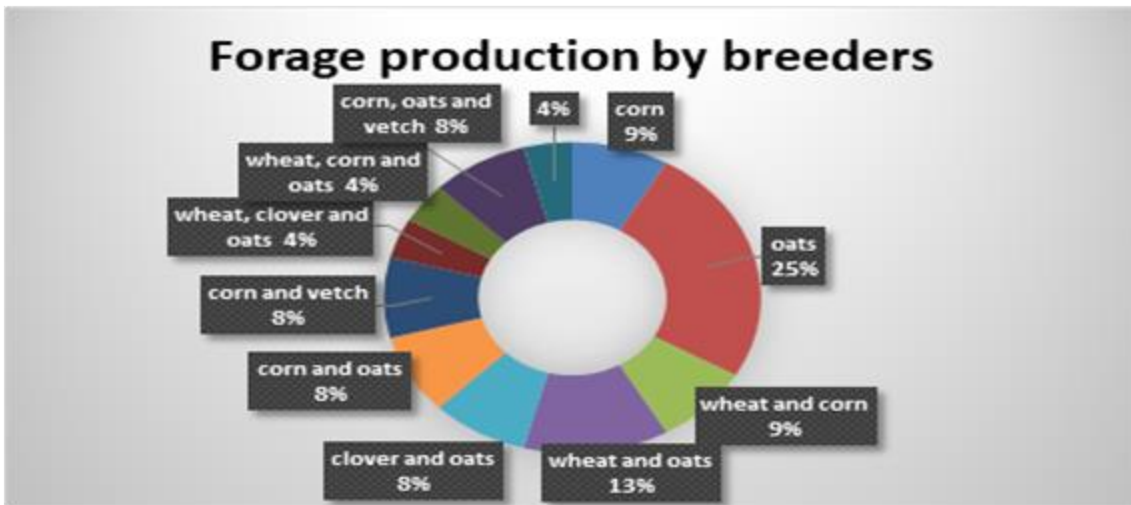


Figure 3. Age distribution graph of the breeders participating in the survey

Table 1. Number of breeders benefiting from government support

Support of Government	Plant Production	Milk Production	Buffalo	Cattle	Fodder Plant
Number of beneficiaries	0	3	36	22	3

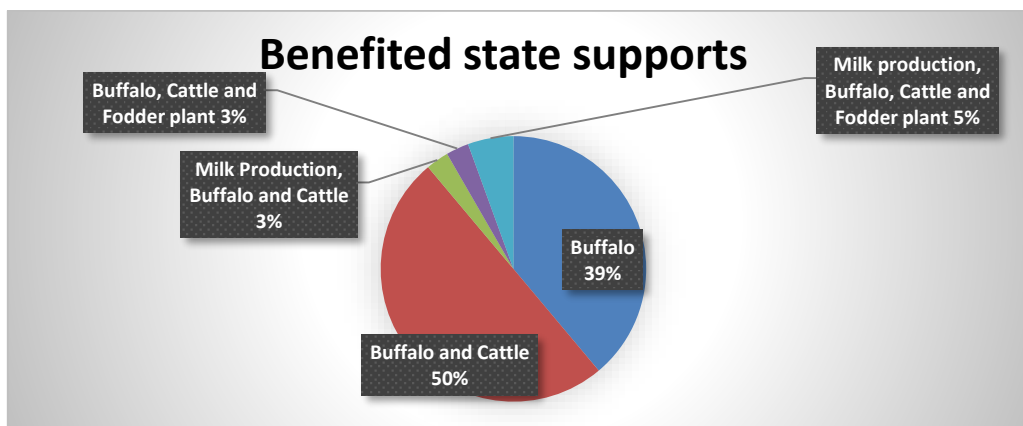


Figure 4. Benefited state supports

Table 2. Number of breeders who are members of breeder or producer associations

Breeders Association	Buffalo	Cattle	Milk producers	None	Breeders Association
Number of members	7	4	4	23	Number of members

