ISSN: 2458-8989

Natural and Engineering Sciences

NESciences, 2020, 5(2): 73-81

*- REVIEW ARTICLE-*

# General Status and Growth Potential of Fisheries Sector in Northern Cyprus

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## Abstract

The island of Cyprus is a growing region in terms of the aquaculture sector. Northern Cyprus, in particular, is very weak for the aquaculture, although its environmental conditions are very favorable for aquaculture. While the number of fishers in Northern Cyprus was around 30-40 before 1974, the number of registered fishers has reached 1167 today. There are two existing cage facilities in the region, and there are no juvenile production facilities and feed mills. The amount of fish obtained from the natural stock with the fisheries activities are also limited. However, the amount of fish produced by aquaculture has been increasing since 2015 and today exceeds the amount of fish obtained from natural stock. The effect of the tourism sector on the increase in aquaculture and fish production is remarkable. In the country, for per capita meat consumption, fish product consumption ranks fourth. To increase the amount of fish consumed, a couple of suggestions made. This review has the most up to date data about fisheries and aquaculture sector for North Cyprus.

**Keywords:**
Fisheries, Aquaculture, North Cyprus, Review

**Article history:**
Received 18 December 2019, Accepted 25 March 2020, Available online 23 June 2020

## Introduction

### *Geographical location and climate characteristics of Northern Cyprus*

Cyprus is the third largest island in the Mediterranean after Sicily and Sardinia and located in the Eastern Mediterranean region (Figure 1). The nearest mainland region of Turkey is about 65 km from the North (Çatalbaş et al., 2010).

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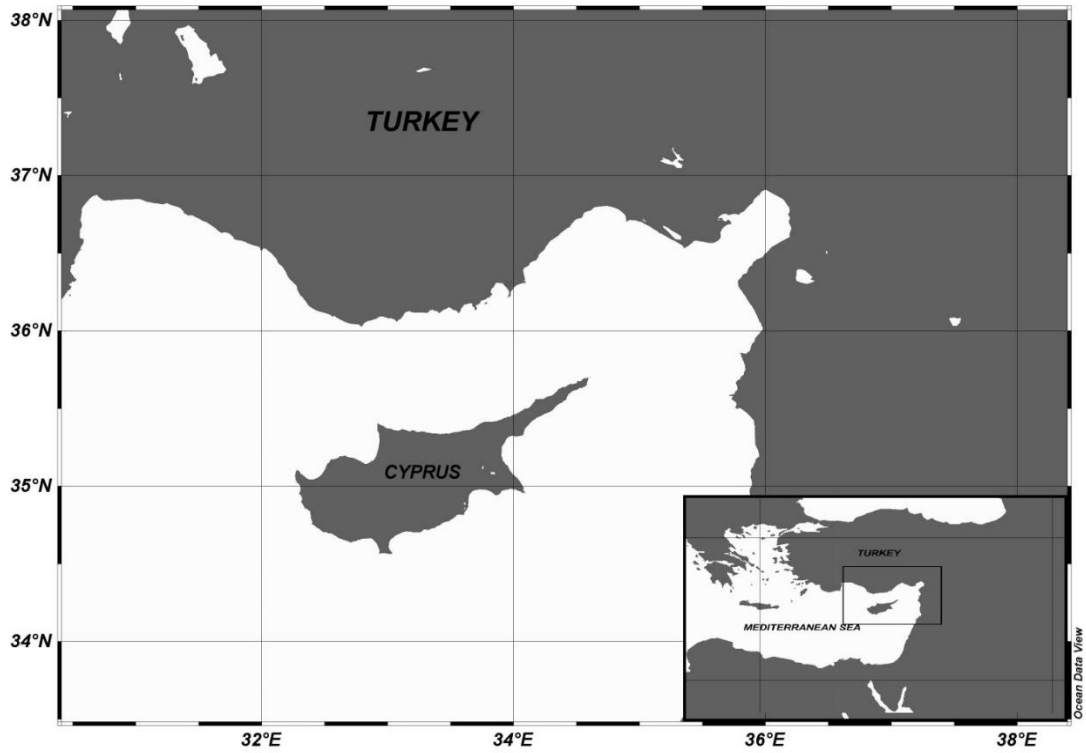


Figure 1. The geographical location of Cyprus.

