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Some demographic characteristics of farmers and their knowledge of the systems of raising and caring for meat animals in the New Valley governorate, Egypt

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Abstract

The research was designed to study the demographic characteristics of farmers and systems of raising and caring for meat animals for smallholders in the crop-livestock production system in New Valley governorate, Egypt. The primary data for the study were obtained using 300 questionnaires from 3 centres located in the New Valley governorate, selected randomly. The data presented showed that the average age of respondents in different centres in the New Valley governorate was 51.60 years old. There were 5.58 members in the family house, and their marital status reveals that only 4.0% are single, while 91.0% are married, and the rest are widowed, an average of 5.0%. The education level suggested a high proportion of households with a high school rate (36.0%). The study revealed that smallholders keep mixed livestock species, including local, foreign, and cross-bred cows, buffalo, and sheep. About 63.7% gave their animals immunizations and vaccinations. About 52% of animals are raised on natural pastures. Also, households have limited practice of feed conservation in the form of hay or silage. The overall mean of calf weight at birth was 32.57± 0.281 kg, the mean weaning age of calf was 3.87±0.055 month, the mean of calf weight at weaning was 84.11±0.733 kg, and the mean of the milk amount during the suckling period was 3.28±0.033 kg/day for each calf.

Keywords: demographic characteristics, households, New Valley governorate, smallholders, raising meat animals.

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1. Introduction

The agricultural sector is regarded as one of the most significant areas of the national economy, given that it is the primary source of food for both humans and animals, in addition to providing some raw materials for the industrial sector. Humans' need for food has become a serious challenge for society, and the people and nations of the developing world experience a massive food gap as a result of an imbalance between what is available and what is needed to meet those demands. This food gap puts a strain on national investments (Abd El Sadek, 2019). Animal production in Egypt is without a doubt an important part of the national economy and is intimately related to public safety and health. Approximately 152.8 billion pounds, or about 37.2% of the average value of production, is thought to be the average value of animal production. On average, sheep and goats produced 9861,353 tons of red meat, or 4.3% and 0.2%, respectively, of the total amount of meat produced. 230,795 tons of Hamra nationwide meat was produced during the time frame 2015 to 2018 (Belal and Mohammed, 2020). Families in rural areas benefit economically and socially from livestock raising (Nkonki-Mandleni *et al*., 2019). Research indicates that knowledge of the socioeconomic and agricultural features of farm households is essential for creating suitable and successful livestock programs that assist households (Ayalew *et al*., 2013). Furthermore, working with households to enhance livestock productivity requires an awareness of the various elements that affect livestock raising (Zaw Win *et al*., 2018). A significant problem is the high rate of population density and overpopulation in the Nile Valley and Delta. As a result, over the past seven years, the Egyptian government has increased the agricultural sector by building numerous projects in Egypt's desert regions. According to Egypt's Vision 2030, we must harness the natural resources that are accessible in the severe desert and environmental circumstances and turn livestock production into a true sustainable development instrument for the Bedouins (Khidr, 2022). The New Valley governorate in Egypt is the largest Egyptian governorate and the one with the most extended desert areas. The New Valley, which makes up 44% of the total area and is located in the Western Desert of Egypt, is the country's largest governorate. There are three oases in the region: Dakhla, Kharga, and Farafra. It is in the south-west of the country and stretches from the borders of Libya in the west to the Nile Valley in the east. The New Valley experiences unusual weather patterns, including hot summers, very cold winter nights, little yearly rainfall, and the highest solar radiation intensity in Egypt. The difference in ambient temperature between day and night fluctuated greatly, frequently exceeding 20°C. Since desert oases have been isolated for generations and have had difficult environmental circumstances,

local Wahat livestock features have been altered to cope (Elshazly and Youngs, 2019), usually at the expense of their low productivity. A variety of small-scale crop and livestock farming systems with various farm sizes and cropping patterns can be found in the study area's objective. In order to provide appropriate revenue for the local households, the production from these farms must be increased from its current low level. Welfare laws are probably going to have an increasing impact on livestock productivity. Future livestock product demand from animals may be significantly tempered by socioeconomic variables such as shifting sociocultural values and worries about human health. Thus, the purpose of the study is to examine the demographic traits of farmers and their familiarity with the New Valley governorate systems of raising and caring for meat animals.

