# The Livestock Sector in TRNC: An Examination of Red Meat Sector

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# ABSTRACT

In today's changing and developing world, one of the most important problems that people face is a balanced diet. To continue their lives in a healthy way, people should consume animal source foods in sufficient quantities. Although the share of the agriculture sector in the TRNC economy has decreased from the past to the present, it always has a place that cannot be neglected in the economy due to its importance in the diet of individuals because meeting the basic needs of individuals in their daily life sufficiently is one of the main duties of the agriculture sector.

In addition to its importance in human nutrition, red meat also contributes greatly to the economies of countries due to the employment of many people and its contribution to national development. In the TRNC, the red meat sector is important for the economy as it creates both consumption and a large employment area. In addition to all these advantages, the fact that red meat and its products have a significant share in local flavors makes the red meat sector important for the TRNC economy.

Since the TRNC does not have a liberal economy, there is no large scale import in this sector. However, recently, the thinking of red meat imports and the decision to import led to further discussion of the problems experienced in red meat production and the factors affecting production. The decision to import red meat supports the depth of existing problems in this field today.

This study reveals the necessity of policies that will bring structural solutions in order to overcome the problems encountered as a result of the analyzes covering the TRNC red meat sector. In other words, the aim of the study is to reveal the current situation and problems of the red meat sector and to provide suggestions for

solutions. In this way, it is aimed to minimize the problems in the sector and eliminate the negative effects on both the sector and economic development. In the case of TRNC, there has been no previous study on this subject in such detail, so it constitutes a precedent.

**Keywords**: Animal Source Food, Red Meat, TRNC, Livestock Sector, Problems, Solutions

# ÖZ

Günümüzde değişen ve gelişen dünyada, insanların karşılaştıkları en önemli sorunlarından biri de dengeli beslenmedir. Bireylerin yaşamlarını sağlıklı bir şekilde devam ettirebilmeleri için hayvansal kaynaklı gıdaları yeterli miktarlarda tüketmeleri gerekmektedir. Bireylerin gündelik hayattaki temel ihtiyaçlarının yeterli ve nitelikli olarak karşılanmasının tarım sektörünün temel görevlerinden birisi olması nedeniyle, her ne kadar geçmişten günümüze değin tarım sektörünün KKTC ekonomisi içerisindeki payı azalmış olsa dahi, bireylerin beslenmesindeki önemi gereği her zaman ekonomi içinde ihmal edilemeyecek bir yeri bulunmaktadır.

Kırmızı et, insan beslenmesindeki öneminin yanı sıra, birçok kişiye istihdam sağlaması ve ulusal kalkınmaya olan katkısı nedeniyle ülkelerin ekonomilerine de büyük katkı da bulunmaktadır. KKTC'de hem tüketim, hem de geniş bir istihdam alanı yaratması nedeniyle kırmızı et sektörü KKTC ekonomisi için hayati bir öneme sahiptir. Bir diğer ifadeyle, kırmızı et sektörü gerek beslenmedeki yeri gerekse üretimdeki mevcut potansiyeli nedeniyle KKTC için kritik öneme sahiptir. Tüm bu avantajlara ek olarak, yerel lezzetlerinde kırmızı et ve ürünlerinin önemli bir paya sahip olması kırmızı et sektörünü KKTC ekonomisi için önemli kılmaktadır.

KKTC liberal bir ekonomiye sahip olmadığı için bu sektörde geniş çaplı ithalat yapılmamaktadır. Fakat, son dönemlerde kırmızı et ithalatının gündeme gelmesi ve ithalat kararının alınması, kırmızı et üretiminde yaşanan sorunları ve üretimi etkileyen faktörlerin kamuoyunda daha fazla tartışılmasına yol açmıştır. Kırmızı et ithalatı kararının alınması günümüzde bu alanda varolan sorunların derinliğini destekler niteliktedir.

Bu çalışma KKTC kırmızı et sektörünü kapsayan analizler sonucunda karşılaşılan sorunların giderilebilmesi için yapısal çözümler getirecek politikaların gerekliliğini ortaya koymaktadır. Bir diğer ifadeyle, çalışmanın amacı kırmızı et sektörünün mevcut durumunun ve sorunlarının ortaya konulmasını ve çözüm önerilerinin getirilmesini sağlamaktır. Böylelikle, sektördeki sorunları en aza indirerek hem sektördeki hem de ekonomik gelişme üzerindeki olumsuz etkilerin giderilmesi amaçlanmaktadır. KKTC özelinde, daha önce bu konu hakkında bu kadar detaylı bir şekilde yapılmış herhangi bir çalışma bulunmamaktadır. Bu nedenle emsal teşkil etmektedir.

**Anahtar Kelimeler:** Hayvansal Kaynaklı Gıdalar, Kırmızı Et, KKTC, Hayvancılık Sektörü, Sorunlar, Çözüm Önerileri

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| | |
|---|---|
| DLWG | Daily Live Weight Gain |
| EOKA | Ethniki Organosis Kyprion Agoniston |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FE | Feed Efficiency |
| GDP | Gross Domestic Product |
| GNP | Gross National Product |
| TCCI | Turkish Cypriot Chamber of Industry |
| TL | Turkish Lira |
| TRNC | Turkish Republic of Northern Cyprus |
| UK | United Kingdom |
| UN | United Nations |
| USA | United States of America |
| WHO | World Health Organization |

# Chapter 1

# INTRODUCTION

Cyprus, after Sicily and Sardinia is the Mediterranean's third largest island. Due to the disagreements between Turkish and Greek Cypriots throughout the history, the island of Cyprus was divided into two as South and North. The Turkish Cypriots in the south moved to the north, and the Greek Cypriots in the north moved to the south with the agreement of the United Nations (UN) agreed on intercultural negotiations in Vienna (TRNC Ministry of Foreign Affairs, 2011). North Cyprus, which has limited natural resources and workforce, is a small developing Mediterranean island. It strives to maintain its economic development under the political isolation and embargoes due to the conflicts between the two communities (Celebi, 2011).

The economy of the North Cyprus is dominated by the service sectors such as tourism, higher education, public services, business, personal and other services. These services make up almost 70 percent of the Gross Domestic Product (GDP). On the other hand, the shares of industry and agriculture sectors are 9,2 and 5,7 percent respectively (Table 1.1). Similar to the TRNC, service sectors dominated the country's economy in Malta and Southern Cyprus. In both countries, service sectors account for 75% of GDP (Table 1.1.). However, the agricultural sector of both countries has less than 2 percent of the GDP. Thus, TRNC agricultural sector has a more important place in the economy compared to Malta and South Cyprus.

Malta's agricultural sector is small and accounts for only 0.86 percent of GDP (Table 1.1.). Most farms are small scale and privately owned. The production method

is usually based on small-scale machines or manual tools, because the small operating size does not allow the use of large machines. The industry is characterized by low productivity per capita, with businesses typically run by family members. The production of animals and animal products mainly includes pork meat and cattle milk. The most important vegetables are potatoes, tomatoes and onions, while the most important fruits are citrus fruits, stone fruits and grapes. The most important agricultural exports are potatoes and fish. The sector is largely protected from foreign competition and protection is particularly high in terms of pork, beef, dairy products, processed vegetables, fruits and products used as inputs for the agro-industry (Briguglio & Cordina, 2003).

The agricultural sector has an important place in the economy of Southern Cyprus as it provides employment to a large part of the people in rural areas, is a strategic food supplier, earns a large amount of foreign currency through exports, provides raw materials for production and helps to protect the rural environment. However, over time, the share of agriculture in the economy has decreased due to chronic structural bottlenecks in the sector such as water scarcity, excessive land fragmentation, prevalence of small businesses, and competition for land and labor from other sectors of the economy. The agricultural sector constitutes only 1.88 % of GDP (Table 1.1.). The island's dry climate and frequent droughts, which at times lead to severe water shortages, pose significant constraints to agriculture. Unlike the crop production, the livestock sector has made significant progress due to the support given by the authorities. Cyprus is self-sufficient in pork, chicken and eggs. Despite the visible improvement of sheep and goat breeding, the rate of self-sufficiency is 90%. Among all sub-sectors, cattle breeding is dependent on imports. Despite self-sufficiency in fresh milk, substantial imports of dairy products continue, while

Cyprus' famous cheese (helloumi) is exported in large quantities in many markets around the world. (Markou, 2006).

Table 1.1. Average Distribution of GDP by Sectors Between 2014 and 2018 (% of GDP)

| **Main Sectors** | **TRNC** | **South Cyprus** | **Malta** |
|---|---|---|---|
| Services | 68,62 | 74,63 | 75,34 |
| Industry | 9,2 | 10,85 | 12,41 |
| Agriculture | 5,7 | 1,88 | 0,86 |

Source: TRNC State Planning Organization & Statista.com

Compared to other sectors, although the agricultural sector contributes less to GDP, it has been a very important sector for the TRNC since the past, as it provides employment and income to a significant part of the workforce. In addition to providing employment and income to a significant part of the population, it also contributes to increasing the country's income due to the fact that export revenue is obtained from agricultural products. Furthermore, it supports the development of other sectors. For example, the contribution of the higher education and tourism sectors, which are often considered as locomotive sectors by many economists in recent years in the Turkish Republic of Northern Cyprus (TRNC), are directly related to the agriculture sector. In order to maximize the contribution of income from service sectors such as tourism and higher education to the economy, the agriculture sector should be able to produce at the price, quantity and quality demanded by the market. Otherwise, it will be inevitable to transfer a significant portion of the income from the service sectors to foreign countries (Besim & Sertoglu, 2015). Thus, it is seen as one of the main economic sectors.

The agriculture sector in the TRNC is divided into three sub-sectors. The average share of sub-sectors from 2014 to 2018 was 2.9% for livestock production, 2.5% for crop production and 0.3% for fishery. In line with these data, it is understood that livestock production is at the forefront in the agriculture sector (Table 1.2).

Table 1.2. Average Share of Sub-Sectors of the TRNC Agriculture Sector in GDP (% of GDP)

| **Main Sectors** | **2014-2018** |
|---|---|
| **Agriculture sub-sectors** | |
| Livestock Production | 2,9 |
| Crop Production | 2,5 |
| Fishing | 0,3 |

Source: TRNC State Planning Organization

In the developing and changing world, adequate and balanced nutrition is one of the most important and constant problems of human beings. In this respect, animal source foods are indispensable due to their biological features and cannot be substituted with other foodstuffs. According to the World Health Organization (WHO), a healthy person should consume 1 gram of protein per kilogram of body weight per day, and 42% of it must be of animal source. In addition to being the main and most important animal protein source in human nutrition, many socio-economic reasons such as the fact that its geographical characteristics are suitable for bovine and ovine breeding, its cultural structure, and the importance of red meat and its products in its local flavors make the red meat sector important for the TRNC (Saygın & Demirbas, 2018).

The livestock sector, which is one of the sub-sectors of the agriculture sector, continues its importance from the past to the present. It will undoubtedly continue its

importance in the future because animal products are the most important sources of adequate and balanced nutrition, which is the main problem of society in the developing and changing world (Susurluk Commodity Exchange, 2017). In recent years, parallel to the developments in the health sector, the population has been increasing with the prolongation of life expectancy and decreasing infant mortality (Figure 1.1). It is widely believed that the global demand for red meat, which is the most important source of animal protein (product), will increase in parallel with the population growth (Salter, 2017).

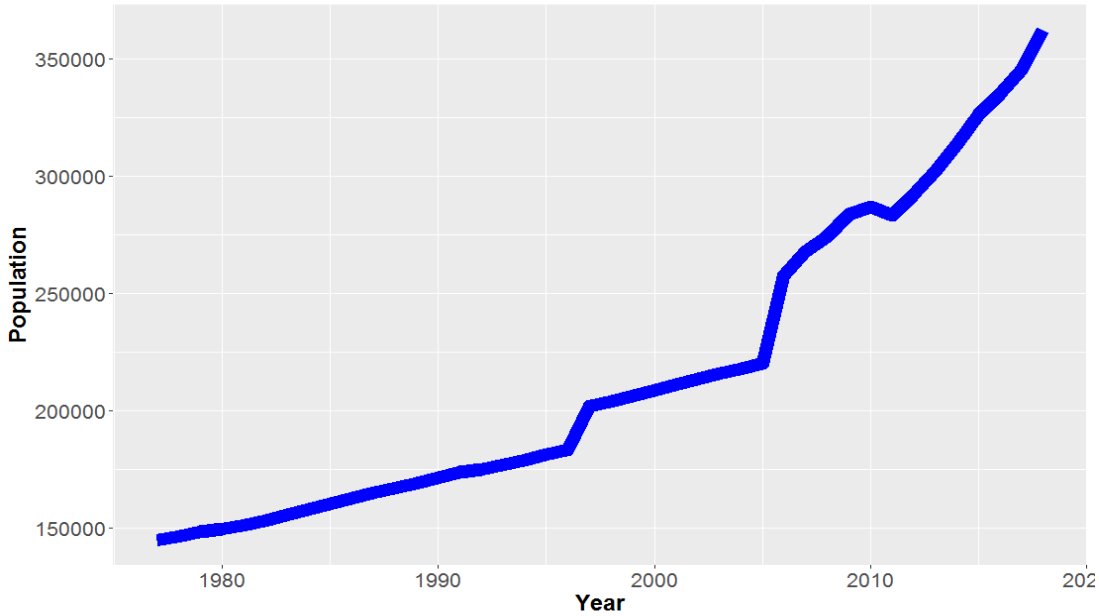


Figure 1.1. TRNC Population from 1977 to 2018
Source: TRNC State Planning Organization

Historically livestock sector is one of the most important production areas for the TRNC. It has an important potential for the TRNC economy in reducing malnutrition and providing economic advantages to a certain population (Salter, 2017). Animal husbandry is also important in terms of providing raw materials to industry, increasing national income, creating employment opportunities, ensuring balanced development between regions, utilizing the feed produced in the enterprise and a

regular cash flow throughout the year (Demirkol, 2007). Moreover, it is one of the vital points of the economy today, as well as meeting the nutritional needs of people to survive. Shortly, it provides people with a healthy and balanced diet, as well as increasing national income and employment, providing raw materials to meat, milk, textile, leather, cosmetics and pharmaceutical industries, developing the industry related to animal husbandry, creating employment in rural areas, supporting the family economy and increasing foreign currency income through exports (Susurluk Commodity Exchange, 2017). Thanks to all these functions', the livestock sector is very important for the TRNC. However, there are problems that need to be resolved in the back and forward links of the sector.

The aim of this study is to reveal the current situation and problems of the red meat sector in TRNC and to propose solutions. Also, in this study, it is aimed to determine the possible reflections of the import decision in the sector and present policy suggestions for forward-looking solutions. In line with this purpose, the structure of the livestock sector both in TRNC and in the world has been discussed. Large (cattle) and small ruminants (sheep and goat) which meet the important part of red meat consumption in the TRNC were handled in the study. As red meat products, pork, horse, rabbit and game meats, which are not commercially produced and consumed in the TRNC or not registered, are excluded from the evaluation.

There is no study analyzing the situation in the red meat sector in the TRNC. Studies in the TRNC generally address the main problems in the agriculture sector and suggestions for the solution of these problems. However, in this study, by analyzing the situation of the red meat sector, besides bringing solutions to the problems in the sector, the effect of taking the import decision on the future of the sector was also examined shortly. Furthermore, in order to enrich the work, it was

planned to have a focus group meeting with people in the sector. However, since such a study poses a risk due to pandemic conditions, the findings of the study were discussed by interviewing 9 people face to face and 5 people on zoom meeting. For this reason, this study goes beyond the problems in the agriculture sector and the solutions offered to these problems. It contributes to the literature by taking the opinions of the producers in the sector and focusing on the red meat sector, which is a more specific issue. Since there are many difficulties in collecting and presenting data in the TRNC, it is not possible to conduct a quantitative study on this subject. Therefore, a descriptive analysis was conducted in the study.

The organization of thesis is as follows. The first chapter contains the introduction. In the second part, the history and economy of the Cyprus Island examines. In the third chapter, fattening performance that determining the profitability in the red meat industry and factors affecting it discusses. In the fourth chapter, an evaluation of the red meat sector worldwide is presented. In the fifth chapter, the current situation of the red meat sector in the TRNC is examined and a market analysis has been made. Problems experienced in the red meat sector in TRNC, solution plans for these problems and discussions of the findings with the producers in the sector are presented in the sixth chapter. The last section summarizes results disclosures and policy recommendations.

# Chapter 2

# TURKISH REPUBLIC OF NORTHERN CYPRUS

## 2.1 A Brief History of the Turkish Republic of Northern Cyprus

Cyprus is the third largest island in the Mediterranean, after Sicily and Sardinia, and has a strategic location at the intersection of the West and the East. Thanks to its geopolitical position, the island of Cyprus has attracted the attention of many civilizations that wanted to dominate the Mediterranean and Mediterranean trade throughout history. Therefore, the Island of Cyprus was ruled by Arabs, Assyrians, Romans, Egyptians, Lusignans, Persians, Venetians, Ottoman Empire and the United Kingdom. Every civilization that dominates the island of Cyprus has contributed to the formation of the rich culture of the island today by leaving a trace of their own culture on the island during their reigns (TRNC Ministry of Foreign Affairs, 2011; Yuksel, 2009).

In 1570, when the island of Cyprus came under the patronage of the Ottoman Empire, two different national communities started to live on the island. These two communities are Muslim Turks and Orthodox Greeks. Members of these two communities lived in peace and serenity until 1821 within the framework of the Ottoman Empire's "Millet System" practice. However, with the Greek rebellion that started in 1821, the two communities confronted for the first time and began to feel distrust towards each other. Following this situation, some leaders of the Greek State separated from the Ottoman Empire in 1829 and turned their longing for Romanization into a national ideology and aimed to re-establish the Byzantine

Empire. In order to achieve this goal, they defended the idea of Enosis, that is, the idea that Cyprus should be attached to Greece (TRNC Ministry of Foreign Affairs, 2011; Yuksel, 2009).

Britain, which wanted to conquer Cyprus due to its dominant position in the Mediterranean, took over the administration of the island in 1878 in return for the aid it gave to the Ottoman Empire, which was at war with Russia. However, with the participation of the Ottoman Empire in World War I, Cyprus was annexed by the United Kingdom (UK) and UK took over the ownership of the island. The conflicts that started between the two communities in 1821 continued increasingly during the UK administration. Greek Cypriots who wanted to implement the Enosis plan, with the support of Greece, revolted against the presence of the UK on the island in 1931. Then, on April 1, 1955, they started an armed struggle with the help of Greece to implement the Enosis plan. In other words, the Greek Cypriot terrorist organization Ethniki Organosis Kyprion Agoniston (EOKA) has committed violence against Turkish Cypriots in order to realize the Enosis plan that envisions the attachment of Cyprus to Greece (Yuksel, 2009).

Thanks to the 1959 London and Zurich Treaties, a compromise between the two communities was achieved. Thus, the Republic of Cyprus, based on the partnership of the two communities, was established in 1960. With the end of the conflicts between the two communities, the island gained its independence. Unfortunately, the 1960 Partnership Republic could only last three years due to the Greek Cypriots who wanted the island to be annexed to Greece (TRNC Ministry of Foreign Affairs, 2011; Yuksel, 2009).

Following the end of the 1960 Partnership Republic, the 1963 incidents occurred in which many Turkish Cypriot civilians lost their lives. The UN Peace Keeping

Force intervened in March 1964 to put an end to the conflict between the two communities. However, Greek Cypriots who did not give up on the Enosis plan carried out the bloodiest attack in 1974. On 15 July 1974, the Greek Cypriot terrorist organization EOKA, in cooperation with the junta in Greece, attacks the Turkish Cypriots more harshly. Turkey did not remain silent on the events in Cyprus, so they interfered Cyprus in order to end the conflicts on the island based on the 1960 Treaty of Guarantee. Turkey's intervention prevented the annexation of the island to Greece (TRNC Ministry of Foreign Affairs, 2011; Yuksel, 2009).

After the intervention of Turkey, on August 2, 1975 in accordance with the decisions taken as a result of intercommunal talks held in Vienna, the Turkish Cypriots were immigrated to the north; the Greek Cypriots were immigrated southward. Thus, the island is divided between the two communities. Turkish Cypriots declared TRNC on 15 November 1983. There is a belief that a peaceful, fair and viable solution should be found through negotiations to be conducted on the basis of equality in order to re-establish the partnership between the two peoples from the past and to solve the Cyprus problem through diplomacy. However, there has been no solution up to this day. For this reason, the island of Cyprus still contains two separate states today (TRNC Ministry of Foreign Affairs, 2011; Yuksel, 2009).

## 2.2 Economy of the Turkish Republic of Northern Cyprus

As in other small island economies, the TRNC economy has an economic structure with a small-scale internal market and limited natural resources, mainly based on the service sector. Generally, island countries with small economies try to increase foreign demand by providing access to foreign markets in order to ensure their economic development. The TRNC has also chosen this path. However, the ongoing Cyprus problem prevents TRNC from accessing foreign markets. Deprived

of sufficient interaction and cooperation with the international community due to political reasons, the TRNC has formed a unique economic structure over time (Besim & Sertoglu, 2015).

The currency that is used in the TRNC economy belongs to the Turkey. In other words, the TRNC does not have its own currency. Control of the Turkish Lira which is used in the TRNC economy is completely in the hands of the Turkey Central Bank', so it completely eliminates the effectiveness of both money and foreign trade policy for the TRNC. A real struggle against inflation is impossible due to the lack of monetary policy in the TRNC (Safakli & Ozdeser, 2002).

The political uncertainty created by the Cyprus problem, unstable policies, barriers to trade and the increasing weight of the public sector in the country's economy have created a highly restricted private sector structure. It has not been discussed much under what conditions and in which product areas it can be competitive in foreign markets. It was believed that existing problems could be solved with help. In order to compete in new markets, a creative vision and policy could not be implemented and an economic structure dependent on the public and even worse on foreign aid originating from the Republic of Turkey emerged. An approach that focuses on non-commercial activities has also inevitably created an economy that becomes civil servant (Safakli & Ozdeser, 2002).

When viewed from a long-term perspective, it is seen that TRNC has transformed from an agricultural economy into an urban economy. However, this urbanization process could not create an employment structure based on the private sector. The share of the agricultural sector in total employment decreased by approximately one third, from 36 percent in 1983 to 12 percent in 2005 (Figure 2.1). Despite this decline in agricultural employment, it is not possible to mention about

any concentration in areas that will ensure the rapid growth of the economy (Safakli & Ozdeser, 2002).

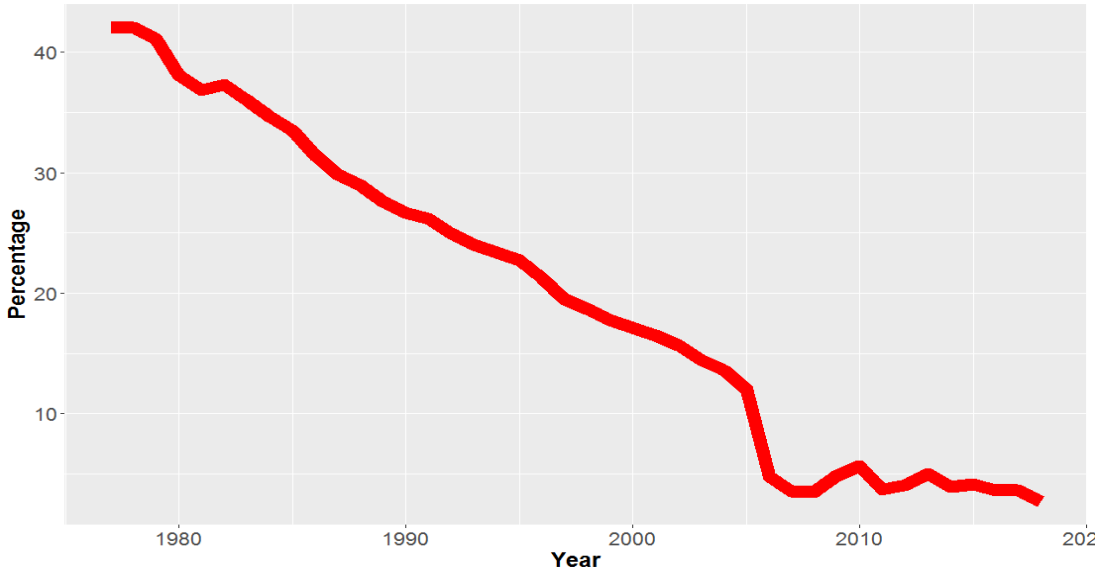


Figure 2.1. Share of Agriculture Sector Employee to the Total Working Population
Source: The TRNC Ministry of Agriculture and Natural Resources Statistics

When Northern Cyprus is examined in terms of foreign trade markets, a structure in the form of trade integration with European countries, especially the UK, was dominant in the past. However, nowadays it is seen that a structure which largely offset trade integration with Turkey and Middle East countries. Historically, Northern Cyprus has an integrated structure with Europe, especially the UK economy, but it is seen that this structure has changed especially after 1995. With the embargo decision taken by the Court of Justice of the European Union in 1995, TRNC exports declined significantly. In 1977, while 27.6 percent of Northern Cyprus exports went to Turkey, this ratio rose to 52 percent in 2018. As well as Turkey, the share of Middle East countries in Northern Cyprus exports increased from 5 percent in 1977 to 30,4 percent in 2015. On the other hand, the share of

Britain in Northern Cyprus exports declined from 67,4 percent in 1985 to 2,4 percent in 2015 (Table 2.1).

Table 2.1. Export by Countries (%)

| | 1977 | 1985 | 1995 | 2005 | 2015 | 2018 |
|---|---|---|---|---|---|---|
| 1. Turkey | 27,6 | 11,7 | 30 | 50,2 | 56,1 | 51,7 |
| 2. European Union Countries | 64 | 75,8 | 54,2 | 27,3 | 5,5 | 10,2 |
| 2.1 United Kingdom | 49,4 | 67,4 | 35,4 | 20,3 | 2,4 | 3,2 |
| 3. Middle East Countries | 5 | 9,7 | 2,4 | 9,9 | 30,4 | 25,7 |
| 4. Other Countries | 3,4 | 2,8 | 13,4 | 12,6 | 8 | 12,4 |

Source: TRNC State Planning Organization

In order to determine the importance of the agriculture sector in the TRNC economy and to ensure the integrity of the study, firstly it is aimed to examine in detail four sectors that constitute the growth resources within the economic structure of the TRNC.

