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RESEARCHPAPER

Determination of General Structure of Enterprises Producing Eggs in Free Range System in Ordu Province

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Abstract

In this research, the general structure of the enterprises that produce eggs in the free range system in Ordu province was determined from face-to-face surveys with 54 producers.

It has been determined that 68.5% of the enterprises producing eggs in the free range system are located in the field under hazelnut, and 42.6% prefer to use concrete materials in the construction of the poultry house. It has been stated that 50% of the enterprises provide ventilation in the hen house with fans, 44.4% use nipple type drinkers and 42.6% prefer thick sawdust as litter material. In addition, 61.1% of enterprises do not use workers. The egg yield was more than 81% in 26.9% of the enterprises. Moreover, the average feed consumption per chicken in 42.5% of the enterprises was between 100-120g. According to the statements, 72.2% of the producers were not members of the "Egg Producers Association" and 81.5% of the producers pointed out that they did not meet the expectations of the “Egg Producers Association”. At the same time, 70.4% of the producers told that the Covid-19 epidemic affected the egg sales prices, and 50% of the producers affected by the epidemic stated that they were negatively affected.

Introduction

Most consumers prefer eggs produced through alternative production systems that apply food safety regulations since animal rights started to be considered important in egg production systems (Anderson, 2009). There are various alternative production systems available such as free range, organic, enriched cage, aviary and deep-litter systems (Şekeroğlu et al. 2010; Türker and Alkan, 2018). There has been a resurgence of interest in free-range poultry farming in recent years in developed countries, as a result of welfare concerns associated with farming of poultry under intensive conditions. For the “best positive welfare outcome”, hens should be free from hunger, thirst, discomfort, pain, injury, disease, fear and distress and able to express normal behaviors (Brambell, 1965).

In free-range system laying hens breeding, where animal rights and welfare are more considered, animals are raised in conditions suitable for their nature as much as possible, the movements of hens are not restricted, their skeletal systems are better developed and the wishes and sensitivities of consumers who seek different tastes are taken into account. In this kind of breeding system, the use of cages is minimized and hen house is a breeding system in which hens can move freely in certain areas during the day and benefit from the green grass in these areas. Therefore, with this system, hens benefit from both the grass in the open area and sunlight at the maximum level. Since the stress level is lower in hens that actively use the open space, plucking and cannibalism events are also less common. The stocking density should not exceed 7 hens/m2 of available floor space in the free range system (Thear, 1997).

Again, under free range system conditions, the hens show high vigor, a firm and strong feather

coverage and wattles (Bogdanov, 1997). Birds show typical signs of calmness and comfort, such as dust and solar bathing, stretching wings and beak cleaning and preening of their feather (Bogdanov, 1997). In addition to these, beak trimming should not be necessary for hens in this system (Sorensen, 1994; Yenilmez ve Uruk, 2016; Durmuş ve Alkan, 2015; İpek ve Sözcü, 2015).

Ordu province is located between 40-41 North parallels and 37-38 East meridians. It is geographically rugged and almost all of the agricultural lands consist of hazelnut gardens. While hazelnut producers generate income from hazelnuts at certain times of the year, these gardens remain empty during the rest of the year. Developing and implementing alternative production activities in addition to hazelnuts in the Ordu province is very important in preventing migration from the village to the city. In this regard, producers may provide additional income by making free system egg chickens under hazelnut gardens. With this production system, approximately 10% savings can be achieved in the feed consumption of the hens grazing in the hazelnut gardens and the weeds in the gardens are cleaned by the hens without requiring additional labor costs (Anonymous, 2014; Derebaşı and Alkan, 2018). It is stated by historical sources that commercial egg production and export in Ordu has been taking place since 1900s (Köse and Durmuş, 2014). However, the egg sector in the area could not develop rapidly due to the ruggedness of the region, the high humidity and the lack of knowledge of the producers about the poultry sector (Anonymous, 2014).

The best method for the management of the grazing area in free range laying is the rotational grazing system. In this way, the grasses in the rotated areas grow sufficiently and grass with high nutrient content is obtained. In the rotational grazing system, the basic principle is to divide the grazing area into 4 equal parts and rotating it and moving to the other grazing area when there is no grass in one grazing area. In free range system laying hens; there exists two parts as a walking area and a closed poultry area (floor system or perch type) (Durmuş and Alkan, 2015; İpek and Sözcü, 2015; Sözcü and Yılmaz, 2014). A planning should be made in such a way that at least 4 m^2 of green area per hen in the walking area will be provided. In the henhouse, closed area should be planned so that there will be 5-6 chickens per m^2. By increasing the area allocated per hen in the hen house, the problems to be experienced due to ammonia, temperature and humidity increase in the hen house can be reduced (Durmuş and Alkan, 2015).

