

FISHERIES IN TURKISH REPUBLIC OF
NORTHERN CYPRUS

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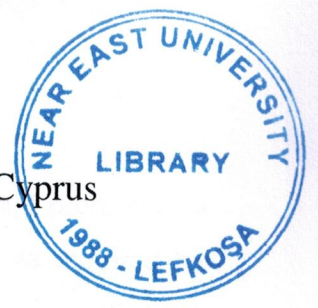
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Ahmet Beyoğlu: Fishing Activities in Turkish Republic of Northern Cyprus



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To my parents

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First and foremost, I would like to thank my supervisor Assoc. Prof. Dr Serdar KUM who has shown plenty of encouragement, patience, and support as he guided me through this endeavor fostering my development as a graduate student and scientist. My colleagues, and my family who helped me throughout deserves special thanks for their constant motivation throughout this thesis. I am also thankful for the contributions and comments the teaching staff of their kind help.

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ABSTRACT

Fishery is an activity that attracts everyone from any age group in North Cyprus. Fisheries is a part of a common heritage, and it is done for years for many different reasons. When fishing activities are not controlled, it may cause a considerable reduction in stocks and may cause big problems for this sector and for people who survive by doing this job. Those who are involved in this sector should obey obligations and should do everything possible to sustain common rules with the collective management and/or planned activities for fishing sources. The national legislations related to fishing activities in Turkish Republic of Northern Cyprus (TRNC) are discussed in detail in this study. In addition, existing and potential marine sources are also assessed on the viewpoint of mariners. This study also presents a five-year statistics of fishing and aquaculture as well as a fishing fleet available in the TRNC. Finally, this study also suggests some recommendations to increase the fishing activities in TRNC by considering to Ecosystem Management, available problems, suggests ways of dealing with these. It is believed that if these are done and followed this sector will become much better and will improve at its best to help the citizens of the country.

Keywords: Statistics of fishing activities in TRNC; Fishing and environment integration; Ecosystem Management, Development of Fishing, Increasing Fishing Sources

ÖZET

Kuzey Kıbrıs'ta Balıkçılık her ya grubundan kiinin ilgisini çeken bir aktivitedir. Kültürel mirasın bir parçası olan balıkçılık, birçok yıldır farklı amaçlarla yapılmaktadır. Bu aktivite kontrol edilmedi i takdirde, stoklarda ciddi azalmalara neden olabilir ve bu da sektörle ilgilenen ve geçimini bu eilde sa layan kiilerde sıkıntılara yol açabilir. Bu sektöre katılan herkes gerekli tüm kurallara ve yasalara uymalıdır ve planlı bir eilde balıkçı kaynaklarının kullanımı sürdürebilmek için gerekeni yapmalıdır. Balıkçı faaliyetlerine uygulanan yasal uygulamalar bu çalı mada detaylı olarak verilmi tir. Buna ek olarak, var olan ve potansiyel balıkçı kaynakları balıkçıların genel görüşlerine dayanarak de erlendirilmi tir. Bu çalı mada KKTC ile ilgili 5 yıllık istatistiklere de yer verilmi tir. Sonuç olarak bu çalı manın amacı balıkçılık sektörüyle ilgili tüm problemleri gösterebilmek, yapılabileceklerle ilgili önerilerde bulunmak, eko sistem yönetimi ile ilgili sıkıntılara yer vermek ve bu sorunların nasıl a ılabilece i konusunda yol göstermektir. E er bunlar yapılır ve uygulanırsa bu sektörün daha iyi bir hale gelece i ve KKTC 'de yaayan yurtta ların da daha çok bu sektörden faydalanaca ı dü ünülmektedir.

Anahtar Kelimeler: KKTC'de balıkçılık faaliyetleri istatistikleri; balıkçılık ve çevre entegrasyonu; eko sistemi yönetimi; balıkçılı ın geli imi, balıkçı kaynaklarının artırılması

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LIST OF ABBREVIATIONS

FAO	: Food and Agriculture Organization
ICCAT	: The International Commission for the Conservation of Atlantic Tunas- International Commission for the Protection of Atlantic Tuna
NGOs	: Non-Governmental Organizations
NMFS	: National Marine Fisheries Service
NOAA	: National Oceanic and Atmospheric Administration
TRNC	: Turkish Republic of Northern Cyprus
UNEP	: United Nations Environment Programme

CHAPTER!

