

A Research on Satisfaction Levels of Water Buffalo Breeders in Sivas Province, Türkiye Türkiye, Sivas İli Manda Yetiştiricilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma

Gökçe ÖZDEMİR^{1*}

Abstract

Buffaloes can adapt to different regional and climatic conditions, yield high quality milk and meat products and are suitable for organic animal husbandry, which provides significant advantages in livestock raising. In this study, a total of 122 buffalo breeders living in the center of Sivas province, Şarkışla and Suşehri districts were examined in terms of age, gender, educational level and satisfaction with breeding buffaloes, reasons for breeding, problems encountered in breeding and expectations using a survey. The participants were mostly middle-aged individuals (89.3%). It was found that 67.2% of them graduated from primary school while 12.3% graduated from high school. It was revealed that the participants were breeding buffaloes in order to meet the daily needs of their homes (29%), were pleased with breeding them (91.8%) and had such positive views that they advised their children to breed buffaloes (62.7%). 64 % of the participants stated that they were satisfied with buffalo breeding for quality of dairy products and the high prices of these products. The buffalo breeders reported their breeding problems as high costs of fodder (35%), low meat price (25%) and the lack of market (10%) while they predicted that the buffalo breeding may become more profitable (95.6%) with the help of solutions to be made by the authorities. In order to achieve this aim, the breeders declared their demands to increase prices of their products sold in the market (34.4%), and loan limits for purchasing fodder and husbandry (33.7%). A significant relationship was found between the participants' gender and the views that their work could be made profitable ($p<0.001$). It was also revealed that there was a significant relationship between the satisfaction level of the participants and recommending breeding buffaloes to their children ($p<0.05$) and the views that their work could be made profitable ($p<0.001$). When the problems of buffalo breeders in Sivas province, expectations from the authorities and solutions to be offered are considered as a whole, it can be interpreted that increasing the quality of production, preference of conscious breeding practices in animal selection, pricing that will guarantee production and developing new marketing opportunities will be beneficial to overcoming problems.

Keywords: Water buffalo breeding, Satisfaction, Problems, Expectations, Profitability

^{1*}**Sorumlu Yazar/Corresponding Author:** Gökçe Özdemir, Department of Animal Science and Nutrition, Faculty of Veterinary Medicine, Sivas Cumhuriyet University, Sivas and Turkey. E-mail: gokceozdemir@cumhuriyet.edu.tr  ORCID: 0000-0003-1977-130X

Atf: Özdemir, G. (2024). Türkiye, Sivas ili manda yetiştiricilerinin memnuniyet düzeyleri üzerine bir araştırma. *Journal of Tekirdag Agricultural Faculty*, 21(2): 444-456.

Citation: Özdemir, G. (2024). A research on satisfaction levels of water buffalo breeders in Sivas Province, Türkiye. *Tekirdağ Ziraat Fakültesi Dergisi*21(2): 444-456.

©Bu çalışma Tekirdağ Namık Kemal Üniversitesi tarafından Creative Commons Lisansı (<https://creativecommons.org/licenses/by-nc/4.0/>) kapsamında yayımlanmıştır. Tekirdağ 2024

Öz

Farklı bölge ve iklim koşullarına adapte olabilen, kaliteli süt ve et ürünlerine sahip ve organik hayvancılığa uygun olan mandalar, önemli avantajlara sahip bir hayvan yetiştiriciliği koludur. Bu çalışmada, Sivas ili Merkez, Şarkışla ve Suşehri ilçelerinde toplam 122 manda yetiştiricisine ait yaş, cinsiyet, eğitim ve memnuniyet durumları, manda yetiştirme nedenleri, yetiştiricilik sorunları ve beklentilerine yönelik olarak yapılan anket verileri incelendi. Katılımcıların, ağırlıklı olarak; orta yaş (%89.3) grubunda ve eğitim durumunun %67.2'sinde ilkokul, %12.3'ünde lise düzeyinde olduğu tespit edildi. Katılımcıların, daha çok evlerinin günlük ihtiyaçlarını karşılamak (%29) amacıyla manda yetiştiriciliği yaptıkları, yetiştiricilikten memnuniyet duydukları (%91.8) ve çocuklarına tavsiye etme (%62.7) yönünde olumlu düşüncelere sahip oldukları tespit edildi. Manda yetiştiriciliğinden memnun olma nedeni olarak katılımcıların %64'ü süt ve süt ürünlerinin kalitesi ile bu ürün fiyatlarının yüksek olduğu görüşünü belirttiler. Yetiştiricilik sorunları; yüksek yem fiyatı (%35), düşük et fiyatı (%25) ve pazar bulunamaması (%10) olarak belirtilirken, yetiştiriciler yetkili merciler tarafından üretilecek çözümler ile manda yetiştiriciliğinin daha karlı bir hale gelebileceği noktasında bir ön görüşe (%95.6) sahip olduklarını bildirdiler. Manda yetiştiriciliğinin karlı hale getirilebilmesi için yetiştiriciler, pazar fiyatlarının artırılması (%34.4), yem alımı ve damızlıkta kredi artırılması (%33.7) yönündeki taleplerini beyan ettiler. Katılımcıların, cinsiyetleri ile işlerinin karlı hale getirilebileceği görüşleri ($p<0.001$) ve yaptıkları işten memnuniyetleri ile çocuklarına tavsiye etme ($p<0.05$) ve memnuniyetleri ile işlerinin karlı hale getirilebileceği görüşleri ($p<0.001$) arasında bir ilişki olduğu saptandı. Sivas ili özelinde manda yetiştiricilerinin sorunları, yetkililerden beklentileri ve çözüm önerileri bir bütün olarak değerlendirildiğinde; üretim kalitesini artırılması, damızlık hayvan seçiminde bilinçli yetiştiricilik uygulamalarının tercih edilmesi, üretimi garanti altına alan fiyatlandırma ve yeni pazarlama imkanlarının geliştirilmesi gibi yaklaşımların faydalı olacağı söylenebilir.

Anahtar Kelimeler: Manda yetiştiriciliği, Memnuniyet, Sorunlar, Beklentiler, Karlılık

1. Introduction

In the past century, the number of buffaloes has decreased significantly in many countries in Asia, Europe and the Near East due to several factors such as low milk yield, preference of imported dairy cattle products, decreased demand for products, mechanization in the agricultural sector and rapidly changing socio-economic conditions (Borghese, 2010; Yilmaz et al., 2012; Naveena and Kiran 2014). In order to eliminate this situation, many countries have put great efforts to increase milk and meat production and create a market for quality buffalo products that will increase consumer demand and dealt with the problems of buffalo breeding (Bernardes, 2007; Borghese, 2010; Sariözkan, 2011; Naveena and Kiran 2014). Buffalo breeding has managed to exist in difficult conditions as a traditional economic activity that provides motivation especially for small family businesses with its advantages such as quality milk and meat products and suitable for organic animal husbandry in any climatic condition in a period when climate change is invariably a part of global agenda (Atasever and Erdem, 2008; Şahin et al., 2013; Borghese and Mazzi 2005; Soysal, 2014).