### 2.2.1 Tourism

Tourism sector, which is one of the main actors of the service sector, has great importance for the country's economy. In addition to its geographical location, TRNC has an important potential in world tourism due to its being an island in the middle of the Mediterranean, having fewer cloudy days compared to Central and Northern Europe countries, having clean coasts and natural beaches. These features of the TRNC attract tourists to the country for summer tourism. On the other hand, the island of Cyprus, which was ruled by many civilizations in the past, also has cultural riches left by these civilizations. For this reason, it attracts tourists to the country with factors such as art, history, archeology and cultural values. In recent

years, there has been significant progress in the number of tourists visiting the country (Figure 2.2).

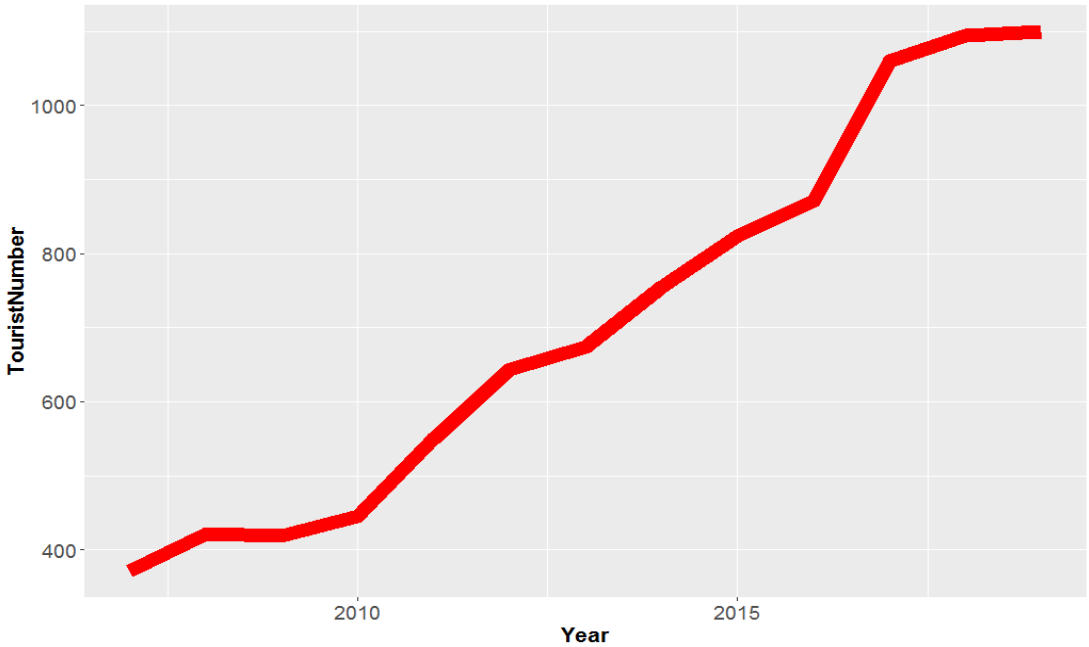


Figure 2.2. Number of Tourist in TRNC from 2007 to 2019 (Thousand People)
Source: TRNC State Planning Organization

However, when the tourism sector of the country is examined, it is seen that although there has been a significant increase in the number of tourists in recent years, it has not been able to use its current potential sufficiently. The main reason for this situation is the continuation of the Cyprus problem. Since the TRNC is not politically recognized, planes taking off from foreign countries cannot land directly to the TRNC. For this reason, the tourism sector cannot realize its potential. Although the TRNC has not achieved its tourism potential despite its virgin nature, cultural texture and historical past, the contribution of tourism to the country's economy is too important to ignore (Besim & Sertoglu, 2015).

### 2.2.2 Higher Education

Especially in recent years, with the rapid increase in the number of universities, the importance of higher education in the TRNC has increased rapidly and has created a significant share in the country's economic activities. In the article written by Besim and Sertoglu (2015) on a sustainable economic growth in the TRNC, higher education sector has been determined as the second priority sector in development after the tourism sector in the TRNC, which has a service-oriented economic structure.

The number of students stated by universities has increased from 40,431 students to 102,953 students in the last 10 years. As of the 2018-2019 academic years, the total number of students in higher education has exceeded 100 thousand. While 55 thousand of these students came from Turkey, 36 thousand of them came from the 3rd country. As a result of the survey conducted by Besim & Sertoglu (2015), in order to understand how much the students from abroad spend their expenses on and which goods and services sectors their expenses are concentrated, university students spend a significant portion of their non-tuition expenditures (34%) on food stuffs. According to the study of Besim & Sertoglu (2015), a student with Turkish nationality spends 29,718 TL annually, while this figure is 24,474 TL for third national students. Besim & Sertoglu (2015) calculated the total annual expenditure of students other than TRNC university students as 1.689 million TL, based on 2014 figures, as a result of the calculation they made considering the total number of students. This figure corresponds to 20% of the 2014 GDP. This amount of expenditure has great importance for the TRNC economy. In other words, this amount of expenditure made by students from abroad proves the importance of the higher education sector in the TRNC economy. The fact that students spend on many

sectors is a source of significant increase in total demand. The fact that expenditures are concentrated especially on basic nutrients such as food, such an expenditure for the TRNC agricultural sector, which has limited domestic demand and has a scale problem, contributes to a significant increase in total demand.

In short, not only the tourism sector but also the higher education sector contributes significantly to the national economy with the increasing number of tourists, universities and students in recent years. The fact that a significant part of the tourists and students' expenditures are spent on food, which is the basic nutrient, proves that these sectors make an important contribution to the agricultural sector.

### 2.2.3 Industry

The industrial sector is not at the desired level due to the small scale of the economy, the introverted market, the absence of raw materials and energy resources, the lack of sufficient markets, transportation-related difficulties, insufficiency of capital, and lack of qualified personnel. Under these conditions, industry tries to maintain its importance as a sector that is generally composed of small and micro enterprises and provides input to other leading sectors in the economy (Besim & Sertoglu, 2015).

In addition to food production based on the processing of agricultural products, the industry of the TRNC emerges a sectorial structure consisting of wood and metal processing light industry and enterprises operating in the fields of clothing. In addition to these products, food, drink, tobacco, forest products, furniture, stone and soil-based production areas have developed because the raw material of these industrial branches can be obtained from within the country.

Considering that the tourism and higher education sectors, which have developed in the island in recent years, have increased the total food demand, the

manufacturing industry has the chance to supply final or intermediate goods to this increasing demand. Thus, it is foreseen that it can contribute to the growth of not only the industrial sector but also the agricultural sector by directing the developing sectors to the production of goods that will complete and fulfill the nutritional function (Besim and Sertoğlu, 2015).

### 2.2.4 Agriculture

The agricultural sector has important functions in the national economy because it meets the food needs of the country's population, provides raw materials to the industrial sector, creates demand for industrial products, increasing not only national income but also employment and contributes to foreign sales. For the TRNC, which has a limited economic structure, these functions of the agricultural sector gain even more importance. In addition to increasing national income and employment, production for foreign sales makes significant contributions to the country's economy.

Historically, the agriculture sector is one of the most important production areas for the TRNC. When the percentage distribution of the population working in agriculture, the share of the agricultural sector in GDP, the share of the agriculture sector in TRNC exports and the export structure are analyzed, it is understood that the most important potential in increasing employment and welfare in the TRNC economy is met by the agriculture sector. While the share of agriculture sector in exports was 83.4% in 1978, this rate was 31.7% in 2000 (Figure 2.3). Parallel to this decline, the share of the working population decreased from 42.03% to 17.1% (Figure 2.1). Despite this situation, the agriculture sector is one of the most important sources of employment in the TRNC because some of the people working in the agricultural sector are unregistered. In other words, in the country due to the second

job ban, there is an informal employment in agriculture sector. These types of people are not reflected in the data because they do this job as a second job or hobby. Moreover, since most of the workers in the industrial sector work in the processing of agricultural products such as processing of milk and dairy products, juice production etc, the agricultural sector contributes indirectly to employment.

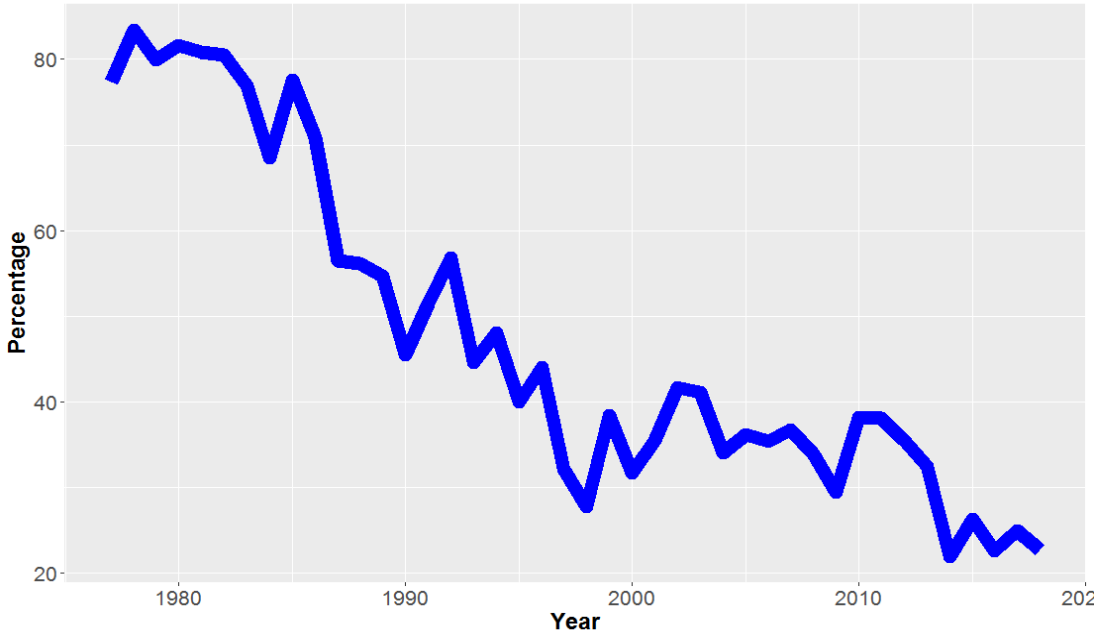


Figure 2.3. Share of Agricultural Products in TRNC Export (%)
Source: The TRNC Ministry of Agriculture and Natural Resources Statistics

Decrease in the share of agricultural products in TRNC exports does not mean that agriculture has lost its importance in exports because when looking at the value of agricultural products in TRNC exports, it is seen that agricultural exports, which were 20 million dollars in 1978, exceeded 45 million dollars in 2011 (Figure 2.4). In parallel with the increases in the exports of agricultural products, significant progress has been made in employment and welfare (Safakli & Ozdeser, 2002).

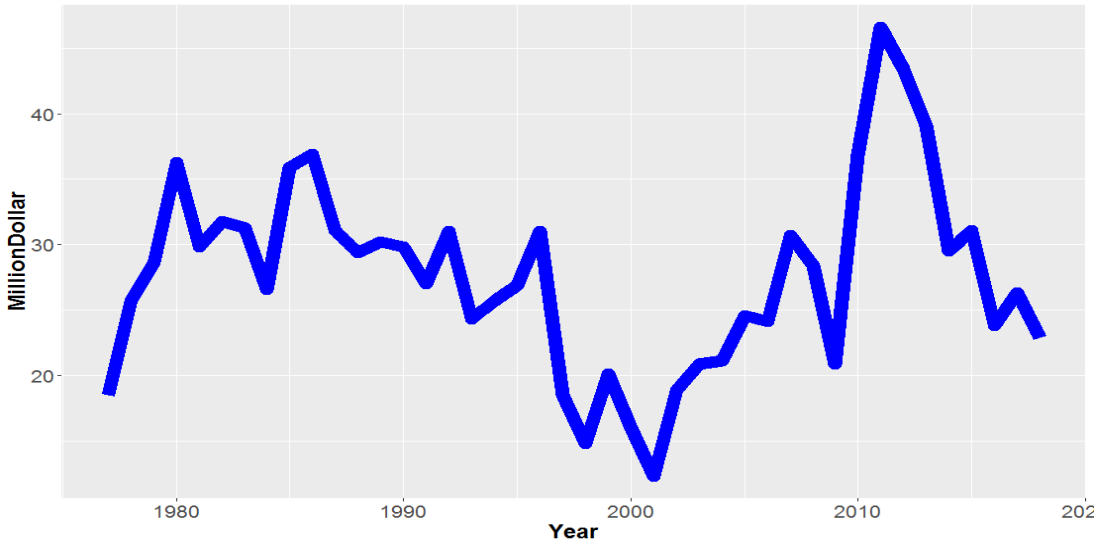


Figure 2.4. Value of Agricultural Products in TRNC Export (Million Dollars)
Source: The TRNC Ministry of Agriculture and Natural Resources Statistics

When looking at the structure of exports, it is seen that it has shifted from agricultural products to industrial products. In other words, when looking at the composition of exports, it is seen that the structure of exports shifted from unprocessed agricultural products such as oranges and potatoes to processed agricultural products, namely milk and dairy products. As can be understood from these data, the agriculture-based industry makes significant contributions to the TRNC economy such as meeting the need for food from within the country, creating added value, increasing and diversifying exports, and increasing employment etc. Thanks to the development of the agricultural industry for processing milk and dairy products in the country, dairy farming has developed in the country. In short, the agricultural industry is important in the TRNC agricultural sector, because the agricultural sector also develops with the development of the agricultural industry.

Table 2.2. Composition of Exports

| | 1977 | 1985 | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2018 |
|---|---|---|---|---|---|---|---|---|---|
| **1.Agricultural Products** | **77,4** | **77,6** | **45,5** | **40** | **31,7** | **36,1** | **38,2** | **26,3** | **22,7** |
| 1.1 Citrus | 65,7 | 64,6 | 37,4 | 32,8 | 26,6 | 29,6 | 28,2 | 16,2 | 18,1 |
| 1.2 Potatoes | 7,5 | 5,6 | 3,7 | 2,1 | 0,2 | 1,5 | 0,9 | 3,9 | 0,2 |
| **2.Industrial Products** | **12,1** | **22,2** | **53,7** | **59,1** | **67,9** | **60,4** | **54** | **73,3** | **77,3** |
| 2.1 Processed Agricultural Products | 3,8 | 8,4 | 18,1 | 17,7 | 24,2 | 40,8 | 40,8 | 63,3 | 57,3 |
| 2.2 Clothing | 0 | 0 | 0 | 35,4 | 38,3 | 14,7 | 4,1 | 2,1 | 2,6 |
| **3.Minerals** | **10,5** | **0,2** | **0,8** | **0,9** | **0,4** | **3,5** | **7,8** | **0,3** | **0** |

Source: TRNC State Planning Organization

However, according to the figures, the role of agricultural production in terms of employment and the share of national income have decreased recently. In 2013, employment in agriculture sector was 5.01% of total employment of country (Figure 2.1). In the same year agriculture took 8.2% of total GDP (Figure 2.5). However, this decrease does not mean that agricultural production has decreased. As in all developing countries, this decrease occurs as a percentage due to the increase in other sectors such as the service sector. The importance of the agriculture sector is clearly visible today, as it was in the past, and processed and raw agricultural products constitute the main stream of the country's limited export potential. Therefore, the agriculture sector has a very important place for the TRNC economy.

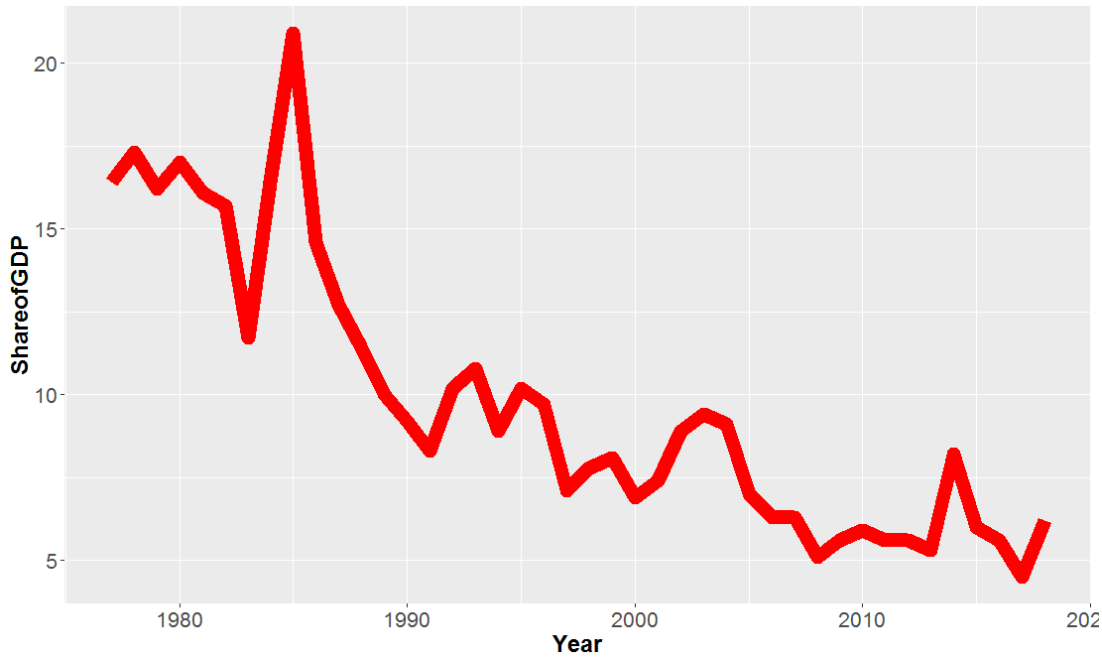


Figure 2.5. Share of Agriculture Sector in GDP (1977 Prices)
Source: The TRNC Ministry of Agriculture and Natural Resources Statistics

To sum up, although agriculture sector especially livestock sector has an effective place in the economy, important problems in this area limit the sector's taking its place in economic development and the realization of a rapid development. Therefore, in the study, the analysis of the red meat sector, which is an important activity branch of the agriculture sector, will be carried out and solutions will be produced to realize its true potential.

# Chapter 3

# FATTENING PERFORMANCE AND THE FACTORS AFFECTING IT

The feeding program implemented to increase meat yield and quality in ruminants is called fattening. The purpose of fattening activity is to produce quality meat by providing the highest amount of live weight gain every day as permitted by the genetic structure of the ruminants (Gultekin, n.d; Salman, n.d).

There are two important points that producers should pay attention to make fattening activity profitable. One of them is the daily live weight gain (DLWG), and the other one is the feed efficiency (FE). FE refers to the amount of dry matter-based feed consumed by the animal to gain 1 kilogram (kg) live weight gain. In order to calculate the DLWG increase, the live weight at the end of the fattening is subtracted from the live weight at the beginning of the fattening and divided by the fattening duration. On the other hand, in order to calculate the FE ability, first the dry matter of the feed consumed during the fattening period is divided by the fattening period. Then, the resulting value is divided by DLWG and FE is found. It is desirable to have a low FE value. The low FE value means that the animal in the fattening needs to consume less feed for each 1 kg live weight (Gultekin, n.d).

When performing the livestock activities both DLWG and FE are called "Fattening Performance". As Gültekin (n.d) mentioned in his study, in order to sustain livestock activities profitably, producers should have knowledge about the

factors affecting the fattening performance and continue their livestock activities by taking these factors into account.

Factors affecting fattening performance are divided into factors related to animals and factors related to the environment. Discussing the issue of factors affecting fattening performance, the authors suggest many factors that affect fattening performance. But these authors generally agreed on the following factors. Animal-related factors are breed, gender and age, while environmental factors are care and feeding, health and housing conditions (Gultekin, n.d; Salman, n.d).

## 3.1 Breed of the Animal

Animal breeds are divided into three as dairy, meat and combined breeds due to their superior characteristics. In order for an animal to be a meat breed, it must clearly show its superior meat holding performance in itself and the offspring. The situation is the same for dairy breeds. However, breeds that did not make a significant difference in meat and milk yield compared to other breeds are called combined breeds.

Table 3.1. Some Animal Breeds and Their Genetic Features

| **Breeds** | **Cattle** | **Sheep** | **Goat** |
|---|---|---|---|
| **Meat** | Angus<br>Belgian Blue<br>Hereford<br>Charolaise<br>Limousine | Wendeen<br>Van Rooy<br>Katahdin<br>Dorper<br>Ille de France<br>Suffolk | Boer<br>Kalahari<br>Savanna |
| **Dairy** | Holstein<br>Jersey | Chios<br>East Frisian | Saanen<br>Alpine |
| **Combined** | Simmental<br>Brown Swiss | Awassi<br>Bergamasca | Damascus |

Source: (Yeniyurt, 2007)

The breeds described as meat breeds have only been developed in terms of meat yield. The milk of these breeds is generally not used for commercial purposes and is not milked. These breeds usually give enough milk for their offspring. These breeds developed in terms of meat and they are generally preferred in countries with large pastures, and meadows. On the other hand, the breeds described as dairy breeds have been developed in terms of milk yield. The milk of these breeds is used for commercial purposes. Male of this breed are used in fattening. For example, Holstein is the best known dairy breed in large ruminants, while Saanen, Alpine and Chios are known dairy breeds in small ruminants. While meat yield is low in dairy breeds, milk yield is low in beef breeds. However, the combined productive breeds have developed in both directions, with emphasis on both milk and meat yield characteristics. But the milk of the combined productive breeds is generally less than the dairy breeds while their meat yield is less than the meat breeds.

## 3.2 Age of Animal

Age is an important factor affecting fattening performance. For a profitable stock breeding, animals should be young and suitable for gaining live weight. In other words, animals to be fattened should not have completed their growth period. Since young animals spend a small part of the feed they consume for continuing their life and a large part for growth, the rate of feed utilization is high. On the other hand, elderly animals use most of the feed they consume for continuing their life. Therefore, as the animal gets older, the amount of feed dry matter consumed for 1 kg live weight gain increases. This causes the red meat to be more expensive and the gain to decrease. In addition, with aging, the amount of fat in the body increases, and the amount of water and protein decreases. On the other hand, in young animals, the fat is distributed in the muscle and provides a good marbling, while the quality of the

meat is also increased. For all these reasons, fattening should be done up to maturity. There is no economic value in keeping the animal that reaches maturity. On the other hand, slaughtering animals at an early age also causes economic losses. Since the growth rate and the quality of the meat vary according to age, young animals should be preferred for a profitable fattening. Just as it is not economical for animals to be fed for a long time, it is not economical for animals to go to slaughter before they complete their development. In general, it is recommended to stop fattening at the age of 2 for large and at the age of 1 for small ruminants (Uygur, 2007).

## 3.3 Gender of Animal

Females can be taken into fattening activities like males. However, males are preferred in fattening because of the effects of sex hormones on fattening performance and meat quality. Testosterone promotes growth and muscle development. In addition, this hormone contributes to growth by increasing protein accumulation in the body and accelerating metabolism. Males have better DLWG and FE than females. In addition, their live weight at the end of the fattening and therefore the amount of meat they produce is also high. Therefore, fattening performance of male is better than that of females. These advantages of the testosterone hormone of males help them to be preferred in stockbreeding (Uygur, 2007).

## 3.4 Feeding and Care

Feeding and care are among the most important factors affecting fattening performance. Any mistake in the feeding and care of ruminants directly affects the profitability of fattening activity because livestock production is an expensive and technical work. It requires great attention and care. A mistake that can be made in the preparation of feed rations directly affects not only the health of the animals but also

the quantity and quality of the product obtained, namely red meat. Thus, in order to achieve a high fattening performance, care should be taken in the feeding and care of the animals. An important part of the emergence of health problems in ruminants is closely related to feeding and care. For this reason, it is necessary to pay attention to the care and feeding of ruminants in order to achieve high fattening performance (Ozen et al, 2015).

## 3.5 Health

The health status of the animal is an important factor that determines fattening performance. According to Wielgosz-Groth and her friends (2017), the disease containment of the herds increases the overall production costs because of the extra treatment costs such as medicine and veterinary services, and is associated with a longer and costly fattening period in order to reach optimum slaughter weight.

There is an opinion that animals that are sick or have had a disease in the past have lower fattening performance than healthy animals. Studies on this subject support this view. Wielgosz-Groth and her friends (2017) conducted a study in order to determine the effects of diseases on fattening performance and carcass quality of animals. They found that the sick animals had less average DLWG than healthy animals. According to their study, the same situation is valid for the final body weight. Therefore, as a result of their observations and experiences, they found that diseases during the rearing period had negative effects on fattening performance and carcass quality.

To conclude, diseases reduce the profitability of livestock activity by causing a decrease in DLWG and final body weights that causing a decrease in carcass weight. Therefore, beef producers should look at the animal's medical history before buying

them. In addition, they should give importance to preventive medicine in order to keep the animals healthy during the fattening period.

## 3.6 Shelter Conditions

Another factor affecting the fattening performance is the housing conditions. Environmental conditions affect the growth, development and productivity of the animal. For this reason, factors such as temperature, humidity, air movement and lighting time in barns should be arranged in a way that takes into account the requirement of the species. Since high temperature and humidity will reduce the desire to eat feed, animal productivity will decrease significantly. This problem can be solved by installing a good ventilation system, lowering the ambient temperature with the cooling system when necessary, and a good insulation. On the other hand, inability to generate sufficient heat due to extremely low temperatures in winter can result in death, especially in small ruminants. In addition, extremely low temperatures cause animals to become ill. Thus, in order to achieve high fattening performance, while building the shelter, it should be built in accordance with the needs of the animals (Can & Boga, 2018; Goncu, Onder, Koluman & Mevliyaogullari, 2015).