INTRODUCTION

In this thesis fisheries in Turkish Republic of Northern Cyprus will be explained and how it forms the basis of the culture will be defined as fisheries maintains to be a part of the common culture in Cyprus as the country is an island surrounded by sea. Although it is a type of activity that many people do as a hobby, there is also another reason as to why people do it which is to earn money to survive. Therefore, this activity should be done in a controlled way that should be provided with the support of the government to avoid any problems that could rise once the reduction occurs in stocks if a considerable number of people start to take part in this activity. Therefore, in this thesis to make the government in the country (TRNC) more aware of the current situation, national legislations related to fishing activities will be discussed in detail. In addition to the existing available marine source is investigated and analysed and the strengths and weaknesses of the sector will be determined that will give ideas to determine what is needed to be done to improve the conditions of fishing sector in the TRNC.

There is no doubt that everyone knows fisheries and is known as one of the oldest occupations mankind had to survive throughout the history as the other occupation they had was to hunt. Both hunting and fishing are the oldest occupations that gave people chance to maintain their existence in this world. When humans established their first civilizations and looked for places for settlement they looked for seaside. Water and water products have a very important place in human life and activities and everyone should also know that aquaculture cannot just be seen as a fish food. For example; sponges, sea coral and shells and pearls that are used in making jewellery and ornaments for people to wear forms the big part of the economy that are acquired from the sea. At first fisheries were only seen as a food source that played an important role in human life, changed in the later years and began to play a major role in cultural and commercial life, even so have been effective in strengthening the economic develop multi-state such as; Norway, Japan, like the United Kingdom (Üçüncü and Şahin, 2011). Fishing is an activity that is suited to people of almost any age and across a large range of physical abilities.

CHAPTER2

THE HISTORY OF FISHERY

Basically fishing is the activity of catching fish. FAO (Fisheries and Aquaculture in our changing climate Policy Sources) (2009) stated that it is an ancient practice dating back at least 40,000 years: Since the 16th century fishing vessels have been able to cross oceans in pursuit of fish and since the 19th century it has been possible to use larger vessels and in some cases process the fish on board. Fish are normally caught in the wild. Techniques for catching fish include hand gathering, spearing, netting, angling and trapping. The same statistics also points out; the total number of fishermen and fish farmers is estimated to be 38 million. Fisheries and aquaculture provide direct and indirect employment to over 500 million people. The only reason why people in the past started the fishing activity was they needed food to be able to survive. There have been many different sectors in which people have worked for throughout the years and centuries and fishery is one of the oldest of this sector. The first human communities sustained their lives by hunting and gathering as they preferred close habitat areas which generally have a mild climate and clean water resources. As a result of these, the aquaculture has started to occupy a big part of human life. The most important in the evidence of these that can be encountered is the found fishing hook in Turkey going back to 2000-2500 years ago. In later years past civilizations established human communities and first settled around places which had sea or important waterways. As a result of this, water products have been in a very important place in human life and activities. Water products are not just limited to fish food and it should not be thought and understood like that. Turkish people whose roots belong to Central Asia and being dependent on land and despite the fact they had highly developed culture considering the past, in the later years the lives they had close to the sea or they established near the sea has maintained their cultural habits and this made them continue their lives as almost "being offended to the sea". Another important aspect that should be considered is fish not occupying important part of our Turkish cuisine. Although there is a long history of fishery and fishing activities, the below photo shows how it started and how this sector has become an important part of people's lives which started in 1940s and is still important today.



Figure 2.1: Photo taken in 1940s showing the importance of fishery (NEFSC, 2015)

In terms of the richness of the species coastal areas up to 200m constitutes rich regions and in these region 74 bony fish has been detected (Benli et al., 2004). In the country hunting is usually done between 5 to 40 m depth of the field and fishery done in small boats could not go beyond coast fishery. However, coasts no shallower than 40m by being sector growth for fish and seafood due to field development it is a very important area in terms of the ecosystem where fishing activities are suited to present serious challenges for the future. This means that fishing activities in the country would be planned in such a way that would be environmentally compatible for the future, and should be done in no more than 40 m shallow areas, otherwise if done fish reserves would not be able to be removed and this would create a very big problem for the country.