The number of buffaloes, which was 1,117,000 in the 1980s in Türkiye, decreased to 84,705 in 2007. This decrease in buffalo population is explained by application of genotype improvement efforts only in cattle and the change of preference for cattle breeds (Gürcan et al., 2011; Sariözkan, 2011). In order to reverse the current situation, special incentives and support programs have been established by the Ministry of Agriculture and Forestry, and the institutions and organizations related to national and regional projects contributed to the development of buffalo breeding by supporting producers (Sariözkan, 2011; Soysal, 2014). As a result of all these efforts, in 2021, the population of Anatolian buffaloes reached 185,574 (TÜİK, 2022). The new developments that focus on buffalo breeding as a branch of livestocking and problems encountered in buffalo breeding have also required to conduct more research in this field (Çiçek and Tandoğan, 2009; Yilmaz et al., 2012).

While the number of buffaloes in Sivas province was 1,807 in 2009, it increased to 5,103 in 2022. As a result of the studies carried out within the scope of both public and breeding unions and universities in order to develop buffalo breeding as a livestock production branch, an increase was seen in the number of buffaloes in Sivas as well as throughout the country (Anonymous, 2015; 2016; 2018; 2022). The province of Sivas ranks ninth in Türkiye in terms of the number of buffaloes and has appropriate conditions for livestock raising with its geographical structure and large pastoral areas (Anonymous, 2015; 2018).

This study sought to ascertain breeders' motivations for breeding buffalo, their levels of satisfaction, production issues, breeders' expectations, and suggestions for solutions in the Sivas province.

2. Materials and Methods

The study sample consisted of the buffalo breeders selected according to the data provided by Sivas Provincial Directorate of Agriculture and Forestry and Buffalo Breeders Union. It was determined by the clustered sampling method among 177 water buffalo breeders on the basis of districts, villages and businesses where breeding is intensively made (Özdamar, 2013). The study data were collected through face-to-face interviews with a total of 122 buffalo breeders in 20 villages located in the center of Sivas (68 participants), Şarkışla (15 participants) and Suşehri (39 participants) districts. The survey questions were developed by using previous studies in the literature (Özdemir and Özdemir, 2016; Özdemir, 2021). Questionnaire was conducted between September 2019 and January 2020. The data obtained from 18 questions from the problems and expectations section of the questionnaire. The survey included questions related to age, gender, educational and satisfaction level, reasons for breeding buffalo, breeding problems, expectations and solutions.

2.1. Statistical analysis

The data obtained in the study were analyzed by using and with Chi-Square (χ^2) independence test on SPSS 28.0 package program. The number of cells with expected values less than 5 in the Chi-Square test crosstabs $r \times c$ tables belonging to some variables is more than 20% of the total number of cells in the table. Monte Carlo Exact Pearson Chi-Square test analysis done, instead of combining row and column cells. $R \times C$ Exact Chi-Square test results obtained with the combinatorial approach were used (Özdamar, 2013). Based on the analysis of the cross tables, the results were presented using descriptive statistics, frequencies, p significance level and Monte Carlo Pearson Chi-Square values ($MC \chi^2_p$), and correlation coefficients (r) (Spearman) of the variables.

3. Results and Discussion

The participants' characteristics such as age, gender, educational level, social security and business ownership were presented in *Table 1*. 43.4% of the participants were found to be 46-50 years of age. 29.5% of them were aged between 36-45 years and 16.4% of them were 56 years and older. 73.8% of them were male and 26.2% of them were female. 67.2% of the participants reported that they were primary school graduate while 12.3% of them were high school graduate and 9% of them were secondary school graduates. 3 participants from Sivas and Suşehri were university graduates. Although the participants had different social security statuses, it was determined that they were mostly members of BAĞ-KUR (56.6%) (Social Security Organization for Artisans and the Self-Employed) and SGK (11.5%) (The Social Security Institution). The rate of the breeders who did not have any social security was determined as 20.5%. 96.7% of the breeders stated that they owned their business. Age, gender and educational level of buffalo breeders in Sivas, Şarkışla and Suşehri districts were found to have greater socio-demographic advantage compared to the literature. Aşkan and Dağdemir (2015) reported that both gross production value and milk production value was increased by the fact that the breeders were young and had a high level of education. In his study, Çiftçi and Yılmaz (2020) found that 98.53% of the breeders were male, 54.41 % of them were 40 years and older and were primary school (55.9%), secondary school (16.2%) and high school (15.4%) and university graduates. Soysal et al. (2005) found in his study that 79% of the participants were aged between 18-60 years and 93 % of them graduated from at least primary school while 7% of them did not receive any education. Saner et al. (2022) reported that the average age of buffalo breeders was 45.89 years and received education for an average of 6.58 years. Şeker et al. (2012) found that 8.0% of the breeders in Muş were not literate, 38.4% of them graduated from primary school while 2.4% of them graduated from university. Karadavut et al. (2010) found that 53.85% of the participants did not have a social security in their study. The low rate of participants (20.5%) without social security in this study can be explained by the fact that female breeders who are housewives are included in this group. It is mandatory for the producers/breeders to ensure the continuity of production with stable income in their own businesses and to have social security for the sectors based on natural conditions.

Table 1. Demographic, social security and property information of the participants