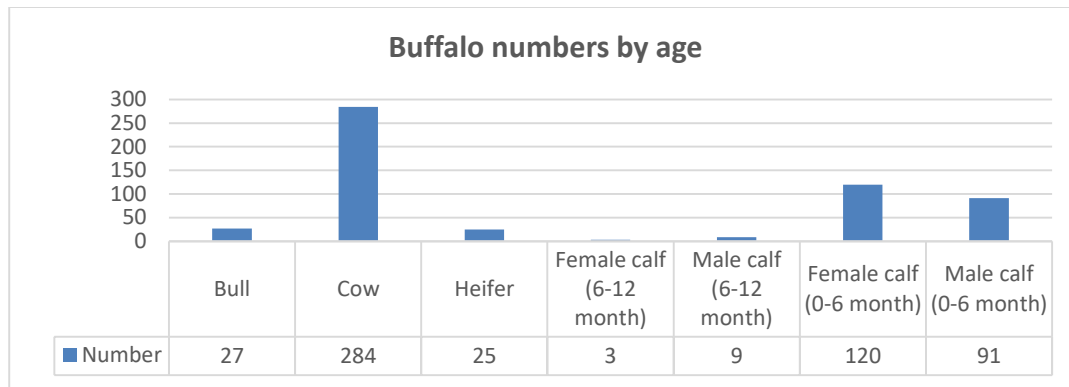


Figure 5 Number of buffaloes by sex and age

and 44-51 months. According to these results, the age of giving birth to the first calf is within the range specified in the literature (Küçükkebabçı and Aslan, 2002).

All of the breeders reported the interval between two calving as 11-15 months in buffaloes (Figure 7). Aksoy and Tekeli (1993) reported the average calving interval for Anatolian buffaloes as 462 days, and Şekerden (2002b) reported the ideal calving interval for water buffaloes as 13-14 months. In the survey, this period was reported as a maximum of 450 days. According to this result, the calving period, which is one of the factors affecting the fertility and therefore profitability, was considered suitable for extensive breeding in Çaycuma district.

For the maximum age of buffalo to stay in the herd, 55% of the breeders declared 11-15 years old, 31% 16-20 years old, 14% 6-10 years old, there was no breeder who declared the options 0-5 years old and older than 20 years. Based on the results, the breeders cull buffaloes after the age of 15, and none of them keeps buffaloes over 20 years old. They stated that the reason for this situation is that as the age progresses, the yield decreases and the animal weakens.

Figure 9 shows the graph of the age declarations at which buffaloes reach sexual maturity. According to this graph, 83% of breeders reported the age of sexual maturity as 23-24 months, 11% as 25 months and over, and 6% as 21-22 months. No breeder reported the 18-20 month option. According to the information given by the breeders, although sexual maturity can start after

for them to reach sexual maturity. Aksoy and Tekeli (1993) reported that the breeding age for female buffaloes was determined as 20-24 months. This shows that the answers given by the breeders are similar.

When we examine Figure 10, it is seen that 97% of the surveyed breeders stated the survival rate in calves between 90-100% and 3% of them between 80-89%. It is possible to say that the survival rate of calves is over 95% throughout the district. Önal (2011) reported that the average survival rate for calves up to 6 months is 88%. When this value is compared with the survey results, it is seen that the viability rate of the calves in the region is high.

22% of the calves have a birth weight of 30 kg or less, 14% 31-35 kg, 36% 36-40 kg, 8% 41-45 kg, 3% 46-50 kg and 17% of them reported 50 kg and over (Figure 11). According to this information, we can say that the birth weight of the buffaloes reared in the district is mostly in the range of 30-40 kg. Aksel (2015) reported that the average birth weight of calves is 34 kg. When compared with the survey results, it is seen that the majority is close to this value.

Of the 36 breeders surveyed, 1 person reported that they gave colostrum to their calves for only 1 day, and all of the other 35 breeders for more than 3 days (Figure 12). There was no one who declared that she had been drinking for 2 and 3 days. As can be seen from these results, breeders are aware that colostrum is very important for calves.