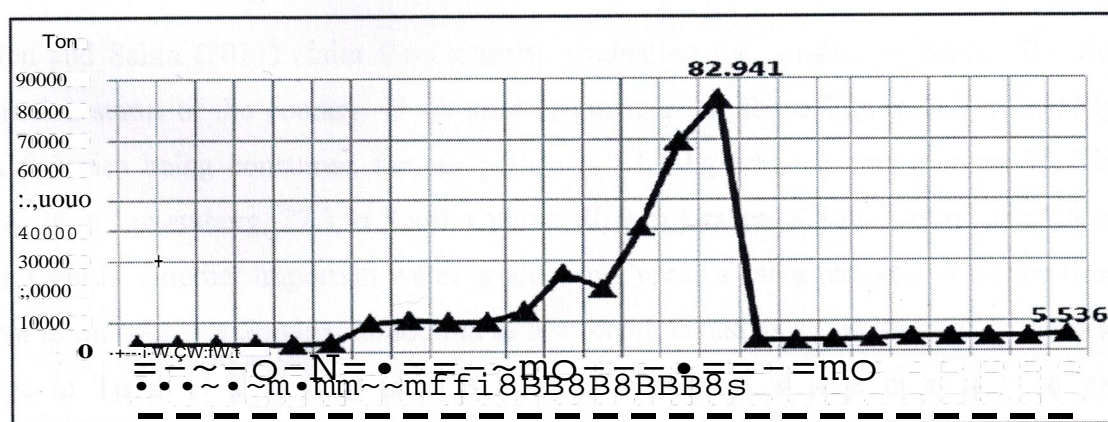


Figure 2.2: Water products acquired in South Cyprus according to years (1986-2010) (FAO, 2009)

On the island not only production, but also the consuming status is important. Due to mentioned reasons above since Turkish people do not consume too much fish products when compared with Europe it always stayed behind the list. Therefore, the amount of water products being consumed varies in each year and as shown in Figure 2.2. It had its peak between the years 1999-2000 and then, had a massive drop in 2002 and this continued to remain stable until the year 2010.

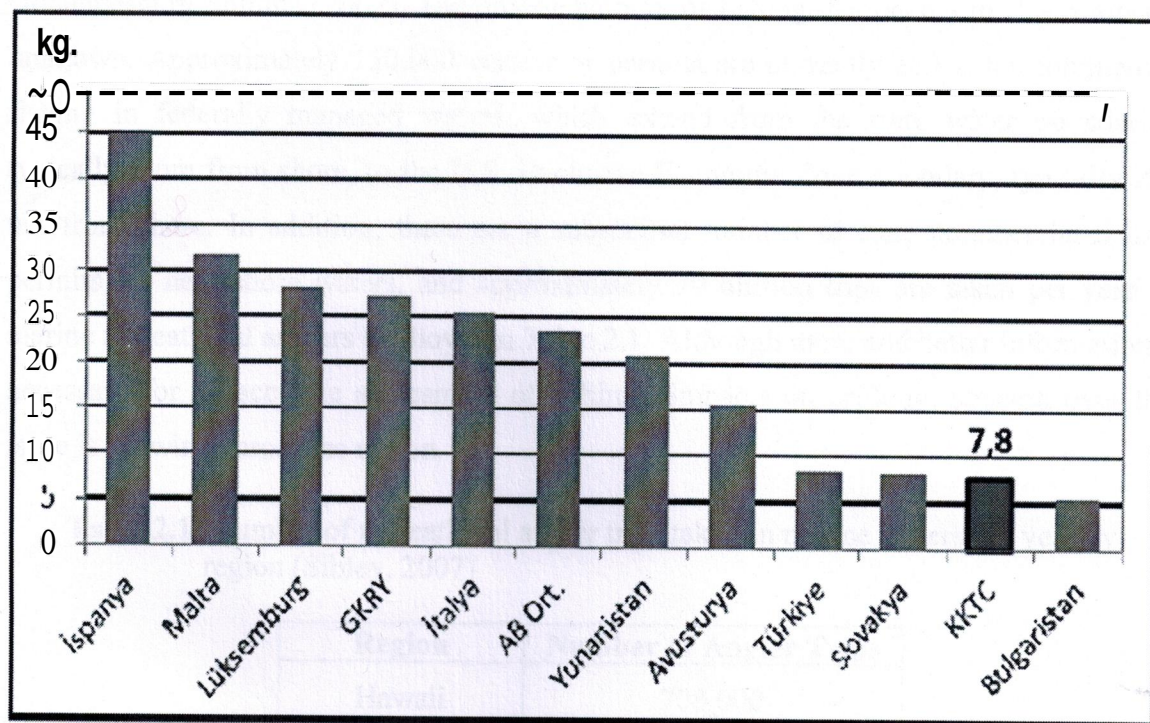


Figure 2.3: In the selected countries the amount of products for per person (Eurostat, 2011)

Erbilen and Sahin (2011) claim that, it worth evaluating the consuming status after the production status of the country. If we need to go over the above Figure 2.2, in 2009 in USA fisheries being consumed for per person is 23,3 kg whereas this amount 31,7 in Malta, 28 in Luxemburg, 27.3 in South Cyprus, 20.9 in Greece, 8.5 in Turkey, and 7.8 in North Cyprus. Another important water product in Cyprus as an alternative is at one time known in the world is Sponge moliddima as also being called as "Turkish cup" is the best sponge in Turkish culture and is known as Mediterranean sponge or rough sponge. Although there are many other sponges available in the country the most known and preferred is this type and this refers to the past years and constitutes the basis of the sponge activity. For many years the local people in Cyprus were not interested in this activity at all

and Greece sponge hunters dealt with this at that time. Firstly in 1888-1889 period a Greek Cypriot person has officially started hunting business in this sector, but couldn't managed to continue (Dedeçay, 2002). Especially in Kyrenia and Bafra harbour area are surrounded by rich sponge farms.