As a result, in order to realize a healthy, profitable and sustainable production, a production should be carried out according to the factors affecting the fattening performance. Otherwise, it is not possible to reach the desired values.

# Chapter 4

# GLOBAL RED MEAT INDUSTRY

In recent years, individuals' demand for meat has increased not only in the developing countries but also in the industrialized countries. Globalized trade, media and urbanization have assisted to form a diet of animal source proteins in the diet of individuals. In this process, there have also been changes in meat production with the shrinkage of grazing lands in parallel with the population increase and the general movement towards industrialized agriculture. In other words, industrialization took place in meat production. Thus, the global meat trade has come to the fore in recent years (Nierenberg & Mastny, 2005).

Global meat industry has important economic functions for countries such as providing national nutrition, increasing exports, supplying raw materials to industry, achieving stable development with balanced development between regions and sectors, preventing unemployment in rural areas, creating new employment opportunities in industry and services sectors. For this reason, livestock sector is seen as one of the biggest driving forces behind economic growth in many countries (Sakarya & Aydın, 2011).

Cattle, goats and sheep not only produced meat and milk, which are important source of animal protein in human nutrition, but also served people with their skin, nails, horns and manure (Sakarya & Aydın, 2011). However, since this study examines the issue of red meat, which is vital in human nutrition, other animal products were excluded from the study.

## 4.1 Global Ovine and Bovine Stocks

According to the Dyck & Nelson (2003), large and reliable livestock stock is an important criteria for determining competitiveness in the global meat industry. Thus, before examining the global meat supply, ovine and bovine stocks in continents and some selected countries that have an important place in the livestock sector have been examined in Table 4.1.

Table 4.1. Cattle Stock in Continents and Some Selected Countries (1975 and 2015)

| **Number of Cattle** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| | Head | % | Ind. | Head | % | Ind. |
| **Africa** | 156.457.789 | 13,2 | 100 | 335.742.912 | 23,1 | 214 |
| **Americas** | 401.898.330 | 33,8 | 100 | 512.574.667 | 35,3 | 127 |
| **Asia** | 343.847.300 | 28,9 | 100 | 443.741.062 | 30,6 | 129 |
| **Europe** | 243.033.101 | 20,5 | 100 | 121.970.885 | 8,4 | 50 |
| **Oceania** | 42.668.430 | 3,6 | 100 | 37.983.656 | 2,6 | 89 |
| **World** | 1.187.904.950 | 100 | 100 | 1.452.013.182 | 100 | 122 |
| **EU** | 120.084.420 | 10,1 | 100 | 89.619.321 | 6,17 | 75 |
| **Argentina** | 56.707.008 | 4,77 | 100 | 51.429.848 | 3,54 | 91 |
| **Australia** | 32.792.704 | 2,76 | 100 | 27.412.872 | 1,89 | 84 |
| **Brazil** | 92.495.360 | 7,79 | 100 | 215.220.508 | 14,8 | 233 |
| **Canada** | 14.278.000 | 1,20 | 100 | 11.640.000 | 0,80 | 82 |
| **Chile** | 3.606.210 | 0,30 | 100 | 2.735.857 | 0,19 | 76 |
| **China** | 56.682.903 | 4,77 | 100 | 63.195.894 | 4,35 | 111 |
| **Cyprus** | 15.500 | 0,001 | 100 | 58.559 | 0,01 | 378 |
| **India** | 179.457.008 | 15,1 | 100 | 188.166.506 | 12,9 | 105 |
| **Japan** | 3.644.000 | 0,31 | 100 | 3.860.000 | 0,27 | 105 |
| **Mexico** | 24.301.008 | 2,05 | 100 | 33.502.623 | 2,31 | 138 |
| **NewZealand** | 9.292.321 | 0,78 | 100 | 10.032.763 | 0,69 | 108 |
| **Norway** | 914.905 | 0,08 | 100 | 853.327 | 0,06 | 93 |
| **Paraguay** | 5.043.300 | 0,42 | 100 | 14.216.256 | 0,98 | 282 |
| **Turkey** | 13.388.000 | 1,13 | 100 | 14.223.109 | 0,98 | 106 |
| **Russia** | | | 100 | 19.263.687 | 1,33 | 44,5 |
| **Ukraine** | | | 100 | 3.884.000 | 0,27 | 19,8 |
| **USA** | 132.028.000 | 11,1 | 100 | 89.143.000 | 6,14 | 68 |
| **Uruguay** | 11.530.000 | 0,97 | 100 | 11.911.000 | 0,82 | 103 |

Source: Food and Agriculture Organization of the United Nations Statistics

World cattle stock increased by 22% from 1975 to 2015, reached the number of 1,452,013,182. During this period, while cattle stock decreased in the Europe and Oceania continents by 50% and 11% respectively as compared to the 1975, it increased in the Africa, Americas and Asia continents by 114, 27 and 29% respectively as compared to the 1975. As of 2015, 35.3% of the world's cattle assets are located in America, 30.6% in Asia, 23.1% in Africa, 8.4% in Europe and 2.6% in Oceania. On the other hand, during this period, while cattle stock decreased in the European Union (EU), Argentina, Australia, Canada, Chile, Norway, Russia, Ukraine and United States of America (USA), it increased in the Brazil, China, Cyprus, India, Japan, Mexico, New Zealand, Paraguay, Turkey and Uruguay. As of 2015, while 14.8% of the world's cattle stocks are Brazil, 12.9% India, 6.17% EU, 6.14% USA, and 3.54%'s is located in Argentina, other selected countries have less than 2%' of the world's cattle stock (Table 4.1).

Table 4.2. Goat Stock in Continents and Some Selected Countries (1975 and 2015)

| **Number of Goat** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| | Head | % | Ind. | Head | % | Ind. |
| **Africa** | 119.875.558 | 29,6 | 100 | 401.836.246 | 40 | 335 |
| **Americas** | 31.689.183 | 7,85 | 100 | 37.324.582 | 3,72 | 117 |
| **Asia** | 236.126.051 | 58,2 | 100 | 544.045.417 | 54,2 | 230 |
| **Europe** | 17.295.338 | 4,27 | 100 | 16.926.889 | 1,68 | 97,9 |
| **Oceania** | 300.206 | 0,08 | 100 | 4.000.820 | 0,4 | 1332 |
| **World** | 405.286.336 | 100 | 100 | 1.004.133.954 | 100 | 247 |
| **EU** | 10.614.860 | 2,62 | 100 | 12.826.911 | 1,28 | 120 |
| **Argentina** | 4.000.000 | 0,99 | 100 | 4.720.674 | 0,47 | 118 |
| **Australia** | 70.000 | 0,02 | 100 | 3.600.000 | 0,36 | 5142 |
| **Brazil** | 7.101.000 | 1,75 | 100 | 9.620.877 | 0,95 | 135 |
| **Canada** | 18.000 | 0,004 | 100 | 30.006 | 0,003 | 166 |
| **Chile** | 800.000 | 0,20 | 100 | 412.538 | 0,04 | 51,6 |
| **China** | 66.358.576 | 16,4 | 100 | 141.833.662 | 14,1 | 213 |
| **Cyprus** | 200.000 | 0,05 | 100 | 236.920 | 0,024 | 118 |
| **India** | 72.500.000 | 17,9 | 100 | 138.391.040 | 13,8 | 190 |
| **Japan** | 110.800 | 0,03 | 100 | 17.104 | 0,002 | 15,4 |
| **Mexico** | 9.067.185 | 2,24 | 100 | 8.724.946 | 0,87 | 96,2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **NewZealand** | 60.000 | 0,01 | 100 | 74.718 | 0,007 | 124 |
| **Norway** | 69.463 | 0,02 | 100 | 67.007 | 0,007 | 96,5 |
| **Paraguay** | 107.800 | 0,03 | 100 | 147.361 | 0,01 | 136 |
| **Turkey** | 18.746.000 | 4,63 | 100 | 10.344.936 | 1,03 | 55,2 |
| **Russia** | | | | 2.104.459 | 0,21 | 75,9 |
| **Ukraine** | | | | 585.300 | 0,06 | 74,8 |
| **USA** | 1.350.000 | 0,33 | 100 | 2.650.000 | 0,26 | 196 |
| **Uruguay** | 12.000 | 0,003 | 100 | 17.438 | 0,002 | 145,3 |

Source: Food and Agriculture Organization of the United Nations Statistics

World goat stock increased by 147% in 2015 compared to 1975, reaching the number of 1,004,133,954 from 405,286,336. Goat stock decreased only in the Europe by 2,5% as compared to the 1975. On the other hand, goat stock increased in the Africa, America, Asia and Oceania continents by 235, 17, 130 and 1232% respectively as compared to the 1975. As of 2015, 54.2% of the world's goat assets are located in Asia, 40% in Africa, 3.72% America, 1.68% in Europe and 0.4% in Oceania. On the other hand, during this period, the EU, Argentina, Australia, Brazil, Canada, China, Cyprus, India, New Zealand, Paraguay, USA and Uruguay was a significant increase in the presence of goat. Goat assets decreased only in Chile, Japan, Mexico, Norway, Turkey, Russia and Ukraine. As of 2015, while 14.1% of the world's goat stocks are China and 13.8%'s is located in India, other selected countries have less than 2%' of the world's goat stock (Table 4.2).

Table 4.3. Sheep Stock in Continents and Some Selected Countries (1975 and 2015)

| **Number of Sheep** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| | Head | % | Ind. | Head | % | Ind. |
| **Africa** | 163.094.473 | 15,56 | 100 | 362.967.010 | 30,7 | 222 |
| **Americas** | 124.123.116 | 11,85 | 100 | 82.410.228 | 6,95 | 66 |
| **Asia** | 283.834.045 | 27,09 | 100 | 507.618.015 | 42,8 | 178 |
| **Europe** | 269.840.367 | 25,75 | 100 | 130.846.941 | 11,1 | 48 |
| **Oceania** | 206.981.201 | 19,75 | 100 | 100.061.925 | 8,45 | 48 |
| **World** | 1.047.873.202 | 100 | 100 | 1.183.904.119 | 100 | 113 |
| **EU** | 111.658.814 | 10,66 | 100 | 98.186.234 | 8,29 | 88 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Argentina** | 34.691.008 | 3,31 | 100 | 14.859.486 | 1,25 | 43 |
| **Australia** | 151.653.216 | 14,5 | 100 | 70.909.812 | 5,99 | 47 |
| **Brazil** | 17.828.224 | 1,70 | 100 | 18.410.551 | 1,56 | 103 |
| **Canada** | 497.100 | 0,05 | 100 | 824.300 | 0,07 | 166 |
| **Chile** | 5.644.401 | 0,54 | 100 | 2.185.449 | 0,18 | 39 |
| **China** | 94.700.030 | 9,04 | 100 | 162.237.927 | 13,7 | 172 |
| **Cyprus** | 210.000 | 0,02 | 100 | 296.857 | 0,03 | 141 |
| **India** | 40.540.000 | 3,87 | 100 | 66.694.432 | 5,63 | 165 |
| **Japan** | 12.060 | 0,001 | 100 | 13.595 | 0,001 | 113 |
| **Mexico** | 6.330.100 | 0,60 | 100 | 8.710.781 | 0,74 | 138 |
| **NewZealand** | 55.320.000 | 5,28 | 100 | 29.120.827 | 2,46 | 53 |
| **Norway** | 1.639.313 | 0,16 | 100 | 2.380.491 | 0,20 | 145 |
| **Paraguay** | 366.300 | 0,03 | 100 | 498.357 | 0,04 | 136 |
| **Turkey** | 40.539.008 | 3,87 | 100 | 3.1140.244 | 2,63 | 77 |
| **Russia** | | | | 22.578.257 | 1,91 | 71 |
| **Ukraine** | | | | 785.800 | 0,07 | 16 |
| **USA** | 14.515.000 | 1,39 | 100 | 5.280.000 | 0,45 | 36 |
| **Uruguay** | 15.069.000 | 1,44 | 100 | 6.647.000 | 0,56 | 44 |

Source: Food and Agriculture Organization of the United Nations Statistics

World sheep stock increased by 13% in 2015 compared to 1975, reaching the number of 1,183,904,119 from 1,047,873,202. During this period, while sheep stock decreased in the America, Europe and Oceania continents by 34, 52 and 52% respectively as compared to the 1975, it increased in the Africa, and Asia continents by 122 and 78% respectively as compared to the 1975. As of 2015, 42.8% of the world's sheep assets are located in Asia, 30.7% in Africa, 11.1% in Europe, 8.45% in Oceania and 6.95% in America. On the other hand, during this period, the EU, Argentina, Australia, Chile, New Zealand, Turkey, Russia, Ukrine, USA and Uruguay was a significant decrease in the presence of sheep. Sheep assets increased only in Brazil, Canada, China, India, Japan, Mexico, Norway and Paraguay. As of 2015, while 13.7% of the world's sheep stocks are China, and 8.29%' is located in EU, other selected countries have less than 6%' of the world's sheep stock (Table 4.3).

Shortly, in the light of the data given above, it can be clearly observed that from 1975 to 2015, the ovine and bovine stocks in the world increased. Despite the increase worldwide, the the ovine and bovine stocks have increased in some continents and some selected countries, while they have decreased in some continents and some selected countries. From 1975 to 2015, on a continental basis, Africa and Asia are home to a large proportion of the world's ovine and bovine livestock stocks. In other words, 54% of the world's cattle stocks, 73% of sheep stocks and 94% of goat stocks are in these continents.

## 4.2 Global Ovine and Bovine Meat Supply

The most important factor that affecting the supply of a good is the amount of demand for that good. The fact that the product to be produced is a product that will meet the basic needs of individuals increases the interest in that line of business (Sakarya & Aydın, 2011). Red meat is also such a product. The rapid economic development and population growth experienced in developing countries in recent years have increased the demand for red meat. Compared to 1975, 22% increase in world cattle stock, 147% increase in goat stock and 13% increase in sheep stock in 2015 supports this situation.

Table 4.4. Cattle Meat Supply in Continents and Some Selected Countries (1975 and 2015) (Tonne)

| **MEAT Quantity (Tonne)** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| **Cattle** | Amount | % | Ind. | Amount | % | Ind. |
| **Africa** | 2.471.435 | 5,65 | 100 | 6.356.756 | 9,95 | 257,2 |
| **Americas** | 19.666.232 | 45 | 100 | 29.724.214 | 46,6 | 151,1 |
| **Asia** | 2.823.574 | 6,42 | 100 | 13.991.284 | 21,9 | 495,5 |
| **Europe** | 16.702.213 | 38,2 | 100 | 10.421.067 | 16,3 | 62,4 |
| **Oceania** | 2.069.291 | 4,73 | 100 | 3.354.207 | 5,25 | 162,1 |
| **World** | 43.732.744 | 100 | 100 | 63.847.528 | 100 | 145,9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **EU** | 9.306.185 | 21,3 | 100 | 7.684.425 | 12 | 82,6 |
| **Argentina** | 2.438.552 | 5,58 | 100 | 2.727.000 | 4,27 | 111,8 |
| **Australia** | 1.546.965 | 3,54 | 100 | 2.661.640 | 4,17 | 172 |
| **Brazil** | 2.156.979 | 4,93 | 100 | 9.425.000 | 14,8 | 436,9 |
| **Canada** | 1.087.684 | 2,49 | 100 | 1.017.551 | 1,59 | 93,5 |
| **Chile** | 215.479 | 0,49 | 100 | 225.261 | 0,35 | 104,5 |
| **China** | 213.215 | 0,49 | 100 | 5.566.157 | 8,72 | 2610 |
| **Cyprus** | 1.372 | 0,003 | 100 | 4.953 | 0,008 | 361 |
| **India** | 723.492 | 1,65 | 100 | 931.645 | 1,46 | 128,8 |
| **Japan** | 352.664 | 0,81 | 100 | 481.019 | 0,75 | 136,4 |
| **Mexico** | 569.595 | 1,30 | 100 | 1.845.236 | 2,89 | 323 |
| **NewZealand** | 508.100 | 1,16 | 100 | 675.844 | 1,06 | 133 |
| **Norway** | 68.742 | 0,16 | 100 | 79.672 | 0,12 | 115,9 |
| **Paraguay** | 98.900 | 0,23 | 100 | 444.668 | 0,70 | 449,6 |
| **Turkey** | 132.865 | 0,30 | 100 | 1.014.926 | 1,59 | 763,9 |
| **Russia** | | | | 1.649.373 | 2,58 | 60,3 |
| **Ukraine** | | | | 384.000 | 0,60 | 32,4 |
| **USA** | 11.271.258 | 25,8 | 100 | 10.777.601 | 16,9 | 95,6 |
| **Uruguay** | 344.975 | 0,79 | 100 | 536.769 | 0,84 | 155,6 |

Source: Food and Agriculture Organization of the United Nations Statistics

World beef supply increased by 45.9% from 1975 to 2015, reaching approximately 64 million tons. Although the Americas, Europe and Oceania have 35.3%, 8.4% and 2.6% of the world's cattle as of 2015 respectively, they have realizes 46.6%, 16,3% and 5,25% of the total beef supply respectively. On the other hand, while the continent of Asia and Africa have 30.6% and 23,1% of the world's cattle assets for the same year respectively, they have only realized 21.9% and 9.95% of the world beef supply respectively. In addition, although America and EU have 6.14% and 6.17% of the world's cattle as of 2015 respectively, they realized 16.9% and 12% of the total beef supply respectively. On the other hand, India has 12.9% of the world cattle assets for the same year, but it realized only 1.46% of the world beef supply. As can be understood from these data, the number of animals that continents or countries have is not important by itself. The meat yield that countries can obtain

from their animals is also important because high number of animals does not mean that more meat yield is obtained per head of animal (Table 4.4).

The average carcass yield of Cattle in the continents and some selected countries (1975 and 2015) is presented in Table 4.5.

Table 4.5. Carcass Yield of Cattle in the World and in Some Selected Countries

| **Carcass Yield of Cattle** | **1975** | | **2015** | |
|---|---|---|---|---|
| | Weight(kg) | Ind. | Weight(kg) | Ind. |
| **Africa** | 145,6 | 100 | 157,6 | 108,2 |
| **Americas** | 216,3 | 100 | 270 | 124,8 |
| **Asia** | 108 | 100 | 160,3 | 148,4 |
| **Europe** | 192,5 | 100 | 257,1 | 133,7 |
| **Oceania** | 171,1 | 100 | 224,4 | 131,2 |
| **World** | 187,8 | 100 | 217,8 | 115,9 |
| **EU** | 208 | 100 | 290,6 | 139,7 |
| **Argentina** | 200,8 | 100 | 224,3 | 111,7 |
| **Australia** | 183,4 | 100 | 263,4 | 143,6 |
| **Brazil** | 187,6 | 100 | 245,7 | 130,9 |
| **Canada** | 209,1 | 100 | 349,4 | 167,1 |
| **Chile** | 241,3 | 100 | 244 | 101,1 |
| **China** | 98,4 | 100 | 146,6 | 148,9 |
| **Cyprus** | 228,7 | 100 | 331,6 | 144,9 |
| **India** | 84 | 100 | 103 | 122,6 |
| **Japan** | 277,6 | 100 | 434,5 | 156,5 |
| **Mexico** | 172,5 | 100 | 216,5 | 125,5 |
| **New Zealand** | 142 | 100 | 142,2 | 100,1 |
| **Norway** | 172,7 | 100 | 280,4 | 162,4 |
| **Paraguay** | 198,5 | 100 | 235,4 | 118,6 |
| **Turkey** | 57,5 | 100 | 269,6 | 468,9 |
| **Russia** | | 100 | 197,9 | |
| **Ukraine** | | 100 | 166,1 | |
| **USA** | 240,5 | 100 | 367,6 | 152,9 |
| **Uruguay** | 188,1 | 100 | 243,5 | 129,5 |

Source: Food and Agriculture Organization of the United Nations Statistics

World average carcass yield of cattle increased by 15.9% from 1975 to 2015, reaching approximately 218 kg per cattle. Moreover, from 1975 to 2015, an increase in the average carcass yield of cattle has been observed in all continents and selected

countries. In 2015, while America, Europe and Oceania were above the world average carcass yield of cattle, Asia and Africa were far below this average. On the other hand, while average carcass yield of cattle is high in countries such as EU, Canada, Cyprus, Japan, and USA, it is low in countries such as China, India and Ukraine (Table 4.5).

Table 4.6. Goat Meat Supply in Continents and Some Selected Countries (1975 - 2015) (Tonne)

| **MEAT Quantity (Tonne)** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| **Goat** | Amount | % | Index | Amount | % | Ind. |
| **Africa** | 398.475 | 26,9 | 100 | 1.359.260 | 24,1 | 341,1 |
| **Americas** | 97.988 | 6,6 | 100 | 130.231 | 2,30 | 132,9 |
| **Asia** | 872.883 | 58,8 | 100 | 4.022.087 | 71,2 | 460,8 |
| **Europe** | 112.517 | 7,56 | 100 | 102.393 | 1,80 | 91 |
| **Oceania** | 2.013 | 0,14 | 100 | 33.809 | 0,60 | 1679,5 |
| **World** | 1.483.876 | 100 | 100 | 5.647.780 | 100 | 380,6 |
| **EU** | 73.497 | 4,95 | 100 | 67.156 | 1,19 | 91,4 |
| **Argentina** | 7.920 | 0,53 | 100 | 8.506 | 0,15 | 107,4 |
| **Australia** | 375 | 0,03 | 100 | 32.285 | 0,57 | 8609 |
| **Brazil** | 20.500 | 1,38 | 100 | 31.167 | 0,55 | 152 |
| **Chile** | 5.580 | 0,38 | 100 | 5.147 | 0,09 | 92,2 |
| **China** | 150.686 | 10,2 | 100 | 2.157.749 | 38,2 | 1431,9 |
| **Cyprus** | 1.575 | 0,11 | 100 | 2.061 | 0,036 | 130 |
| **India** | 261.500 | 17,6 | 100 | 521.459 | 9,23 | 199 |
| **Japan** | 216 | 0,01 | 100 | 46 | 0,0008 | 21,3 |
| **Mexico** | 27.969 | 1,88 | 100 | 39.390 | 0,70 | 140,8 |
| **NewZealand** | 1.100 | 0,07 | 100 | 1.255 | 0,02 | 114 |
| **Norway** | 252 | 0,02 | 100 | 289 | 0,005 | 114,7 |
| **Paraguay** | 188 | 0,01 | 100 | 1.062 | 0,018 | 564,9 |
| **Turkey** | 68.200 | 4,60 | 100 | 68.077 | 1,21 | 99,8 |
| **Russia** | | | | 17.651 | 0,31 | 84 |
| **Ukraine** | | | | 5.300 | 0,09 | 58,9 |

Source: Food and Agriculture Organization of the United Nations Statistics

World goat meat supply increased by 280.6% from 1975 to 2015 and reached approximately 5.7 million tons. Although the Asian continent has 54.2% of the

world's goat assets as of 2015, it realizes 71.2% of the total goat meat supply. On the other hand, while the African continent has 40% of the world's goat assets for the same year, it has realizes only 24.1% of the world goat meat supply. In addition, although China has 14.1% of the world's goat as of 2015 respectively, it realized 38.2% of the total goat meat supply respectively. On the other hand, India has 13.8% of the world goat assets for the same year, but it realized only 9.23% of the world beef supply (Table 4.6).

Table 4.7. Carcass Yield of Goat in the World and in Some Selected Countries

| **Carcass Yield of Goat** | **1975** | | **2015** | |
|---|---|---|---|---|
| Goat | Weight(kg) | Ind. | Weight(kg) | Ind. |
| **Africa** | 11,2 | 100 | 11,2 | 100 |
| **Americas** | 11,8 | 100 | 13,2 | 111,9 |
| **Asia** | 10,8 | 100 | 12,2 | 112,9 |
| **Europe** | 10,1 | 100 | 11,6 | 114,9 |
| **Oceania** | 15,1 | 100 | 14,9 | 98,7 |
| **World** | 10,9 | 100 | 11,9 | 109,2 |
| **EU** | 8,7 | 100 | 10,2 | 117,2 |
| **Argentina** | 6,6 | 100 | 6,6 | 100 |
| **Australia** | 25 | 100 | 15,2 | 60,8 |
| **Brazil** | 11,4 | 100 | 11,5 | 100,9 |
| **Chile** | 18 | 100 | 18 | 100 |
| **China** | 10,5 | 100 | 13,8 | 131,4 |
| **Cyprus** | 13,1 | 100 | 21,7 | 165,6 |
| **India** | 10 | 100 | 10 | 100 |
| **Japan** | 8,8 | 100 | 16,1 | 182,9 |
| **Mexico** | 11,6 | 100 | 16,8 | 144,8 |
| **New Zealand** | 16,2 | 100 | 10,8 | 66,6 |
| **Norway** | 13,6 | 100 | 12 | 88,2 |
| **Paraguay** | 10 | 100 | 9,7 | 97 |
| **Turkey** | 14,2 | 100 | 15,1 | 106,3 |
| **Russia** | | 100 | 17,6 | |
| **Ukraine** | | 100 | 13,5 | |

Source: Food and Agriculture Organization of the United Nations Statistics

World average carcass yield of goat increased by 9.2% from 1975 to 2015, reaching approximately 11.9 kg per goat. In 2015, while Asia, America, and Oceania

were above the world average carcass yield of goat, Africa and Europe were below this average. On the other hand, while average carcass yield of goat is high in countries such as Australia, Cyprus, Russia, it is low in countries such as Argentina, India and Paraguay (Table 4.7).