Cyprus has typical Mediterranean climate characteristics. It is characterized by warm, rainy winters affected by cyclones moving westward and long, hot and dry summers caused by the continuous atmospheric collapse controlled by the Asian monsoon and Hadley circulation. Cyprus is also severely affected by global climate change conditions (such as global warming) (Hadjinicolaou et al., 2011). With a coastal length of 396 km, North Cyprus holds approximately 50.6% of the coasts throughout the island. There is 19.3 km of coastline suitable for fishing in the country, which is equivalent to a total area of 8780 $km^2$ (Üçışık & Şahin, 2014).

Small-scale (Artisanal) fishing is done in North Cyprus. Fishing is mostly done by wooden boats of 3-12 m length and with a maximum power of 100 HP. Fishing activities are often carried out at depths of 5-40 m. Depending on the target species, fishing activities can be carried out at depths of 100 m and above. When the data of the registered fishing boats for 2016 are analyzed, the percentage distribution of boat lengths by regions is given below.

Kyrenia : Between 3-8 m 54.9%, 8-10 m 36.2%, 10-12 m 4.4% and above 12 m 4.4%.
Gemikonağı : Between 3-8 m 45%, 8-10 m 42.5% and 10-12 m 12.5%.

Famagusta : Between 3-8 m 46.6%, 8-10 m 36.9%, 10-12 m 14% and above 12 m 2.4% (*Kuzey Kıbrıs Türk Cumhuriyeti Tarım ve Doğal Kaynaklar Bakanlığı Tarım Master Planı*, 2017).

The main species of commercial interest are; mullet (*Mullus* spp. (Linnaeus, 1758)), common pandora (*Pagellus erythrinus* (Linnaeus, 1758)), boque (*Boops boops* (Linnaeus, 1758)), picarel (*Spicara* spp.)), salema (*Sarpa salpa* (Linnaeus, 1758)), spinefoot/rabbit fish (*Siganus* spp.)), parrotfish (*Sparisoma cretense* (Linnaeus, 1758)), groupers (*Epinephelus* spp.)), common

dentex (*Dentex dentex* (Linnaeus, 1758)), greater amberjack (*Seriola dumerili* (Risso, 1810)), little tunas (*Euthynnus alletteratus* (Rafinesque, 1810)), *Auxis rochei* (Risso, 1810)), and *Thunnus alalunga* (Bonnaterre, 1788)) (U. Sencer, personal communication, 27th November 2019).

***History and current situation of fisheries in Northern Cyprus***

In 1950, the fishing fleet across Cyprus; consisted of 320 non-motor sailing boats, 19 motor-sailing boats, and ten fishing boats. A total of 960 fishers and crews were employed, and total fishing reached 460 tons/year. Speargun, extension net, long-lines, wire basket, bottom net, and occasionally using dynamite were aimed at hunting coastal-demersal species.

In 1974, fisheries data could not be collected during the eventful process that lasted until the separation of two communities, north and south. While the number of fishers in Northern Cyprus before 1974 was around 30-40; currently, there are 1167 registered fisher as commercial and amateur (TRNC Ministry of Agriculture and Natural Resources, 2018; Ulman et al., 2015).

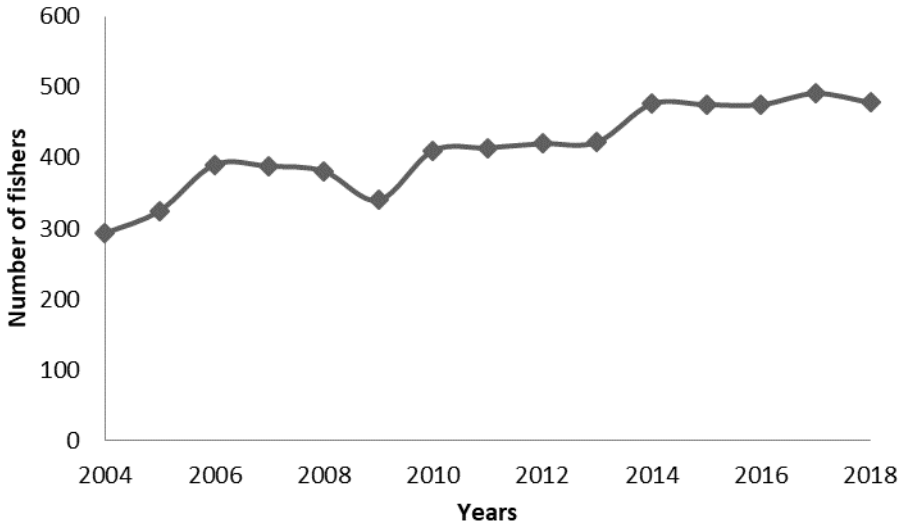


Figure 2. Distribution of registered commercial fishers' numbers in TRNC between 2004-2018 (TRNC Ministry of Agriculture and Natural Resources).