Giving information related to fishery is not enough to talk about this sector throughout the world and make generalizations and say this is how it is and how it will be. The amount of fishing that is taking place in each eountry and each region varies for different reasons (Johannesburg Summit, 2002). The precise amount of fishing that occurs in U.S. waters is unknown. Approximately 150,000 vessels or permits are currently active for commercial fishing in federally managed waters, which extend from the state water boundaries, typically 3 nm from shore, to the U.S. Exclusive Economic Zone boundary, typically 200 nm from shore. In addition, there are a substantial number of state commercial-fishing permits for near shore waters, and approximately 70 million trips are taken per year by marine recreational anglers as shown in Table 2.1. Although more and better information is necessary for an accurate assessment of fishing's impacts on ecology, concern over this issue is growing across the nation.

Table 2.1: Number of recreational angler trips taken in marine waters per year by region (Sibley, 2007)

Region	Number of Angler Trips
Hawaii	708,000
Pacific Coast	9,656,000
Gulf of Mexico	20,868,000
South Atlantic	18,754,000
Mid Atlantic	15,576,000
North Atlantic	6, 513,000

Fisheries and Aquaculture Department in the TRNC mentions that, like all types of management fisheries management should be aiming to meet the goals of people by satisfying their needs of food and by providing them economic benefits through management' actions that would help them focus on the fishing activity and the target resource. Because fisheries have not been managed in a way that contributes positively to

sustainable development, the impact on the world's economies and societies will be enormous now, and probably even more importantly, well in the future. This situation will inevitably contribute to increased poverty, increased inequities and lack of opportunities for many of the world's fishers to make a decent livelihood. Poor management is depriving many regions and states of the potential social and economic benefits of fishing (currently estimated to employ 12.5 million people with about US\$40 billion per annum in international trade). Approximately 80-90 million people, most of them in developing countries, depend on fish for their main daily source of protein. The need to reduce the alarming trend of depletion and degradation has been recognized in many international fora, most recently at the World Summit for Sustainable Development which pledged to: maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015 (Gmelin, 1789). This quote shows that there is obviously a need to improve the approach used in fisheries management so that potential social and economic benefits can be achieved. Therefore, conflicts between competing users must be reduced, and fisheries must be accepted by society as responsible users of the marine environment.

CHAPTER 3

THE MAIN WATER PRODUCTS IN NORTH CYPRUS

Fishing should be dealt with two aspects of basic economic; on behalf of basic food nutritionally balanced is one of the first of these activities that is an important protein in the supply of fishery products, and the other is, it is an important source of livelihood in the commercial sense. Despite the fact that we live in the Mediterranean, it is an inland sea, and in terms of having a diversity of aquaculture products we have a poor sea when it is compared to the oceans and seas (the Norwegian and the Arctic Sea). However, it is connected to the world's largest inland sea (about 2.5 million km²) and Gibraltar Strait (Strait of Gibraltar) and to the Atlantic Ocean and when it is compared it poses a richer feature than most of the other inland seas. Therefore, many countries bordering the Mediterranean such as; Turkey, Israel, Egypt, Tunisia, and Italy receive significant revenue from fisheries, and this forms the most part of their lives. In addition to all these, due to Global Climate change taking place in the recent years, and some pests (predator-invasive) species that are spreading by Suez Canal, pollution, intense pressure on fish stocks, uncontrolled hunting are giving rise to serious recession in most countries of the Mediterranean fisheries. There is another important factor that cannot be underestimated and that is puffer fish which has emerged in recent years and poses a threat to human health and tourism. Due to the civilizations built in Cyprus as being an island water products always maintained its importance (Benli et al., 2004). Being located on the east of the Mediterranean basin, and being the largest island in the area with 9251 km Turkish Republic of Northern Cyprus has been one of the states which fisheries took place as one of the most important economic activities. Characteristically resources are limited in the island countries, therefore, keeping this in mind, it is important to get the efficient utilization of all available resources, and it is what makes the fishing activities as an indispensable activity in the country.