2. Materials and methods

2.1 Study area

The New Valley governorate (NVG) is a region of South-Western Egypt that borders both Sudan and Libya on the international level. Its internal borders are shared with the governorates of Assiut, Suhag, Qena, and Aswan in the east, as well as Menia, Giza, and Marsa Matrooh in the north. The governorate is situated between 25°42' E to 30°47' E longitude, 22°30' N to 29°30' N latitude, 602 kilometers south-west of Cairo, and around 226 km from the Assiut governorate. It is regarded as the largest governorate in the nation in terms of size, with a total area of 440098 km^2, or roughly 43.6% of Egypt's total land area (EEAA and EMU, 2008). The NVG's three oases are Kharga, Dakhla, and Farafra served as the site for this investigation (Figure1).

2.2 Data collection

This study included collecting a questionnaire from ten villages belonging to three centres located in New Valley Governorate, which were randomly selected to participate in this study with a total of 300 pre-test questionnaires. The primary data for this study was obtained using a pre-tested questionnaire. Accordingly, 30 pre-tested questionnaires for each village from 3 centers: (1) Farafra center, as well as Frafra village, Elnahda village, and Allwaa Sobeeh village. (2) Paris center, as in Paris village, Jeddah, Baghdad, and Ezbet Paris. (3) Palat center as Palat, Tunaydah, and Albashandy villages. The aforementioned families received a questionnaire that was created and distributed. It offered details on certain demographic farmers' characteristics and their understanding of the systems for raising and treating meat animals. This data was gathered to identify the production system of breeders in the area (the traditional system), which included the following variables: (1) Farmers' socio-critical characteristics. (2) Family type, basic and secondary occupation of breeders. (3) The average number of

animals bred by farmers. (4) Care and breeding methods. (5) Methods of animals' nutrition and drinking water. (6) Suckling system.

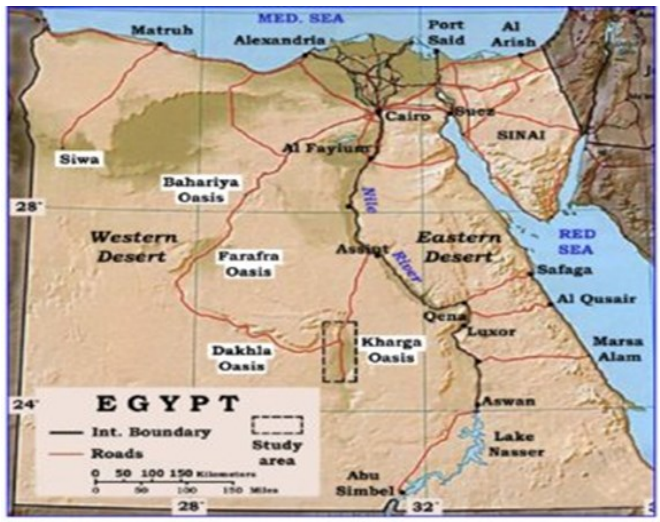

Figure (1): Geographical location of New Valley governorate, Egypt.

2.3 Statistical analyses

Data were analysed using a variety of statistical methods, including chi-square and the general linear model (GLM). All data were statistically analysed as completely randomized, designed by one-way ANOVA using the GLM model of SPSS (2004). Duncan's multiple range tests were used to determine significant differences between means (Steel and Torri, 1980). The data were presented as mean ± S. The level of significance was set at $P \leq 0.05$.

3. Results and Discussion

3.1 The snail habitats

Table (1) describes the average age of breeders in different centres in the New Valley governorate, Egypt which was recorded at 51.60 years old. In this respect, Khalil *et al*. (2013) reported that the average farmer's age in the north-western coastal zone of Egypt is around 51 years old, which is close to our results. In addition, Abd El-Ati *et al*. (2019) reported that in New Valley governorate, 61.4% of breeders have medium ages between 42 and 60 years, while the percent was 55.7% in Assiut governorate. This result is similar to the findings reported by Metawi *et al*. (2019), who found that the average age of respondents included in their study in Damietta governorate was about 46.6±13.6 years, and about 95% of them were married. On the other hand, Lawal-Adebowale (2011) found that the average age of a farmer in