Figure 2 shows the change in the number of commercially registered fishers (except amateur fishers) in the TRNC from 2004 to today. It is observed that the number of fishers has increased gradually except for the slight decline in 2009, and the steady course in some periods.

Trawling was only attempted between 1993 - 1997 and banned in 1998 due to damage to marine ecology (Ulman et al., 2015). Besides, the hunting and collection of economically valuable species such as all kinds of sponges, seahorses (*Hippocampus hippocampus*), sea meadows, *Pinna* sp., etc. were prohibited (TRNC Council of Ministers, 2014).

The first data on the total annual amount of seafood in TRNC is 66 tons from 1986. Between 1990 and 2006, this amount was around 400 tons. With the development of tourism and the university sector, the need for aquaculture has increased over the years, and production has risen in parallel (Üçışık & Şahin, 2014).

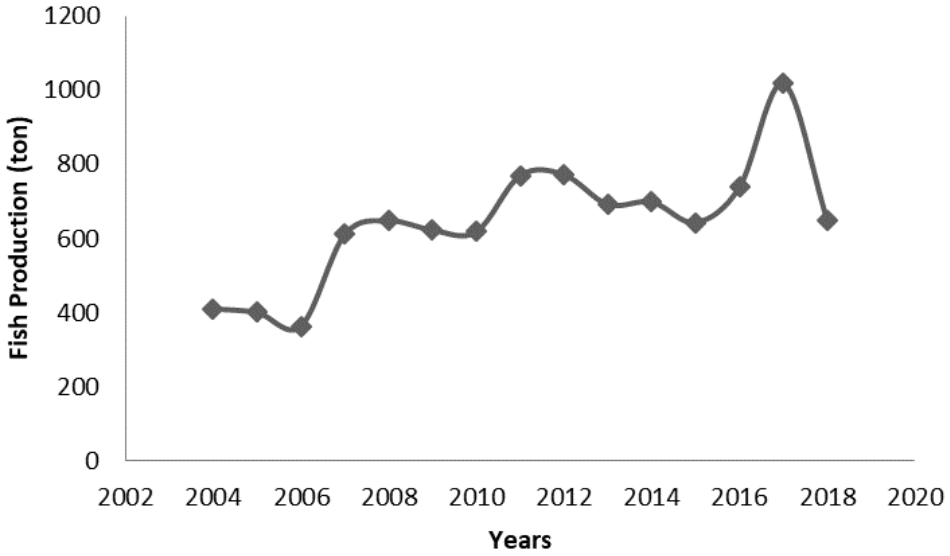


Figure 3. Distribution of total fish production in TRNC between 2004-2018 by fisheries and aquaculture (TRNC Ministry of Agriculture and Natural Resources).

The change in total fish production in the TRNC since 2004 is shown in Figure 3. Accordingly, it is observed that production is steady in some periods but increases regularly. The highest value in terms of total fish production in the island's history was reached in 2017 with an output of 1018 tons. In 2018, this value returned to the level of previous years. When we look at the real growth rates in the fisheries sector shown in Figure 4, it is noteworthy that there is a significant similarity with Figure 3.