When we look at them any species in the Mediterranean boned and boneless fish species, as well as various shellfish (lobster, such as oysters) invertebrates (such as a sponge species) and cephalopods (from Cuttlefish) and plants are available in our seas. As a result of the study conducted in North Cyprus 74 Bones, 10 cartilaginous (sharks, stingrays), 9 cephalopods (squid), 7 crusted (prawns, lobsters and mussels) are found (Benli et al., 2004). Among the main economically valuable species mullet (*Mullus surmelutus*), horse

mackerel (*Trachurus* spp.), sardine (*sardina pilchardus*), carpenter (*zeus, faber*), clarion (*synodus, saurus*), sea bream (*spicara smaris*), swallow (*triglia, lucema*), scorpio, deep sea silver, coral, flounder, whiting, mackerel, grouper species, gilt-head bream, perch, tunny, sinagrit (Benli et al., 2004).

In TRNC Animal Husbandry is the authority in charge of arranging all kinds of fisheries activities. The legal justification of Fisheries Regulation numbered as 27/2000 was published in the year of 2000. These are; amateur (sports) Fishing Legislation, Marketing Certain Fisheries Legislation, Regulation on Fishing Port Operation and Administrative Principle, Regulations for Rules Regarding Fisheries Information Records, Regulation on Fisheries Retail Sales Places, Regulation on Permission for Surrounding Nets, Aquaculture Legislation, Regulation on Monitoring and Auditing Fish Farms, Rules regarding Project Design for Artificial Reefs, Design, Implementation and Monitoring (TRNC DAHOAR, 2013).

The legal justification of Fishing Ships (Registration, Sales, Transfer and Pledge) Law numbered 34/1975, 52/1988 is "Fishing Ships Regulation". By looking at the available information given above TRNC's land borders consists of 67% of usable shorelines. 50.6% of total island shores have fishing area of 8780 km². It can be stated that a serious potential is available for improvement of the fishing sector, if total 21 lakes (ponds) and offshore waters of Mediterranean Sea out of 12 nautical miles are considered. Thus, water products and fishing sectors are affected from socio-politic and socio-economic status of the country, rapid development of technology in the world, scientific researches and technological developments (TRNC DAHOAR, 2013).

3.1 Coastal Fisheries and Production in TRNC

As mentioned in TRNC, 2008 starting from the early years there has always been a distance to fishing activities. Another indication of this can be seen when we look at the traditional Turkish cuisine aquatic products that they do not occupy an important place. Indeed, the characteristics of the Turkish nation in the TRNC features generally been avoided by protecting coastal and fisheries compared to other agricultural activities. Therefore, although there is a serious lack of infrastructure in the sector, it is known that the level of support given to meet the needs of fisheries is a breakthrough in the industry and not showing enough interest as a country is another result of the Traditional Turkish

habits. With a total length of 396 km TRNC, coastal island in the country is 50.6%. Overall the coasts in the country are offering more recesses and protrusions and have an unprotected structure. As a natural consequence of this condition the country is not rich in terms of bay. As a result of this, suitable fishing port area is quite small and this is appearing as a significant obstacle in the formation of the infrastructure, and the result appears to lie in the same situation, especially in tourism and in other maritime activities. Throughout the history the best places in maritime activities are Famagusta, Morphou, and Kyrenia bays as they have been one of the most important centres in the opening to the world. The richest stocks in terms of fisheries in TRNC are found at Karpaz and Korucam coast. For many years fishing activities continued in Kyrenia beside Famagusta. In the country Famagusta is the most appropriate place for fishing. Having used all the sources ignorantly for many years and their consumption required rules and regulations to be put by the state. May is the most productive month in the country and March, June and August are important period for these activities. As a result of the facts that have been mentioned in the status of the production, very serious fluctuations are shown in Table 3.1. As a result of the war and the political situation of the country, in 1986 fishing lost a small value such as 66 tons, then in 1990 demonstrated a rapid rise and production rose to 400 tons. Between 1990-2000 the overall production remained around 400 tons. When the year reached to 2010, this amount has reached to the highest value 593 tons in the history with the biggest influence of the increase in the population of the island, developing tourism and increase in the student population.