Spain is 50.5 years. Also, there were 5.58 family members in the house (Table 1). The average Egyptian household size is 4.4 people, which is less than the current result, according to the CAPMAS data from 2011. According to Metawi (2011), the average family size in the north coastal zone's rain-fed and irrigated farming systems was 7.8 people and 5.7 people, respectively. In the former farmed regions of Sharkeia Governorate, 6.4 individuals made up the average family. Furthermore, Metawi *et al*. (2019) reported that in Damietta governorate, there were 5.82 household members in the house; this result was the nearest to our results. The distribution of households in Table (1) by marital status reveals that only 4.0% are single, while 91.0% are married, and the rest are widowed, an average of 5.0% in New Valley governorate. El-Fateh (2014) found that the distribution of households by marital status reveals that 92.2% are married, while only 5.8% are single. The results of education Level suggested a high proportion of households who have high school rate (36.0%), while the proportions of households who have uneducated, reads and writes, primary education, preparatory education, and university education were (11.7, 12.3, 11.7, 10.3 and 18.0%, respectively.

Table (1): Age, social status and educational level of farmers in New Valley governorate, Egypt.

Descriptor	Mean ± SE	
Age of farmers	51.60 ± 0.57	
Family members	5.58 ± 0.101	
Descriptor	No	%
Social status		
Single	12	4.0
Married	273	91.0
Widow	15	5.0
Total	300	100
Chi-Square 25.656 (P < 0.108)		
Education level		
Uneducated	35	11.7
Reads and writes	37	12.3
Primary education	35	11.7
Preparatory education	31	10.3
High school	108	36.0
University education	54	18.0
Total	300	100
Chi-Square 44.979 (P < 0.473)		

This outcome is consistent with research published in 2013 by CAPMAS, which found that 25.9% of Egyptians over the age of 10 were literate. Harby (2020) resulted that the proportions of households who have uneducated (27.14%), reads and writes (0.0%), primary (1.43%), preparatory (7.14%), secondary schools (54.29%) and university (10.0%) in New Valley, while

there were uneducated (48.57%), reads and writes (7.14%), primary (0.0%), preparatory (4.29%), secondary schools (27.14%) and university (12.86%) in Assiut, respectively. Education has a crucial role in the efficient operation of economic operations and enhances one's capacity for problem-solving.

3.2 Family type, basic and secondary occupation of breeders

Table (2) showed that the family type in the studied areas was 85.0% simply family and 15% was compound family. As for the basic and secondary occupations of breeders, there were several. The proportions of households that have basic occupations as farmers, employees, craftsmen, and retirees were 63.0, 26.7, 5.3, and 5.0% of respondents, respectively. While the occupations of respondents as farmers, animal breeders, employees, and craftsmen were 11.7, 12.3, 11.7, and 10.3%, respectively. Furthermore, the result reported that a total of 65% of households identified themselves as farmers (basic occupation), while the second occupation was that 12.3% of households identified themselves as animal breeders, derived from household income from the sale of crops and/or animals only (Table 2). This result is higher than that found by Abdel-Monaime (2018), who reported that 55% of households identified themselves as full-time farmers in Upper Egypt. Also, Abdel-Monaime (2014) observed that 19.6% of respondents are farmers.

Table (2): Family type, basic and secondary occupation of breeders in New Valley governorate, Egypt.

Descriptor	No	%
Family type		
Simple family	255	85.0
Compound	45	15.0
Total	300	100
Chi-Square 15.294 (P > 0.083)		
Basic occupation		
Farmer	189	63.0
Employee	80	26.7
Craftsman	16	5.3
Retired	15	5.0
Total	300	100
Chi-Square 74.208 (P >0.05)		
Secondary occupation		
Farmer	35	11.7
Animal breeding	37	12.3
Employee	35	11.7
Craftsman	31	10.3
Total	300	100
Chi-Square 111.022 (P > 0.05)		

The result is similar to Nkonki-Mandleni *et al*. (2019), who found that the majority of the farmers (77.2%) practiced farming on a full-time basis. In addition, Yacoub

and Diab (2021) in Kharga Oasis found that 47.5% were governmentally employed, besides practicing agriculture. The implication of this for development is that any planned change in the practices of producers should take into account their allocation of labor for off-farm work.