Questions	Parameters	Central		Şarkışla		Suşehri		Sivas Total		χ^2/p
		n	%	n	%	n	%	n	%	
Age	0-15	-	-	-	-	-	-	-	-	5.855 ^{NS}
	16-30	8	11.8	3	20	2	5.1	13	10.7	
	31-45	20	29.4	6	40	10	25.6	36	29.5	
	46-50	31	45.6	4	26.7	18	46.2	53	43.4	
	51 > +	9	13.2	2	13.3	9	23.1	20	16.4	
Gender	Man	51	75	9	60	30	76.9	89	73.8	1.723 ^{NS}
	Woman	17	25	6	40	9	23.1	32	26.2	
Education	Illiterate	4	5.9	1	6.7	1	2.6	6	4.9	18.055 ^{NS}
	Literate	4	5.9	-	-	1	2.6	5	4.1	
	Primary school graduate	47	69.1	8	53.3	27	69.2	82	67.2	
	Secondary school graduate	8	11.8	-	-	3	7.7	11	9	
	High school graduate	3	4.4	6	40	6	15.4	15	12.3	
University graduate	2	2.9	-	-	1	2.6	3	2.5		
Social Insurance	BAĞ-KUR	34	50	10	66.7	25	64.1	69	56.6	7.293 ^{NS}
	SGK	10	14.7	-	-	4	10.3	14	11.5	
	Green Card	3	4.4	-	-	3	7.7	6	4.9	
	Pension fund	6	8.8	1	6.7	1	2.6	8	6.6	
	No assurance	15	22.1	4	26.7	6	15.4	25	20.5	
Ownership of the business	Yes	65	95.6	15	100	38	97.4	118	96.7	0.847 ^{NS}
	No	3	4.4	-	-	1	2.6	4	3.3	
	Partner	-	-	-	-	-	-	-	-	
	Rent	-	-	-	-	-	-	-	-	

n: Frequency, %: Percent, χ^2 : Monte Carlo Pearson Chi Square (MC χ^2_p), P: Significance Level, NS: Not significant.

The breeders expressed the reasons for breeding as “meeting daily household needs” (29%), “income for livelihood” (25%), “due to geographical conditions” (16%) and “my family profession” (12%) (Figure 1). Breeding buffaloes is a livestock branch with significant advantages, including utilising the geographical conditions for production while also providing a source of nutrition as well as serving as a bumper for support for the family in case of cash needs and income through the sale of surplus products in the countryside. In a study conducted in Bingöl, the breeders stated that they bred buffaloes to meet household needs, keep family business and due to appropriate geographical conditions (Özdemir and Özdemir, 2016). Şeker et al. (2012) reported that those who were engaged in breeding cattle did this work for livelihood (55.1%) or financial contribution to family (33.9%). In a study conducted in the Philippines, the main reasons for breeding buffaloes especially due to the effect of climate changes included the need for alternative livelihoods, having regular income (95%) and support from government programs (42%) and non-governmental organisations (28%), maintaining health (24%) and a passion for breeding buffalo (6%). In the same study, it was reported that the participants unanimously considered the buffaloes as a source of livelihood for their family and benefitted from their milk (86%), force (70%), and fertilizer (39%) sales by selling alive animals (94%), since it is a production model that gains value thanks to its multi-faceted production (Escarcha et al., 2020).

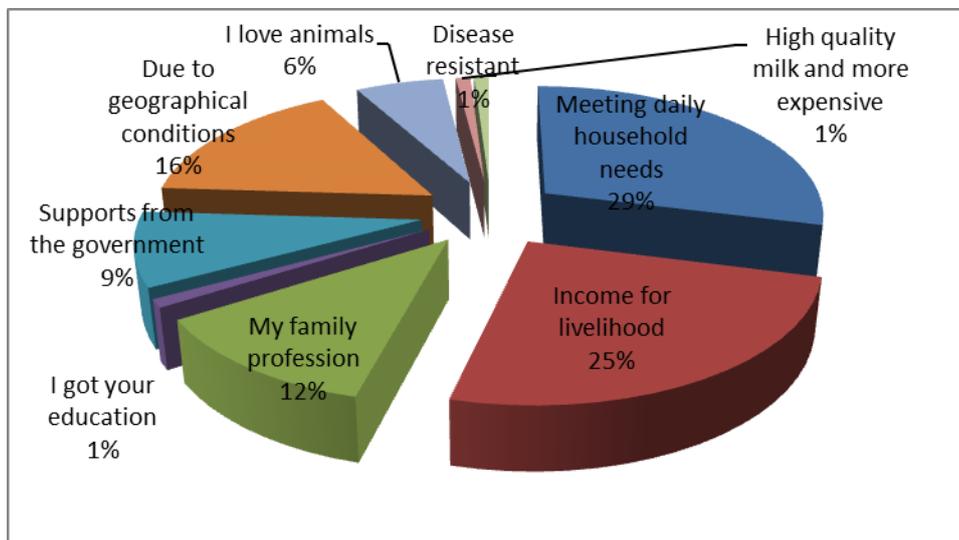


Figure 1. Reasons of the participants to raise the water buffalo

The participants' responses of to the questions related to satisfaction levels, recommending breeding buffaloes to their children, work areas if they quit breeding and costs were presented in Table 2. 91.8% of the participants clearly reported that they were satisfied with buffalo breeding. The fact that the high level of satisfaction and general positive attitudes towards breeding buffaloes is thought to be the main factor in the sustainability of this breeding. Only 10 (8.2%) participants stated that they were not satisfied with buffalo breeding. When these participants were asked to explain the reasons for their dissatisfaction, they expressed the difficulties they experienced in terms of caring for buffaloes general livestock raising problems such as high fodder prices, inadequacy of support and lack of marketing. In a study conducted in Balıkesir, it was found that the breeders intended to make new investments in buffalo breeding in the upcoming periods and that this situation will continue to be more widespread (Saner et al., 2022). In his study Karadavut et al. (2010) found that 87.18 % of the breeders were not satisfied with breeding. In the same study, 66.67% of the breeders complained about the low prices of their products. 16.67% of them stated that they did not have any other job. 11.76% of them were not satisfied with their low income and 4.90% of them emphasised the lack of marketing opportunities. It was found that 62.7% of the breeders had a positive idea about whether they would recommend buffalo breeding to their children while 37.3% did not agree with this view (Table 2). 35.4% of the breeders who were asked what to do if they quit buffalo breeding stated that they would never do this. However, 31.9% of the participants stated that they would start farming if necessary while 15% of them stated that they would breed cattle, and 15% of them stated that they would give up livestock raising and deal with other livestocking branches. A significant number of the breeders who stated that they would not give up their buffalo breeding and that they were satisfied with buffalo breeding emphasized that they would continue to work in another livestock raising branch if necessary. The indispensability

of buffalo breeding in view of the breeders' views can be explained by their durability and adaptability to every climate, relatively low consumption of fodder and grazing in the pastures, capacity to benefit from larger areas and the importance of buffalo products in nutrition and their high economic value. The views of the participants related to buffalo breeding are thought to be influenced by guaranteed income in addition to traditions and cultural structure. In a study conducted in Bingöl, 80% of the participants recommended breeding buffaloes to their children (Özdemir and Özdemir, 2016). Although the farmers never rely on a single livelihood as a source of income within the agricultural production economy, they always focus on areas with the highest profits and develop a productive behavior towards diversifying their agricultural activities (Escarcha et al. 2020). It is seen that the buffalo breeders in Sivas have such a similar background in producing animal products. Mostly, small family businesses, which prefer mixed (vegetative-animal) production model, generally optimize the benefits of both production. Basically, vegetative production is used as a source of income and cash flow while animals production is used as a source of capital. Since animal production is a more adaptable and sustainable source of livelihood, it always maintains its potential and place in rural production (Escarcha et al. 2020).