In this research, we aimed to determine the general structure of the enterprises that produce eggs in the free range system in Ordu province.

Material and Method

In this study, face-to-face interviews were used as data collection method and questionnaire forms prepared to measure research variables were used as data collection tool. After the questionnaire was explained to the owners of the enterprises to which the questionnaires were to be applied, it was ensured that the participants answered the questions in a healthy way. In this study, 9 of the questions in the questionnaires are about demographic characteristics, 29 of them are about poultry enterprises, 11 of them are about health and nutrition of hens, 11 of them are about sales and marketing of eggs, 10 of them are egg producers' association, 3 of them are about Covid-19 epidemic, and a total of 75 questions were used in the survey.

Sample of the Study

The sample of the study consisted of 54 enterprises that produce eggs in the free range system in Ordu province.

Statistical Analysis

First of all, frequency values (n and %) were calculated by frequency analysis of the answers given by the participants to all the questions in the survey. SPSS (2008) statistical package program was used in the calculations.

Findings and Discussion

Demographic Characteristics of Producers

The numerical (n) and percentage (%) frequency values of the individual characteristics of egg producers in free-range system and socio-economic characteristics of families are given in Table 1. It was determined that 53.7% of the producers were between the ages of 31-50, while 37% were older than 51 years. It has been determined that 55.55% of the producers are farmers, 16.16% are self-employed, 11.11% are civil servants and 16.66% are retired. It was also determined that none of the producers were veterinarians or agricultural engineers. It was determined that 35.18% of the producers participating in the research were primary/secondary school graduates, 46.29% were high school, 16.66% were university graduates and 1.85% were illiterate. It was determined that 62.96 % of the producers had more than 4 households, 35.18% had 4-6 and 1.85% had more than 7 households. When the ownership status of the enterprises is examined, it has been determined that 81.5% of the enterprises belong to the producers themselves, 11.1% to the rent and 7.4% to both the rent and the producers. At the same time, 33.3% of the producers had Social Security Organization for Artisans and the Self-Employed, 39.8% Social security agency and 1.9% Green Card social security, while 25.9% did not have any social security. While 25.9% of the producers attended the course or training related poultry, 74.1% did not. Of those who did not attended a course or training on poultry, 70% stated that they wanted to attended, 17.5% did not want to participated, and 12.5% stated that they did not have any idea about this issue. While establishing their enterprises, 35.18% of the producers used credit from

the bank, 1.85% from the Agriculture and Credit Cooperative, on the other hand, 62.96% did not use any credit. Çimrin et al., (2019) in their study on laying hens in the province of Hatay, found that approximately 40% of the producers were between the ages of 36-50, 35% were over the age of 51, and Cönk (2006) found that 42.6% of the producers were between 36- 50 years old. He reported that among 50 years of age, 50% were 51 years or older. Again, 55.6% of the producers stated that they are engaged in farming as a profession and 63% of them stated that the number of households is less than 4 people. It was determined that 1.9% of the producers included in the research were illiterate, 35.2% were primary school-secondary school graduates, 46.3% were high school graduates and 16.7% were university graduates. In the study conducted by Sarıca et al. (2020) average age of the producers was found to be 53. It was also determined that 50.7% of the enterprise owners were primary school graduates, 33.6% were middle school graduates, 13.6% were high school graduates, and 5.8% were university graduates. Moreover, cattle breeding is practiced in 96.1% of the poultry enterprises, sheep breeding is practiced in 35.9% of the poultry enterprises and, in only 1.1% of the enterprises, there is no other production other than poultry breeding. It was determined that 98.9% of the enterprises were not vaccinated at all and only 1.1% of the enterprises were vaccinated against Newcastle disease. In a study conducted by Aydın and Çelen (2011) in Gaziantep, Diyarbakır, Şanlıurfa, Batman, Adıyaman, Kilis and Mardin provinces, it was found that all poultry enterprise owners in Batman province were primary school graduates, whereas all poultry enterprise owners in Gaziantep province were university graduates. Köse and Durmuş (2014) reported that 31.5% of the producers were primary school graduates, 58% were secondary and high school graduates, and 10.5% were university graduates in their study conducted in poultry enterprises in Ordu province. When these data are compared, it is understood that over the years, university graduates have participated in free system egg poultry with a higher rate compared to previous years in Ordu province. While 74.1% of the producers stated that they did not attend any training or course related to poultry, 70% of them that they wanted to attend. It was determined that 38.9% of the producers included in the research were dependent on the social security institutions in terms of social security. While 81.5% of the producers stated that they owned the enterprises, 63% stated that they did not use any agricultural credit. In the study conducted by Çimrin et al. (2019) in Hatay province, it was determined that 1.9% of the producers used bank loans while establishing their enterprises, while 79.6% used equity.