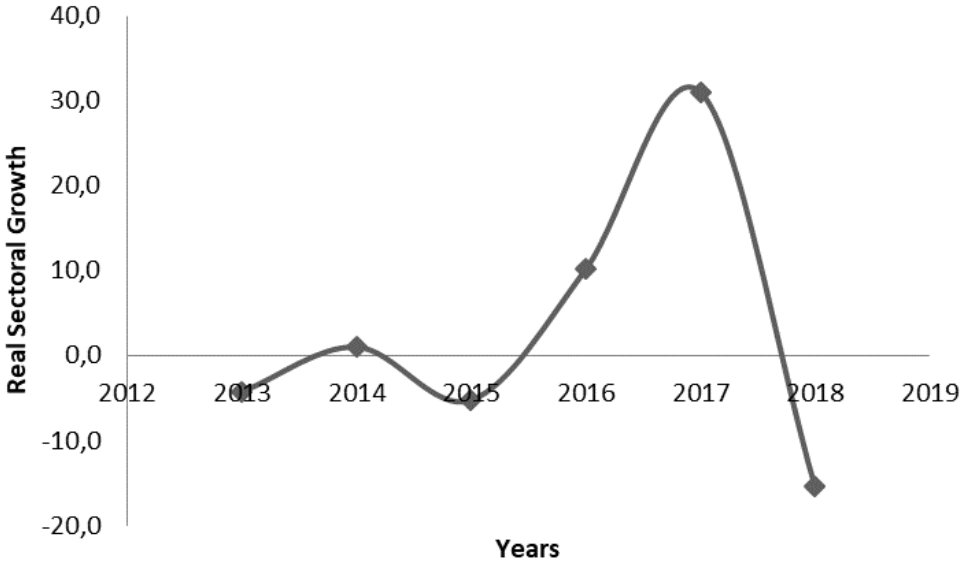


Figure 4. Actual growth rates in the fisheries sector in TRNC between 2013-2018 (TRNC Ministry of Agriculture and Natural Resources).

In order to understand the reason for the striking similarity between 2016-2018 in the growth rate of the fisheries sector and the total fish production charts, it is necessary to look at the

situation in other industries in similar periods. When we look at the country statistics at that time, it is observed that there is a related change in the hospitality and restaurant sectors (Figure 5).

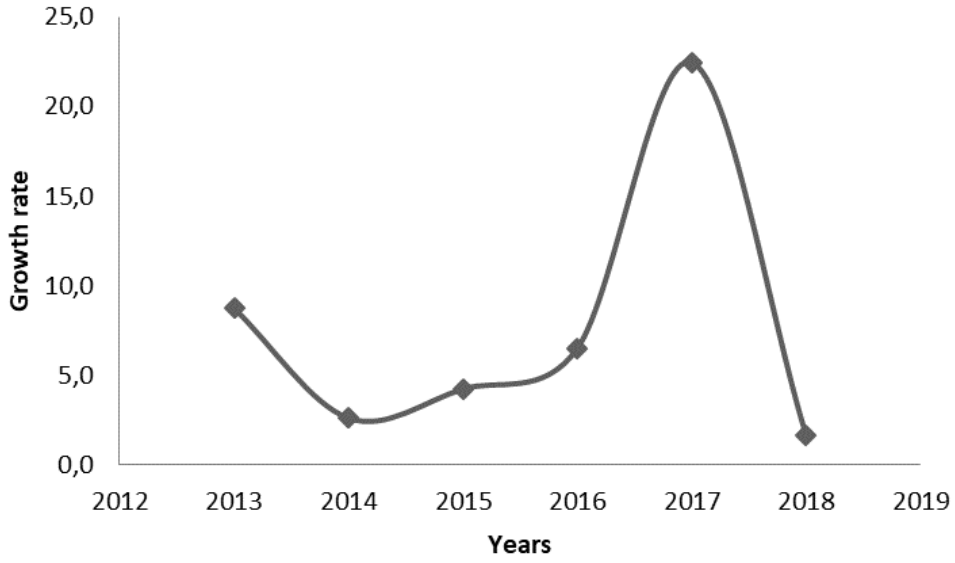


Figure 5. Real growth rates in the hospitality and hospitality sector in TRNC between 2013-2018 (TRNC Ministry of Agriculture and Natural Resources).

When the fluctuations in all graphs evaluated, it can be concluded that total fish production is determined by the total amount of tourists visiting the country during the year.

***Aquaculture in North Cyprus***

The first aquaculture trial conducted on the island of Cyprus was held in 1944. Carp and breeding were done in 2 sand ponds in Kumköy region (Servet S. Dedeçay, 2002). Then in 1969, the trout in the mountains of Troodos and 1972 in the area of Gastria Mullet were cultivated. Between 1978-1989, experimentally, marine fish farming was carried out in small cages in Paphos harbor. In 1989 a marine fish aquaculture research center was established near Larnaca airport. The first open cage system was created between 1990 and 1991; sea bream and sea bass were cultivated. In 1997, the number of farms engaged in aquaculture in the open cage system in southern Cyprus increased to 8. Today, there are six active offshore cage farms in Southern Cyprus. Sea bream-perch production in 5 farms annual production varies between 100-700 tons. Besides, there are one shrimp farm and two tuna farms. Tuna production is around 1000 tons per farm per year (Daphne Stephanou, 2007).