3.3 Some farmer's knowledge about animals' husbandry and nutrition

3.3.1 The average number of animals breeds by farmers

In the study area, households kept different kinds of cows, buffalo, and sheep. The age distribution of local cows is presented in Table (3). In New Valley governorate, about 3.49±0.098 of farm local cows are female >2 years, followed by 3.37±0.137 and 3.33±0.089 of female <1 year and female 1-2 years, respectively. But male ranged between 2.87±0.091 and 2.96±0.100 of male <1 to male >2 (Table 3). The proportion of buffalo cows ranged from 3.15±0.093 to 3.29±0.079 for males <1 year to males 1-2 year, respectively. While the female ranged from 2.80±0.085 to 3.20±0.077 for female buffalo >2 years to female 1-2 years, respectively. The number of male buffalo is higher than the number of female buffalo in the studied district. The number of foreign cows, whether male or female, ranged from <1 year to >2 years, and between then, it ranged from 3.10±0.087 up to 3.43±0.108 per household. As for the crossbreed cows, they were 1.97±0.101, 2.03±0.098, and 2.49±0.102 for males aged 1-2 years, >2 years, and <1 year, respectively. While 2.16±0.126, 2.57±0.099 and 3.66±0.148 for female 1-2 years <1 year and >2 years, respectively Table (3). Also, household kept with sheep more than buffalo or cows. The sheep herd composition gender and age per household holding in the study area. The female sheep ranged between 3.22±0.131 and 4.26±0.153 for <1 year and >2 years, respectively, while male sheep ranged between 2.11±0.091 and 3.01±0.129 for <1 year, respectively and the average number of females was more than male sheep (Table 3). According to Nsoso *et al*. (2004), such flock structures develop because farmers are aware that keeping flock sizes stable depends on keeping the more fertile females around longer than the males. In six investigated areas located in the east and west banks of the Nile in the Assiut governorate, Abd El-Monaime (2018) found that the household owned more sheep (44.45%) and goats (45.42%) than cattle (3.83%) and buffalo (6.30%) of farmer herds. According to El-Fateh (2014), the New Valley governorate retained an average of 4.18 cattle, 1.74 sheep, and 1.76 goats per livestock holding. Households in the examined region, however, have a higher proportion of cattle; this may be because they own substantially more land and that land is more heavily covered in grain crops. Galal *et al*. (2011) shown that breeding females make up a bigger share of the flock, with goats' suckling age group being the second-largest age group. The common practice of keeping females for breeding while selling males when they reach

market age may be to blame for the increased number of females.

Table (3): The average numbers of animals breed by farmers in New Valley governorate, Egypt.

Descriptor	Mean ± SD
Local cows	
Female local cows >2 years	3.49±0.098
Male local cows >2 years	2.93±0.094
Female local cows 1-2 years	3.33±0.089
Male local cows 1-2 years	2.87±0.091
Female local cows < 1 year	3.37±0.137
Male local cows <1 year	2.96±0.100
Foreign cows	
Female foreign cows >2 years	3.43±0.108
Male foreign cows > 2 years	3.15±0.098
Female foreign cows 1-2 years	3.14±0.095
Male foreign cows 1-2 years	3.38±0.093
Female foreign cows <1 year	3.10±0.087
Male foreign cows <1 year	3.28±0.083
Cross cows	
Female cross cows >2 years	3.66±0.148
Male cross cows >2 years	2.03±0.098
Female cross cows 1-2 years	2.16±0.126
Male cross cows 1-2 years	1.97±0.101
Female cross cows <1 year	2.57±0.099
Male cross cows <1 year	2.49±0.102
Buffalo	
Female buffalo >2 years	2.80±0.085
Male buffalo >2 years	3.24±0.080
Female buffalo 1-2 years	3.20±0.077
Male buffalo 1-2 years	3.29±0.079
Female buffalo <1 year	3.07±0.082
Male buffalo <1 year	3.15±0.093
Sheep	
Female sheep >2 years	4.26±0.153
Male sheep >2 years	2.59±0.115
Female sheep 1-2 years	3.33±0.137
Male sheep 1-2 years	2.11±0.091
Female sheep <1 year	3.22±0.131
Male sheep <1 year	3.01±0.129

3.3.2 Care and breeding methods

Results of field survey of the studied districts showed that the animals purchased from a reliable source reached to 60.3% from a known source at rate of 85.3%, in contrast to 39.7% purchased from unreliable source with 14.3% from unknown source (Table 4). According to Mohammady *et al*., (2018), most farm animals came from the local market or were raised as replacements on the farms. As show in Table (4), the 81.3 % from the farmers didn't have any reports for record all movements to and from the farm, whereas 18.7% have a clear record of all movements to and from the farm. In addition, about 75.0% accepted the

management system and found it adequate. While 25.0% refuse the management system.