Table 1. Demographic Characteristics of Producers

No	Demographic Characteristics	Options	Frequency	
			n	%
1	Participant's age	less than 30 years old	5	9.3
		31-40 years	15	27.8
		41-50 years	14	25.9
		over 51 years old	20	37.0
2	Occupation of the participant	Farmer	30	55.5
		Self-employment	9	16.6
		Veterinarian or agricultural engineer	0	0
		Officer/Worker	6	11.1
		Retired	9	16.6
3	Participant's educational status	illiterate	1	1.8
		Primary -Middle School	19	35.1
		High school	25	46.2
		University	9	16.6
4	Number of households of the participant	less than 4	34	62.9
		4 to 6	19	35.1
		more than 7	1	1.8
5	Participant's enterprise property	Own	44	81.5
		Rent	6	11.1
		Own-Rent	4	7.4
		State land	0	0
6	Social security of the participant	None	14	25.9
		Social Security Organization for Artisans and the Self-Employed	18	33.3
		Social security agency	21	38.9
		Green Card social security	1	1.9
			14	25.9

7	Participant's participation in poultry training or course	I joined		
		I did not participate	40	74.1
8	If you haven't joined, would you like to join?	Yes	28	70.0
		No	7	17.5
		I have no idea	5	12.5
9	The participant's use of agricultural credit	Bank	19	35.1
		Agriculture and Credit Cooperative	1	1.8
		Chamber of Agriculture	0	0
		I did not use	34	62.9

3.2. Main Findings for Enterprises

The main findings (n and %) regarding the general characteristics of the enterprises are given in Table 2.

In the study, 68.5% of the producers stated that their enterprise is under hazelnuts, 24.1% in open land and 7.4% in other ways. At the same time, it was determined that 42.6% of the producers preferred to use concrete in the construction of poultry houses, 25.9% of them used sandwich panels and 31.5% of them used other building materials. Keeping the temperature and relative humidity at optimum levels in the henhouses, removing the harmful gases released by the animals and animal welfare are directly related to the ventilation quality of the house (Akkaya ve İşgüzar, 2006). Again, nearly half of the producers stated that they provide ventilation in the poultry houses by using fans, 27.8% using windows and 22.2% using chimneys and windows. Also, 57.4% of the producers included in the research stated that they use individual nesting-box, 38.9% of them use group nesting-box, and 3.7% do not use nest boxes. Nest boxes should be above ground level to avoid floor-laid eggs; a common problem for free-range hens. Loose material in the nest boxing is preferred by hens. Thear (1997) suggested that straw is better than hay in nest boxes. The Australian Code of Practice recommends 7 birds/nest box (SCARM, 1995).

Again, 44.4% of the producers stated that they used nipple type drinkers, 42.6% of them used round type drinkers and 13% of them used trough type drinkers or other types. As substrate material, it was determined that 42.6% of the producers used thick sawdust, 14.8% rice husk, 14.8% fine sawdust and 27.8% other substrate materials. It was determined that while 44.4% of the enterprises applied 16 hours of lighting to the hens, 37% of them were illuminated as much as daylight, 13% of them 12 hours and 5.6% of them 24 hours of lighting. Also, 79.6% of the producers stated that hens can find green grass in the open area throughout the year. At the same time, 51.9% of the producers participating in the survey stated that the number of hens in their enterprise is 250 and below, 35.2% of them are between 250-750 and 13% of them are 750 and above. The ideal free-range egg layer should have adequate body weight at the start of lay and a good hen-housed egg production (Thear, 1997). More importantly these birds should reproduce and survive under very harsh environmental conditions (Huque, 1999). Modern strains can be successfully raised in a free-range condition with a slightly reduced rate of lay during summer (Glatz and Ru, 2002). Local breeds are inseparable from the rural scenario due to their adaptability under harsh environmental conditions. In a study conducted by Demircan et al. (2010) in Afyonkarahisar province, it was determined that 75% of the hybrid genotypes used in poultry enterprises were Lohmann, Nick Chicks, Bovans White, while 25% were Hy line, Brown Nick. Çimrin et al. (2019) found that ATAK'S genotype hens are more preferred because they are more resistant to adverse environmental conditions in Hatay province and are more suitable for free range egg production system.