After 1974 peace operations in North Cyprus, a sea bream farm was established under the name of Kalecik Seafood Research and Development Station near the Kalecik region. The farm continued its activities with the support of the Directorate of Livestock until 1997 and closed due to a lack of technical personnel. The farm is now idle. The first commercial aquaculture application was carried out in 2003 in the offshore of Kumyalı Village. In this context, Tuna Fattening Farm, with a production capacity of 3000 tons per year, was established. The farm, which produced 150,743 kg in the year it was established, had 68,575 kg in the following year, and lastly, 346,192 kg in 2005 produced by exporting tuna (Bluefin Tuna-*Thunnus thynnus*). It was subsequently closed for international political reasons. The sea bream and sea bass farm with a production capacity of 500 tons per year was established in 2008 instead of the closed tuna farm. Besides, a

new sea bream and sea bass farm with a production capacity of 500 tons per year was established off the Kalecik Village in 2006. These two farms still operate today. Two fish farm applications with an ability of 500 tons/year are also in the process of obtaining permission (Vurana, 2019).

The total registered production amounts of the two sea bream and sea bass farms mentioned above in Northern Cyprus shown in Table 1.

Table 1. Status of total aquaculture fish production in North Cyprus by years (Vurana, 2019).

| **Years** | **Sea bream (tons)** | **Sea bass (tons)** | **Total** |
|---|---|---|---|
| 2007 | 211 | | 211 |
| 2008 | 147.92 | 9.71 | 157.63 |
| 2009 | 131.315 | 41.11 | 172.425 |
| 2010 | 127.033 | 15.866 | 142.899 |
| 2011 | 247.474 | 72.416 | 319.89 |
| 2012 | 255.537 | 66.478 | 322.015 |
| 2013 | 162.686 | 103.985 | 266.671 |
| 2014 | 192.27 | 56.37 | 248.307 |
| 2015 | 148.122 | 19.742 | 167.864 |
| 2016 | 181.208 | 82.395 | 263.603 |
| 2017 | 568.785 | 50.175 | 618.96 |
| 2018 | 341.189 | 153.246 | 494.435 |

When Table 1 is examined, it is not seen that the total fish production has increased regularly over the years. However, the sudden rise in 2017 is in line with the values discussed in Figure 3. In 2017, 60.8% of the total production of 1018 tons of fisheries and aquaculture sectors in North Cyprus came from aquaculture. This percentage is the period in which aquaculture has the highest role of output compared to previous years. In 2018, this ratio increased to 76%. This value is an indication of the effect of tourism on aquaculture and fish production quantities rather than the fishing sector.

Department of Animal Husbandry of Northern Cyprus by the acquired information produced by aquaculture products is mostly limited to the domestic market. It is also known that a small amount is exported to Turkey. The political situation of Northern Cyprus suppresses production activities.

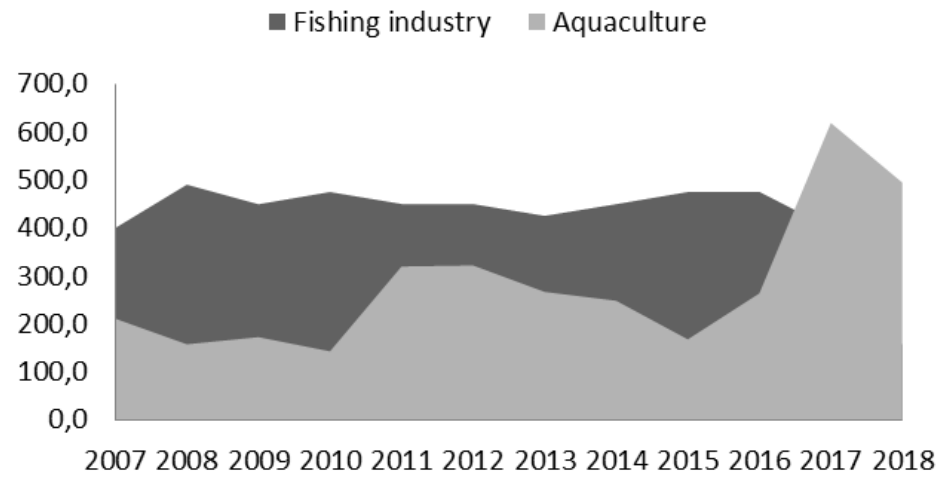


Figure 6. Comparison of the amount of fish produced by aquaculture and the amount of fish caught by fisheries by the years (TRNC Ministry of Agriculture and Natural Resources, 2018; Vurana, 2019).