Table 3.1: Quantity of fishing and aquaculture production (TRNC DAHOAR, 2013)

Year	Fishing (ton)		Aquaculture (kg)		
	Declared	Estimated	Sea bream	Sea bass	Total
2010	176	400-600	127.033	15.866	142.899
2009	157	400-450	131.315	41.110	172.425
2008	215	400-450	147.920	9.710	157.630
2007	186		211.000	-	211.000
2006	162		33.350	-	211.000
2005	165		-	Tuna	346.192
2004	130		-	Tuna	68.575
2003	-		-	Tuna	150.743

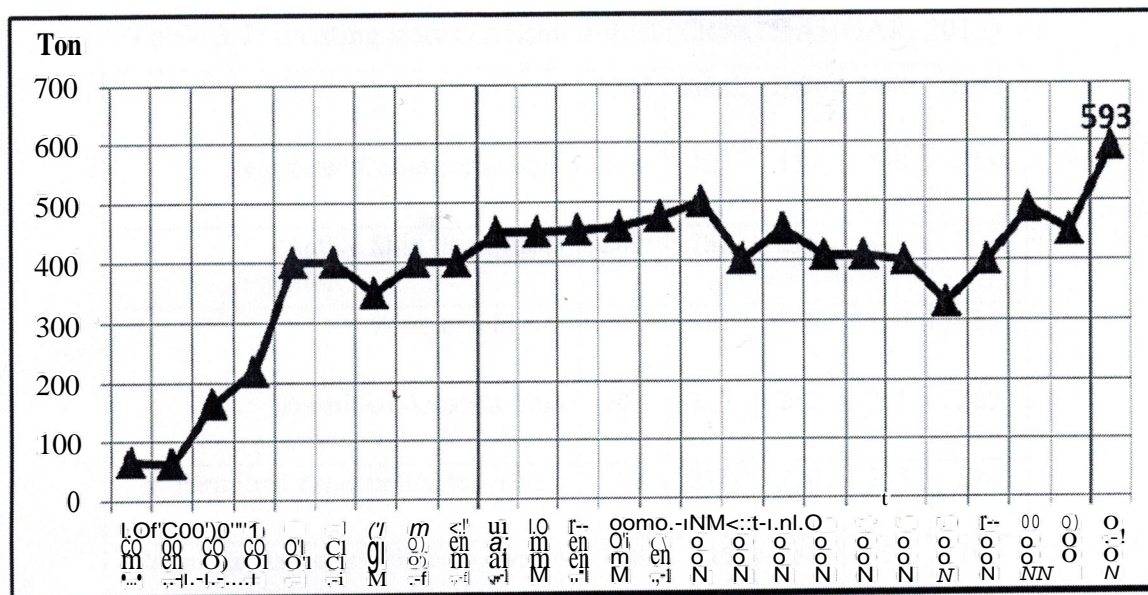


Figure 3.1: The amount of water products obtained in TRNC according to the years (1986-2010) (TRNC DAHOAR, 2013)

The Ministry's report (TRNC DAHOAR, 2013) as shown in Figure 3.1, the most amount of water product that has ever been reached was seen in 2010 and the least was in 1986 due to different reasons. Although we cannot reach to Turkey's population and despite the fact that it has more intensive young population, it remains behind it with less population even the countries without a coast to the sea. Fishing in TRNC can be defined as a typical Mediterranean Shore Fishing performed with artisanal methods in which individual marine origin productions based on coastal competition without organizing and completely un-audited annual production is estimated as 450-500 tons. Moreover, some of captured are consumed as household needs and remaining is presented to market at the fishing area, and among 350-400 fishers working in this sector, some of them work for hobby, some of them for a second work or revenue and just 30-40% of them accept this job as their profession. Furthermore, some alternative fishing methods such as joint fishing operations are not available among fishing vessels, yet.

In Table 3.2, fishing and livestock activities considering fleet's existing status, production level and imports/exports are indicated. There is a low increasing in fishing activities based on these data, and it's not sufficient in numbers considering the potential of Island.

Table 3.2: Existing status of fishing fleet (TRNC DAHOAR, 2013)

	2007	2008	2009	2010	2011
Registered Commercial Ship	442	422	437	448	454
Active Ship (Permitted)	269	288	295	300	305
Permitted Fisher	388	381	340	410	414
Permitted Amateur Ship	207	227	242	281	320
Permitted Amateur (Sole Owner)	205	217	220	263	313
Permitted Amateur (Not sole owner)	138	146	157	221	101
Underwater Gun Permission	306 ⁻¹	384	208	368	346
Total	1955	2065	1899	2291	2253

3.2 Problems of infrastructure sector and trade in TRNC related to fishing

As mentioned in earlier section, besides, the main problems that are above the other existing problems are the lack of infrastructure. These activities not going further than coastal areas, and the eating habits of our culture. Unfortunately, for these reasons TRNC is left behind in terms of fishing and fishing activities. If we are to mention sector related problems in a more detailed way related to infrastructure problems fishery shelters come first. As it has been mentioned by Atun (1999), our country consists small number coves in the name of housing fishing shelters, and their incorrect selection in terms of their location and their insufficiency due to structural deficiencies are among the main problems in the fisheries sector. The same report shows, the country has reached to a total of 16 fishing ports with a capacity of 295 boats (Atun, 1999).