Lohman Brown genotype hens are used in 63% of the enterprises, Atak-S genotype in 25.9%, Tinted genotype in 9.3% and Nick Brown genotype in 1.9%. In this study, it was determined that Lohman Brown genotype (63%) was used in free-range system in Ordu province. Similarly, in the study conducted by Köse and Durmuş (2014) in Ordu province, Lohman Brown and Hy-Line Brown hens were used in most of the poultry enterprises, and in the study conducted by Çimrin et al., (2019) in the province of Hatay, it was reported that hen breeds such as Atak-S were used in 52.18% of the enterprises and Lohman Brown and Nick Brown were used in 47.82. Again, 57.4% of the producers stated that they bought their hens at the age of 16-18 weeks, 22.2% under the age of 12 weeks, 11.1% over the age of 18 weeks and 9.3% at the age of 12-14 weeks. At the same time, it was determined that 51.9% of the producers used hens 71 weeks and over, 44.4% between 51-70 weeks of age and 3.7% less than 50 weeks in production. Again, 87% of the producers reported that they purchased hens by their own means, 11.1% through the Egg Producers Association and 1.9% through the Chamber of Agriculture. Half of the producers participating in the survey stated that they wanted to rais the chicks they used, and half of them did not want to. While 27.8% of the producers reported 6 or more hens per m^2 in the walking area of their enterprise, 27.8% of them stated that 4 hens, 27.8% of them 3 hens and 16.7% 5 of hens were raised. Australia Free Range Egg Producers Association

(FREPA, 1998) recommends maximum stocking density of 750 birds/hectare. The UK Soil Association requires that the stocking rates should not exceed 250 hens/acre (625/hectare) (Thear, 1997). Again, 37% of the producers reported that there were 6 or more hens per m² indoors, while 29.6% of producers stated that there were 4 hens, 18.5% of them 5 hens, and 14.8% of them 3 hens. At the same time, 72.2% of producers stated that the mortality rate in their enterprises was less than 5%, 13% of them between 6-10%, 9.3% of them more than 15% and 5.6% of them between 11-15%. In the study conducted by Tuğluk and Yalçın (2004) in Nevşehir Kozaklı, it was stated that the average mortality rate in laying hen enterprises was 5.9%. It was determined that 96.3% of the producers regularly make egg yield calculations in their enterprises. It was determined that the egg yield was between 61-80% in 46.2% of the enterprises for which egg yield calculations were made, more than 81% in 26.9% of enterprises and less than 60% in 26.9% of enterprises. Similarly, in the study conducted by Tuğluk and Yalçın (2004) in Nevşehir Kozaklı, it was stated that the average egg yield in laying hen enterprises is between 70-80%. Again, 61.1% of the producers stated that there are no employees in their enterprises, and 35.2% of producers stated that they employed 1 (18.5%) or 2 (16.7%) people. In another study conducted by Çimrin et al. (2019) in Hatay province, it was determined that more than half of the enterprises met their labor needs as permanent labor force from outside the enterprise.

In the study conducted by Köse and Durmuş (2014) in poultry enterprises in Ordu province, it was determined that 82.4% of the enterprises employed 1 person and 17.6% of them employed 2. Since the egg poultry enterprises in Ordu are not very large, either one worker or none is generally needed. This situation is considered to be due to the fact that the producers try to keep their enterprises sustainable by reducing their labor costs against increasing costs. Also, 59.3% of the producers reported that they have a feed storage in their enterprises. Again, 63% of the producers stated that they made poultry as an additional source of livelihood, while 16.7% of producers reported that they adopted egg poultry as their main source of livelihood. Also, 57.4% of the producers reported that they have been hen breeding for more than 4 years, 18.5% of producers for 1 year, 18.5% of producers for 3 years and 5.6% of producers for 2 years. At the same time, it has been determined that 75.9% of the producers are positive about continuing poultry, 44.4% are considering expanding their enterprises, whereas 16.7% are considering to leave egg poultry. Contrary to the results of this study, Cönk (2006) reported that in the study conducted in Afyonkarahisar, approximately 67% of poultry breeders would not continue production.

Again, while 64.8% of the breeders reported that they did not breed any other animal species other than hens, it was determined that 63.2% of those who raised other animals in addition to poultry breeding were engaged in cattle breeding, 10.5% in sheep-goat breeding and 10.5% in beekeeping. Also, 72.2% of the breeders stated that their enterprises were adequately controlled. Also, it was determined that 55% of the breeders asked for feed support, 18.5% cash aid, 14.8% pullet support and 11.1% training-course support from public institutions and organizations.