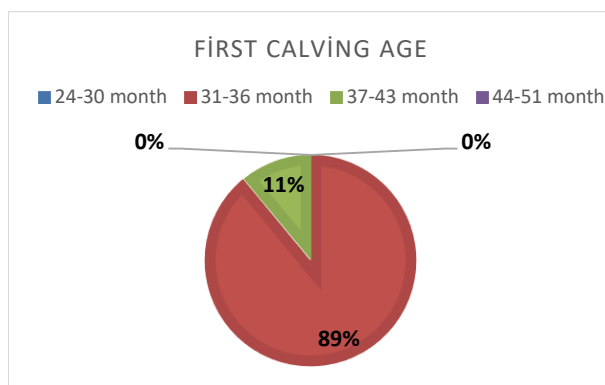


Figure 6. Age at first calving in buffaloes

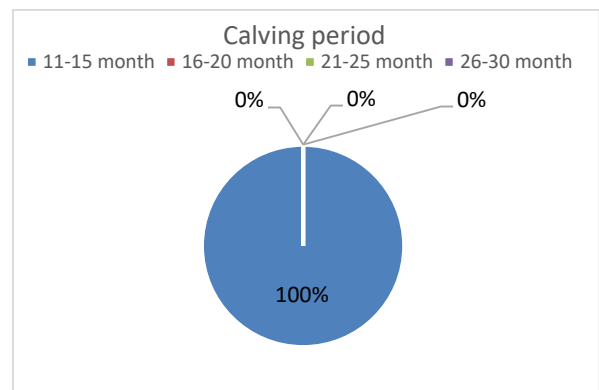


Figure 7. Calving interval of root buffaloes

The total pasture area in Çaycuma district is 673 hectares and they are pastures with low and medium productivity (Anonymous, 2019b). 86% of the breeders declared that the pastures they use are sufficient, 11% are insufficient, and 3% have declared that there is no pasture that they can use (Figure 13). According to these results, it is understood that the geographical conditions and pasture conditions of the villages in the district differ.

Black Sea climate prevails in the district. Precipitation usually occurs in the spring and autumn seasons. Snowfall is generally seen in December, January and February, but since it is not continuous, it does not prevent the animals from going to the pasture for a long time. As seen in Figure 14, 42% of the breeders stated that they could benefit from the pasture for 7-8 months, and 55% of them for 9 months or more. Only 3% stated that they do not take their animals to pasture. Yılmaz (2013) reported that the maximum duration of use of pasture in Afyon region is 8 months due to the weak resistance of water buffaloes to cold. As it can be understood from here, the Black Sea region is more advantageous than the regions in the interior in terms of the duration of using the rangeland.

In Table 3, information about the water source status of the rangelands in the district is given. 86% of the breeders declared that the pastures are near the stream, and 14% declared that they are by the artificial pond. It is important for water buffalo that most of the pastures are near the river. While the animals are grazing in the pasture, they can easily meet both their water needs and their cooling needs.

97% of the breeders reported that they followed the signs of estrus in buffaloes, and 3% did not (Figure 15). In the study conducted by Uslu (1970), it was reported that the animal should be given to the bull in the first estrus after birth, otherwise the next estrus can be seen 8-10 months later. It is important to follow estrus in buffaloes in terms of fertility.

When the breeders were asked about the daily average milk yield from buffaloes; 1 of them reported 2 liters, 18 of them 3 liters, 13 of them 4 liters, 3 of them 5 liters, 1 of them 7 liters of milk (Figure 16). However, these values are approximate or average values. For this reason, it is necessary to carry out

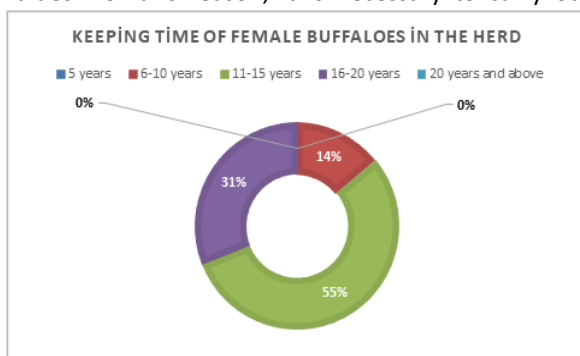


Figure 8. Keeping time of female buffaloes in the herd

measurement-based studies in order to determine the real milk yield in buffaloes.

64% of surveyed breeders reported that the lactation period was between 180–210 days and 36% between 210–270 days (Figure 17). Uğurlu (2017) reported the lactation period of Anatolian buffalo as 200-250 days. According to these values, it is possible to say that the lactation periods in the region are generally of medium length.

The breeders were asked about the products they earn from the buffalo and 9 of the 36 breeders were only yoghurt; 22 of them are milk and yogurt; 2 of them are milk, yogurt and butter; 1 of them is milk, yogurt and cream; 1 of them milk, yogurt and meat; 1 of which stated as milk, yogurt, butter and cream. As can be seen in Table 4, the most profitable buffalo product in the region is yogurt in the first place and milk in the second. Butter and cream are produced by some breeders when there is customer demand.