Another problem with available fishing shelters is that these boats do not have the capacity of serving large-scale vessels. Therefore, either new fishing shelters are needed for the big vessels or some changes are needed to be done in the existing ones.

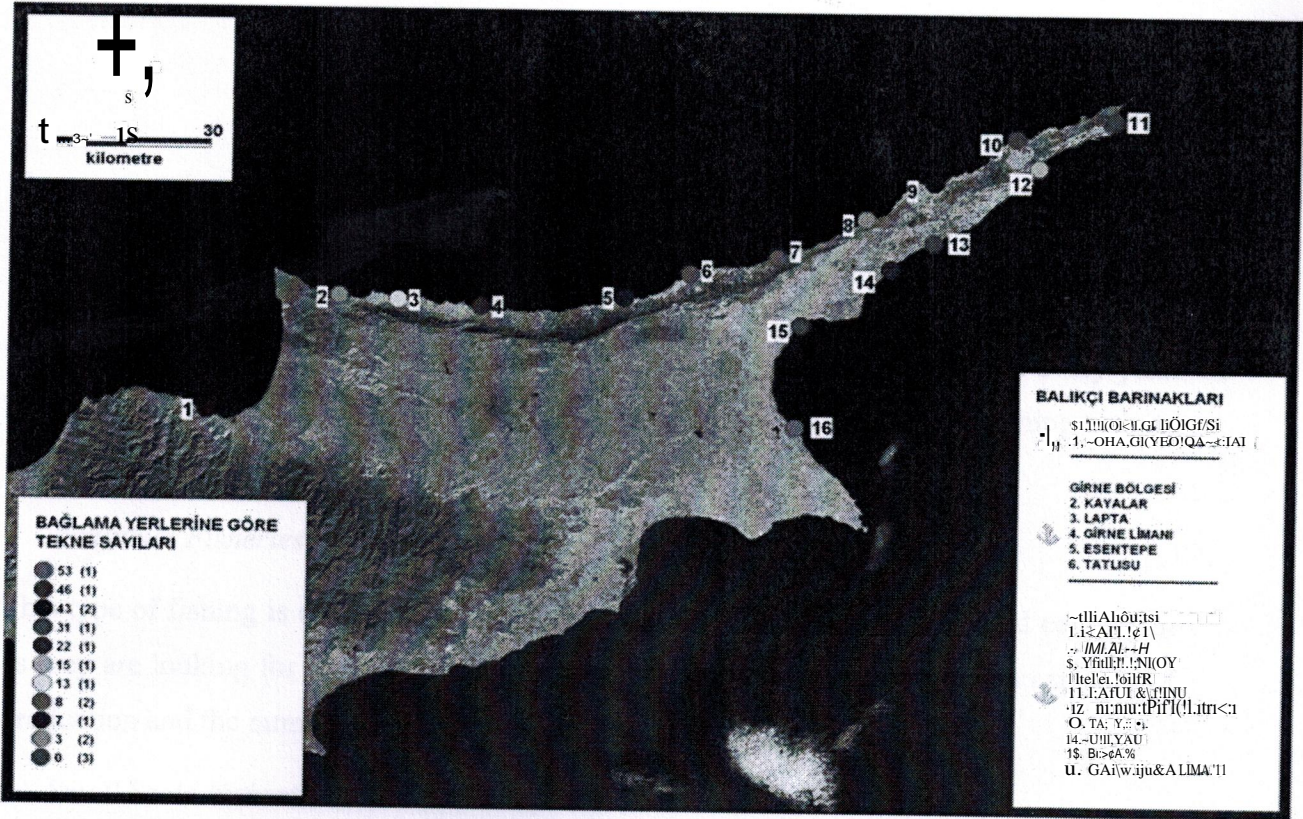


Figure 3.2: Fishing ports and mooring locations (Atun, 1999)

CHAPTER4

TYPES OF FISHERY

The reason why people choose fishery as part of their lives can change. Fishery can be a part of the society by helping the country's economy, welfare, and health of the citizens. Moreover, many people find job opportunities with the development of this sector and are unemployed, and the countries earn billions every year from fish trade they do every year. The North Cyprus coast has many different types of fish, and therefore, the fishing activity they engage in various for the purposes of fisheries.

- *Industrial Fisheries*

This type of fishing is carried out by large vessels, and these people have good equipment as they are looking for a large number of fish. Industrial fisheries have a high capacity of production and the number of fish they catch is also high.