In Figure 6, the total amount of fish produced since the beginning of the aquaculture sector is compared with the fisheries sector by years. It is seen that the amount of fish caught from the fish stock is progressing to a certain level. Nevertheless, it is seen that the amount of fish produced with aquaculture has increased rapidly since 2015, and has been leading the way since 2017.

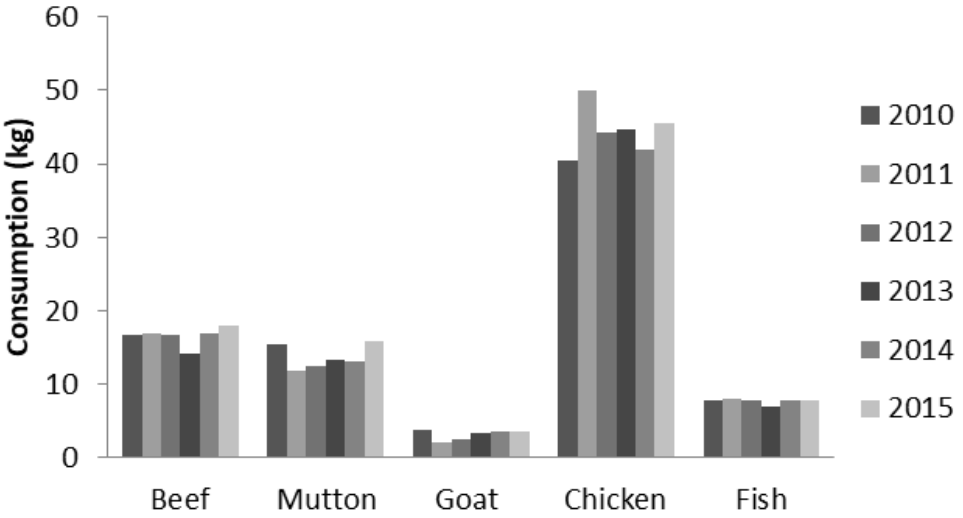


Figure 7. Annual consumption amounts per person in different meat categories for North Cyprus between 2010-2015 (U. Sencer, personal communications, 27th November 2019).

According to data given in Figure 7, chicken is the most preferred meat source in North Cyprus. Fish consumption had the fourth-order. Data after 2015 is not yet available.

**Suggestions and Discussion**

In North Cyprus, aquaculture is a growing sector compared to other countries. The population of the country is continually increasing with external migration, and the need for nutrients increases accordingly. The political situation of the TRNC suppresses the export of the produced fish, and production is limited to the demand in the domestic market. The people of TRNC prefer red meat and chicken meat as a protein source. One of the reasons is that they can be used in all meals daily. However, red meat and chicken meat can be offered to the market in different forms. Fish products are sold after cleaning of flakes, and internal organs. Local people, on the other hand, consume these products by cooking them by grilling or roasting. Most people choose to use alternative sources of protein as they do not want to bother with fish preparation.

To increase the demand in the domestic market of these products, which are highly beneficial for human health due to their ease of digestion, omega 3 fatty acids content, and high/quality protein amounts, it will be helpful to develop processing techniques in addition to production activities. Raising marketed fish such as sea bream and sea bass in fresh or frozen forms by creating various alternatives such as fillet, fish meatballs, or sushi instead of offering them to the market as a whole will positively affect the demand for seafood.

Fish pieces from fillets and other forms can be converted into the fish meal in a state-based collection unit and turned into fish feed by adding appropriate mixtures. A feed mill to be established in the country will reduce the feed costs of fish farms, which will help to sell the produced fish at a more affordable price. If the aquaculture sector is further advanced in the following years, a juvenile production facility can also be established in the country and supply less costly juveniles to local businesses. As shown in previous sections, tourism, hotel, and restaurant sectors make the most significant impact on fish consumption. The number of tourists coming to the country is severely suppressed for political reasons. Aquaculture businesses will not be able to improve on political issues, but it is in the hands of the operators to make the best publicity of the sector. People from many parts of the world travel to different regions for sport fishing. Within the farms, individual sections can be developed, and sportfishing tourism can be created.

**Acknowledgments**

We want to thank the Northern Cyprus Livestock Department and the Statistical Institute for their contribution to the data collection.

**Conflict of Interest:** The author declares that he has no conflict of interest.

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