Table 2. Satisfaction status data of participants in buffalo farming

Questions	Parameters	Central		Şarkışla		Suşehri		Sivas Total		χ^2/p
		n	%	n	%	n	%	n	%	
Satisfaction	Yes	60	88.2	15	100	37	94.9	112	91.8	2.978 ^{NS}
	No	8	11.8	-	-	2	5.1	10	8.2	
Recommending breeding buffaloes to their children	Yes	37	56.1	11	84.6	26	66.7	74	62.7	4.177 ^{NS}
	No	29	43.9	2	15.4	13	33.3	44	37.3	
Work areas if they quit breeding	Farming	27 ^a	42.9	3 ^{ab}	21.4	6 ^b	16.7	36	31.9	33.984 ^{***}
	I dont give up	10 ^a	15.9	8 ^b	57.1	22 ^b	61.1	40	35.4	
	Cattle Breeding (dairy/meat)	15 ^a	23.7	-	-	2 ^b	5.6	17	15	
	Livestock (Poultry / Sheep-Goat breeding / Beekeeping)	11	17.5	2	14.3	4	11.1	17	15	
	Pension	-	-	1	7.1	2	5.6	3	2.7	

n: Frequency, %: Percent, χ^2 : Monte Carlo Pearson Chi Square (MC χ^2_p), P: Significance Level, NS: Not significant., *: $p < 0.05$

a,b: Within a row, different superscript letters indicate statistically significant differences between compared frequencies (% within district).

64% of the participants stated that they were satisfied with buffalo breeding for quality of dairy products and the high prices of these products (Figure 2). During the interviews of the participants, it is notable that they are breeding buffaloes to meet their daily needs and emphasize the quality and taste of buffalo products with superior and distinctive properties against cattle products. Buffalo milking is a special livelihood strategy that offers economic advantages to the breeders in the midst of agricultural difficulties. The profits obtained from the buffalo milk ensure that the breeders guarantee their livelihood and security. The buffalo milk can be priced about two to three times compared to cattle milk (Bernardes, 2007; de la Cruz-Cruz et al., 2014; Escarcha et al., 2020). Milk is the staple product in buffalo businesses. The buffalo milk is used to prepare various special products. As a rising trend, it is reported that buffalo breeding gained more importance among the animal breeders since the popularity of buffalo meat and milk production rose with the consumer demand (Soysal et al. 2005). The buffalo milk is appreciated due to production of famous Turkish desserts besides quality products such as yoghurt, cheese and butter, and thus is preferred. This is the most important source of motivation for the breeders to raise buffaloes (Soysal and Kok, 2004; Azabağoğlu and Hurma, 2014; Degirmencioglu et al., 2015).

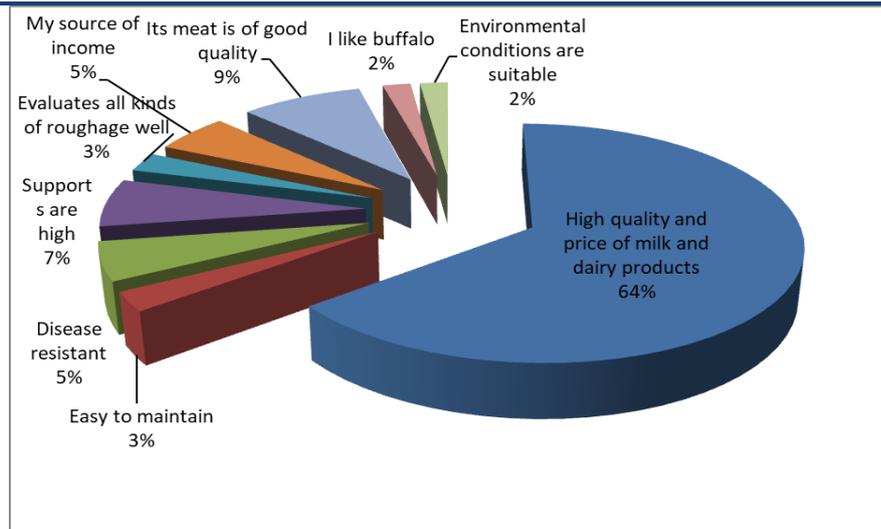


Figure 2. Reasons for participants' satisfaction with buffalo breeding

The breeders as the most important cost items in the business stated that they spent money for fodder (94.2%), animal diseases/health services (2.5%), shepherding (1.7%), workers' cost (0.8%), respectively. They also stated that the most important problem in breeding was high fodder prices, which is an important evidence that the fodder supply for the buffaloes makes the the breeding economically difficult. 48.7% of the breeders in Muş (Şeker et al., 2012) reported that fodder/fodder raw materials ranked the first place among their total costs. Most of the costs in livestock businesses are related to fodder supplies (70-80%). The high costs of fodder materials and the insufficiency of fodder production of fodder raw materials are the most important problems of livestock raising in Türkiye. Although the fodder costs are at the forefront, feeding based on natural pasture is the main feature of the buffalo breeding system (Ligda and Georgoudis, 2005; Borghese, 2010; Degirmencioglu et al., 2015). The fact that the buffalo breeding is a livestock activity carried out under extensive conditions due to the geographical conditions reported as one of the main reasons for breeding is considered the main reason for the continuation of buffalo breeding in this region for many years and its huge popularity among the breeders. However, 0.8% of the participants did not have any costs.