Table 4.8. Sheep Meat Supply in Continents and Some Selected Countries (1975-2015) (Tonne)

| **MEAT Quantity (Tonne)** | **1975** | | | **2015** | | |
|---|---|---|---|---|---|---|
| Sheep | Amount | % | Index | Amount | % | Ind. |
| **Africa** | 606.800 | 11,4 | 100 | 1.899.012 | 20,1 | 312,9 |
| **Americas** | 504.464 | 9,50 | 100 | 395.955 | 4,20 | 78,5 |
| **Asia** | 1.195.269 | 22,5 | 100 | 4.793.205 | 50,8 | 401 |
| **Europe** | 1.982.450 | 37,4 | 100 | 1.141.458 | 12,1 | 57,8 |
| **Oceania** | 1.018.086 | 19,2 | 100 | 1.208.323 | 12,8 | 118,7 |
| **World** | 5.307.069 | 100 | 100 | 9.437.953 | 100 | 177,8 |
| **EU** | 940.617 | 17,7 | 100 | 853.609 | 9,04 | 90,7 |
| **Argentina** | 123.361 | 2,32 | 100 | 57.609 | 0,61 | 46,7 |
| **Australia** | 527.148 | 9,93 | 100 | 721.053 | 7,64 | 136,8 |
| **Brazil** | 44.000 | 0,83 | 100 | 90.342 | 0,96 | 205,3 |
| **Canada** | 7.781 | 0,15 | 100 | 16.845 | 0,18 | 216,5 |
| **Chile** | 18.085 | 0,34 | 100 | 9.056 | 0,09 | 50 |
| **China** | 159.000 | 2,99 | 100 | 2.243.643 | 23,8 | 1411 |
| **Cyprus** | 2.032 | 0,04 | 100 | 3.388 | 0,04 | 167 |
| **India** | 136.200 | 2,57 | 100 | 248.467 | 2,63 | 182,4 |
| **Japan** | 27 | 0,0005 | 100 | 171 | 0,002 | 633,3 |
| **Mexico** | 20.582 | 0,39 | 100 | 59.419 | 0,63 | 288,7 |
| **NewZealand** | 490.900 | 9,25 | 100 | 487.149 | 5,16 | 99,2 |
| **Norway** | 16.471 | 0,31 | 100 | 25.555 | 0,27 | 155,2 |
| **Paraguay** | 1.778 | 0,03 | 100 | 2.558 | 0,03 | 143,9 |
| **Turkey** | 328.865 | 6,2 | 100 | 336.000 | 3,56 | 102,2 |
| **Russia** | | | | 186.838 | 1,98 | 77,7 |
| **Ukraine** | | | | 8.400 | 0,09 | 27,5 |
| **USA** | 185.972 | 3,50 | 100 | 70.580 | 0,75 | 37,95 |
| **Uruguay** | 42.430 | 0,80 | 100 | 14.521 | 0,15 | 34,2 |

Source: Food and Agriculture Organization of the United Nations Statistics

World sheep meat supply increased by 77.8% from 1975 to 2015, reaching approximately 9.5 million tons. Although the Asia, Europe and Oceania have 42.8%,

11.1% and 8.45% of the world's sheep as of 2015 respectively, they have realized 50.8%, 12.1% and 12.8% of the total sheep meat supply respectively. On the other hand, while the Africa has 40.7% of the world's sheep in the same year, it realized only 20.1% of the world sheep meat supply.

In addition, although China has 13.7% of the world's sheep as of 2015 respectively, it realized 23.8% of the total sheep meat supply. On the other hand, India has 5.63% of the world sheep assets for the same year, but it realized only 2.63% of the world sheep meat supply (Table 4.8).

Table 4.9. Carcass Yield of Sheep in the World and in Some Selected Countries

| **Carcass Yield of Sheep** | **1975** | | **2015** | |
|---|---|---|---|---|
| Sheep | Weight(kg) | Ind. | Weight(kg) | Ind. |
| **Africa** | 12,8 | 100 | 14,8 | 115,6 |
| **Americas** | 16,9 | 100 | 17,9 | 105,9 |
| **Asia** | 13,3 | 100 | 16,8 | 126,3 |
| **Europe** | 14,7 | 100 | 16,3 | 110,8 |
| **Oceania** | 16,6 | 100 | 21,1 | 127,1 |
| **World** | 14,6 | 100 | 16,8 | 115 |
| **EU** | 15,1 | 100 | 16 | 105,9 |
| **Argentina** | 15,2 | 100 | 18,3 | 120,3 |
| **Australia** | 18,4 | 100 | 22,6 | 122,8 |
| **Brazil** | 16 | 100 | 16 | 100 |
| **Canada** | 19,4 | 100 | 23 | 118,5 |
| **Chile** | 17,3 | 100 | 14,1 | 81,5 |
| **China** | 10,6 | 100 | 16,2 | 152,8 |
| **Cyprus** | 16 | 100 | 21,4 | 133,7 |
| **India** | 12 | 100 | 12 | 100 |
| **Japan** | 16 | 100 | 28,7 | 179,3 |
| **Mexico** | 15,9 | 100 | 20 | 125,7 |
| **New Zealand** | 15,1 | 100 | 19,2 | 127,1 |
| **Norway** | 20,3 | 100 | 20,8 | 102,4 |
| **Paraguay** | 15 | 100 | 14,7 | 98 |
| **Turkey** | 12,5 | 100 | 16 | 128 |
| **Russia** | | 100 | 17,6 | |
| **Ukraine** | | 100 | 16,2 | |
| **USA** | 23,1 | 100 | 30,4 | 131,6 |
| **Uruguay** | 13,5 | 100 | 16,9 | 125,1 |

Source: Food and Agriculture Organization of the United Nations Statistics

World average carcass yield of sheep increased by 15% from 1975 to 2015, reaching approximately 17 kg per sheep. In addition, from 1975 to 2015, an increase in the average carcass yield of sheep has been observed in all continents and selected countries except Brazil, Chile, India and Paraguay. In 2015, while America and Oceania were above the world average carcass yield of sheep, Africa and Europe were below this average. On the other hand, while average carcass yield of sheep is high in countries such as Australia, Canada, Cyprus, Japan, Norway and USA, it is low in countries such as India and Paraguay (Table 4.9).

In line with the data that analyzed above, it is observed that while some countries such as USA, EU, and Canada achieve high meat yields per animal, some countries have low productivity per unit of animal such as China and India. In the following sections, it will examine the reasons why these countries have high and low meat productivity.

## 4.3 World Meat Production and Consumption

According to the Sakarya & Aydın (2011), demand for the meat and hence per capita meat consumption; depends on the annual population growth, amount of production, the distribution of the population by age and sex, the level of income and its distribution, the prices of the products and the price factors of other products. Also, the amount of meat consumption per capita is considered an important indicator in order to determine the development levels of countries today. Due to the fact that the amount of meat consumption per person is so important, meat consumption in the world and some selected countries is examined in Table 4.10.

Table 4.10. Meat Consumption in the World and Some Selected Countries (1975 and 2015) (kg / person / year)

| | 1975 | | | | | 2015 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Beef & Buffalo | Poultry | Goat & Sheep | Pig | Total | Beef & Buffalo | Poultry | Goat & Sheep | Pig | Total |
| **Africa** | 6.33 | 1.98 | 2.35 | 0.69 | 13,09 | 6.33 | 6.73 | 2.78 | 1.47 | 19 |
| **Americas** | 35.35 | 12.30 | 1.07 | 14.76 | 64,25 | 29.16 | 39.13 | 0.65 | 17.40 | 86,95 |
| **Asia** | 1.87 | 1.57 | 0.94 | 4.56 | 9,19 | 4.40 | 9.79 | 1.94 | 15.82 | 32,55 |
| **Europe** | 23.05 | 9.38 | 3.21 | 29.95 | 67,72 | 14.89 | 23.35 | 1.91 | 34.61 | 77,35 |
| **Oceania** | 67.23 | 11.88 | 26.60 | 11.86 | 119,31 | 30.31 | 42.67 | 10.64 | 22.69 | 108,49 |
| **World** | 11.12 | 4.58 | 1.62 | 10.25 | 28,38 | 9.32 | 14.99 | 1.91 | 16.02 | 43,22 |
| **EU** | 21.33 | 11.48 | 2.98 | 33.98 | 72,49 | 14.88 | 22.54 | 2.09 | 39.00 | 81,26 |
| **Argentina** | 83.34 | 10.65 | 4.21 | 9.66 | 108,88 | 54.26 | 42.24 | 1.46 | 9.99 | 108,94 |
| **Australia** | 70.99 | 13.29 | 26.34 | 12.50 | 125,13 | 37.09 | 47.21 | 9.99 | 26.63 | 123,25 |
| **Brazil** | 19.24 | 5.09 | 0.58 | 6.89 | 31,93 | 37.92 | 46.16 | 0.60 | 12.86 | 97,88 |
| **Canada** | 49.69 | 18.39 | 1.11 | 26.27 | 95,6 | 27.43 | 37.88 | 0.98 | 24.88 | 91,18 |
| **Chile** | 20.67 | 4.20 | 2.13 | 2.88 | 30,03 | 21.87 | 35.72 | 0.52 | 23.14 | 81,98 |
| **China** | 0.25 | 1.14 | 0.34 | 8.06 | 9,93 | 5.24 | 12.27 | 3.09 | 38.92 | 60,69 |
| **Cyprus** | 8.99 | 8.89 | 6.52 | 14.21 | 39,47 | 5.83 | 24.51 | 5.00 | 33.65 | 70,35 |
| **India** | 2.34 | 0.16 | 0.64 | 0.34 | 3,61 | 0.79 | 2.10 | 0.45 | 0.23 | 3,67 |
| **Japan** | 3.66 | 6.71 | 1.16 | 10.39 | 23,36 | 8.50 | 17.68 | 0.15 | 19.71 | 46,14 |
| **Mexico** | 9.16 | 5.03 | 0.79 | 13.13 | 28,85 | 14.06 | 30.99 | 0.87 | 15.89 | 62,48 |
| **New Zealand** | 72.56 | 8.40 | 37.59 | 11.34 | 130,36 | 20.99 | 34.36 | 18.93 | 24.33 | 100,77 |
| **Norway** | 18.32 | 2.18 | 5.25 | 20.49 | 48,12 | 20.05 | 18.90 | 5.20 | 23.48 | 68,4 |
| **Paraguay** | 26.39 | 3.77 | 0.70 | 19.57 | 51,1 | 12.34 | 7.15 | 0.60 | 28.28 | 48,42 |
| **Turkey** | 3.81 | 4.64 | 9.91 | 0.01 | 18,42 | 12.34 | 19.72 | 4.95 | 0.00 | 37,03 |
| **Russia** | 28.68 | 9.97 | 2.36 | 19.57 | 61,21 | 14.33 | 29.57 | 1.38 | 24.02 | 73,1 |
| **Ukraine** | 26.03 | 9.67 | 0.68 | 22.62 | 59,58 | 7.79 | 21.24 | 0.30 | 16.39 | 46,27 |
| **USA** | 54.93 | 21.16 | 0.90 | 24.13 | 102,2 | 35.18 | 54.67 | 0.48 | 29.72 | 120,86 |
| **Uruguay** | 82.60 | 5.23 | 11.85 | 9.50 | 109,48 | 32.53 | 9.79 | 1.79 | 12.89 | 58,01 |

Source: Food and Agriculture Organization of the United Nations Statistics

When looking at the amount of meat consumed per capita by animal species in 1975 and 2015, per capita beef consumption in the world decreased by 16.2% from 11.12 to 9.32 kg, but the total meat consumption increased by 52.3% from 28,38 to 43.22 kg. In the same period, while per capita beef consumption decreased in the world, the reason for the increase in total meat consumption is the increase in chicken meat consumption, which is a cheaper protein source and a substitute for beef (Table 4.10).

Meat consumption varies widely around the world. In the USA and other developed countries, meat constitutes an important part of the normal diet due to its

contribution to daily energy intake, daily protein intake and daily fat intake. The demand for meat in developing countries continues to increase as meat production and consumption increases with current income. The results obtained in the previous table are consistent with the results found in the study of Daniel, Cross, Koebnick and Sinha (2010). Overall meat consumption continued to increase over time in the United States and the rest of the developed world. Despite a shift towards higher poultry consumption, red meat still represents the largest proportion of meat consumed in the United States (Daniel, Cross, Koebnick & Sinha, 2010).

On the other hand, when looking at the amount of meat production according to animal species in the world in Table 4.11, an increase is observed in all meat categories from 1975 to 2015. Moreover, the total meat production in the world increased by 180.9% from 1975 to 2015 and reached approximately 326 million tons. While 37.8% of the world's total meat production is from bovine animals, 35.9% from pig, 14.2% from chicken, 5.86% from ovine animals and 6.24% from other animal species are produced in 1975, 36.7% of the world's total meat production is from pig, 31.9% from chicken, 19.6% from bovine animals, 4.66% from ovine animals and 7.14% from other animal species are produced in 2015. While 14.2% share of chicken meat in total world meat production in 1975 increased to 31.9% as of 2015, the 37.8% share of bovine meat in total world meat production in 1975 decreased to 19.6% in 2015. This situation is noteworthy (Table 4.11).

Table 4.11. Meat Production Quantities According to Animal Species in the World (Tonne)

| **Meat by animal species** | | | **1975** | | | **2015** |
|---|---|---|---|---|---|---|
| (Tonne) | Amount | % | Ind. | Amount | % | Ind. |
| **Cattle** | 43.732.744 | 37,8 | 100 | 63.847.528 | 19,6 | 145,9 |
| **Chicken** | 16.390.365 | 14,2 | 100 | 103.777.327 | 31,9 | 633,2 |
| **Goat** | 1.483.876 | 1,28 | 100 | 5.647.780 | 1,76 | 380,6 |
| **Pig** | 41.669.902 | 35,9 | 100 | 119.362.626 | 36,7 | 286,4 |
| **Sheep** | 5.307.069 | 4,58 | 100 | 9.437.953 | 2,90 | 177,8 |
| **Others** | 7.229.479 | 6,24 | 100 | 23.210.765 | 7,14 | 321,1 |
| **Total** | 115.813.435 | 100 | 100 | 325.283.979 | 100 | 280,9 |

Source: Food and Agriculture Organization of the United Nations Statistics

## 4.4 World Ovine and Bovine Meat Trade

The main purpose of countries in meat production is to meet the food needs of the population. However, with the effect of globalization, it appears that meat trade has an important place in the economies of the country in recent years. Therefore, nowadays countries produce meat not only for their own citizens but also for citizens of other countries. The removal of trade barriers and epidemics is helping to expand export markets. Meat trade between countries is largely determined by the different resource structure of each country, consumer preference in meat selection, domestic industrial structure and trade barriers. Countries that produce low-cost meat have the advantage of competing in world trade (Sakarya & Aydın, 2011).

Table 4.12. The Trade of Beef and Products and Live Cattle in 2015 in the World and in Some Selected Countries

| 2015 | Import | | | | Export | | | | Trade Balance (1000$) |
|---|---|---|---|---|---|---|---|---|---|
| Cattle | Beef &Products | | Live Cattle | | Beef & Products | | Live Cattle | | |
| | Amount (Tonne) | Value (1000$) | Quantity (Head) | Value (1000$) | Amount (Tonne) | Value (1000$) | Amount (Head) | Value (1000$) | |
| Africa | 471.760 | 2.048.769 | 1.486.786 | 862.931 | 101.405 | 319.428 | 1.228.336 | 579.085 | -2.013.187 |
| Americas | 1.782.573 | 10.401.250 | 2.227.945 | 2.526.103 | 3.036.284 | 16.535.338 | 2.694.206 | 2.765.132 | 6.373.117 |
| Asia | 2.665.323 | 13.584.856 | 3.196.569 | 3.035.474 | 229.531 | 819.774 | 434.442 | 240.882 | -15.559.674 |
| Europe | 2.880.000 | 14.658.932 | 3.549.825 | 2.538.023 | 2.564.248 | 12.369.236 | 4.722.094 | 3.882.319 | -945.400 |
| Oceania | 27.952 | 148.404 | 303 | 312 | 1.814.837 | 9.291.468 | 1.352.640 | 1.136.636 | 10.279.388 |
| World | 7.827.608 | 40.842.211 | 10.461.428 | 8.962.843 | 7.746.305 | 39.335.244 | 10.431.718 | 8.604.054 | -1.865.756 |
| EU | 2.348.335 | 12.669.704 | 3.275.971 | 2.265.929 | 2.378.730 | 11.753.275 | 4.580.579 | 3.793.585 | 611.227 |
| Argentina | 48 | 429 | 3 | 10 | 131.498 | 863.895 | 334 | 731 | 864.187 |
| Australia | 3.398 | 13.303 | 0 | 0 | 1.357.650 | 6.997.156 | 1.331.377 | 1.102.093 | 8.085.946 |
| Brazil | 443.699 | 256.429 | 1.776 | 1.395 | 1.079.119 | 4.664.109 | 212.183 | 210.601 | 4.616.886 |
| Canada | 162.910 | 1.022.468 | 35.904 | 22.158 | 279.834 | 1.530.497 | 831.822 | 1.313.465 | 1.799.336 |
| Chile | 174.913 | 823.991 | 0 | 0 | 7.278 | 53.804 | 22.879 | 36.281 | -733.906 |
| China | 863.452 | 4.565.303 | 167.310 | 445.623 | 114.860 | 339.087 | 37.997 | 59.640 | -4.612.199 |
| Cyprus | 2.155 | 16.371 | 0 | 0 | 12 | 63 | 3.346 | 2.893 | -13.415 |
| India | 0 | 0 | 158 | 1.758 | 183 | 342 | 2 | 0 | -1.416 |
| Japan | 493.986 | 2.783.889 | 9.369 | 15.636 | 1.611 | 90.943 | 0 | 0 | -2.708.582 |
| Mexico | 122.932 | 865.478 | 22.922 | 45.313 | 161.284 | 1.091.472 | 1.212.793 | 871.545 | 1.052.226 |
| New Zealand | 9.656 | 45.163 | 0 | 0 | 456.866 | 2.292.944 | 21.263 | 34.543 | 2.282.324 |
| Norway | 22.408 | 138.554 | 13 | 34 | 253 | 1.495 | 1 | 3 | -137.090 |
| Paraguay | 306 | 1.490 | 539 | 971 | 271.763 | 1.121.856 | 1.095 | 3.781 | 1.123.176 |
| Turkey | 17.574 | 104.916 | 203.077 | 298.797 | 40 | 458 | 9 | 51 | -403.204 |
| Russia | 435.333 | 1.497.600 | 144.168 | 175.311 | 2.215 | 9.731 | 24.841 | 5.501 | -1.657.679 |
| Ukraine | 1.160 | 3.483 | 603 | 1.867 | 32.065 | 83.978 | 45.115 | 24.319 | 102.947 |
| USA | 1.078.932 | 6.405.016 | 1.985.103 | 2.200.145 | 719.151 | 5.174.912 | 72.625 | 98.729 | -3.331.520 |
| Uruguay | 2.237 | 8.133 | 10 | 25 | 259.282 | 1.422.468 | 216.628 | 145.584 | 1.559.894 |

Source: Food and Agriculture Organization of the United Nations Statistics

The trade of beef and products and live cattle in 2015 in the world and in some selected countries is given in Table 4.12. The amount of beef meat and products traded in the world is approximately 8 million tons and its commercial value is approximately 41 billion dollars in 2015. In the same year, approximately 11 million live cattle trade was made in the world, and the financial value of this trade is approximately 9 billion dollars. In other words, the annual trade volume of live cattle and beef and their products is approximately 50 billion dollars in the world. In the trade of live cattle and beef meat and products; while EU, Argentina, Australia, Brazil, Canada, Mexico, New Zealand, Paraguay, Ukraine and Uruguay are net

exporter, Chile, China, Cyprus, India, Japan, Norway, Turkey, Russia and USA are net importer (Table 4.12).

Table 4.13. The Trade of Goat Meat and Live Goat in 2015 in the World and in Some Selected Countries

| 2015 | Import | | | | Export | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Goat | Goat Meat | | Live Goat | | Goat Meat | | Live Goat | | Trade Balance (1000$) |
| | Amount (Tonne) | Value (1000$) | Amount (Head) | Value (1000$) | Amount (Tonne) | Value (1000$) | Amount (Head) | Value (1000$) | |
| Africa | 609 | 2.335 | 739.501 | 35.304 | 20.286 | 126.600 | 3.570.770 | 281.673 | 370.634 |
| Americas | 22.464 | 117.396 | 3.272 | 359 | 769 | 2.931 | 6.805 | 555 | -114.269 |
| Asia | 39.165 | 187.616 | 5.346.985 | 475.101 | 5.793 | 41.895 | 2.090.779 | 142.911 | -477.911 |
| Europe | 5.241 | 33.919 | 34.962 | 4.065 | 5.547 | 37.364 | 37.290 | 5.140 | 4.520 |
| Oceania | 241 | 842 | 24 | 38 | 32.976 | 187.813 | 90.190 | 7.759 | 194.692 |
| World | 67.720 | 342.108 | 6.124.744 | 514.867 | 65.321 | 396.603 | 5.795.834 | 438.038 | -22.334 |
| EU | 4.994 | 30.953 | 32.367 | 2.885 | 5.547 | 373.643 | 40.181 | 5.553 | 345.358 |
| Argentina | 0 | 0 | 0 | 0 | 173 | 184 | 0 | 0 | 184 |
| Australia | 60 | 288 | 23 | 22 | 32.059 | 183.129 | 90.190 | 7.759 | 190.578 |
| Canada | 1.867 | 9.053 | 283 | 64 | 0 | 0 | 2.439 | 147 | -8.970 |
| China | 5.793 | 24.325 | 7.700 | 2.242 | 1.949 | 19.101 | 6.700 | 1.206 | -6.260 |
| Cyprus | 31 | 76 | 0 | 0 | 0 | 0 | 3.751 | 494 | 418 |
| India | 0 | 0 | 0 | 0 | 14 | 56 | 230.863 | 9.262 | 9.318 |
| Japan | 366 | 1.918 | 0 | 0 | 0 | 0 | 0 | 0 | -1.918 |
| Mexico | 0 | 0 | 0 | 0 | 95 | 1.506 | 46 | 21 | 1.527 |
| New Zealand | 8 | 11 | 1 | 16 | 917 | 4.684 | 0 | 0 | 4.657 |
| Turkey | 0 | 0 | 690 | 436 | 0 | 0 | 13 | 4 | -432 |
| Russia | 14 | 62 | 870 | 594 | 0 | 0 | 105 | 4 | -652 |
| Ukraine | 0 | 0 | 869 | 283 | 0 | 0 | 0 | 0 | -283 |
| USA | 17.823 | 95.327 | 2.437 | 139 | 418 | 1.107 | 4.105 | 329 | -94.030 |

Source: Food and Agriculture Organization of the United Nations Statistics

The amount of goat meat and products traded in the world is approximately 68 thousand tons and its commercial value is approximately 400 million dollars in 2015. In the same period, approximately 6,2 million live goat trade was made in the world, and the financial value of this trade is approximately 515 million dollars. In other words, the annual trade volume of live goat and their meat products is approximately 1 billion dollars in the world. In the trade of live goat and their meat and products; while EU, Argentina, Australia, Cyprus, India, Mexico and New Zealand are net

exporter, Canada, China, Japan, Turkey, Russia, Ukraine and USA are net importer (Table 4.13).

Table 4.14. The Trade of Sheep Meat and Live Sheep in 2015 in the World and in Some Selected Countries

| 2015 | Import | | | | Export | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sheep | Sheep Meat | | Live Sheep | | Sheep Meat | | Live Sheep | | Trade Balance (1000$) |
| | (Tonne) | Value (1000$) | Amount (Head) | Value (1000$) | Amount (Tonne) | Value (1000$) | Amount (Head) | Value (1000$) | |
| **Africa** | 31.750 | 109.563 | 2.608.874 | 287.264 | 12.764 | 146.291 | 8.745.437 | 772.294 | 521.758 |
| **Americas** | 131.178 | 963.695 | 69.105 | 15.182 | 19.559 | 107.773 | 52.543 | 3.802 | -867.302 |
| **Asia** | 515.907 | 2.291.980 | 10.678.218 | 1.257.427 | 38.045 | 207.346 | 1.840.719 | 297.167 | -3.044.894 |
| **Europe** | 360.179 | 2.526.356 | 2.706.451 | 200.358 | 226.403 | 1.424.444 | 4.920.303 | 465.218 | -83.7052 |
| **Oceania** | 34.574 | 104.292 | 297 | 320 | 843.459 | 4.047.261 | 2.005.584 | 192.364 | 4.135.013 |
| **World** | 1.073.588 | 5.995.886 | 16.062.945 | 1.760.551 | 1.140.230 | 5.933.115 | 17.564.586 | 1.730.845 | -92.477 |
| **EU** | 348.399 | 2.386.671 | 2.559.459 | 190.947 | 220.867 | 1.393.802 | 4.773.154 | 455.143 | -728.673 |
| **Argentina** | 0 | 0 | 23 | 134 | 1.454 | 5.918 | 27 | 33 | 5.817 |
| **Australia** | 1.011 | 4.711 | 278 | 241 | 426.032 | 1.903.783 | 1.959.761 | 184.921 | 2.083.752 |
| **Brazil** | 7.390 | 45.743 | 82 | 35 | 0 | 1 | 185 | 278 | -45.499 |
| **Canada** | 19.118 | 136.117 | 6.554 | 1.071 | 153 | 552 | 5.513 | 441 | -136.195 |
| **Chile** | 22 | 127 | 20 | 79 | 5.040 | 28.117 | 0 | 0 | 27.911 |
| **China** | 246.521 | 847.988 | 22.404 | 22.813 | 3.551 | 21.999 | 33 | 5 | -848.797 |
| **Cyprus** | 1.155 | 6.205 | 0 | 0 | 8 | 38 | 0 | 0 | -6.167 |
| **India** | 53 | 809 | 0 | 0 | 21.596 | 128.229 | 38 | 2 | 127.422 |
| **Japan** | 18.139 | 133.406 | 0 | 0 | 0 | 0 | 0 | 0 | -133.406 |
| **Mexico** | 11.666 | 47.089 | 53.324 | 12.695 | 0 | 3 | 37 | 7 | -59.774 |
| **New Zealand** | 3.724 | 12.194 | 5 | 42 | 417.362 | 2.143.286 | 45.823 | 7.443 | 2.138.493 |
| **Norway** | 1.608 | 13.389 | 0 | 0 | 8 | 121 | 0 | 0 | -13.268 |
| **Paraguay** | 0 | 0 | 2.869 | 448 | 0 | 0 | 0 | 0 | -448 |
| **Turkey** | 0 | 0 | 2.387 | 522 | 18 | 399 | 4.500 | 861 | 738 |
| **Russia** | 3.793 | 19.666 | 826 | 274 | 23 | 207 | 35.472 | 1.760 | -17.973 |
| **Ukraine** | 7 | 120 | 27 | 2 | 12 | 30 | 907 | 56 | -36 |
| **USA** | 85.703 | 697.951 | 5.674 | 440 | 2.789 | 15.450 | 44.508 | 2.577 | -680.364 |
| **Uruguay** | 0 | 0 | 26 | 55 | 9.415 | 54.979 | 2.168 | 457 | 55.381 |

Source: Food and Agriculture Organization of the United Nations Statistics

The amount of sheep meat traded in the world is approximately 1.2 million tons and its commercial value is approximately 6 billion dollars in 2015. In the same year, approximately 17,5 million live sheep trade was made in the world, and the financial value of this trade is approximately 1.8 billion dollars. In other words, the annual trade volume of live sheep and their meat is approximately 8 billion dollars in the world. In the trade of live sheep and their meat; while Argentina, Australia, Chile,

India, New Zealand, Turkey and Uruguay are net exporter, EU, Brazil, Canada, China, Cyprus, Japan, Mexico, Norway, Paraguay, Russia, Ukraine and USA are net importer (Table 4.14).