Table (4): Some farmers' knowledge of care and breeding methods in New Valley governorate, Egypt.

Descriptor	No	%
Are the animals purchased from a reliable source?		
Yes	181	60.3
No	119	39.7
Total	300	100
Chi-Square 2.911 (P > 0.05)		
Is the source of all animals purchased known?		
Yes	256	85.3
No	44	14.7
Total	300	100
Chi-Square 2.237 (P < 0.05)		
Are there clear records of all movements to and from the farm?		
Yes	56	18.7
No	244	81.3
Total	300	100
Chi-Square 1.405 (P > 0.05)		
Are the management systems acceptable and adequate?		
Yes	225	75.0
No	75	25.0
Total	300	100
Chi-Square 5.778 (P > 0.05)		
Are there records of all farm operations?		
Yes	59	19.7
No	240	80.3
Total	300	100
Chi-Square 0.126 (P > 0.05)		
The animals raised with intensive or extensive system?		
Extensive system	240	80.3
Intensive system	59	19.7
Total	300	100
Chi-Square 6.019 (P > 0.05)		
Are animals raised individually or collectively?		
Individually	196	65.6
Collectively	103	34.4
Total	300	100
Chi-Square 11.382 (P > 0.05)		
Was the animals castrated?		
Yes	7	2.4
No	281	97.6
Total	300	100
Chi-Square 2.966 (P < 0.05)		
Have immunizations and vaccinations been performed?		
Yes	191	63.7
No	109	36.3
Total	300	100
Chi-Square 14.540 (P > 0.05)		

It's clearly showed that, about 80.3% hadn't records all farm operations, in contrast to just 19.7% record all of farm operations. According to Omer *et al*., (2021), not a single responder in Sudan mentioned maintaining written records for

animal pedigree, breeding, or productivity. The primary cause was the farmers' (81.7%) assertion that they could memorize all pertinent facts. Thirteen percent of the respondents reported having trouble maintaining written records. As a result, farmers' memories served as the foundation for all information pertaining to cattle production. Novel farmers' cooperatives make it simple to provide this kind of training to a large number of farmers at once collectively. Table (4) revealed that, households indicated that 80.3% from the animal raised on extensive system, and 19.7% raised on intensive system. Additionally, 65.6% from the animals raised individually, and 34.4% raised collectively. It is possible to classify Egypt's farming system as intensive, semi-intensive, or widespread. In intensive farming, animals are kept in small spaces and never allowed to graze. There is a grazing period of 4-8 hours in both extensive and semi-intensive farming systems. Large-scale farming is the norm in some parts of the world (Karthik *et al*., 2021; Mbow *et al*., 2019). Animals often have to make do on wastelands that are unfit for farming because there are no designated pastures for them to graze on. According to Abd El-Monaime, (2018), the subtropical regions of the world are home to small ruminant production systems, or smallholders. According to the data collected from the household, it can be found that 97.6% did not castrate the animals to complete the mating process, while the 2.4% done the castrate process. In the study areas about 63.7% gave their animals immunizations and vaccinations, in contrast the rate of not vaccinating the animals was high (36.3%), may be due to the reduction of medications and veterinary services offered to small ruminants by the district's Office of Veterinary and Rural Development. The high small ruminant mortality rate was a direct result of the shortage of veterinary services and pharmaceuticals (Abd El-Monaime, 2018). Vaccinations of the herd are given mostly by General Authority of Veterinary Services. Most common vaccinating that given for animals in all the studied districts as follow: Rift Valley Fever and Lumpy Skin disease for cattle, while Lumpy Skin disease, Foot and Mouth disease and plague for sheep and goat (Mohammady *et al*., 2018). Only 21% of respondents were satisfied with the animal health services during an experiment in Sudan, while the majority (79%) said they had limited access to suitable animal health treatments (Omer *et al*., 2021).

3.3.3 Animals' nutrition

A significant barrier to the production of livestock in the study district is inadequate nourishment. Due to the seasonal pattern of rainfall, fodder has inadequate nutritional value for most of the year. Rainfall ranges from 600 to 1000 mm annually in the semi-arid and arid zones, respectively. As indicated in Table (5), about 52% from animals under study raised on natural pastures, while 48.0% doesn’t. During our study, Table (5) revealed that most of the responding depends on ready feedstuffs, while little of them depend on the feedstuffs made by themselves for their animals. Organic wastes, especially agricultural wastes and agro-industrial byproducts are becoming more and more popular as low-cost alternatives to other feed sources for animals. Data in the same Table revealed

that 9.7, 3.3 and 6.0% in food animal contain dried meat or fish powders, chicken wastes and growth promoters or hormones, respectively.