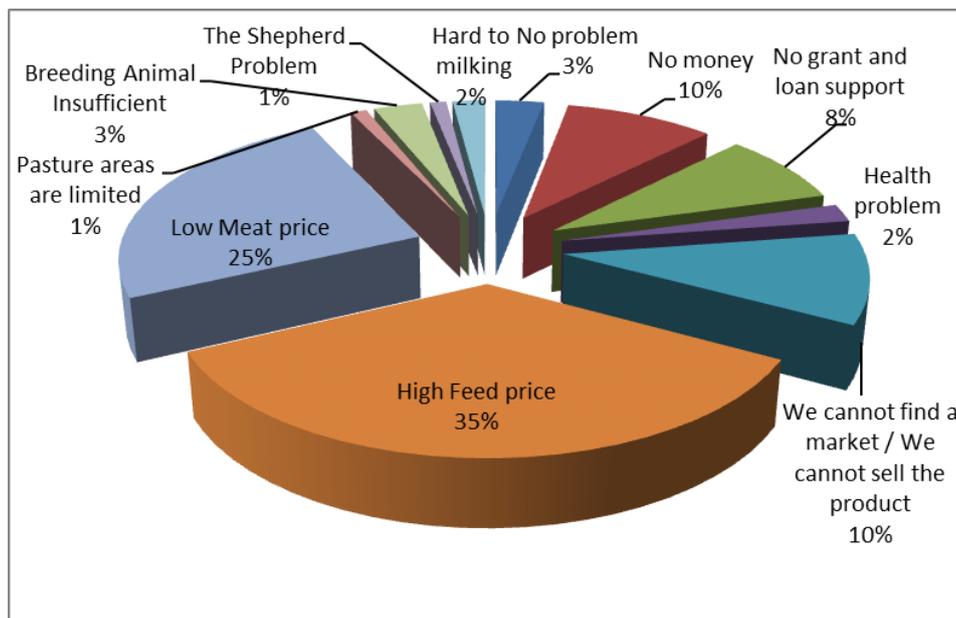


Figure 3. Problems of buffalo farming

They reported the major problems of buffalo breeding as high fodder prices (35%), low meat prices and lack of marketing (25%) and failure to sell their products (10%) (Figure 3). Although the buffalo meat has an excellent sensory quality, the change in market prices causes the breeders not to gain much in response to their efforts. The

prices of the buffaloes in live or their meat are significantly low compared to cattle prices. The findings of the current study (Karadavut et al., 2010; Özdemir and Özdemir 2016; Çiftçi and Yılmaz 2020) overlap with other studies that identified other variables that affect the profitability of the breeders such as low product prices and high fodder prices. In addition to these problems, Saner et al. (2022) stated that the problems such as inadequacy of supports, insufficiency of pastures around the villages and inadequate payments for milk. Commercial production, decisions and actions of businesses in the livestock sector are shaped by the costs, needs and preferences for production. Knowing needs and preferences makes it possible to predict future market reactions (Marin et al., 2017).

The breeders reported their expectations from the authorities to lower fodder prices (26.2%), increase marketing facilities of the products (17%) and distributing breeding animals (17%) (Figure 4). In some studies carried out in different livestock branches, it has been reported that the breeders have expectations from the government in terms of fodder prices, bank credits, veterinary medical services, breeding animal supply, education and marketing issues (Şahinli and Özçelik, 2011; Şeker et al, 2012; Karli et al., 2018). In order for the businesses to make a more economical production under current conditions, they are required to organize the production by applying new methods and techniques and to develop new marketing policies (Marin et al., 2017). In order to meet the expectations of the breeders, sustainable marketing conditions should be created. First of all, this should be focused on environmental, social equality and economic concerns while developing access of small-scale businesses to market and marketing services as a holistic approach and marketing strategies. Local delicacies, safe production methods, protection of the environment and human health, local products and highlighting biodiversity issues will be beneficial to the production of buffalo and marketing of their products (Adanacioğlu, 2015). In the subject of breeding animal demand, the participants' desire to have animals with high milk yield for yielding more and high quality production will be possible by genetic improvement of the herds and increasing their quality. Due to the neglect of buffalo breeding for many years, the individual milk yields of buffaloes remain stable. In cattle, on the other hand, the efficiency per animal has increased continuously by efforts to improve herd genetics in order to increase milk production (Yılmaz et al., 2012). In order to increase productivity by transferring the experiences and advancements seen in cattle breeding to buffalo breeding, the conditions of breeders should be optimized for milk and meat production. Thanks to this information and accumulation transfer, a faster and greater success can be achieved (Bernardes, 2007). In order to develop buffalo cultivation and to guarantee its sustainability, the breeders should be informed and supported in production, herd management and marketing process. As they declare in the study, the breeders expect more support and incentives from the authorities.



Figure 4. Expectations of breeders from authorities

When they were asked whether buffalo breeding could be made more profitable, 95.9% of the breeders responded positively. The buffalo is a stable source of income for farmers, a profitable breeding branch that provides production by using more efficient use of home labor and local resources. Profit is the main driving factor in the decisions and activities of farmers (Naveena and Kiran, 2014; Escarcha et al., 2020). In order to achieve this

aim, the breeders declared their demands to increase prices of their products sold in the market (34.4%) and loan limits for purchasing fodder and breeding animal (33.7%) (Figure 5). The two most important problems affecting the competitiveness of businesses in the livestock sector are low yield and high production costs. The low yield is closely related to the genetic structure of husbandry animals, caring and feeding conditions. The increased costs of the production compels the breeders more than in the past. At this point, in addition to productivity and cost issues, attempts should be made to provide cost and competitive advantage in the long term in terms of production, markets, incentives and supports (Ören and Bahadır, 2005). The fact that the breeders demand the marketing opportunities of their products to be increased is an urgent problem that is necessary to be solved immediately. It has been reported that the profits obtained from buffalo breeding promotes the welfare and livelihood of the family and allow the farmers to accumulate more livelihoods (Naveena and Kiran, 2014; Escarcha et al., 2020). Saner et al. (2022) stated that the continuation of the buffalo breeding businesses depends on the structure of input resources and the effective marketing. In another study on making buffalo breeding profitable, 95.9% of the participants responded positively and emphasized that the market prices (54.9%) and credits should be increased for fodder and breeding animal (23.9%), pasture areas (15.9%) and herd genetics should be improved (5.3%) (Özdemir and Özdemir, 2016).