## 4.5 Secrets of Success in High Meat Yield Countries

According to the data in the tables, it is observed that some countries produce higher meat per unit animal than other countries in terms of bovine and ovine meat yield. In other words, it is determined that some countries have higher meat yield than other countries in the production of bovine and ovine meat. Countries such as the EU, Canada, Cyprus, Japan and the USA have high meat yields in bovine meat production, while countries such as Australia, Cyprus, Japan, Mexico, and the USA have high meat yields in ovine meat production. In order to determine the reason behind the success of these countries that are successful in meat yield, the following results were reached as a result of the researches made by considering the factors affecting the fattening performance mentioned in the 3rd chapter.

### 4.5.1 Countries with High Bovine Meat Yields

Considering the animal breeds in countries with high beef yield, it is generally observed that there are breeds with high meat yield. For example, Hereford, Angus, Charolaise, Simmental, Holstein and Limousine are common in the EU, America and Canada, while there are Aberdeen-Angus and Hereford breeds in Japan, and Holstein and Shorthorn breeds in Cyprus (Canadian Cattlemen's Association, 2013; Nakatsuji, 2009).

These countries have been given great importance to animal health. Since the diet and immunity of cattle are closely related, balanced feeding programs are critical to the health and welfare of the cattle. For this reason, in these countries, care is taken to the health of cattle by paying maximum attention to the conditions of care and

feeding. In order to improve the rumen size and muscle growth for young calves, a diet based on high quality roughage is generally applied, while in the future, concentrated feed based nutrition programs are implemented in line with the needs of the animals. In order to prevent the cattle from harming each other and to ensure their welfare, cattle are grouped according to their size and raised in small paddocks (Suzuki, 2014).

### 4.5.2 Countries with High Ovine Meat Yields

Similar to countries with high bovine meat yield, in countries with high ovine meat yield, animal breeds generally consist of breeds with high meat yield. While Boer goats and merinos' sheep are bred in Australia, Damascus goat and Local Breed Crosses, Chios sheep and Fat tailed Crosses are widely bred in Cyprus. On the other hand, while Suffolk's, Hampshire's, Southdown's, and Cheviots are common examples of sheep breeds in the USA, Alpine, Saanen, Boer and Angora are excellent examples of goat breeds in the USA.

Similar to countries with high bovine meat yield, in countries with high ovine meat yield, preventive medicine is very important for animal diseases. For this reason, it carries out reclamation studies in order to obtain more durable and productive breeds so that the changing climatic conditions do not prepare the ground for animal diseases. In other words, these countries have been engaged in animal reclamation studies that will be more compatible with the changing climatic conditions in their geographies against the climate change prevailing all over the world. For example, as a result of reclamation studies in Australia, animals eat the same amount of feed, but give more meat (Donat, 2019; Yildirim, 2019).

## 4.6 Causes of Failure' in Low Meat Yield Countries

Unfortunately, not all countries apply the right practices. Countries such as the China, India, Russia and Ukraine have low meat yields in bovine meat production, while countries such as India, Paraguay, Argentina and Chile have low meat yields in ovine meat production. As a result of the researches carried out by considering the factors affecting the fattening performance in order to determine the underlying causes of the failure of the countries that were unsuccessful in meat yield, as was done when examining the successful countries before, the following conclusions were reached.

### 4.6.1 Countries with Low Bovine Meat Yields

Countries with low meat productivity show similarities with each other on some issues. One of these similarities is that although there are cattle breeds with high meat yield in countries, most of the cattle assets are comprised of the local cattle breeds of their own countries. For example, local Chinese yellow cattle is widely available in China, while local breeds such as Tharparkar, Hariana, Kankrej, Gir, Ongole, Krishna Valley and Deoni are found in India. Another similarity is that cattle diseases are common in these two countries. There are many cases of bovine disease in these countries, including outbreaks of Foot and Mouth Disease, Brucellosis, Anthrax, and Bovine Tuberculosis. Due to these diseases, high mortality and yield loss are experienced.

### 4.6.2 Countries with Low Ovine Meat Yields

Countries with low productivity of ovine meat generally have local sheep and goat breeds that have low meat productivity, just like countries with low bovine meat productivity. Studies examining the reasons for the low productivity of sheep meat in these countries point to inefficient feeding conditions, lack or insufficient

supplementary feeding in critical seasons, diseases that cause high mortality and loss of productivity, and a serious lack of organized effort to achieve genetic improvement.

In summary, when the reasons behind the success of these countries, which are successful in meat production, are examined, it overlaps with the information given in the 3rd section under the title of factors affecting fattening performance. However, it is clear that the countries that fail in meat yield do not match the information given in chapter 3. In other words, countries, which are successful in meat yield, achieve high meat yields per animal thanks to the true strategies that they have followed. Countries with such high productivity have achieved this productivity increase thanks to the conscious production they have made by taking into account the factors that affect the fattening performance we mentioned in chapter 3. Unfortunately, despite they have the high bovine and ovine stocks, some countries have low productivity per unit of animal. These countries could not reach the desired meat yield due to the traditional production, without taking into account the factors affecting the fattening performance. In the next section, the livestock sector in the TRNC will be examined and the situation in the red meat sector will be discussed. During the examination, the truths and errors made by using the information in this section will also be included.

# Chapter 5

# AN INVESTIGATION OF THE TRNC RED MEAT AND LIVESTOCK SECTOR

## 5.1 Analysis of the TRNC Livestock Sector

### 5.1.1 Livestock Numbers and Genetic Resources

The livestock sector in the TRNC is divided into 4 sub-sectors as cattle, sheep, goat and poultry breeding. However, poultry breeding was not included in the study, as this study examines only the red meat sector. A Holstein cattle, which is known for its high milk yield throughout the world, is the only cattle breed in the TRNC. In other words, all of the existing cattle assets in the country consist of dairy breed. The sheep population in the country consists of Chios sheep, Awassi sheep, Cyprus Fat-tailed sheep and crossbreeds of these breeds. On the other hand, while the majority of the goat population in the country is Damascus goats, mountain goats and their hybrids in different degrees, the number of Saanen and Alpine goats, which have high milk yield, has been increasing rapidly in recent years. (TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı, 2017; Wilson, 2017). When the characteristics of the animal breeds that found in the country are examined, it is observed that they are generally dairy and combined breeds (Table 3.1). In other words, there is not any meat breeds in the country.

The presence of sheep is higher than other species. In other words, sheep is the breed with the highest number of animals in the TRNC, followed by goats and cattle. From 1975 to 2018, the 43-year period, while there was an increase in the number of

sheep from time to time, it has been decreased from time to time. In other words, the number of sheep, which was approximately 148,000 in 1975, increased to 251,000 in 2015, and declined to approximately 195,000 in 2018 (Figure 5.1).

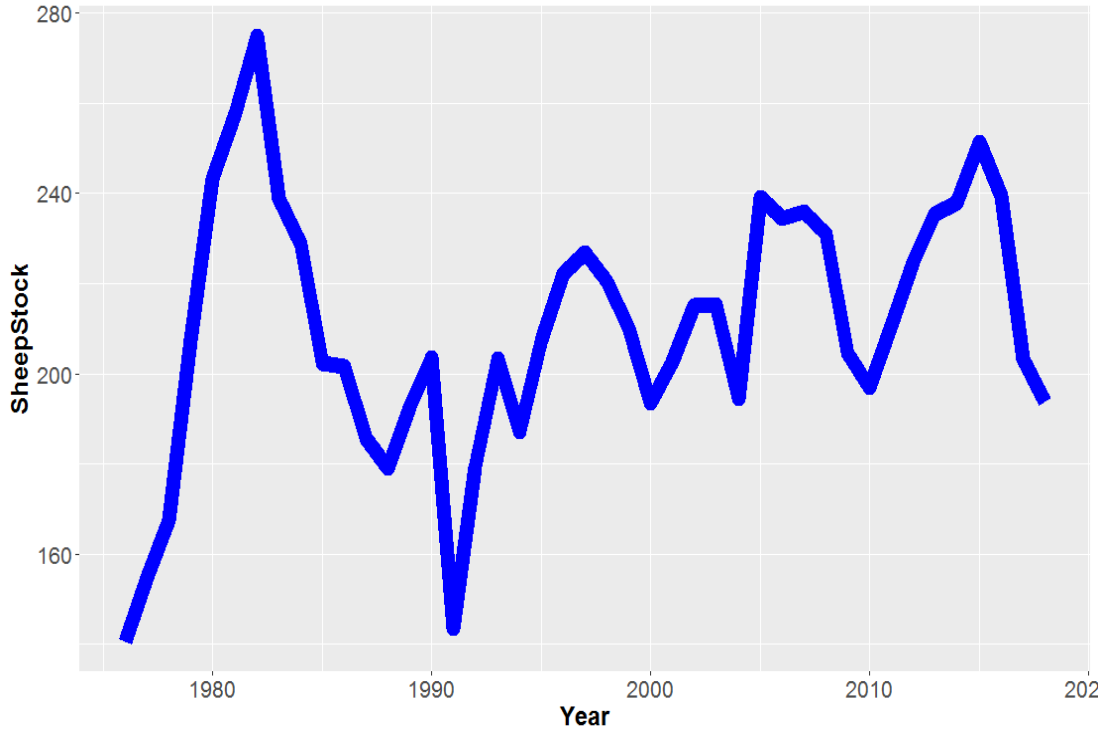


Figure 5.1. Total Number of Sheep in TRNC from 1975 to 2018 (Thousand Animal)
Source: TRNC Ministry of Agriculture and Natural Resources

From 1975 to 2018, while there was an increase in the number of goat from time to time, it has been decreased from time to time. In other words, in the 43-year period, the situation in sheep breeding was also experienced in goat breeding. The number of goat, which was approximately 65,000 in 1975, increased to 102,500 in 2015, and declined to approximately 85,000 in 2018 (Figure 5.2). Shortly, there has not been a steady increase in the number of both sheep and goats during the 43-year period. During this time, a fluctuating has emerged in the number of sheep and goats.

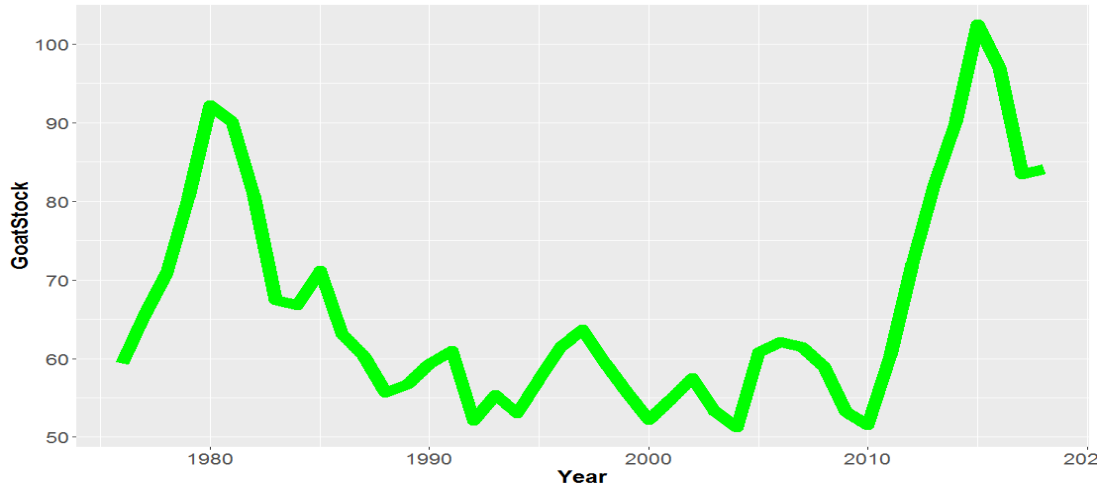


Figure 5.2. Total Number of Goat in TRNC from 1975 to 2018 (Thousand Animal)
Source: TRNC Ministry of Agriculture and Natural Resources

In contrast to sheep and goats, it is possible to say that the number of cattle has increased steadily over the 43-year period. The number of cattle, which was 10,000 in 1975, reached approximately 70,000 in 2018 (Figure 5.3). It is observed that the number of cattle has increased much faster than other species in the 43-year period. The main reason for this situation is the preference of cattle breeding, which has a higher milk yield than sheep and goats, since the support given to the producers in the country is given over the raw milk price.

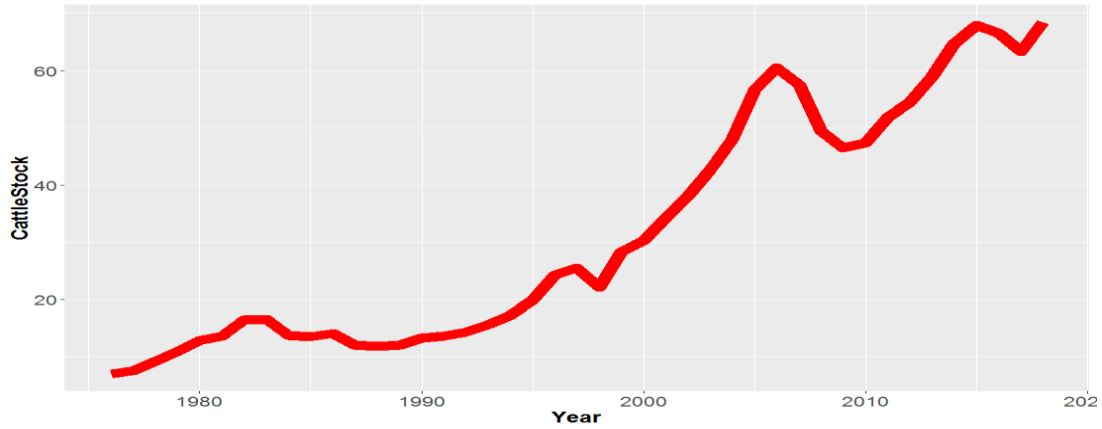


Figure 5.3. Total Number of Cattle in TRNC from 1975 to 2018 (Thousand Animal)
Source: TRNC Ministry of Agriculture and Natural Resources

In short, it is observed that there was an increase in all animal species in 2018 compared to 1975, even though there was a fluctuation in the presence of small ruminants in the 43-year period.

### 5.1.2 Production Systems

According to the TRNC Veterinary Department registration system, there are a total of 4.933 livestock enterprises in the country as of December 1, 2016. While there are 1.086 bovine enterprises in the country, there are 4.140 ovine enterprises. While there are 538 enterprises that only breed cattle, there are 3.592 enterprises for only ovine farming. The number of enterprises engaged in both bovine and ovine farming is 548. Thus, the total number of bovine and ovine farming enterprises in the country is 4.678 (TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı, 2017).

As of 2016, there are 1.086 cattle enterprises in the country. There are 630 cattle enterprises with a number of 1-25 animals in the country. These enterprises have an average of 7.75 animals and these are very small scale enterprises. In other words, 58% of the cattle enterprises in the country are very small scale enterprises. On the other hand, although 107 cattle enterprises with 201 and more animals constitute 9.85% of the total cattle enterprises, they have 52.9% of the country's cattle assets (Table 5.1).

Table 5.1. Business Size of Cattle Farms and Percentage Distribution of Animal Numbers (2016)

| Cattle Farm Size | Number of Farm | % of Farm | Number of Cattle | Average Number of Cattle | % of Cattle |
|---|---|---|---|---|---|
| 1-25 | 630 | 58,01 | 4.882 | 7,75 | 7,33 |
| 26-50 | 123 | 11,33 | 4.253 | 34,58 | 6,39 |
| 51-100 | 130 | 11,97 | 9,084 | 69,88 | 13,65 |
| 101-150 | 66 | 6,08 | 7.997 | 121,17 | 12,01 |
| 151-200 | 30 | 2,76 | 5.125 | 170,83 | 7,70 |

| | | | | | |
|---|---|---|---|---|---|
| 201-250 | 37 | 3,41 | 8.055 | 217,70 | 12,10 |
| 251-500 | 58 | 5,34 | 18.804 | 324,21 | 28,25 |
| 501+ | 12 | 1,10 | 8.357 | 696,42 | 12,56 |
| Total | 1086 | 100 | 66.557 | 61,28 | 100 |

Source: TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı (2017)

Sheep breeding has an important place in the country's animal husbandry. Although the geographical structure and climatic conditions of the country are extremely suitable for sheep breeding, the milk and meat yield obtained from sheep farming are not at the desired level (TRNC Ministry of Agriculture and Natural Resources Tarım Master Plan, 2017). According to 2016 statistics, there are 3.748 sheep farming enterprises in the country. There are 2.367 sheep enterprises with a number of 0-50 animals in the country. These enterprises have an average of 21.11 animals and these are very small scale enterprises. In other words, 63.15% of the sheep enterprises in the country are very small scale enterprises. On the other hand, although 650 sheep enterprises with 101 and more animals constitute 17.35% of the total sheep enterprises, they have 55.96% of the country's sheep assets (Table 5.2).

Table 5.2. Business Size of Sheep Farms and Percentage Distribution of Animal Numbers (2016)

| Sheep Farm Size | Number of Farm | % of Farm | Number of Sheep | Average Number of Sheep | % of Sheep |
|---|---|---|---|---|---|
| 0-50 | 2.367 | 63,15 | 49.974 | 21,11 | 20,87 |
| 51-100 | 731 | 19,5 | 55.480 | 75,89 | 23,17 |
| 101-150 | 293 | 7,82 | 38.260 | 130,58 | 15,98 |
| 151-200 | 151 | 4,03 | 27.997 | 185,41 | 11,69 |
| 201-300 | 126 | 3,36 | 32.489 | 257,84 | 13,57 |
| 301-500 | 68 | 1,81 | 25.742 | 378,55 | 10,75 |
| 501+ | 12 | 0,32 | 9.491 | 790,91 | 3,96 |
| Total | 3.748 | 100 | 239.433 | 63,88 | 100 |

Source: TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı (2017)

Just like sheep breeding, goat breeding is a branch of production that has adapted to the country's geographic, climatic and breeding conditions. In addition, the consumption habits of the people of the country are also directed towards goat products. Particularly, some of the red meat consumption is met from goat meat, while goat milk is preferred in the production of halloumi that is the traditional product of the country. Therefore, goat breeding is also an important production area (TRNC Ministry of Agriculture and Natural Resources Tarım Master Plan, 2017). According to 2016 records, there are a total of 2.626 goat breeding enterprises in the country. There are 2.138 goat enterprises with a number of 0-50 animals in the country. These enterprises have an average of 14.18 animals and these are very small scale enterprises. In other words, 81.42% of the goat enterprises in the country are very small scale enterprises. On the other hand, although 211 goat enterprises with 101 and more animals constitute 8.03% of the total goat enterprises, they have 49% of the country's goat assets (Table 5.3).

Table 5.3. Business Size of Goat Farms and Percentage Distribution of Animal Numbers (2016)

| Goat Farm Size | Number of Farm | % of Farm | Number of Goat | Average Number of Goat | % of Goat |
|---|---|---|---|---|---|
| 0-50 | 2.138 | 81,42 | 30.326 | 14,18 | 31,26 |
| 51-100 | 277 | 10,55 | 19.137 | 69,08 | 19,72 |
| 101-150 | 86 | 3,27 | 10.613 | 123,4 | 10,94 |
| 151-200 | 53 | 2,02 | 9.162 | 172,86 | 9,44 |
| 201-300 | 34 | 1,29 | 8.301 | 244,14 | 8,56 |
| 301-500 | 21 | 0,8 | 8.321 | 396,23 | 8,58 |
| 501+ | 17 | 0,65 | 11.163 | 656,64 | 11,51 |
| Total | 2.626 | 100 | 97.023 | 36,95 | 100 |

Source: TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı (2017)

In line with this statistical information, it is clearly observed that most of the livestock enterprises in the TRNC are small-scale. According to Wilson (2017), most

of the small enterprises are managed in conjunction with part-time basis and crop production. Due to the fact that most of the registered producers in the country are not real producers and the primary source of income for these producers is not livestock, the necessary investments are not made in livestock enterprises (Besim & Sertoğlu, 2015). For example, milking in ovine farms is mostly done by hand under primitive conditions. Few of the enterprises have a simple separate milking parlor and a small number of modern milking parlors (TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı, 2017). Moreover, the facilities that used for housing, feeding, control and management of animals are often primitive. In other words, most of the pens are lacking in infrastructure. Furthermore, hygiene is generally low standard. There is little interest in biosecurity and animal health services are inadequate (Wilson, 2017).

### 5.1.3 Performance

There is no study examining the meat performance of large and small ruminants in the TRNC. For this reason, based on the graphs created using bovine and ovine carcass meat yield data obtained from the website of the TRNC Ministry of Agriculture and Natural Resources, comments were made on the carcass meat yield in the TRNC by comparing the information given in the 4th chapter.

In the study, 2015 was taken as a basis instead of 2018 for comparison. Because when we look at the number of animals in the TRNC, the peak was reached in all categories in 2015 except sheep. In sheep farming, such a high number was reached for the first time after 1981. However, after 2015, it is observed that there was a significant decrease in the number of animals until 2018. The main reason for this situation is the rapid depreciation of Turkish Lira (TL) in 2015. Due to the rapid depreciation of TL, the livestock producers, whose costs increased, sent their

breeding animals to slaughter. Slaughtering of breeding animals artificially increases carcass yield. The aim of the study is to determine the existing situation in the livestock sector and to find solutions to them. Therefore, in order to determine the current situation in the country, it is necessary to learn the real carcass yield in the TRNC. Thus, in the study, the year 2015 was taken as a basis while determining the situation and making comparisons.

In the study, the meat yield per unit of animal was compared with the south of the country. The reason why it is compared to Southern Cyprus is that it has the same climatic and geographical conditions. In fact, when comparing meat yield, comparisons with developed countries such as the Netherlands are more preferred. However, such a comparison was not made in this study because the Netherlands has high quality pasture areas that are indispensable for livestock activities due to its climate and geographical features, so livestock activities are highly developed. However, TRNC does not have pasture areas due to its arid climate. For this reason, it will not be meaningful to make comparisons with countries such as the Netherlands. For this reason, TRNC was compared with Southern Cyprus due to having the same climatic and geographical conditions.

Cattle carcass yield, which was below 200 kilograms in 1976, increased over time and reached approximately 280 kilograms in 2010. However, it later declined to 235 kilograms in 2015 (Figure 5.4). When the cattle carcass yield in TRNC is compared with the world average, it is observed that it is above the world average that is 217,8 (Table 4.5).

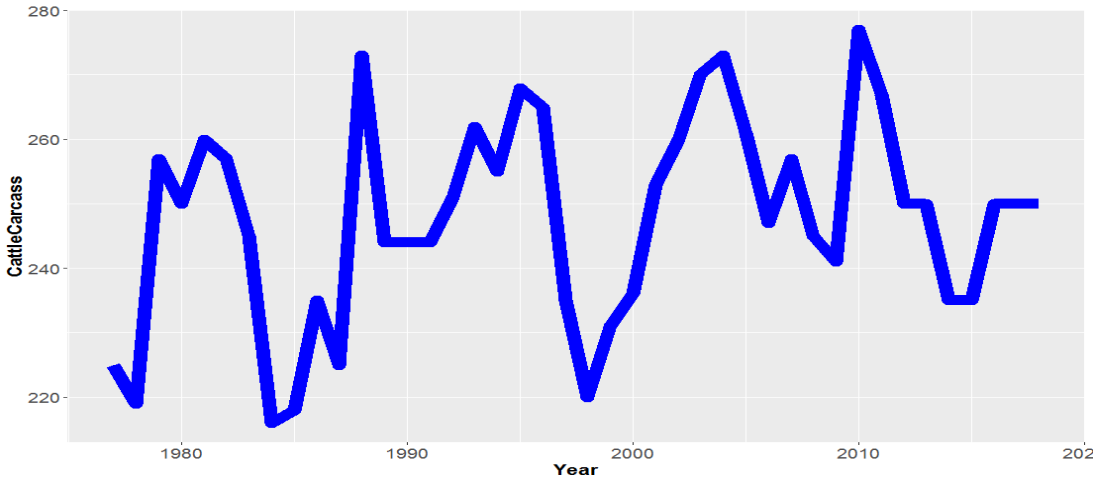


Figure 5.4. Carcass Weight of Cattle in TRNC from 1976 to 2018 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

However, this productivity is well below the productivity in the south of the country that is 331,6 (Figure 5.5). Moreover, TRNC cattle carcass meat yield per animal is less than not only from South Cyprus, but also Turkey which had many problems in the livestock sector in recent years (Table 4.5).