Table 2. Main Findings for Free Range Egg production System Enterprises

No	Questions	Options	Frequency	
			n	%
1	What is your reason for doing egg production?	For basic livelihood	9	16.6
		For additional livelihood	34	62.9
		Because it's profitable	5	9.2
		Cause I have nothing else to do	6	11.1
2	How many years have you been egg production?	1 years	10	18.5
		2 years	3	5.6
		3 years	10	18.5
		4 years and more	31	57.4
3	Do you raise other animals other than hens?	Yes	19	35.2
		No	35	64.8
4	If your answer is yes, which animal are you raising?	Cattle	12	63.2
		Sheep-Goat	2	10.5
		Bee	2	10.5
		Other	3	15.8
		Yes	24	44.4
		No	21	38.9

5	Are you considering expanding your enterprise?	I'm thinking of quitting	9	16.7
		I have no idea	0	0
6	What is the land structure where your enterprise is located?	Under hazelnut	37	68.5
		Open land	13	24.1
		Other	4	7.4
7	What material did you use in the construction of the hen house?	Concrete	23	42.6
		Sandwich panel	14	25.9
		Other	17	31.5
8	What type of nesting-box do you use in the hen house?	Individual	31	57.4
		Group	21	38.9
		I don't use	2	3.7
9	How do you provide ventilation in your hen house?	Fan	27	50.0
		Window	15	27.8
		Chimney	0	0
		Chimney + Window	12	22.2
10	How do you give water to hens in your hen house?	Trough type drinker	1	1.9
		Nipple drinker	24	44.4
		Hanging type round drinker	23	42.6
		Other	6	11.1
11	How much lighting time do you apply to hens during the laying period?	as daylight	20	37.0
		12 hours	7	13.0
		16 hours	24	44.4
		24 hours	3	5.6
12	Can hens find green grass in the grazing area all year?	Yes	43	79.6
		No	11	20.4
13	How many people work in your enterprise?	None	33	61.1
		1	10	18.5
		2	9	16.7
		3 and above	2	3.7
14	How many hens do you have in your hen house?	Less than 250	28	51.9
		Between 250-500	9	16.7
		Between 500-750	10	18.5
		More than 750	7	13.0
15	What do you use as litter material in your hen house?	Thick sawdust	23	42.6
		Fine sawdust	8	14.8
		Rice glume	8	14.8
		Other	15	27.8
16	Which hen breeds do you have in your hen house?	Tinted	5	9.2
		Lohman Brown	34	62.9
		Nick Brown	1	1.8
		Atak-S	14	25.9
		Hy-Line Brown	0	0
17	How many weeks old do you buy hens to start production?	less than 12 weeks	12	22.2
		Between 12-14 weeks	5	9.3
		Between 16-18 weeks	31	57.4
		Over 18 weeks	6	11.1
18	Would you consider raising the chicks you use in production yourself?	Yes	27	50.0
		No	27	50.0
19	Do you calculate the egg yield at regular intervals in your hen house?	Yes	52	96.3
		No	2	3.7
20	What is your average egg yield in your enterprise?	Less than 60%	14	26.9
		Between 61-70%	11	21.2
		Between 71-80%	13	25.0
		More than 81%	14	26.9
		Less than 5%	39	72.2

21	What is the % mortality from various causes in your hen house?	Between 6-10%	7	12.9
		Between 11-15%	3	5.5
		More than 15%	5	9.2
22	How many weeks old do you use hens in production?	Less than 50 weeks	2	3.7
		Between 51-60 weeks	12	22.2
		Between 61-70 weeks	12	22.2
		More than 71 weeks	28	51.8
23	How do you supply your hens?	At my own facility	47	87.0
		Egg Producers Association	6	11.1
		Chamber of Agriculture	1	1.9
24	Do you think to continue egg production?	Yes	41	75.9
		No	13	24.1
25	How many hens per square meters (m²) in the grazing area in your enterprise?	3	15	27.7
		4	15	27.7
		5	9	16.6
		6 and more	15	27.7
26	How many hens per square meters (m²) indoor area in your enterprise?	3	8	14.8
		4	16	29.6
		5	10	18.5
		6 and more	20	37.0
27	Is there an egg and feed storage unit in your enterprise?	Yes	32	59.3
		No	22	40.7
28	Is your enterprise adequately controlled?	Yes	39	72.2
		No	15	27.8
29	What are your expectations from public institutions and organizations?	Feed support	30	55.6
		Training/course support	6	11.1
		Pullet support	8	14.8
		Cash support	10	18.5

Main Findings on Health and Nutritional Status of Hens

The findings (n and %) regarding the health and nutritional status of hens used in free range system laying hens are given in Table 3.