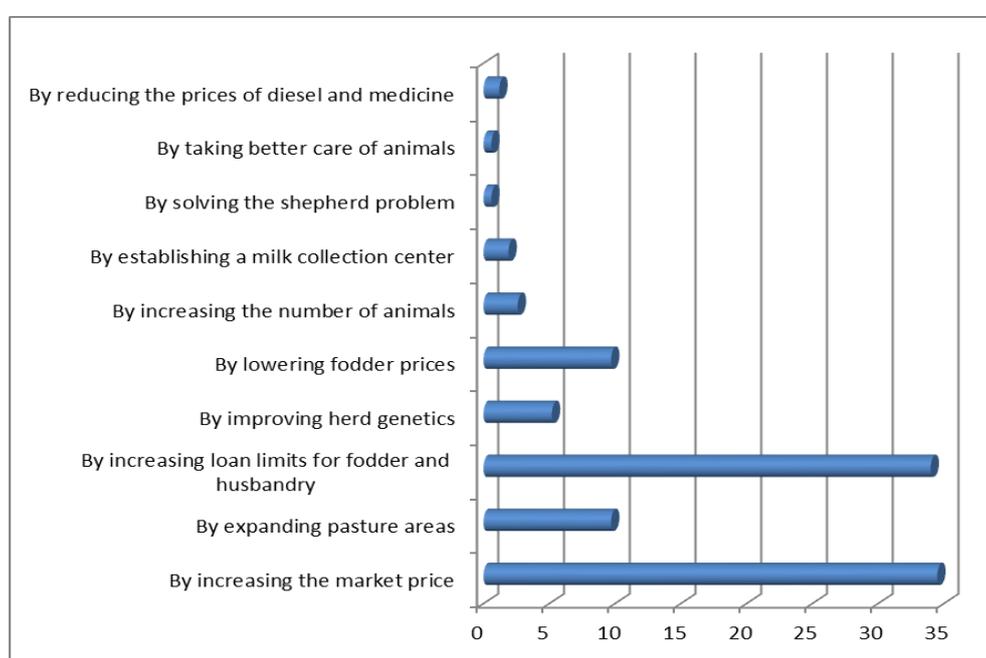


Figure 5. Solution proposals of breeders to make buffalo breeding profitable

When the breeders were asked whether they had difficulties in breeding buffaloes compared to cattle breeding, 35.7% of them had difficulty and 64.3% of them did not have difficulty ($\chi^2=12.888, p<0.001$). The main difficulties reported by the breeders included the following: Milking the buffaloes (21.3%), intractable and grumpy nature of buffaloes (19.7%), and buffaloes not grazing in the faraway pastures (16.4%) and not finding shepherds (Figure 6). The motherhood instinct is strong in buffaloes, and their grumpiness while milking them is actually associated with this feature. The buffaloes are influenced by their caregivers' behaviors during milking and are curious animals about their environment and are not culturally-adapted animals, which accounts for all these problems expressed by the breeders (Napolitano et al., 2013). The buffaloes have gained a special place in Turkish cultural life with their unique living spaces (Semi-aquatik), feeding, and the features of their processed products. The buffaloes have their own requests in terms of breeding, feeding and pasture conditions. It has been demonstrated by the studies that the buffaloes that are forced to compete with cattle breeding are much more economical than cattle and their milk production can be increased if they are genetically improved (Bernardes, 2007; Napolitano et al., 2013; Şahin, 2015; de Lima Carvalhal et al., 2017; Değirmencioglu, 2022). The natural characteristics of being grumpy and vicious mentioned by the breeders is explained by the fact that they do not create problems in grazing and herding, especially in the pasture or barn to the caregivers they are accustomed to, are obedient to their caregivers as long as they are cared by them or if they are not disturbed during the milking and they can be milked

(Bernardes, 2007; Napolitano et al., 2013; de la Cruz-Cruz et al., 2014). The buffaloes are educable animals. If they are trained to behave in a docile manner, they are reported to be easily accustomed to new conditions. However, the knowledge that the temperament of animals is an important element in the selection of breeding animals must be expanded among the breeders. Contrary to what many breeders believe, there is evidence that buffaloes can easily adapt to the machine milking (Yilmaz et al., 2012; Yilmaz and Karaca 2013).

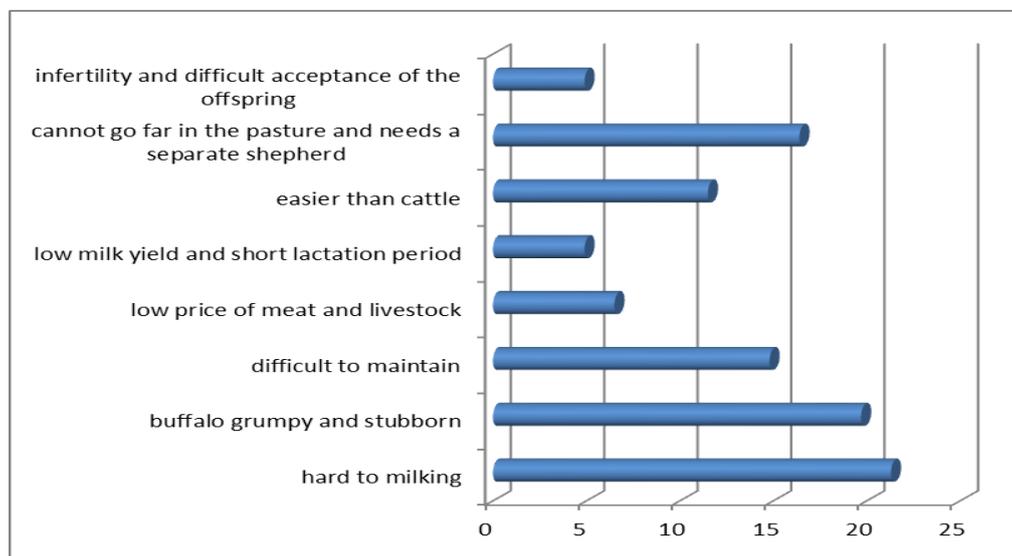


Figure 6. Comparison of cattle and buffalo breeding from the perspective of the breeder

The negative relationship between the participants' age and their social security status ($p < 0.05$) was identified as an indication that young participants did not have social security (Table 3). A significant relationship was found between the gender and social security statuses ($p < 0.05$) of the participants and their views that their business could be made profitable ($p < 0.001$). It can be argued that this relationship is due to the lack of social security and the low number of female breeders (26.2 %) in the livestocking sector. It will be beneficial to promote the employment of women who play an active role in both animal care and milking within the livestocking sector and to offer social security for them. Surprisingly, there was no relationship between social security statuses and satisfaction levels of the breeders. It was found that there was a significant relationship between the satisfaction levels of the participants' with their business and the advising buffalo breeding to their children ($p < 0.05$) and the views that their business could be made profitable ($p < 0.001$) (Table 3). As expected, there was a positive relationship between increasing profitability and breeders' increased satisfaction. Economic self-sufficiency and profitability in production constitute the main sources of satisfaction. The high level of satisfaction promotes the desire of the breeders to sustain production and increase product quality. In accordance with the findings of the study, in Akpınar et al. (2019) and Karlı et al. (2018) reported that the tendency to continue production increased greatly as long as satisfaction levels were high.

Table 3. Relationships between some parameters obtained from study data

Parametreler	Gender	Social Security Statuses	Satisfaction	Recommending to their children	Profitability
Age	-0.092	-0.199*	-0.110	-0.087	-0.075
Gender		0.225*	0.026	0.137	0.252**
Social Security Statuses			-0.030	-0.162	0.076
Satisfaction				0.206*	0.239**
Recommending to their children					0.102

p: Significance Level, *: $p < 0.05$, **: $p < 0.001$.