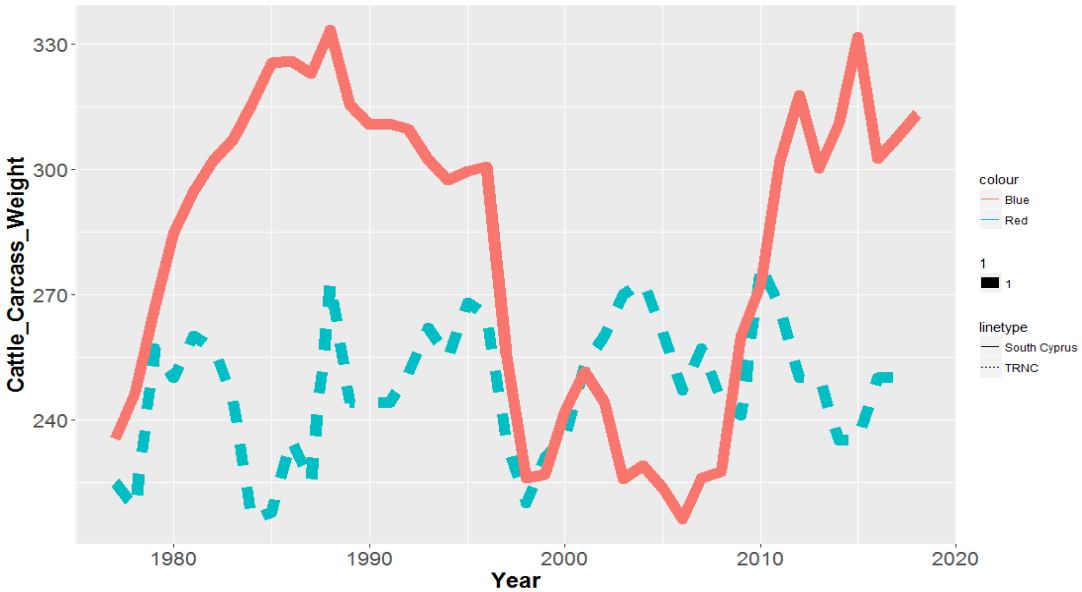


Figure 5.5. Carcass Weight of Cattle in South Cyprus & TRNC from 1976 to 2015 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

Sheep carcass yield, which was below 19 kilograms in 1976, increased over time and reached 23,4 kilograms in 1994. However, it later declined to 19,7 kilograms in 2015 (Figure 5.6).

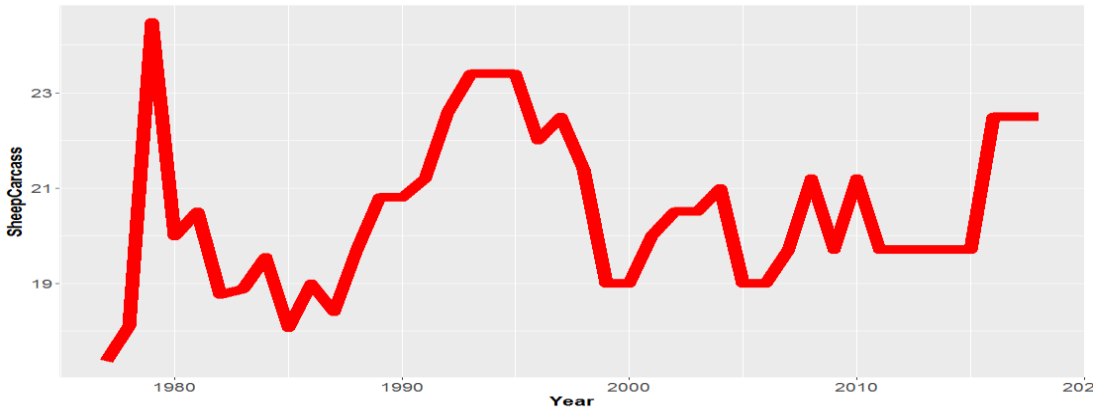


Figure 5.6. Carcass Weight of Sheep in TRNC from 1976 to 2018 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

When the sheep carcass yield in TRNC is compared with the data in chapter 4, it is observed that it is above the world average that is 16,8 (Table 4.9). However, this productivity is well below the productivity in the south of the country that is 21,4 (Figure 5.7).

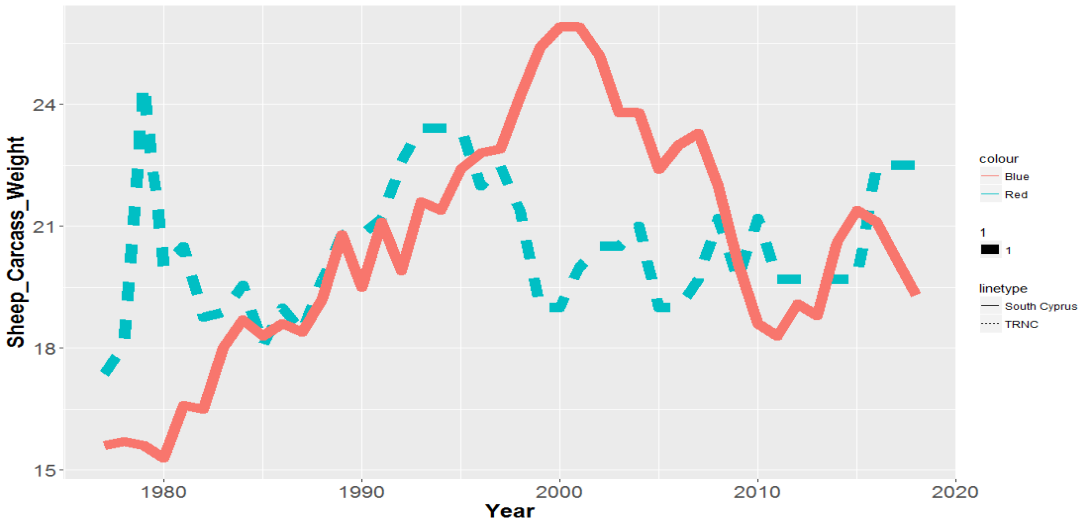


Figure 5.7. Carcass Weight of Sheep in South Cyprus & TRNC from 1976 to 2018 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

Goat carcass yield, which was 18 kilograms in 1976, increased over time and reached 22,4 kilograms in 1993. However, it later declined to 16 kilograms in 2015 (Figure 5.8).

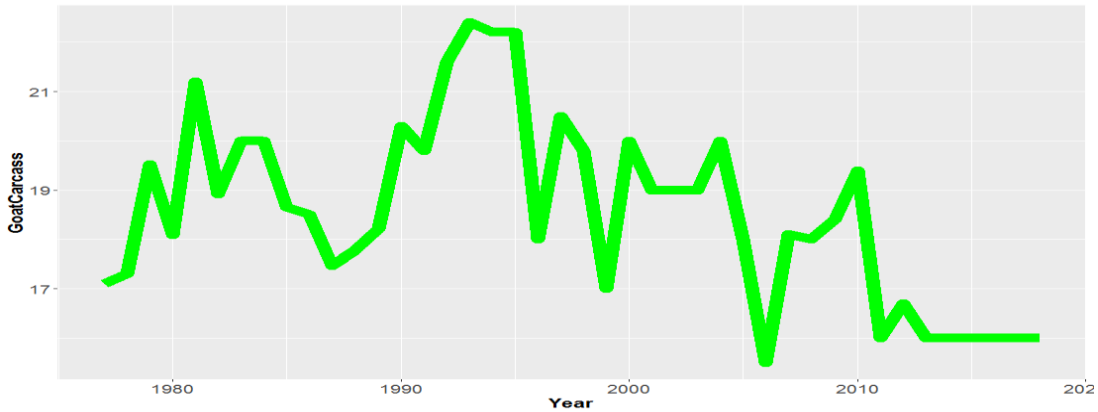


Figure 5.8. Carcass Weight of Goat in TRNC from 1976 to 2018 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

When the goat carcass yield in TRNC is compared with the data in chapter 4, it is observed that it is above the world average that is 11,9 (Table 4.7). However, this productivity is well below the productivity in the south of the country that is 21,7 (Figure 5.9).

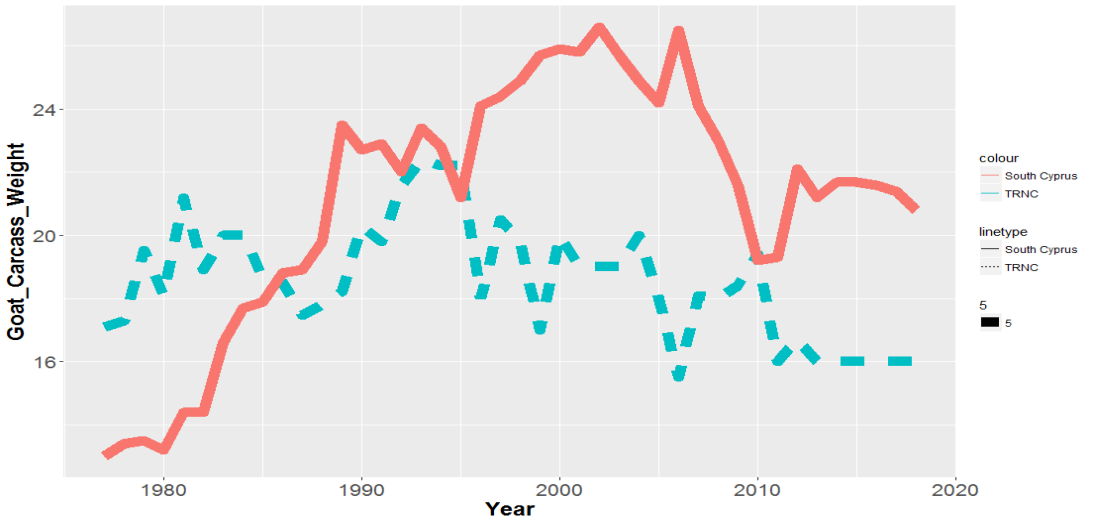


Figure 5.9. Carcass Weight of Goat in South Cyprus & TRNC from 1976 to 2018 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

## 5.2 Analysis of the TRNC Red Meat Sector

### 5.2.1 TRNC Red Meat Production and Consumption

Every society has unique eating habits. Since the island has hosted many civilizations in the historical process, the Cyprus Cuisine has gained its present richness thanks to the interaction with all the communities that are related to the island. The use of red meat is high in Turkish Cypriot cuisine. Cyprus Meatballs, Şeftali kebab, Küp kebab, Molohia, Kolokas, Pastırma and Samarella are specific to traditional Turkish Cypriot cuisine dishes. The high demand for red meat in meals has even caused dolma that made without the use of meat to be called "fake dolma" among the people.

Per capita consumption of red meat in the TRNC is well above the world average. Although worldwide total meat consumption was 43.22 kg in 2015, red meat consumption was approximately 12 kg. Moreover, while red meat consumption is approximately 11 kg in South Cyprus, it is approximately 19 kg in Turkey (Table 4.10). On the other hand, per capita red meat consumption was 36.33 kg in the TRNC in 2015. While consumption of red meat in TRNC is 3 times more than worldwide average and southern Cyprus, it is 2 times more than Turkey. These statistical data prove that red meat is an important product in Turkish Cypriot cuisine (Figure 5.10). Although red meat is an important product in Turkish Cypriot cuisine, it is observed that the consumption of red meat per capita in the long term is 34 kg per person on average, despite the increase in the income of the consumers (Figure 5.10). The main reason why the red meat consumed per capita did not increase over time is the increase in red meat prices over time. One of the main reasons for the increase in red meat prices is the meat smugglers who have become cartels. These smugglers increase the prices of livestock in the local market in order to increase

their profit margins, causing red meat prices to rise. Due to the rising meat prices, there is not much change in the amount of red meat consumed per capita despite the increase in the income of the consumers.

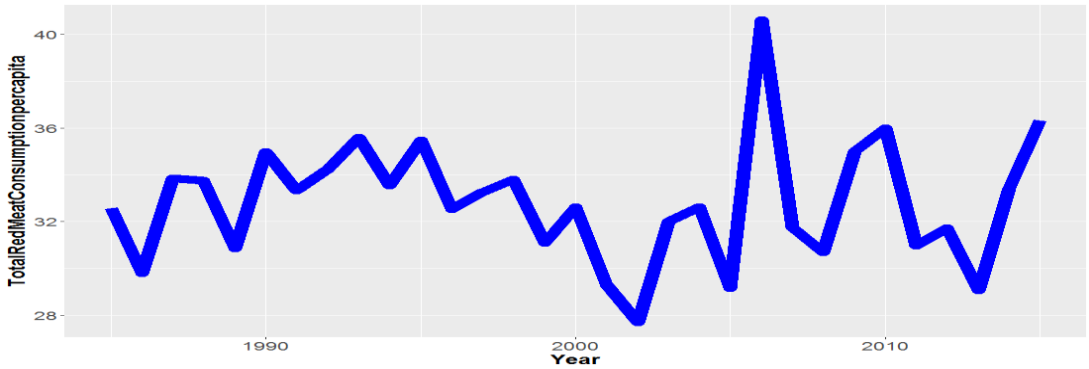


Figure 5.10. Total Red Meat Consumption per capita in TRNC from 1985 to 2015 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

When meat consumption is examined according to animal species, it is observed that red meat consumption is generally obtained from beef and lamb. In other words, Turkish Cypriots prefer beef and lamb when consuming red meat (Figure 5.11).

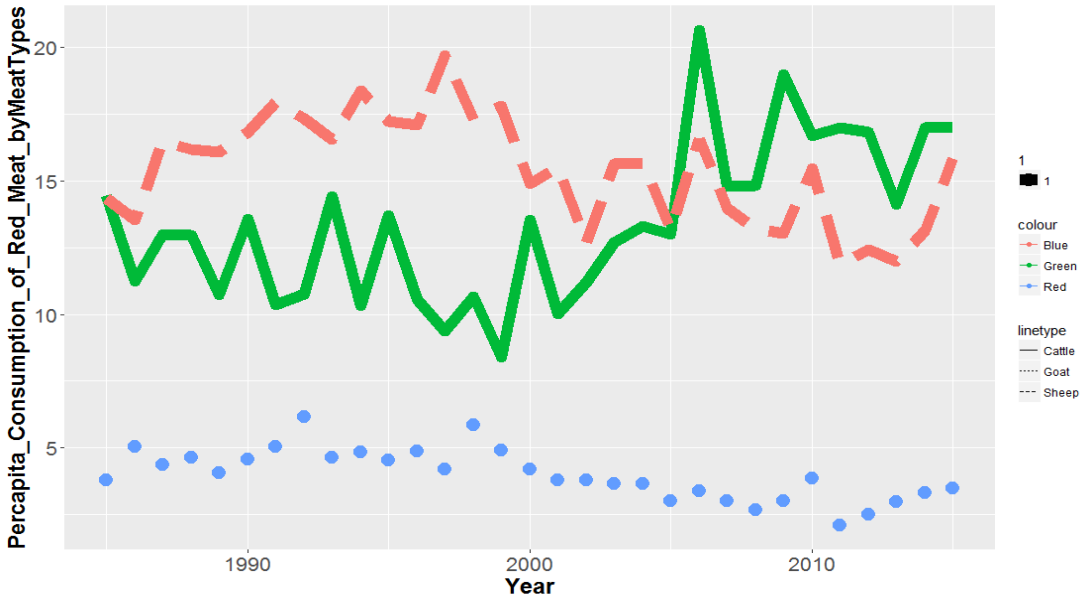


Figure 5.11. Bovine and Ovine Meat Consumption in TRNC from 1985 to 2015 (kg)
Source: TRNC Ministry of Agriculture and Natural Resources

When the red meat production in the TRNC is examined, a picture similar to the consumption of red meat emerges. As mentioned in the previous section, the most important factor affecting the production of a good is the amount of demand for that good. Due to the demand for cattle and sheep meat over time, the production of these two types of meat has increased. However, since the demand for goat meat is not high, it is clear that there is not much increase in this type of meat production (Figure 5.12).

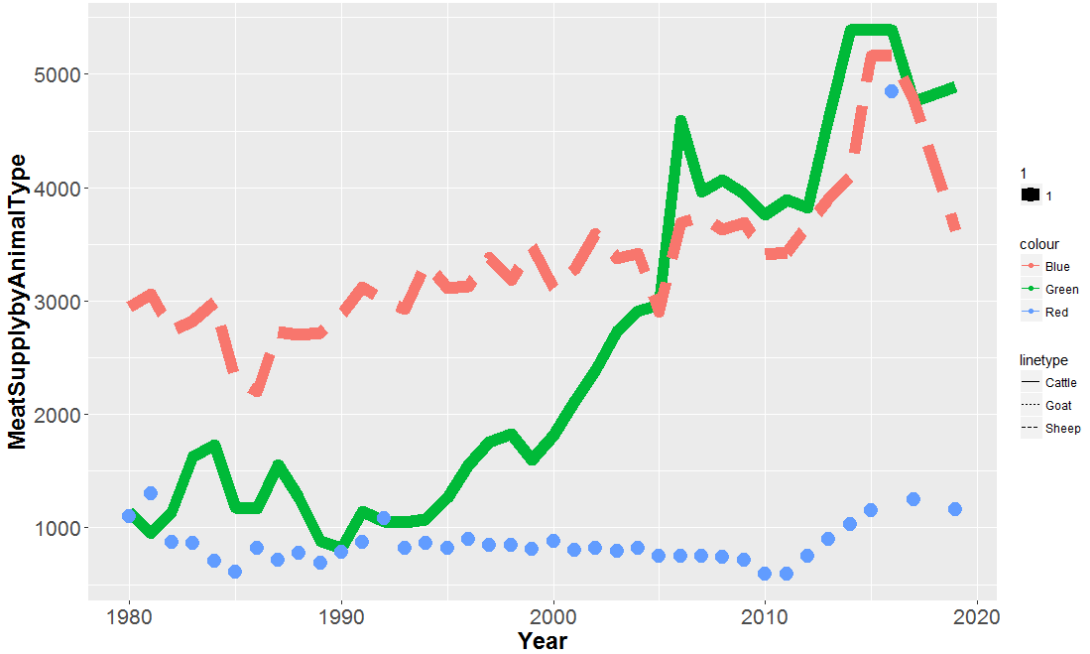


Figure 5.12. Bovine and Ovine Meat Production in TRNC from 1976 to 2018 (Tonne)
Source: TRNC Ministry of Agriculture and Natural Resources

Similar to the TRNC, the production and consumption of goat meat is low worldwide despite the importance of its type. While goat meat is less popular in western countries, it serves as an important source of meat in developing countries. However, perceptions of Western people about goat meat are changing due to the health benefits of consuming lean meat with reduced fat and cholesterol content. In other words, consumers in the Western world are changing their perceptions of goat

meat due to its low fat and cholesterol content so goat meat consumption globally has increased in the last 20 years. Webb (2014) emphasized in his writing that this sector has huge potential to supply food for a growing human population. As Webb (2014) stated in his writing, the production and consumption of goat meat is expected to increase in the future in the TRNC as it is a healthier meat.

### 5.2.2 TRNC Red Meat Market analysis in the form of Supply and Demand

Considering the total red meat production and per capita consumption of red meat by years, it is seen that the total production has increased in parallel with the consumption of red meat. However, it should not be forgotten that especially in recent years, TRNC is a country that has experienced development in service sectors such as tourism and education. These sectors bring in a significant number of tourists and students to the country. Considering these factors, examining the red meat market in terms of supply and demand will help to obtain more accurate results in the study.

#### 5.2.2.1 Demand for Red Meat

There are many factors that affect the demand for red meat. As mentioned before, according to Sakarya & Aydın (2011), demand for the meat depends on the annual population growth, amount of production, the distribution of the population by age and sex, the level of income and its distribution, the prices of the products and the price factors of other products.

##### 5.2.2.1.1 Population Size

There is a steady increase in the population of the country. During the 20-year period between 1977 and 1997, the population, which was 150 thousand, reached 200 thousand. Since the beginning of the 2000s, the population has increased more rapidly. The population of the country has almost doubled in recent years. The

population, which was approximately 210 thousand in 2000, increased by 73.4 percent in 2018 and reached 363 thousand (Figure 5.13).

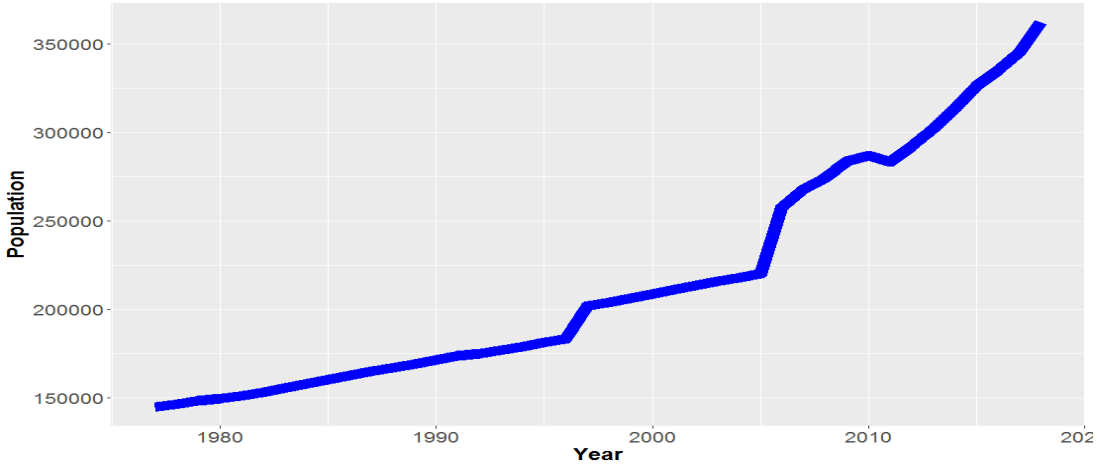


Figure 5.13. TRNC Population from 1977 to 2018
Source: TRNC State Planning Organization

#### 5.2.2.1.2 Gross National Product (GNP)

When looking at the GNP of the TRNC, it is seen that there has been a continuous increase from 1980 to 2019. GNP, which was 4.248 million TL in 1980, reached 18,568 million TL in 2019 (Figure 5.14).

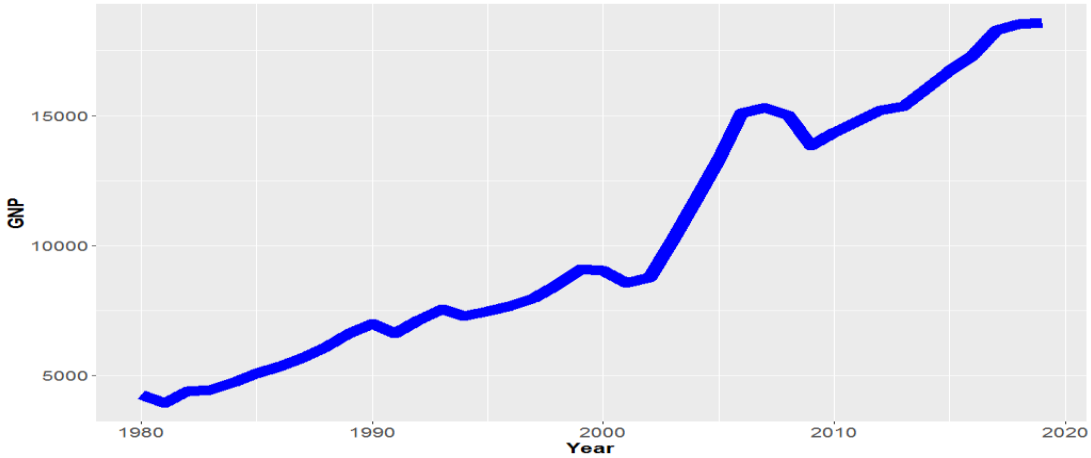


Figure 5.14. TRNC GNP from 1980 to 2019 (1977 Price, Million TL)
Source: TRNC State Planning Organization

#### 5.2.2.1.3 Minimum Wage

With this increase in GNP, it is observed that there has been an increase in the minimum wage in the country. The minimum wage, which was 13,000 YTL in 1981, became 550,000,000 YTL in 2004. With the removal of 6 zeros from the YTL in 2005, the minimum wage, which was 720 TL in 2005, became 2365 TL in 2018 (Table 5.4).

Table 5.4. Minimum Wage from 1981 to 2018

| Year | Minimum Wage (YTL) | Year | Minimum Wage (YTL) | Year | Minimum Wage (TL) |
|---|---|---|---|---|---|
| 1981 | 13.000 | 1993 | 1.373.000 | 2005 | 720 |
| 1982 | 22.000 | 1994 | 3.000.000 | 2006 | 780 |
| 1983 | 24.270 | 1995 | 9.420.000 | 2007 | 950 |
| 1984 | 30.300 | 1996 | 14.800.000 | 2008 | 1.060 |
| 1985 | 46.000 | 1997 | 23.000.000 | 2009 | 1.237 |
| 1986 | 75.000 | 1998 | 50.250.000 | 2011 | 1.300 |
| 1987 | 90.000 | 1999 | 85.000.000 | 2013 | 1.415 |
| 1988 | 121.000 | 2000 | 137.000.000 | 2014 | 1.560 |
| 1989 | 205.001 | 2001 | 200.000.000 | 2015 | 1.730 |
| 1990 | 340.500 | 2002 | 320.000.000 | 2016 | 1.834 |
| 1991 | 520.000 | 2003 | 440.000.000 | 2017 | 2.020 |
| 1992 | 806.000 | 2004 | 550.000.000 | 2018 | 2.365 |

Source: TRNC State Planning Organization

#### 5.2.2.1.4 Number of Students

In addition to the positive developments in GNP and the minimum wage, there have been developments in the tourism and higher education sectors in the country in recent years. There is a steady increase in the number of students studying at TRNC universities, excluding Cypriots. There were almost no students in the 1980s. While about 40 thousand students received education in the higher education sector between 2005 and 2011 in the TRNC, the number of students has increased rapidly since 2011. The number of students has doubled in the last 10 years and has shown a

serious success. While the number of students was 80,874 in the academic year of 2016-2017, this number increased by 8.3 percent in 2017-2018, reaching 87,607 students (Figure 5.15).