According to Table 5, 33 of the 36 breeders surveyed stated that they sold their butcher buffaloes alive to the buyers who came to the village, 4 of them sold them alive to the slaughterhouse, 1 of them cut themselves and sold them as meat to the villagers. No breeder has said that she cuts her own animal and meets her meat needs.

The breeders were asked what they thought about the water buffalo breeding in Çaycuma, and 18 people stated that the number of animals is not given importance, so the number of animals may decrease even more, 1 person stated that the number of those dealing with water buffalo may increase due to the support given in recent years, and 17 people stated that the supports and investments given to water buffalo are insufficient (Table 6). There were no breeders who stated that buffalo breeding would develop in the district.

When asked which suggestions would be appropriate for the development of Çaycuma and Turkish buffalo breeding, 56% of the breeders stated that state subsidies should be increased, 24% stated that the breeding works should be accelerated urgently, and 20% stated that the number of buffaloes should be increased (Table 7). It is necessary to increase the state subsidies every year and to increase the types of support.

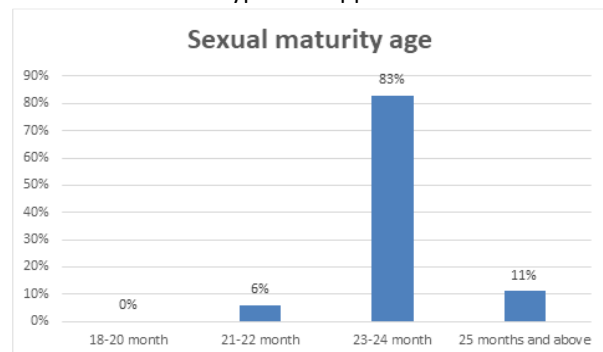


Figure 9. Age of sexual maturity in buffaloes

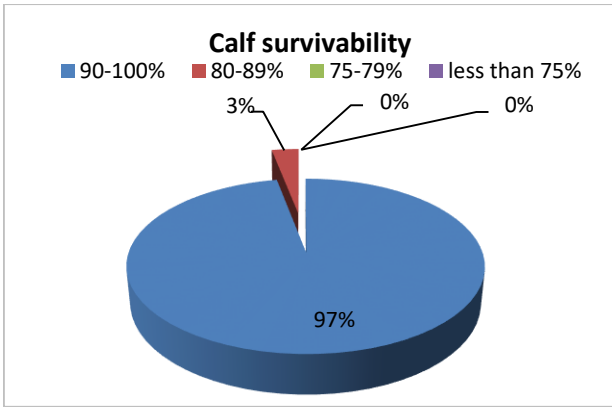


Figure 10. Survival rate in calves

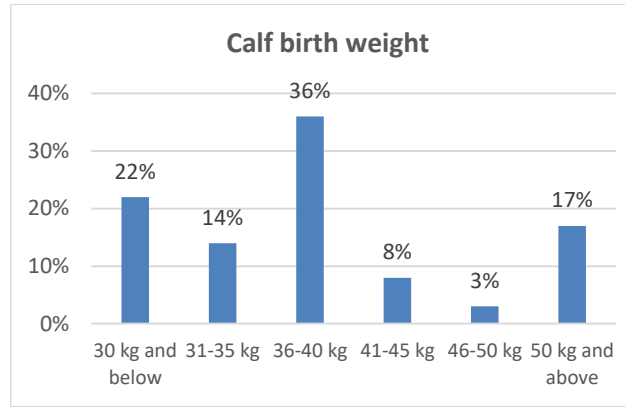


Figure 11. Birth weight of calves

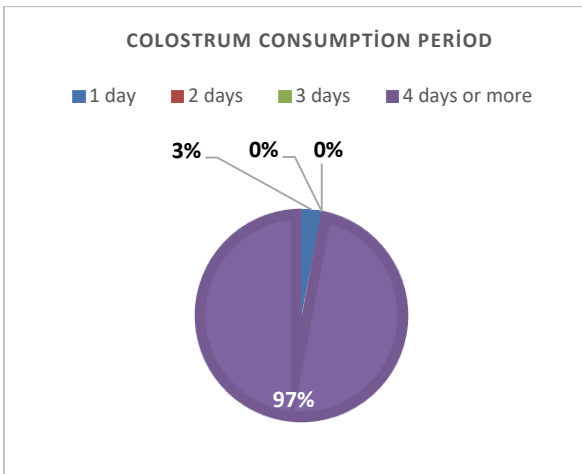


Figure 12. The colostrum consumption period of calves

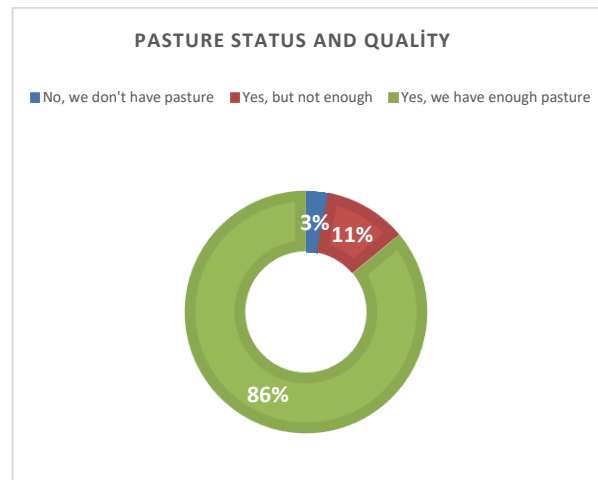


Figure 13. Pasture status and quality

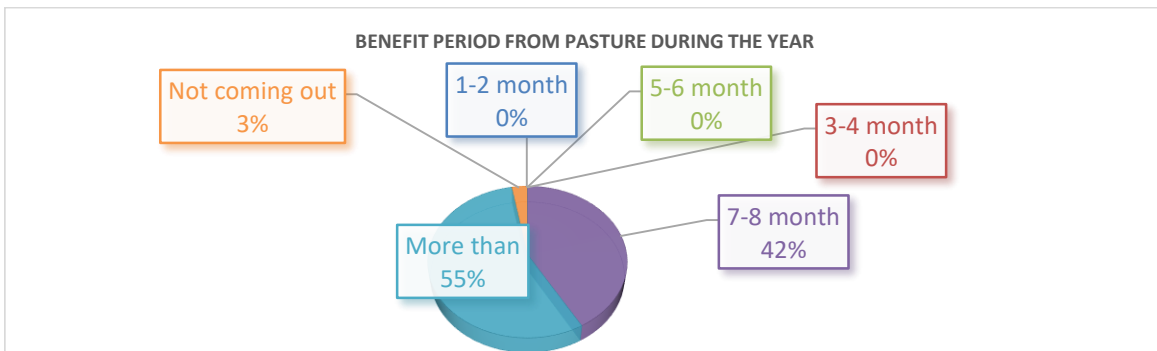


Figure 14. Benefiting period of pasture during the year