Table (5): Some farmer's knowledge about methods of animals' nutrition and drinking water in New Valley governorate, Egypt.

Descriptor	No	%
The animals raised on natural pastures		
Yes	156	52.0
No	144	48.0
Total	300	100
Chi-Square 8.333 (P > 0.05)		
Ration formation Crosstabulation		
Yes	29	9.7
No	271	90.3
Total	300	100
Chi-Square 35.463 (P > 0.05)		
Does animal food contain dried meat or fish powders?		
Yes	10	3.3
No	290	96.7
Total	300	100
Chi-Square 8.276 (P < 0.05)		
Does the animal food contain chicken wastes?		
Yes	18	6.0
No	282	94.0
Total	300	100
Chi-Square 6.856 (P < 0.05)		
Does animal food contain growth promoters or hormones?		
Yes	29	9.7
No	271	90.3
Total	300	100
Chi-Square 5.688 (P < 0.05)		
Is the food stored properly?		
Yes	230	76.7
No	70	23.3
Total	300	100
Chi-Square 2.609 (P > 0.05)		
Is clear water available for the animal to drink?		
Yes	213	71.0
No	87	29.0
Total	300	100
Chi-Square 5.197 (P > 0.05)		

In Egypt (El Shaer *et al*., 1986), research had been done on the possible contribution and usage of agro-industrial by-products and other organic wastes in animal feeding. According to Mohammady *et al*. (2018), the primary source of animal feed in the New Valley is the local, untamed vegetation. Cultivated forages and crop remnants are also used as sources of animal feed. Under the study area it was found that about 76.7% stored the food properly, but 23.3% couldn't do that and the major reason for not practiced feed conservation techniques as reported by respondents were lack of awareness and experience. The highly variable feed supply caused by water availability (rainfall and/or underground water), which

determines the amounts of feed before and during the reproductive cycle and affects the reproductive and productive performance of goats, is one of the main constraints in North Sinai, according to research by Ahmed *et al*. (1999). It can be noticed in the same Table that clear water available for the animal to drink in about 71.0% from the households under the study area, while 29.0% couldn't have clear water. Water scarcity may be the cause of the larger summertime feed shortfall.

3.3.4 Suckling system

Table (6) showed that, the overall mean of calf weight at birth was 32.57±0.281 kg, the mean weaning age of calf was 3.87±0.055 month, the mean of calf weight at weaning was 84.11±0.733 kg and mean of the milk amount used during the suckling period was 3.28±0.033 kg/day for each calf. The suckling method recorded 92.0% normal suckling with the most farmers and 8.0% was artificial way. These results are in harmony with those obtained by Ali (2001) discovered that Baladi calves gained an average of 0.48 kilograms per day after birth, which is consistent with these results. Baladi calves took longer to reach the target weight of 80.35 kg at weaning, as indicated by the longer average age at weaning (126.46 days). According to the findings of Ali *et al.* (2019), on average, calves weighed 27.27 kg at birth, 88.25 kg at weaning, consumed 338.3 kg of milk during the suckling period.

Table (6): Some farmer's knowledge about methods of animals' nutrition and drinking water in New Valley governorate, Egypt.

Descriptor	Mean ± SD	
Average birth weaning age and weight and amount of milk suckling		
Average birth weight (kg)	32.57±0.281	
Weaning age (month)	3.87±0.055	
Weaning weight (kg)	84.11±0.733	
Amount of milk suckling daily (kg)	3.28±0.033	
Suckling method crosstabulation	No	%
Normal suckling	276	92.0
Artificial suckling	24	8.0
Total	300	100
Chi-Square 1.993 ($P < 0.05$)		

4. Conclusion

It is concluded that raising livestock is the primary source of income in the study area and that the significance of agricultural activities varies geographically and is mostly influenced by ecological and economic factors. Various behavioral gaps with respect to all sustainable agriculture subscales may be inferred from the results of the present study. Due to the fact that farmers do not have enough information, it is essential that they be educated on sustainable agriculture practices.

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