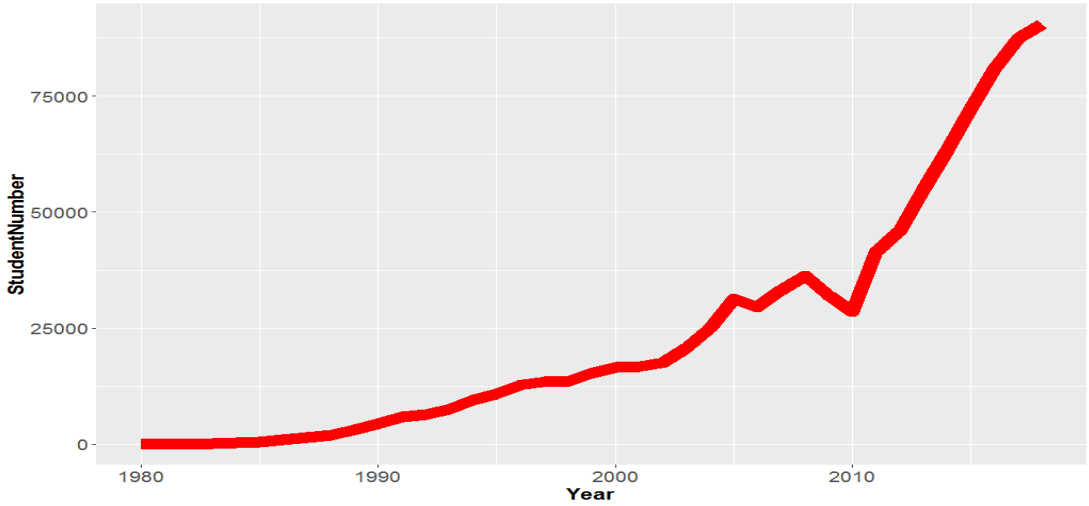


Figure 5.15. Number of Students Studying at TRNC Universities (Except Cypriots)
Source: TRNC State Planning Organization

#### 5.2.2.1.5 Number of Tourists

Similar to the developments in the higher education sector, there have been positive developments in the tourism sector in recent years. There is a steady increase in the number of tourists staying in touristic facilities in the TRNC, except Cypriots. While approximately 400 thousand tourists were accommodated in the TRNC between 2007 and 2010, the number of tourists has increased rapidly since 2010. The number of tourists has almost tripled in the last 10 years, making it a serious success. While the number of tourists was 870 thousand in 2016, this number increased by 21.8 percent in 2017 and reached 1,060 thousand tourists (Figure 5.16).

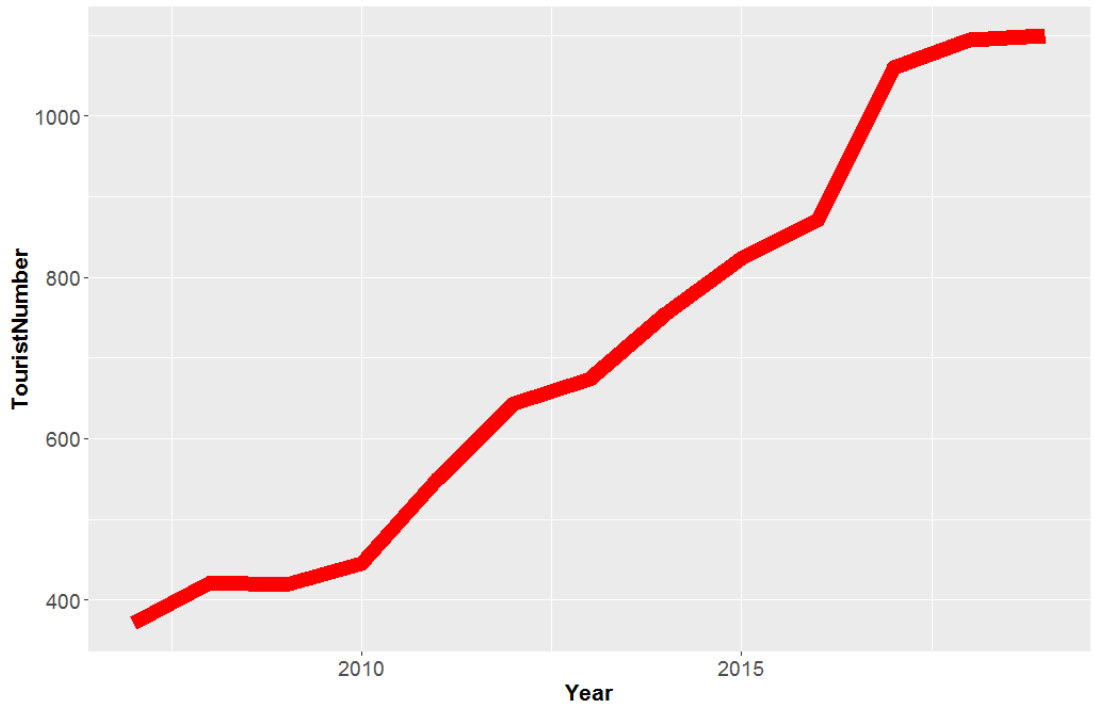

Figure 5.16. Number of Tourists in TRNC from 2007 to 2019 (Thousand People)
Source: TRNC State Planning Organization

In addition to the increase in the population, GNP and income of the country over the years, the service sectors such as higher education and tourism bring more tourists and students to the country than the population of the country, which has significantly increased the demand for red meat. Moving from the work of Sakarya & Aydın (2011), it is possible to say that the demand for red meat has increased significantly over the years due to the increase in population, GNP, income, number of students and tourists.

#### 5.2.2.2 Supply for Red Meat

Although there have been fluctuations in the supply of red meat from the past to the present, it is possible to mention that it has increased in general. The supply of red meat, which was 5.189 tons in 1980, increased over time and approximately 10.500 tons of red meat was produced in 2016, which was the highest level (Figure 5.17).

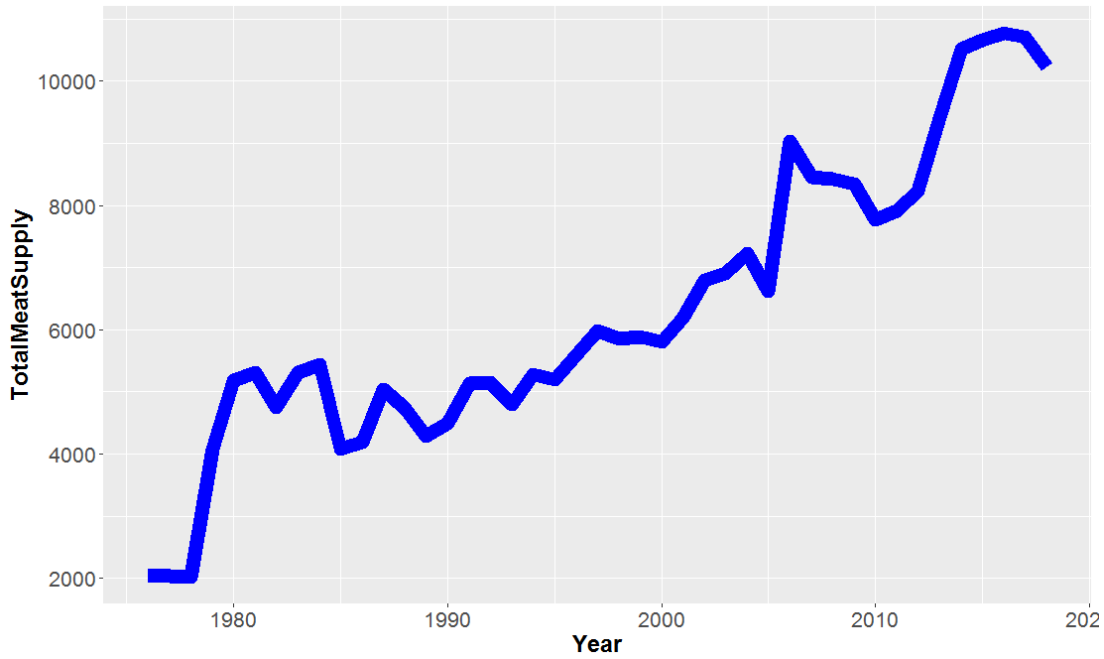

Figure 5.17. Total Meat Supply in TRNC from 1980 to 2019 (Tonne)
Source: TRNC State Planning Organization

When red meat supply is reviewed by animal species, cattle, which had the least meat supply in 1980, draws attention as the species that supplied the most meat after 2005. In other words, while the beef supply was 1,145 tons in 1980, the beef supply has increased over the years, reaching the highest level at 5,387 tons in 2014 and 2016. The sheep, which supplied the highest meat supply with 3.000 tons of meat in the 1980s, increased meat supply less than cattle over the years and became the second species after cattle with 5.162 tons of meat supply in 2016. Goat, which had the least meat supply with 1.099 tons of meat supply in the 1980s, did not show much increase in meat supply over the years, but reached the highest level with 1.253 tons of meat supply in 2017 (Figure 5.18).

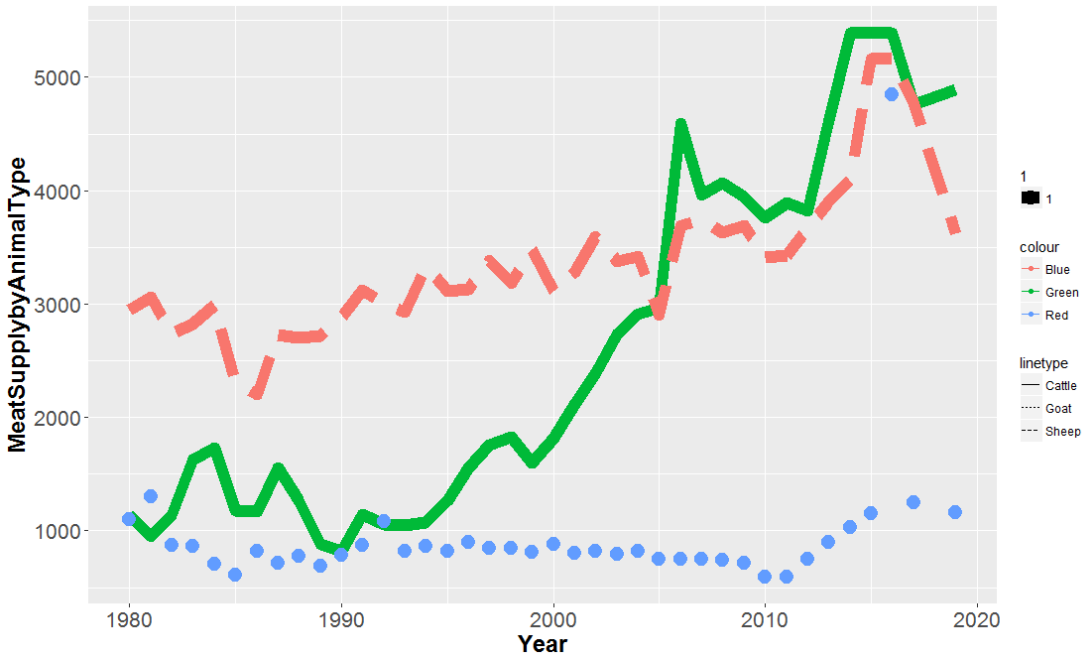


Figure 5.18. Meat Supply by Animal Type in TRNC from 1980 to 2019 (Tonne)
Source: TRNC State Planning Organization

Considering both the total and species-based red meat supply, there was a significant increase in meat supply after 2011, and the peak was reached in 2016. But after 2016, there was a decrease in meat supply. When looking at the animal existence in the country, the highest point was reached in all categories in 2015 except sheep. In sheep farming, such a high number was reached for the first time after 1981. However, after 2015, it is observed that there was a significant decrease in the number of animals until 2018. Due to the continuous depreciation of the TL against foreign currencies, the costs of producers increased too much, as well as the drought in the country in 2016, causing the breeding animals to go to slaughter and the supply of red meat increased. It is determined that meat supply in the country has decreased due to the decrease in the number of breeding animals after 2016 (Figure 5.18).

When looking at the supply and demand of red meat around the world between 1975 and 2015, it is observed that the supply of both ovine and bovine meat has

increased. While the supply of ovine and bovine meat has increased worldwide, the demand for bovine and ovine meat has been decreased. In other words, demand is gradually decreasing as the demand for red meat shifts to pig and chicken meat, which is a cheaper alternative. This situation is exactly the same in Southern Cyprus. While the supply of ovine and bovine meat in southern Cyprus is increasing, the demand for both bovine and ovine meat tends to decrease. (Table 4.4, 4.6, 4.8 & 4.10)

In the TRNC, on the other hand, a different picture is encountered from the situation in the world and in the south of Cyprus. Although there has been an increase in the supply of red meat from 1980 to 2019, the increase in the country's population, GNP and income from 1980 to 2019, and the introduction of students and tourists to the country by the higher education and tourism sectors increased demand considerably. Unlike the world in general and Southern Cyprus, the demand for red meat is much more higher than the supply, due to the importance that red meat has in TRNC cuisine. As the demand for red meat is higher than the supply, the price of red meat is increasing.

It is normal for red meat prices to increase in TRNC because in recent years, the demand for red meat has been increasing rapidly, especially with the increasing number of students and tourists. However, the supply of red meat does not increase as fast as the demand. Therefore, red meat prices are rising. The common belief in the country was that meat prices should increase even more under these conditions. However, there is a prevailing opinion that meat smuggling in the country reduces this to some extent (Kutlay, 2021). However, as a result of the interviews with the people in the sector and the market analysis within the scope of this study, it is understood that this point of view does not fully reflect the reality. Contrary to

popular belief, meat smuggling in the country does not reduce meat prices. On the contrary, it increases prices. Unlike other countries, since there is no meat market in the country, livestock prices are determined as a result of negotiations between the butcher and the producer, and these prices are heard by word of mouth among the producers. Smugglers use this situation to increase the prices of livestock in the market by buying animals from a few producers at high prices in order to increase their profit margins. Thus, they sell illegal meat, which they buy cheaper in the south of the country, at higher prices as a result of their speculation in the north of the country. Thus, smugglers increase meat prices in the country. In addition to smugglers, another reason for the increase in livestock prices in the country is the increase in import-based costs as a result of the continuous depreciation of TL in recent years. As a result of the increase in costs, livestock prices also increase, which causes red meat prices to increase. In the face of increasing prices, the idea of importing red meat comes to the fore as a solution proposal.

When the livestock and red meat trade in the country is examined, it is observed that it has moved from a livestock exporter to a red meat importer. From 1980 to 2000, live animal exports, mainly lamb and kid, were made periodically. However, livestock exports did not take place after 2000 (Table 5.5).

Table 5.5. Number of Livestock Exported by Animal Species

| Years | Calves | Lamb | Kid | Goats | Sheep |
|---|---|---|---|---|---|
| 1980 | | 2,745 | | | |
| 1981 | | 12,685 | | | |
| 1982 | | 21,796 | 8,283 | | |
| 1983 | 155 | 28,863 | 17,795 | 1,587 | |
| 1984 | | 31,004 | 16,320 | | |
| 1985 | | 25,755 | 13,447 | | |
| 1986 | 582 | 27,792 | 15,728 | | |
| 1987 | | 20,596 | 11,104 | | |
| 1988 | | 6,261 | 6,951 | 570 | |

| | | | | | |
|---|---|---|---|---|---|
| 1989 | | 870 | 2,927 | | |
| 1992 | | 3,610 | 2,971 | 100 | |
| 1994 | | 1,567 | | | |
| 1995 | | 500 | 1,091 | 500 | 100 |
| 1996 | 419 | 1,482 | 1,667 | | |
| 1997 | | 1,801 | 2 | 1,444 | 1,022 |
| 2000 | | 5,169 | 1,510 | | |

Source: TRNC Ministry of Agriculture and Natural Resources

On the other hand, approximately 250 tons of beef was imported in 2009 in order to reduce the rising meat prices with the increase in red meat demand due to the increasing population, number of students and tourists. Beginning from 2009, beef was imported uninterruptedly until 2013. After an interval of 5 years, beef was imported in 2018 (Table 5.6).

Table 5.6. Amount of Imported Red Meat

| Years | Beef | Frozen Beef |
|---|---|---|
| 2009 | 246,739 | |
| 2010 | 978,187 | 195,972 |
| 2011 | - | 115,516 |
| 2012 | 71,651 | 146,337 |
| 2013 | 41,466 | |
| 2018 | 64,416 | - |

Source: TRNC Ministry of Agriculture and Natural Resources

## 5.3 The Reasons for the Low Supply of Red Meat in the TRNC and the Idea of Bringing Imported Red Meat as a Solution

In line with the statistics given above, it is clearly seen that the carcass meat yield per unit animal in the TRNC is low. The low yield of carcass meat directly affects the red meat supply. As mentioned in chapter 3, there are many reasons affecting meat yield in ovine and bovine animals. Some of these factors are feeding and care, housing conditions, animal health and breed of the animal. When the care

and feeding, shelter conditions and animal health factors in the TRNC are examined, the following information appears.

The prevalence of hot and arid climate in the country and insufficiency of water resources prevent the diversity of feed production patterns in the TRNC. In the absence of drought, grain feeds such as wheat and barley are grown at a rate to meet the needs of the country. However, in dry years, grain feeds such as wheat and barley are partially imported due to insufficient production. Corn, cotton seed meal, sunflower seed meal, soybean meal and feed additives are completely imported and foreign dependency is gradually increasing. Roughages have a very important place in animal production. For an economical animal production, it is essential to use quality roughages obtained from plant production effectively. However, due to the insufficient supply of quality roughage required by the livestock in the country, instead of using wheat and legume green feeds with high feed value and their silage, poor quality roughages such as straw is used in the ration (TRNC Ministry of Agriculture and Natural Resources Tarım Master Planı, 2017). In his study, Darbaz (2016) is observed that the use of high quality roughages and varieties increases as the scale of the enterprise grows. From this point of view, it is possible to say that since small-scale enterprises in the TRNC do this job as a second job or hobby, they mostly use concentrate feed and poor quality roughage in animal feeding, while large-scale enterprises mainly use high quality roughage and a small amount of concentrate feed.

As Wilson (2017) mentioned in his work, inadequate and expensive animal health services are available in the country. Due to expensive and insufficient animal health services, there are many diseases in the country such as Brucellosis, Lumpy Skin Disease, Scrapie, Maedi Visna etc. and these diseases cause not only low

productivity but also economic losses. In addition, most of the animal shelters in the country are in bad condition (Wilson, 2017). In other words, shelters have many deficiencies in terms of infrastructure. Animal diseases and inadequate housing conditions cause many problems in the TRNC. Taskin and his friends (2006) concluded that 16.8% of lambs across the country died in a study examining productivity in sheep farming in the TRNC. In other words, almost 1 out of 5 lambs that are born die. They asserted the widespread animal diseases and inadequate housing conditions in the country as the most important cause of this problem. The infrastructural deficiencies of shelters bring another problem besides the high mortality rate. According to Naimoğlu, head of the livestock association, livestock enterprises that have infrastructure problems due to the rains that fall in January and February every year cannot sell their animals to butchers so red meat prices increase. In this case, butchers claim that there are not enough animals in the country and demand imported meat (Alasya, 2020). As Naimoğlu said, butchers' demand for imported meat is usually in January and February. From this point of view, the idea that Naimoğlu defended may be correct. However, the correctness of this idea is not enough to solve the meat problem. On the other hand, the solution proposal put forward by butchers, namely the idea of bringing imported red meat, is not the right solution. Because, according to Aydın et al (2010) and Ocaklı et al (2017), who examining the effect of importing red meat on Turkey's livestock breeders, concluded that importing red meat caused the people who deal with fattening to leave this sector and caused more problems in the long run. Moreover, Cevger and Sakarya (2006) conducted a study in order to investigate the changes in red meat prices in Turkey over the years, taking into account the effects of inflation and red meat imports. In this study, they determined that the import of red meat, which was made

to reduce the price of red meat, could not prevent the price increase. On the contrary, it caused the price increases to accelerate due to the decrease in production. Furthermore, Turkish Cypriot Chamber of Industry (TCCI) argues that the approach to cheapness with imports is wrong and that these approaches will increase foreign dependency and cause great damage to the Turkish Cypriot economy. According to the TCCI, first of all, policies that support imports instead of production should be abandoned, instead of opening imports, the development of existing production sectors and the provision of competitive environment by local resources should be encouraged. TCCI emphasizes that the only way to come out of the crisis with the least damage is to produce more as a society (Ozbil, 2018). In order to find solutions to these problems, long-term solutions should be brought instead of the short-term decision such as imported meat.

In short, the inadequate production of high quality roughage in the country, absence of meat breeds, the prevalence of animal diseases due to the problems in the development of preventive medicine because of the expensive animal health services and inadequate shelter conditions are the some factors that negatively affect the carcass meat yield and cause the red meat supply to be low. Although the realization of red meat imports will have a positive effect in the short term, as Aydın et al (2010), Ocaklı et al (2017) and Cevger and Sakarya (2006) mentioned in their studies, red meat imports will cause more problems in the long term. To give an example from the TRNC, since the meat and dairy enterprises in the TRNC are directly linked to each other, importing red meat will cause not only those dealing with fattening but also those dealing with milk to leave this sector. In addition to this situation, the separation of producers from the sector will also cause a great unemployment problem. Since livestock enterprises in the country are generally

small-scale family businesses, it is difficult for these people who leave the sector to find employment in other sectors. It is much more difficult for these people to find a job, especially in a country like the TRNC with a limited business area. Therefore, instead of importing red meats, it is necessary to focus on the solutions of these problems by thoroughly examining the problems that cause the low supply of red meat.

To sum up, although the carcass meat yield that obtained from bovine and ovine animals in the TRNC is above the world average as of 2015, it is not at the desired level. The low carcass meat yield per unit animal causes the red meat supply to be lower than the demand and increases meat prices. The fact that not only bovine but also ovine carcass meat yields in the south of the country are considerably higher than in the TRNC proves that there are serious problems in the country's animal husbandry. In the next chapter, these problems are discussed and solution suggestions are given.

# Chapter 6

# PROBLEMS IN THE TRNC LIVESTOCK SECTOR AND SOLUTION SUGGESTIONS

## 6.1 Problems

Livestock sector, which is a sub-branch of agriculture, has an important share in the economy of the TRNC. However, the fact that the carcass meat yield is low compared to the South Cyprus, which has the same climatic and geographical conditions, proves that there are problems that need to be solved in livestock sector. Due to the inadequacies in solving problems such as stud, care and feeding, shelter, protection of animal health, organization, production policy, specialization, scale, high input prices and false support policy, the livestock sector cannot fully develop throughout the country and the targeted meat yield per animal has not been achieved. To overcome these problems and improve the livestock sector in the country, these problems were briefly examined, and then solutions were proposed for these problems.

### 6.1.1 Stud Animal Problem

As mentioned before, when looking at the breeds in the TRNC, it is seen that only dairy breeds are found in cattle breeding, while combined and dairy breeds are common in sheep and goats. In other words, there are almost no meat breeds with high meat yield in the TRNC. In addition, due to animal diseases across the country, it becomes more difficult to obtain not only meat but also milk yield from dairy animals. Thus, TRNC animal breeders have been in search of qualified breeding

animals for years. This situation is more common especially in sheep and goat breeding. While there is a search for qualified breeding animals in ovine breeding, there is a shortage of meat-breed animals for fattening in cattle breeding. Due to the lack of development of herd tracking systems in the country, herds of animals with high pedigree and genetic structure cannot be formed. For this reason, producers have difficulties in finding both qualified dairy breeds and meat breeds for fattening. In addition to the absence of fattening beef breeds, the inability to create qualified breeding herds causes low meat productivity in the country (Arsoy, Kaymakçı and Ataç, 2014).

### 6.1.2 Scale Problem

The average business size of livestock enterprises in TRNC is well below not only EU averages but also South Cyprus averages. One of the reasons for this situation is that some of the producers carry out animal breeding as a second job or hobby. This phenomenon constitutes an important obstacle for enterprises to switch to profitable scales or to make technological investments. Depending on the scale problem, productivity, mechanization and infrastructure problems prevail in animal production (Besim & Sertoglu, 2015).

### 6.1.3 The Problem of Specialization (Lack of Information)

Specialization in production cannot be achieved due to the fact that most of the registered producers in the country are not real producers and the primary livelihood of these producers is not animal husbandry (Kahramanoglu, Usanmaz & Alas, 2018). In other words, the small-scale livestock enterprises that dominate the country do not have much knowledge about the sector, as they do this as a second job or hobby. Due to the lack of knowledge of the producers in the sector and the fact that they see this

sector as a second field of business, the existing scarce resources cannot be evaluated correctly, and the productivity problem arises.

### 6.1.4 Shelter Problem

In the TRNC, especially sheep and goat breeders house their animals in the barns they have built or in the animal husbandry areas that are partially created at the village level. In some places, dairies do not have infrastructure services such as electricity, roads and water. In addition, since these shelters are built without considering animal welfare, productivity problem arises. There are also many problems in cattle shelters. However, cattle shelters are more planned than sheep and goat shelters (Arsoy, Kaymakci & Atac, 2014).

### 6.1.5 Wrong Support Policy Problem

In the TRNC, supports and regulations in the price formation of animal products are inadequate. In other words, the total support provided to the producer is relatively below countries such as EU, OECD and USA. However, the problem in the agricultural sector of Northern Cyprus is not just the size of the supports, but the way that they are provided. Although different supports are provided to agriculture through various organizations, price support still continues to be the most important support. Support systems support prices rather than support the farmer, which causes high prices in the domestic market. In other words, supports given to agriculture increase production costs in the manufacturing sector. High domestic prices adversely affect the competitiveness of the service sector, which is the engine of the economy (Besim & Sertoglu, 2015).