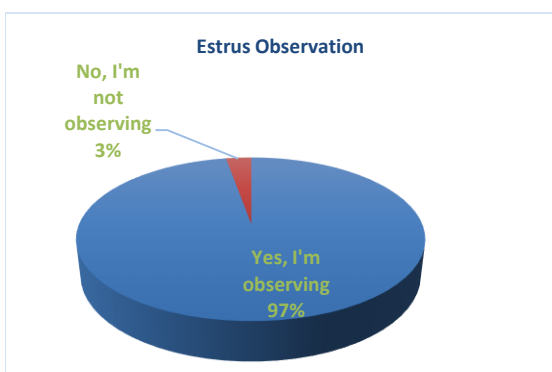


Figure 15. Observing estrus

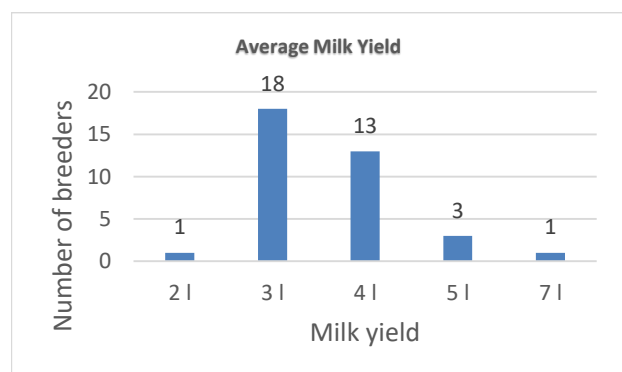
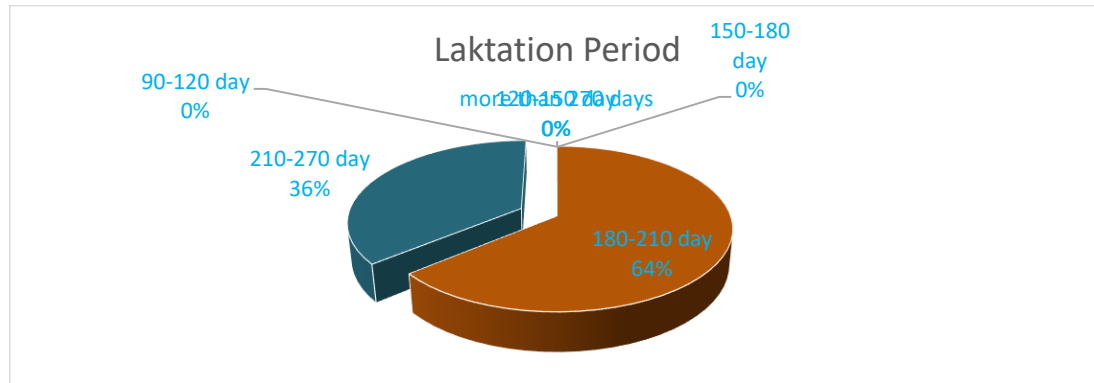


Figure 16. Average daily milk yield in buffaloes (l)

Table 3. The situation of water resources in the village pasture

Number of Breeders Who Say We Have No Water Source		0
Number of Breeders Saying We Have a Water Source	Lakeside	0
	Stream Edge	31
	Artificial Pond Edge	5

**Figure 15.** Observing estrus**Table 4.** The products that breeders earn

Income generating products	Number of breeders
Yogurt	9
Milk/Yogurt	22
Milk/Yogurt/Butter	2
Milk/Yogurt/Cream	1
Milk/Yogurt/Meat	1
Milk/Yogurt/Butter/Cream	1

Table 5. Evaluation of butchery buffaloes

Evaluation of butchery buffaloes	Number of breeders
I take a nap myself and get my meat needs	0
I take a nap myself and sell it in the village	1
I sell live to the slaughterhouse	4
I sell live to buyers	33

Table 6. Opinions of breeders about the future of water buffalo breeding in Çaycuma region

The future of water buffalo in the Çaycuma region	Number of breeders
The number of animals may decrease gradually as buffalo breeding is not given importance.	18
The number of buffaloes will increase due to the support given in recent years.	1
I think that the support and investments for buffalo are insufficient.	17
I think that buffalo breeding in our district will develop.	0

Table 7. Recommendations for buffalo breeding in the district and in our country

Recommendations for the development of buffalo breeding	Number of breeders
Animal production work should be accelerated urgently	10
The presence of buffalo should be increased	8
State subsidies should be increased	23

Conclusion