4. Conclusions

When the age and educational status of the buffalo breeders in Sivas, Şarkışla and Suşehri districts were examined, most of them were in the middle age group and it was found that they mostly graduated from primary and high school. The advantages of buffalo breeding include high satisfaction of the buffalo breeders in Sivas province, their views that buffalo breeding is indispensable, advising buffalo breeding to their children, the use of their products in their own consumption. The positive correlation in buffalo breeding between the satisfaction levels of the breeders, their advice to their children and the profitability of buffalo breeding can be counted among other remarkable advantages that support the sustainability of breeding. The disadvantages of the buffalo breeding include low milk yield, bad temperament of these animals, difficulty in milking. The breeding problems related to low yield, bad temperament and animal behaviors can be handled by technological applications such as selecting animals with high genetic efficiency and more docile temperament as husbandry, genetic improvements and artificial insemination.

When the problems, proposed solutions and expectations of the buffalo breeders in Sivas province from the authorities are considered as a whole, developing new practices and processes is necessary in order to increase the competitiveness of buffalo breeding in rural economy. The participants reported that buffalo breeding is threatened by high fodder prices, lack of market opportunities, limited or no access to loans with governmental support and incentives. The geographical location of Sivas province, the vastness of wetlands, pastures and lakes, which are natural habitats for buffaloes, the traditional production made in the region, and the organic production and geographically registered and/or organic product potential will contribute to overcoming these difficulties. In addition to the geographical possibilities, buffalo breeding should be highlighted more than cattle breeding since it is easier and cheaper, and that buffalo milk and products create better income than cow's milk and products. In order to better integrate animal food manufacturers into the production-food chain, various cooperation forms such as supporting local markets, the consumer and manufacturer coordination, and short marketing chains should be encouraged. Connections that provide local food products between livestocking and tourism sectors should be developed. Direct sales of fresh products are an important source of income for a large number of small farmers. Ensuring an increase in economic profits in production is seen as a solution that will ensure the development of buffalo breeding. With the implementation of the Anatolian Buffalo Improvement program, which is carried out by the Ministry of Agriculture and Forestry, with the cooperation of Buffalo Breeders Association, the support and incentives for the Local Buffalo Breeding Improvement Project can increase satisfaction levels and efforts of the breeders in terms of sustainability. Review of support for buffalo breeding, and determining production and marketing problems will contribute to the introduction of a new approach to the process.

Acknowledgment

This work supported supported by The Scientific Research Project Fund of Sivas Cumhuriyet University (Project No: V-88), Türkiye.

Ethical Statement

This study was prepared under the permission numbered 180, dated 04/12/2018, from the Local Ethics Committee of Sivas Cumhuriyet University Animal Experiments.

Conflicts of Interest

The author declares no conflict interest.

Authorship Contribution Statement

The author contributed to the planning, execution and conclusion of the study.

References

- Adanacioğlu, H. (2015). Sustainable agricultural marketing initiatives. *Turkish Journal of Food - Agriculture Sciences and Technology*, 3(7): 595-603.
- Akpınar, M. G., Gül, M., Tascioğlu, Y., Karlı, B. and Bozkurt, Y. (2019). Analysis of the relationship between the socio-demographic characteristics and satisfaction level of the buffalo farmers: a case of Turkey. *International Journal of Agriculture, Forestry and Life Science*, 3(1): 89-97.
- Anonymous (2015). 2015 Annual Report. T.R. Sivas Governorship, Sivas Directorate of Provincial Agriculture and Forestry. <http://sivas.tarim.gov.tr/menu/21/faaliyet-raporu> (Accessed Date: 10.08.2016).
- Anonymous (2016). Animal Production Statistics. <http://sivas.tarim.gov.tr/Menu/33/Hayvansal-Uretim-Ististikleri> (Accessed Date: 09.08.2016).
- Anonymous (2018). 2017 Annual Report. T.R. Sivas Governorship, Sivas Directorate of Provincial Agriculture and Forestry. <https://sivas.tarimorman.gov.tr/Menu/21/Faaliyet-Raporu> (Accessed Date: 01.11.2018).
- Anonymous (2022). 2022 Annual Report. T.R. Sivas Governorship, Sivas Directorate of Provincial Agriculture and Forestry. (Accessed Date: 12.06.2023).
- Aşkan, E. and Dağdemir, V. (2015). Analysis of the factors affecting the production rates of dairy livestock facilities benefitting from governmental financial supports and incentives: The sample of Erzurum, Erzincan, Bayburt provinces. *Turkish Journal of Agricultural Economics*, 21(2): 69-76.
- Atasever, S. and Erdem, H. (2008). Water buffalo raising and its future in Turkey. *Journal of Agricultural Faculty of Ondokuz Mayıs University*, 23(1): 59-64. <https://doi.org/10.7161/anajas.2008.23.1.59-64>
- Azabağaoğlu, M. Ö. and Hurma, H. (2014). Determination of consumers' demand on water buffalo products. *Social Sciences Research Journal*, 3: 5-11.
- Bernardes, O. (2007). Buffaloes breeding in Brasil. *Italian Journal of Animal Science*, 6 (2): 162-167. <https://doi.org/10.4081/ijas.2007.s2.162>
- Borghese, A. (2010). Development and Perspective of Buffalo and Buffalo Market in Europe and Near East. *9th World Buffalo Congress*, pp. 25-28, Buenos Aires.
- Borghese, A. and Mazzi, M. (2005). Buffalo Population and Strategies in The World. In, Borghese A (Ed): Buffalo Production and Research. 1st ed., pp. 1-39, Rome, Italy. <http://www.fao.org/docrep/010/ah847e/ah847e00.htm>. (Accessed Date: 26.03.2010).
- Çiçek, H. and Tandoğan, M. (2009). A review in point of production costs and profitability in organic dairy. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 15(1): 145-151.
- Çiftçi, S. and Yılmaz, A. (2020). Views of breeders of Anatolian buffalo on buffalo feeding, the utilization of products, and marketing possibilities in Bitlis province of Turkey. *Kahramanmaraş Sütçü İmam University Journal of Agriculture and Nature*, 23(1): 271-280. <https://doi.org/10.33202/comuagri.443113>
- de la Cruz-Cruz, L. A., Guerrero-Legarreta, I., Ramirez-Necoechea, R., Roldan-Santiago, P., Mora-Medina, P., Hernandez-Gonzalez, R. and Mota-Rojas, D. (2014). The behaviour and productivity of water buffalo in different breeding systems: a review. *Veterinárni medicína*, 59(4): 181-193. <https://doi.org/10.17221/7479-VETMED>
- de Lima Carvalhal, M. V., Sant'Anna, A. C., Páscoa, A. G., Jung, J. and da Costa, M. J. R. P. (2017). The relationship between water buffalo cow temperament and milk yield and quality traits. *Livestock science*, 198: 109-114.
- Değirmencioglu, T. (2022). The effects of gas changes in the shelter in the summer period on the milk yield and dry material consumption of Anatolian water buffalo (*Bubalus bubalis*). *Journal of Agricultural Sciences*, 28(3):511-517. <https://doi.org/10.15832/ankutbd.960280>
- Degirmencioglu, T., Unal, H. and Kuraloglu, H. (2015). Comparison of extensive or semi-intensive feeding for Anatolian water buffalo. *Emirates Journal of Food and Agriculture*, 27(9): 712-715. <https://doi.org/10.9755/ejfa.2015.04.07>
- Escarcha, J. F., Lassa, J. A., Palacpac, E. P. and Zander, K. K. (2020). Livelihoods transformation and climate change adaptation: The case of smallholder water buffalo farmers in the Philippines. *Environmental Development*, 33: 100468. <https://doi.org/10.1016/j.envdev.2019.100468>
- Gürcan, E. K., Tuna, Y. T. and Soysal, M. İ. (2011). The morphometric characterization of Anatolian water buffalo according to body measurements. *Journal of Tekirdag Agricultural Faculty*, 8(2): 143-152.
- Karadavut, U., Çakmak, C., Özdemir, G. and Sevinç, N. (2010). A Study on Technical and Economic Structures of Livestock Enterprises In Bingöl. *3. Bingöl Sempozyumu*, 17-19 September, pp 37-46, Bingöl, Türkiye.
- Karlı, B., Gül, M., Akpınar, M. G., Tascioğlu, Y. and Bozkurt, Y. (2018). Problems of water buffalo breeding in Turkey and suggestions for its development. *Revista Brasileira de Zootecnia*, 47: e20170230. <https://doi.org/10.1590/rbz4720170230>
- Ligda, C. H. and Georgoudis, A. (2005). Adaptation of buffalo production systems towards the market demand for certified quality products. *Journal of Tekirdag Agricultural Faculty*, 2(2): 124-126.
- Marin, D., Petroman, C., Ienovan, D., Ciolac, R., Lozici, A., Iosim, I. and Petroman, I. (2017). Research regarding the relationship between consumption and needs. *Animal Science and Biotechnologies*, 50(2): 168-171.
- Napolitano, F., Pacelli, C., Grasso, F., Braghieri A. and De Rosa, G. (2013). The behaviour and welfare of buffaloes (*Bubalus bubalis*) in modern
-