In the current study, 51.9% of the producers stated that they received help from self-employed veterinarians and 88.9% stated that they applied routine disinfection to prevent possible diseases that may occur in the hen houses. In addition, it was determined that 57.4% of the producers had the quality control of the water given to the hens at regular intervals. Also, 83.3% of the producers stated that they buy the feed from any feed factory, 9.3% from the Egg Producers Association and 7.4% stated that they make their own feed. It has been determined that 50% of the producers who produce their feed needs by their own means prefer this way because it is cheaper than the feed they buy. At the same time, 44% of the producers, who meet their feed needs by purchasing, stated that they prefer to buy feed from a factory or Egg Producers' Association because they do not have sufficient technical knowledge. It has also been determined that 88.9% of the producers have sufficient information about the content of the feed they use. Again, 87% of the producers stated that they fed the hens continuously and 70.4% of the breeders stated that they did not feed their hens other than the recommended feed. Moreover, it was determined that the feed consumption was calculated in all hen enterprises and the feed consumption per hen in 42.59% of the enterprises varied between 100-230 grams. In the study conducted by Çimrin et al. (2019) in Hatay province, it was determined that 86.95% of the enterprises purchased feed.

Table 3. Findings on Health and Nutritional Status of Hens

No	Questions	Options	Frequency	
			n	%
1	Is disinfection applied in your hen houses?	Yes	48	88.9
		No	6	11.1

2	How do you fight diseases in your hen house?	From the Provincial/District Directorate of Agriculture and Forestry	12	22.2
		From self-employed veterinarians	28	51.9
		By my own facility	14	25.9
3	Do you continually feed the hens?	Yes	47	87.0
		No	7	13.0
4	Where do you buy the feed?	I'm doing it myself	4	7.4
		From any feed factory	45	83.3
		From the Egg Producers Association	5	9.3
5	Do you give your hens any other feed other than the recommended feed?	Yes	16	29.6
		No	38	70.4
6	Do you calculate the feed consumption of hens?	Yes	54	100.0
		No	0	0
7	Do you have any information about the content of the feed you use?	Yes	48	88.9
		No	6	11.1
8	How many grams is your average daily feed consumption per hens?	less than 100 g	3	5.5
		Between 100-120 g	23	42.5
		Between 21-130 g	21	38.8
		Between 131-141 g	5	9.2
		More than 140 g	2	3.7
9	If you meet your feed needs by producing it with your own facility, what is the most important reason for this?	Because I produce cheaper than I buy from factory	2	50.0
		To earn additional income by selling feed to other producers	1	25.0
		Because I produce better quality feed than feed factories	0	0
		To produce healthier feed	1	25.0
10	If you supply your feed needs from the factory, what is the most important reason for this?	Because it's cheaper	7	14.0
		Because I don't have enough area to store raw materials	6	12.0
		Because I don't have enough technical knowledge	22	44.0
		Because I think it's healthier	15	30.0
11	Is the quality control of the water you give to the hens carried out at regular intervals?	Yes	31	57.4
		No	23	42.6

Main Findings on the Sales and Marketing of Eggs

The findings (n and %) regarding the sale and marketing of the eggs by the producers are given in Table 4.

In our research, 92.6% of the producers stated that the eggs obtained from hens raised in the free range system were better than other eggs production systems. Again, while 70.4% of the producers stated that the eggs produced in this system were healthier, 16.7% the producers stated that they were more nutritious. Consumers have the perception that free-range eggs are healthy and wholesome foods, low in calories and saturated fats, high in protein and vitamins. Many consumers are prepared to pay an increased price for such a product because of the higher cost of production associated with the greater land area required, increased labor output per bird, higher feed consumption and poor economies of scale in grading, packaging and distribution as compared to the cage industry (Miao et al. 2005).

When marketing eggs, 46.3% of the producers stated that they preferred open viols, 20.4% closed cardboard viols, 18.5% gelatin-coated viols and 14.8% plastic viols. While 88.9% of the producers market their eggs themselves, 7.4% stated that they give the eggs wholesale to the Egg Producers Association. According to this result, producers market a very important part of the eggs they obtain with their own facility, and they do not prefer institutions such as the

Egg Producers' Association and Cooperative. It is thought that this situation is due to the decrease in the trust of the producers in these institutions due to the negativities that occur from time to time in the mentioned institutions. In the study conducted by Çimrin et al. (2019) in Hatay province, it was determined that 94.4% of the enterprises marketed the eggs themselves. In the study conducted by Köse and Durmuş (2014) in Ordu, it was determined that only 23% of the producers marketed eggs by their own facility, whereas 77% of them marketed them through Cooperative. At the same time, 75.9% of the producers stated that they are waiting egg prices to increase when there are decreases in egg prices in the short terms and they continue to sell eggs, 18.5% of the producers stated that they sold the hens at low prices and stopped egg production, and 5.6% stated that they reduced the feed they gave to the hens.