The age profile of breeders in the district is mostly over 61 years old and the average age is determined as 53. The number of breeders who make a living from only animal husbandry is very few. Mainly grown forage crops are oats, wheat, clover and corn. Mainly brood buffalo and brood cattle state support is used. More than half of the breeders are not members of any breeder association.

Buffaloes are usually taken out to pasture more than 8 months a year. There is no pasture without a water source and there is usually a stream in the pastures. The most used roughage was determined as straw and dry clover. Grain feeds are not used in the supply of mixed feed and commercial feeds are preferred.

According to the breeder's notifications, the average daily milk yield of the buffaloes in the region is around 3.5 liters. Lactation period is generally between 180-210 days. Milk from buffaloes; It is evaluated as yoghurt or raw milk and cream is rarely made according to demand. For this reason, the products that provide the main income in buffalo farming are yogurt and raw milk.

The breeders are of the opinion that the number of animals will decrease even more since water buffalo breeding is not given importance, that the support given to water buffalo is insufficient, therefore, if the current conditions continue, water buffalo breeding in the region will be in danger of not developing.

Acknowledgements

This study was produced from the Master's thesis of Muhammet KAPTAN. We would like to thank the employees of Çaycuma District Agriculture and Forestry Directorate who contributed to the realization of this study.

Author contributions

First Author: Investigation, Data Curation, Visualization and Writing;

Second Author: Supervision, Writing - review and editing.

Conflict of Interest

The author declare no conflicts of interest.

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