- dairy enterprises. *Animal*, 7(10): 1704-1713. <https://doi.org/10.1017/S1751731113001109>
- Naveena, B. M. and Kiran, M. (2014). Buffalo meat quality, composition, and processing characteristics: Contribution to the global economy and nutritional security. *Animal Frontiers*, 4(4): 18–24. <https://doi.org/10.2527/af.2014-0029>
- Ören, M. N. and Bahadır, B. (2005). Livestock policies and policy transfers in Turkey and OECD countries. *Journal of Animal Production*, 46(1): 1-7.
- Özdamar, K. (2013). Statistical data analysis with package programmes-1. 9. Edition, Nisan Kitabevi, Ankara, Türkiye. (In Turkish)
- Özdemir, G. (2021). Production and marketing status of water buffalo breeders in Sivas province. *Fırat University Veterinary Journal of Health Sciences*, 35(3): 166-171.
- Özdemir, G. and Özdemir, A. (2016). The assessment of problems and solution suggestions towards water buffalo breeding in Bingöl Province from the perspective of breeders. *Iğdır University Journal of the Institute of Science and Technology*, 6(2): 127-134. <https://doi.org/10.21597/jist.2016218859>
- Şahin, A., Ulutaş, Z. and Yıldırım, A. (2013). Buffalo husbandry in Turkey and the World. *Journal of Gaziosmanpaşa Scientific Research*, 8: 65-70.
- Şahin, G. (2015). Water buffalo (*Bubalus bubalis*) raising and evaluation of dairy products in agricultural course of Türkiye. *İstanbul Üniversitesi Edebiyat Fakültesi Coğrafya Dergisi*, 31: 14-40.
- Şahinli, M. A. and Özçelik, A. (2011). *Economic analysis of agricultural farming that involves also sheep farming activities in the Konya province and the determination of prevailing factors in sheep farming activities*. (PhD Thesis) Ankara University, Graduate School of Natural and Applied Sciences, Ankara, Türkiye.
- Saner, G., Engindeniz, S., Adanacıoğlu, H., Güler, D. and Şengül, Z. (2022). An analysis of economical aspect of water buffalo farming: A case study of Balıkesir province. *The Journal of Animal Production*, 63(1): 35-45 <https://doi.org/10.29185/hayuretim.978601>
- Sarıözkan, S. (2011). The importance of water buffalo breeding in Turkey. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 17(1): 163-166. <https://doi.org/10.9775/kvfd.2010.2446>
- Şeker, İ., Tasalı, H. and Güler, H. (2012). The structural features of cattle farms in Muş province. *Fırat University Veterinary Journal of Health Sciences*, 26(1): 09-16.
- Soysal, I. and Kok, S. (2004). Buffalo Breeding in Turkey. *Proceeding of the Seventh World Buffalo Congress*, 20-23 October, pp 547-548, Manila, Philippines.
- Soysal, M. İ. (2014). Anatolian Water Buffalo Husbandry in Turkey. *Proceedings of the International Symposium on Animal Science*, September, pp 147-155, Belgrade-Zemun.
- Soysal, M. İ., Tuna, Y. T., Gürcan, E. K. (2005). An investigation on the water buffalo breeding in Danamandıra village of Silivri district of Istanbul province of Turkey. *Journal of Tekirdağ Agricultural Faculty*, 2(1):73-78.
- TÜİK (2022). Turkish Statistical Institute, Ankara. <https://data.tuik.gov.tr/Bulten/Index?p=Hayvansal-Uretim-Istatistikleri-Haziran-2022-45594> (Accessed Date: 12.09.2022)
- Yılmaz, O., Ertugrul, M. and Wilson, R. T. (2012). Domestic livestock resources of Turkey Water buffalo. *Tropical Animal Health and Production*, 44: 707-714 <https://doi.org/10.1007/s11250-011-9957-3>
- Yılmaz, S. and Karaca, O. (2013). *Water buffalo breeding in Afyonkarahisar province; sample of Küçükçobanlı village*. (MSc. Thesis) Adnan Menderes University, Graduate School of Natural and Applied Sciences Department of Animal Science, Aydın, Türkiye.