In the study, 40.7% of the producers stated that in order to increase egg sales, television and radio programs that encourage egg consumption should be made and 27.8% stated that information studies should be carried out in which the benefits of eggs for health. Again, 3.7% of the producers stated that they thought that promotional studies should be carried out on the process ability of eggs with different products, 13% of them thought that the benefits of eggs should be better explained in schools and 14.8% of them thought that negative and false news about eggs should be prevented. At the same time, 42.6% of the producers stated that they sold their hens to a slaughterhouse at the end of the production period, 46.3% of them sold their hens to a wholesale any company and 11.1% of them sold through the Egg Producers' Association. Also, 72.2% of the producers stated that they used the manure they obtained from their hens on their own land. In the study, 38.9% of the producers stated that free range egg production system would be better in the future, while 38.9% stated that it would be worse. In a study conducted by Benli and Durmuş (2015) in Ordu province, it was reported that advertising and promotional activities should be given importance in order to better explain the nutritional value of eggs.

Table 4. Findings Regarding the Sales and Marketing of Eggs

No	Questions	Options	Frequency	
			n	%
1	Do you think eggs from hens raised in the free-range system are better?	Yes	50	92.6
		No	0	0
		I have no idea	4	7.4
2	In your opinion, why should the consumer prefer eggs obtained from hens raised in the free-range system?	Because it is more nutritious	9	16.6
		Because it's healthier	38	70.3
		Because of the importance of animal welfare	4	7.4
		I have no idea	3	5.5
3	In your opinion, what will be the future status of free-range egg production system?	It will be better	21	38.9
		it will be worse	21	38.9
		No change	10	18.5
		I have no idea	2	3.7
4	How do you pack the eggs?	on open viol	25	46.3
		Viol covered with gelatin	10	18.5
		In closed cardboard viol	11	20.4
		On the sparkling viol	0	0
		On plastic viol	8	14.8
5	How do you market your eggs?	I'm selling myself	48	88.9
		I give to the Wholesale Egg Producers Association	4	7.4
		I market myself + I give to the Egg Producers Association	2	3.7
6	What do you do with your hens at the end of the production period?	I sell to any slaughterhouse	23	42.6
		I'm selling to a wholesale any company	25	46.3
		I sell through the Egg Producers Association	6	11.1
7	How do you evaluate the manure of your hens?	I do not evaluate	7	13.0
		I'm selling	8	14.8
		I use it on my own land	39	72.2
8		I reduce the feed I give to hens	3	5.6

	What measures do you take in the periods when egg prices fall sharply in the short term, and you must sell at a loss?	I wait egg prices to rise and continue to sell eggs without cutting the feed.	41	75.9
		Hoping that egg sales will increase in the short term; I keep eggs in cold storage	0	0
		I sell hens at a loss and stop production	10	18.5
9	In your opinion, what should be done to increase egg sales?	Television and radio advertisements should be made to encourage egg consumption	22	40.7
		Information studies should be conducted to explain the benefits of eggs for health	15	27.8
		Introductory studies should be carried out on the processability of eggs with different products	2	3.7
		The benefits of eggs should be better explained in schools, and students should be encouraged to consume eggs	7	13.0
		Negative and false news about eggs should be prevented	8	14.8

Main Findings on the Egg Producers Association

The findings (n and %) regarding the Egg Producers' Association of Producers are given in Table 5. As can be seen from the table, 81.5% of the producers stated that the Egg Producers Association did not meet their expectations, and 72.2% of the producers were not members of the "Egg Producers Association". At the same time, 43.6% of the producers stated that they are not members of the Egg Producers Association because they can better market the eggs they produce with their own facility. Also, 80% of the producers who are members of the Egg Producers Association stated that they received their payments in the form of money, feed and viol, 13.3% in the form of money only, and 6.7% in the form of feed or viol. Again, 80% of the producers who are members of the Egg Producers Association stated that they received their payments on time and of those who could not get it on time, 66.7% stated that they received payments with a delay of 5 months, and 33.3% of them 3 months late. Tuğluk and Yalçın (2004), in their research on egg poultry enterprises, stated that the participants do not have long-term receivables related to egg sales and they expect payments in a short-term period of 15-20 days. While 66.7% of the producers stated that a sufficient number of meetings were held at the Egg Producers' Association, 60% of producers stated that a meeting should be held at least once a month. Again, 73.3% of the producers who are members of the Egg Producers Association stated that they are not being informed about the meeting date and the decisions taken in the Egg Producers Association.