### 6.1.6 High Input Price Problem

Most of the agricultural inputs such as feed, diesel oil, fertilizers, technical equipment and medicines are imported due to the lack of development of the

agriculture-based industrial sector in the country. The cost of livestock breeders has been constantly increasing due to the continuous depreciation of the TL against dollar, especially in recent years (Kahramanoglu, Usanmaz & Alas, 2018; Figure 6.1).

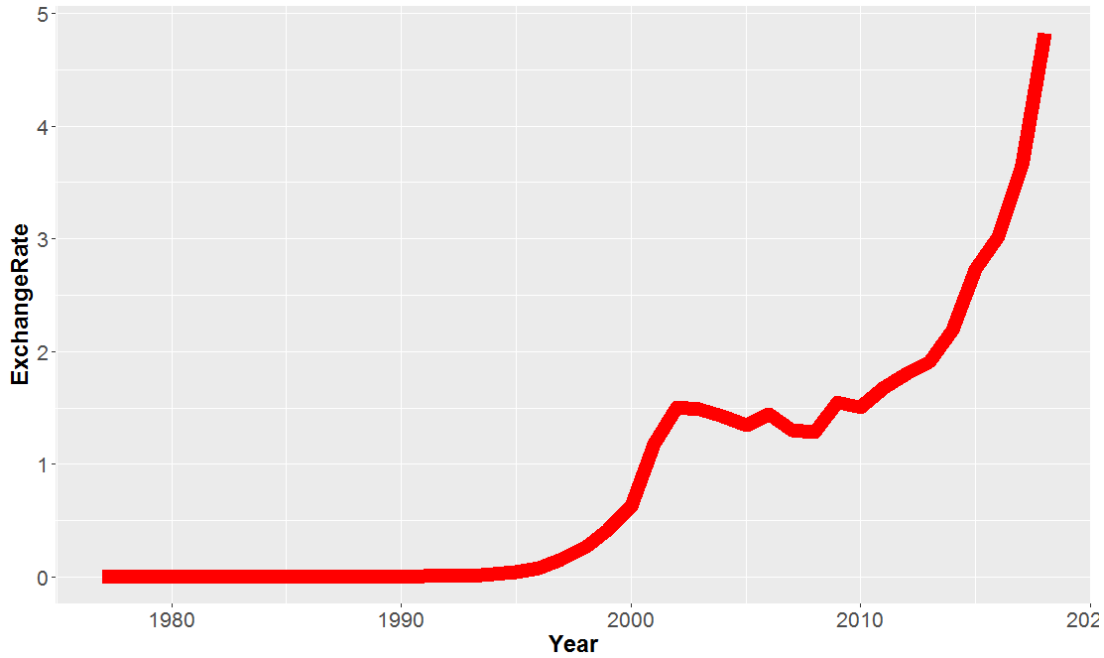


Figure 6.1. TL/DOLAR Exchange Rate from 1980 to 2019
Source: TRNC Ministry of Agriculture and Natural Resources

### 6.1.7 Animal Health Protection Problem

Since TRNC is an island country, it has an advantage over other countries in terms of protecting animals from diseases and pests (Besim & Sertoglu, 2015). However, animal health protection services in the TRNC are expensive and inadequate. Thus, preventive medicine activities are not common in the country. For this reason, there are many animal diseases in the country. While Brucellosis disease is common in large, Scrapie and Meadi Visna diseases are common in small ruminants. According to Arsoy, Kaymakci & Atac (2014), medicines, that used to protect animal health, are sold for 4-5 times higher price than their costs in the

TRNC. Since preventive medicine activities are not common in the country, periodic preventive vaccinations are either not administered at all or not on time. This situation causes not only low productivity but also high levels of death, especially in lambs and goats (Arsoy, Kaymakci & Atac, 2014).

### 6.1.8 Organization Problem

In the EU and other developed countries, producers have united under various unions and cooperatives in order to sustain their income and increase their marketing opportunities. This situation is not common in TRNC. In other words, cooperatives are not common in the country. Although the producers are gathered under a producer organization called "Animal Producers Association", this organization is in a qualitatively weak position. Due to the qualitative weakness of the producer organization, very little of the money consumers pay in the market is reflected in the producers (Arsoy, Kaymakci & Atac, 2014; Besim & Sertoglu, 2015).

### 6.1.9 The Problem of Production Policy (Lack of Sectorial Strategy and Policy)

One of the most important problems of the sector is the lack of a sustainable agriculture strategy which determined with the participation of all stakeholders. Beyond long-term strategies, it is observed that the state has difficulties in maintaining even short-term policies determined periodically. This problem causes the producers to be unable to even make short-term production-investment plans and the debt-receivable balance in the sector to deteriorate (Besim & Sertoglu, 2015).

### 6.1.10 Care and Feeding Problem

The insufficiency of water resources prevent sufficient amount of production of green and dry grass, which is the most important input in feeding bovine and ovine animal. When drought is added to insufficient roughage production, the shortage of roughage occurs at a very high stage. Due to the insufficient supply of quality

roughage needed by the livestock in the country, poor quality roughage such as straw is used in the rations of ovine and ovine animals instead of wheat and leguminous green fodder with high fodder value and their silages. Due to the insufficient level of feeding and care conditions, the yield per animal is low (Arsoy, Kaymakci & Atac, 2014). In addition, concentrate feeds that cannot be grown in the country due to the insufficient climate conditions of the country, such as soybean, sunflower meal, corn, ddgs etc., are imported. However, the low quality of imported feeds is another factor that causes yield losses (Anonymous, 2018).

In conclusion, lack of importance given to the breeding activities in our bovine and ovine breeding, the fact that the optimum animal farm sizes have not been determined yet, the pedigree animal enterprises have not yet been established by training our producers, and the lack of sufficient knowledge in animal production negatively affect the developments in the field of animal husbandry. Not using roughage (green fodder, silage, dry grass) at the required proportions in animal feeding and the use of concentrated feed predominantly cause an increase in the cost of animal products and this is another factor that negatively affects our animal husbandry.

## 6.2 Solution Suggestions

There are many reasons for the problems that experienced in the TRNC livestock sector. However, the basis of these problems is the lack of a sustainable production policy in the sector, the wrong support policy and the producers' inability to organize properly.

One of the most important problems of the sector is the lack of a sustainable agriculture strategy determined with the participation of all stakeholders. Nowadays, it is seen that the state has difficulties in maintaining its short-term policies that

determined periodically. These problems cause the producers to be unable to even make short-term production-investment plans and the debt-receivable balance in the sector to deteriorate. Therefore, manufacturers are hesitant to invest in the sector. Failure to make the necessary investments in the sector causes problems such as shelter, maintenance and feeding problems, scale problems and inability to specialize in the sector. In short, the absence of a sustainable policy in the sector reduces the investments made in the sector and causes some of the producers to make this sector as a second line of business.

On the other hand, the livestock sector in the country is generally supported by milk. In other words, producers are supported by the milk price. For this reason, dairy farming in the country has developed. However, due to this situation, the same is not the case in meat animal husbandry because most of the animals in the country are dairy animals due to the support given through milk. In other words, it is very difficult to find meat breed animals in the country. It is observed that producers operating in the field of meat livestock are faced with difficulties in obtaining livestock for fattening.

On the other hand, while producers in other countries generally have a strong organization mechanism through cooperatives, it is observed that the producers in the TRNC do not use this method much. Production activities carried out individually by following different strategies in a dispersed structure throughout the country are insufficient in solving the problems.

In line with this information, the necessary solution suggestions for the development of TRNC meat animal husbandry are listed below.

### 6.2.1 Genetic Reclamation

Creating disease-free businesses has vital importance in both meat and dairy farming. Fighting animal diseases is vital for healthy and economical production. For this reason, the reclamation studies throughout the country should be continued without interruption. By giving importance to the development of herd tracking systems in the country, animal herds with high genetic structure should be formed together with the improvement studies to be carried out. With the acceleration of the reclamation work, the shortage of qualified breeding animals in both sheep and goats should be eliminated. Incentives should be given to producers in order to increase the use of artificial insemination activities, especially in cattle breeding. In this way, diseases that spread in the herd with the bull are prevented, and breeds with high genetics are obtained. In addition, dairy breed artificial insemination should be applied to some cows in order to rejuvenate the herd by 20% every year, which is a worldwide accepted situation when artificial insemination activities are carried out. For example, in a farm with 100 cows, 20 best quality cows should be inseminated with female dairy breed semen. Thus, the calves born will meet the stud animal needs of the herd in the following years. After the breeding animal needs are met, the remaining 80 cows should be artificially inseminated with meat breeds to obtain hybrids with high meat holding capacity. In using hybrid, both female and male animals are raised for meat production. In this way, by obtaining beef cattle with high meat holding capacity, both higher quality and more efficient meat production is realized.

### 6.2.2 Specialization in the Sector (Getting Information)

In order to increase the knowledge of the producers in the sector, training activities should be continued in a more comprehensive way. By making it

compulsory for the producers to participate in these training activities, both the awareness of the producers should be raised and the producers should be known more closely. By getting to know the manufacturers closely, it can be determined which manufacturer actually does this job and which manufacturer does this job as a second job or hobby. Those who perceive the sector as a second line of business should be kept away from this sector. Thus, it will be possible to reach profitable business dimensions by allowing only real producers to produce in the sector. In addition, by increasing the knowledge level of the producers in the sector, it is possible to realize a more conscious, sustainable and efficient production by evaluating the scarce resources more accurately.

### 6.2.3 Restructuring of Shelters

Considering that the living spaces of animals are a factor that directly affects productivity, farms that prioritize the comfort of animals should be built in order to solve the productivity problem in the red meat sector in the TRNC. Many of the barns across the country were built without considering animal welfare. In order to prevent this problem, existing barns should be made suitable for animal welfare as much as possible. Infrastructural activities should be developed by immediately responding to the barns that do not have basic infrastructure such as electricity, roads and water. On the other hand, propellers must be used in order to prevent the heat stress on the animals, especially in the summer. New businesses should be allowed on the condition that they build farms suitable for animal welfare. Otherwise, new farm set-ups should not be allowed. In other words, before farms are built, characteristics such as the breed, age, etc. of the animal must be built in consideration. In short, it is necessary to improve the shelter infrastructures and

eliminate their negative effects on productivity, animal health, product health and the environment.

### 6.2.4 Restructuring of Support Policy & Production Policy (Sectorial Strategy and Policy)

Due to the lack of a sustainable production policy as well as the faulty supporting policy, many businesses across the country have a small number of animals and see this business as a secondary job. A sustainable agriculture policy needs to be implemented immediately. Thus, producers who hesitate to invest in the sector will find the opportunity to invest more in the sector, and productivity will increase with the increase of mechanization in the sector. Moreover, in order for only real producers to produce in the sector, support should be given only to real producers and this support should not be in the form of price support. Instead of price support, support should be given to baby lambs, goats and calves at a certain age. In this way, the continuation of production is ensured, the real producers are supported, and the high mortality rate in newborn lambs, goats and calves, which become the bleeding wound of the country, is reduced. In addition, by giving an extra premium to each animal born by artificial insemination, artificial insemination activities are encouraged and can increase productivity throughout the country by helping to increase the animal population with high genetic characteristics. In addition, when supporting producers, the state should also look at whether producers are participating in training activities, whether housing conditions are suitable for animal welfare and whether they are producing quality roughage. In this way, while the state supports the producer, it will also support the producers to increase their knowledge in the sector, to improve the shelter conditions and to produce quality roughage.

### 6.2.5 Restructuring of Inputs

Almost all of the inputs that used in the livestock sector are imported such as diesel oil, fertilizer, pesticide, seed, concentrate feed etc. The continuous depreciation of TL increases the production costs of the producers. In order to reduce this problem as much as possible, the dependence on imports should be minimized by giving more importance to the resources available in the country. For example, more emphasis should be placed on the use of animal excrement rather than using imported fertilizers in agricultural activities. Support should be given to the production of high quality forage crops in the country in order to reduce the use of concentrate feed, which is an indispensable part of animal husbandry activities. In addition, the use of drought-resistant seeds should be made widespread, and the problems experienced in grain feed and roughage production in dry years should be minimized. On the other hand, by taking care of the animals, it is possible to produce a healthier and more economical production by preventing them from getting sick and by experiencing both an increase in their productivity and a decrease in the use of expensive drugs.

### 6.2.6 Animal Health Protection Strategies

Fighting animal diseases is vital for healthy and economical production. Efforts to fight against Scrapie, Visna-Meadi and Agalaxia diseases, which are seen in ovine animals and cause economic loss, should be continued. On the other hand, all necessary precautions should be taken for Brucella disease, which is common in cattle enterprises.

In the TRNC, there is an obligation to highlight preventive medicine in combating animal diseases. In this context, in addition to regular health screening in enterprises, timely application of preventive periodic vaccines and full control of

drug prices and quality are required. Necessary precautions should be taken to provide cheap vaccines to be used in preventive medicine. Animal movements should be controlled and illegal slaughter should be prevented. In addition, both meat and livestock smuggling from the south of the country must be strictly prevented.

### 6.2.7 Restructuring of Organization

It is observed that the Turkish Cypriot animal breeders are not sufficiently organized among themselves. Individual production activities by following different strategies in a dispersed structure are insufficient to solve the existing problems. However, by using the power of a planned and organized organization, problems that cannot be solved individually can be easily overcome. Therefore, producers should turn to cooperative activities, which are common in other countries. In other words, the state should take measures to encourage animal producers to gather under the roof of a cooperative.

### 6.2.8 Care and Feeding Strategies

Looking at the livestock breeding activities across the country, it is clearly observed that the conditions of care and feeding are not sufficient except for large farms with a limited number. One of the most important factors in increasing meat yield in the country's livestock is the care and feeding of animals. Unfortunately, available resources are not used well due to the breeders' lack of knowledge and doing this job as a secondary job. It is observed that most of the producers do not prefer the production of silage, which is expensive compared to other roughages, due to their small scale. In order to put an end to this situation and increase productivity, the support given to quality roughage production should be increased as soon as possible and the use of quality foods such as silage in feed rations should be encouraged. In addition, with the establishment of herd tracking systems, it is

necessary to prepare feed rations in the presence of consultants. In this way, animals should be cared for and fed accordingly by grouping them according to the age and gender of the animal. In this way, a more efficient production is realized. On the other hand, there is a quality problem in feed raw materials imported to the country, resulting in low yields. In order to prevent this problem, imported feeds should be analyzed continuously and low quality products should not be allowed to enter.

To sum up, in order to develop meat and dairy farming, it is observed that producers operating in this field face some difficulties in providing breeding animals and continuous feed of the same quality. Achieving the desired level of development in this sector by increasing animal production depends on breeding and distributing breeded pedigree breeders to the producer, using modern animal shelters, effective fight against diseases and stabilizing the production of quality animal feed. Thus, productivity in animal production will be increased, cost factors will be positively affected and a more regular development will be achieved in animal production.

## 6.3 Discussing Findings with Experts and Producers in the Industry

In order to determine the validity of the findings obtained as a result of the study, the opinions of experts and producers in the sector were consulted. Since the focus group work planned in the study poses a risk due to pandemic conditions, interviews were conducted face-to-face and via zoom. A total of 14 people were interviewed. While 6 of these people are experts in the sector, 8 of them are producers. Two of the experts in the sector are also producers.

In line with the examinations made in the study, it has been determined that although the meat yield per unit animal in the TRNC is above the world average, it is lower than Southern Cyprus, which has the same climate and geographical location. As the reasons for this, it has been determined that the animal breeds in the country

are generally dairy and combined breeds, animal diseases are common, and shelter conditions as well as care and feeding conditions are inadequate. Most of the interviewees confirmed that these factors are the main factors causing low meat productivity (Table 6.1). Thus, as a result of the interviews, it was determined that these factors determined in the study reflect the reality. On the other hand, the people who were consulted point out the age of the animal as another factor that causes low carcass meat yield, which is a factor mentioned in Chapter 3. Producers, especially ovine producers, stated that they send their animals to slaughter at an early age before they complete their development due to the economic difficulties they experience due to irregular support and milk payments, and stated that this is a factor that causes low carcass meat yield.

Table 6.1. Reasons for Low Carcass Meat Yield

| | Strongly Recommended | Moderately Recommended | Not Recommended |
|---|---|---|---|
| **Breed of Animal** | 10 | 4 | 0 |
| **Age of Animal** | 9 | 5 | 0 |
| **Care and Feeding Conditions** | 10 | 4 | 0 |
| **Health Conditions** | 10 | 4 | 0 |
| **Shelter Conditions** | 10 | 4 | 0 |

When looking at the main problems encountered in the sector, problems such as high input prices, insufficient and wrong support policy, shelter problem, care and feeding problem, breeding animal problem, low level of knowledge of producers, organization problem, scale problem and production policy have been identified. Some factors are not fully approved by the producers. For example, the low level of

knowledge of the producers and the scale problem were not supported by the producers. Because producers think that the information they have is sufficient for them. On the other hand, factors such as high input costs, widespread diseases, and production policy problems received great support. As a result of the interviews, although some factors received less support, the majority of the people whose opinions were consulted stated that these factors determined in the study reflected the truth (Table 6.2).

Table 6.2. The problems encountered in the sector

| | Strongly Recommended | Moderately Recommended | Not Recommended |
|---|---|---|---|
| **High Input Prices** | 14 | 0 | 0 |
| **Incorrect and Irregular Support Policies** | 10 | 3 | 1 |
| **Shelter Problem** | 11 | 1 | 2 |
| **Care and Feeding Problem** | 10 | 3 | 1 |
| **Common Diseases** | 13 | 1 | 0 |
| **Qualified Breeding Animal Problem** | 10 | 4 | 0 |
| **Lack of Information of Manufacturers** | 8 | 3 | 3 |
| **The Problem of Organization** | 11 | 2 | 1 |
| **Production Policy Problem** | 13 | 1 | |
| **The Scale Problem** | 7 | 5 | 2 |

Based on the study conducted in Turkey, the ideas of the producers on how the importation of red meat will affect them were consulted. 4 people out of 10 whose ideas were consulted stated that they would give up this job due to economic problems in the long term if imported meat was imported, while 3 people stated that

they would reduce the scale size and 1 person would quit this job immediately. On the other hand, 2 people stated that this situation would not affect them (Table 6.3) because these people are of the opinion that this situation will not affect them since the imported meat will be sold like domestic meat due to the fact that the label law is not implemented in the country. In general, as a result of these results, a situation similar to the study conducted in Turkey emerges. If imported red meat is brought in, producers will be cut off from this sector in the long run and this will cause more problems. For example, a structure based on imports will emerge. However, it is not acceptable for people's basic food sources to be based on imports, such as red meat because an import-based order is definitely not sustainable. While providing access to food, it should be in a continuous, healthy and accessible structure. However, it is not always possible to reach these factors in an import-based system. For example, in times of war or famine, countries may impose an export ban on basic food resources to protect their own people. For this reason, it is necessary to increase domestic production by developing agriculture and incentive policies in a way that will increase productivity instead of an order based on imported meat.

Table 6.3. If Imported Red Meat Comes, How Will It Affect You?

| | Doesn't affect | I Reduce the Scale of the Enterprises | I'm quitting this job right now | In the long run, I will have to quit this job due to economic problems. |
|---|---|---|---|---|
| **Producers** | 2 | 3 | 1 | 4 |

Finally, as a result of the study, many solutions have been proposed for the problems experienced in the sector. The people consulted for their opinions supported most of these suggestions. However, some producers do not approve of factors such as supporting only real producers, making participation in training

activities compulsory and developing herd tracking systems. Since the producers think that the information they have is sufficient for them, they do not look forward to participating in compulsory training activities and costly herd tracking systems. On the other hand, according to the producers, instead of the idea of supporting only real producers in the sector, all producers who do this work should be supported, and they mention that extra support should be given to businesses whose only livelihood is livestock. As a result, although there were differences of opinion on some factors, the people who were consulted stated that they supported the recommendations given in this study (Table 6.4). In addition, experts in the sector also suggested that professional livestock breeding should be developed in the country in order to increase meat production.

Table 6.4. The Recommendations Presented to Shoot Down the Price of Red Meat by Increasing the Meat Efficiency and to Overcome the Problems in the Sector

| | Strongly Recommend | Moderately Recommend | Not Recommend |
|---|---|---|---|
| **Herd Tracking System** | 8 | 4 | 2 |
| **Preventive Medicine** | 11 | 2 | 1 |
| **Improving Shelter Conditions** | 11 | 3 | 0 |
| **Participation in Educational Activities** | 9 | 3 | 2 |
| **Health Checkup at Regular Intervals** | 13 | 1 | 0 |
| **Supports should be made to increase efficiency.** | 13 | 1 | 0 |
| **Expansion of Beef Breed Artificial Insemination Activities** | 13 | 1 | 0 |
| **Support should be given to lambs, kids and calves that have reached the age of 3 months.** | 13 | 1 | 0 |
| **A Sustainable Production Policy** | 13 | 1 | 0 |
| **Supports should only be given to real producers.** | 5 | 7 | 2 |

As a result, although there were differences of opinion on some factors, it has been confirmed by the experts and manufacturers in the sector that the findings obtained in this study reflect the current situation in the sector.

# Chapter 7

# CONCLUSIONS AND RECOMMENDATIONS

This thesis generally analyzes the livestock sector in the TRNC and the red meat sector in particular. The historical overview and economic structure of the TRNC show the importance of the agricultural sector for the TRNC. In order to understand the red meat sector in general, first the international red meat sector is examined and then the red meat sector in the TRNC is analyzed. The research data is rely on a descriptive analysis based on the interpretation of primary and secondary sources data from the official websites of the Ministry of Agriculture of Northern Cyprus and Food and Agriculture Organization of the United Nations (FAO).

In parallel with the increase in the world population, red meat production increases in the international arena, while red meat consumption per capita increases in developing countries and tends to decrease in developed countries. On the other hand, it has been observed that there have been positive developments in red meat yield throughout the world and in selected countries. In addition, it has been observed that the red meat trade has an important market throughout the world. As developing countries tend to focus on the agricultural sector in order to develop the economy, TRNC should also support the development of this sector. Although there are political isolations, economic embargoes and drought problems, the source of economic development in the TRNC can be attributed to the red meat sector by increasing the efficiency of animal production.

The economic overview of the red meat sector has shown that the country cannot realize its current potential due to the problems it contains in animal husbandry. It is clearly observed that even though there has been an increase in red meat production and consumption over the years and a significant increase in carcass meat yield has been achieved, it is clearly observed that the desired point has not been reached. When the carcass meat yield is compared with the south of the country, the existence of problems in the sector clearly shows itself. As stated above, the TRNC red meat sector's inability to realize its current economic potential is related to the sector's lack of a sustainable agricultural policy and not being properly supported. The realization of policy that will support production and efficiency will contribute to the sectorial and economic development of the country.

The researches conducted in the study showed that there are many problems in the TRNC red meat sector. Problems encountered in the sector caused low productivity per animal, which has become one of the most important problems in the sector. The low amount of red meat obtained per unit animal due to the problems in the sector caused the red meat supply to remain at low levels. On the other hand, the country's population, GNP, income, and the number of tourists and students coming to the country have increased significantly in recent years, significantly increasing the demand for red meat. As the demand for red meat is higher than the supply, red meat prices are increasing and the idea of imported red meat comes to the fore. However, as a result of research, such a solution proposal is not accepted because it will cause more problems in the long run because, bringing imported red meat to the country will cause the livestock producers who struggling with many problems to leave the sector. For this reason, importing red meat is not seen as a solution as a result of this study, since the import of red meat will result in a decrease

in the export revenue of the country and the unemployment of many people in the country, since the producers will leave the sector in the long term. What needs to be done to solve the problem is to increase the production in the country by increasing the low productivity per animal that causing the problem. For this reason, what needs to be done is to increase the productivity per animal as much as possible rather than import red meat.

At this point, what needs to be done is stated below.

1) Beef cattle breeds that are suitable for country climatic conditions such as Simmental, Angus, Hereford, Charolaise, and Limousine should be brought to the country by artificial insemination method. Goat breeds that are suitable for country climatic conditions such as Boer, Kalahari, Savanna and sheep breeds that are suitable for country climatic conditions such as Wendeen, Van Rooy, Katahdin, and Dorper should be brought to the country and trials should be carried out.
2) Most of the livestock businesses in the country are very small-scale and seem far from profitable. Such businesses see this job as a second job or hobby. People who see this job as a second job should be removed from the sector and only the people who actually do this job in the sector should be left.
3) With the exclusion of those who see the livestock sector as a secondary source of income from the sector, economic developments in the sector should be achieved by providing productivity enhancing supports to real producers remaining in the sector instead of price support. For example, in order to increase productivity by increasing animal welfare, shelter conditions should be improved, animal diseases should be struggled, and feeding and care conditions should be improved.

4) Along with increasing the level of knowledge with the trainings to be provided to the producers in the sector, the necessary importance should be given to the infrastructure conditions. With the resolution of the infrastructure problems in the sector, meat production should be increased by paying particular attention to increasing the small ruminant population.
5) TRNC government should stop the production of politics, which causes inputs from the agricultural sector to be dependent on foreign sources. The use of imported concentrated feed should be reduced by encouraging the production of quality roughage in the country. Thus, a more economical production is provided. In addition, animal diseases should be prevented by expanding livestock activities that prioritize the welfare of animals. Thus, dependence on expensive imported animal drugs should be reduced. In short, the TRNC government should prevent the inputs in the agricultural sector from becoming dependent on external factors. Therefore, these steps, which can be taken by the TRNC government, can be useful not only for the agriculture sector but also for the future of the island.

Shortly, the development of the livestock sector in Northern Cyprus can be provided by the government supports to increase productivity. For now, what needs to be done to increase the meat supply is to increase the population of beef breeds in the country by bringing the genetically high beef breeds that are suitable for the country's climatic conditions to the country through artificial insemination. In addition, in order to obtain the highest efficiency from the animals that currently exist in the country, breeding conditions should be applied as a suitable for animal welfare.

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