Table 5. Main Findings Regarding the Egg Producers Association

No	Questions	Options	Frequency	
			n	%
1	Are you a member of the Egg Producers Association?	Yes	15	27.8
		No	39	72.2
2	If you are not a member of the Egg Producers Association, what are the reasons?	The egg purchase price determined by the Egg Producers Association does not cover the costs	13	33.3
		The payment term determined by the Egg Producers Association is too long	1	2.6
		The Egg Producers Association is monopolized by certain producers, and I am not satisfied with this situation	4	10.3

		I think the Egg Producers Association is not well managed	2	5.1
		Not all egg producers produce the same quality eggs	2	5.1
		I can market better with my own facility	17	43.6
3	Does the Egg Producers Association meet your expectations?	Yes	10	18.5
		No	44	81.5
4	How do you receive your payments from the Egg Producers Association?	Money	2	13.3
		Food/Viol	1	6.7
		Money / Food /Viol	12	80.0
5	Do you receive your payments on time after the egg sale?	Yes	12	80.0
		No	3	20.0
6	How many months are you delaying your payments?	1 month	0	0
		3 months	1	33.3
		5 months	2	66.7
		12 months and above	0	0
7	Do you think there are enough meetings held at the Egg Producers Association?	Yes	10	66.7
		No	5	33.3
8	If your answer is no, how many times a month should the meeting be held?	1	3	60.0
		2	2	40.0
		3	0	0
9	Are you aware of the meeting dates held or to be held and the decisions taken?	Yes	11	73.3
		No	4	26.7

Main Findings on the Covid-19 Pandemic

The findings (n and %) regarding the impact of the producers from the Covid-19 pandemic are given in Table 6. 70.4% of the producers stated that the Covid-19 pandemic affected egg sales prices, and 50% of the producers affected by the epidemic stated that they were negatively affected. At the same time, 81.6% of the producers stated that they expected the effect of the epidemic to last longer than 12 months.

Table 6. Main Findings on the Impact of the Covid-19 Epidemic

No	Questions	Options	Frequency	
			n	%
1	Has the Covid-19 epidemic affected your egg sales prices?	Yes	38	70.4
		No	16	29.6
2	If your answer is yes, how was it affected?	Positive	18	47.4
		Negative	19	50.0
		I have no idea	1	2.6
3	How long do you think the impact of the COVID-19 epidemic on your enterprise will last?	3 months	3	7.8
		6 months	2	5.2
		9 months	2	5.2
		12 months and above	31	81.5

Conclusion and Recommendations

In order for people to lead a healthy life, they need to consume an adequate amount of animal-derived nutrients. One of the foods of animal origin that should be consumed is eggs. The success of laying hen enterprises varies depending on the rearing system, the breed, care-feeding, yield level, marketing status, health and climatic conditions. One of the egg production systems is free range egg production system. Free range laying hen system is a system

where animal rights and welfare are observed more, animals are raised in conditions suitable for their nature as much as possible, the movements of hens are not restricted, their skeletal systems are better developed and the use of cages and hen houses are minimized. At the same time, free range laying hen system is a breeding system in which the wishes and sensitivities of consumers seeking different tastes are taken into account, hens can move freely in certain areas during the day and benefit from green grass in these areas. According to this study, 55.6% of the producers that produce eggs in the free range laying hen system stated that feed support is very important for the production to be sustainable because approximately 70% of the costs of laying hen enterprises are feed costs. For this reason, producers should be supported as much as possible in the production of feed raw materials leading to reduction in the costs of the enterprises. In addition, with the contracted production model, the production of products such as soy and corn can be increased. In the study, 72.2% of the producers stated that they were not members of the "Egg Producers' Association" and 81.5% of producers stated that they did not meet the expectations of the Egg Producers' Association. Selling the eggs produced by the enterprises from a single source ensures continuity and uniformity in marketing. This is possible if the producers are able to work in harmony with the union or cooperative where they are located. In order to achieve this, the necessary trust must be established between these institutions and the producers. These institutions should pay their members for the eggs on time without delay. Most of the producers stated that they want to attend the training/course on hen breeding. For this reason, the necessary training should be given to the producers by the relevant institutions. In order for the producers to be less affected by the supply-demand imbalance that occurs from time to time, warehouses with should be established to store the eggs produced. Since eggs are processable, egg processing technologies should be implemented and expanded in order to make the produced eggs more suitable for export. Thus, by converting eggs into liquid yolk, liquid white, frozen and dry egg powder forms, the transportation of eggs is facilitated and more income can be obtained from the unit product. Innovative technological steps should be taken in Ordu, these studies should be supported and investors should be encouraged. Chicks, feed, medicine, technical information and marketing support should be given to enterprises through unions and cooperatives. Again, consumers should be sufficiently conscious about free range egg production system, which is one of the alternative egg production systems.

Author Contributions:

First Author: Collection and analysis of data

Second Author: Supervision of data collection and analysis, Writing - review and editing of the manuscript

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The authors declare that they have no known competing financial or non-financial, professional, or personal conflicts that could have appeared to influence the work reported in this paper.

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