- *Small Scale Fisheries*

These kind of people dealing with this type of fishery are lacking equipment and even if they have any they use small crafts. Some of them often acquire their equipment from their families.

- *Artisanal Fisheries*

This type of fishery is done for local consumption and the people who are involved in this are traditional fisheries. They can be thought as opposite to commercial companies. They use small fishing vessels, don't have and don't spend too much money, live close to the shore and do short trips to catch fish.

- *Recreational (sport) Fisheries*

These types of people do not aim to earn money from this job, but instead they do it as hobby, and leisure.

- *Commercial Fisheries*

Fishery done for profit. The aim is to sell what is being caught from the sea.

- *Subsistence Fisheries*

In this type of fishing the fish that is caught are shared by families and other fishers. Sometimes they exchange the fish they have among themselves to get another good or services.

- *Traditional Fisheries*

These types of people come from specific communities and they have cultural traits and customs that they follow and are influenced by these. They share the knowledge they have by word and this information passes from mouth to mouth among them.

Table 4.1: The amateur fishermen, fish sizes and restrictions (Cochrane, 2002)

General Name	Min Length in cm	Max Number of Fish
Dolphin Fish	40	3
Leer Fish	30	3
Red Mullet and Striped Red Mullet	13	*
Whiting	20	*
Gilthead sea bream	20	*
Sea bass	25	*
Sole fish	20	*
Common bream	18	*
Angler Fish	30	*
Grouper Fish	45	2
Grill Types	12	*
Annular Sea bream	12	*
Horse Mackerel	15	*
Brown meager	45	2
Black Bream	18	*
Gray Mullet	16	*
Swordfish	130	2
Red Sea Bream	15	*
Chub Mackerel	18	*
Grouper	45	*

Blackspotseabrerun	33	*
Saddled bream	12	2
Striped sea bream	20	2
Crob	25	*
Mineri	30	2
Serranid Fish	12	*
Salema	-	*
Common dentex	20	2
Greater Weaver	15	*
Sorpoz	23	*
Frigate Mackerel	40	3
NorhemPike	60	2
Mackerel in general	20	3
Albacore	60	*
Common pandora	17	*
Skipjack Tuna	45	2
European Lobster	105-300 mm	2
Red Lobster	20-77mm	2
Spiny Lobster	90mm	2
Pink Shrimp	20mm	*
Ocopus	1 kg	*
Annular bream	100mm	*
Carpet shell clam	25mm	*
Warty Venus	25mm	*

CHAPTERS

DIFFERENCES IN CYPRUS AND OTHER COUNTRIES

IN TERMS OF FISHING

There are some differences in Cyprus and other countries in terms of fishing. However, this activity is not restricted to any age group or any country. Anyone at any age or country can take part in the activity for different reasons. These different reasons could be a family activity, school activity, social activity as an interest. Research shows that fishing that is done as an activity provides significant health benefits to seniors through physical activity, vitamin D acquisition and social interaction. Table 5.1 shows that any person can join to this as an activity.

Table 5.1: Fishers by years of age and experience (Ormsby, 2004)

Age	5 years	5-9 years	10-29 years	30 years	Total
15-19 years	23.8	23.8	52.3	-	100
20-29 years	9.1	24.2	66.7	-	100
30-39 years	3.4	9.5	61.5	25.7	100
40-49 years	3.6	5.0	32.9	58.6	100
50-59 years	1.7	3.4	15.5	79.3	100
60 years	3.3	6.6	14.8	75.4	100

5.1 Other Countries

When we look at other countries and compare it with Cyprus there are many things which we would find it different and opposite of what we have in Cyprus. To start with boat, they are longer in length. Active fishing can be seen and people are more educated on the topic. It is easier and cheaper to find the needed supplies. There are more shelters and they are also more appropriate. There are more areas available for hunting. Fishers can hunt in open waters. Moreover, there is no waiting for the ordered fishing products and no custom to pay as extra. You go and buy whatever you want from the shops that sell all the fishing products which are unlike Cyprus. In other countries there is more chance to do what people want because of the available opportunities.

The most important factors are motivating and directing people to this activity either in North Cyprus or in any other country all over the world are; having a demand of resting,

desire of joining indoor and outdoor activity, and wanting to enjoy from the nature. To identify these factors Henry and Lyle (2003) have conducted a survey to find out the underlying reasons as to why people do fishing, and here is the result of the survey done.

Table 5.2: Different reasons for people engaging in the fishing activity (Henry and Lyle, 2003)

Motivation	Very	Quite	Not Very	Not at All
Relax and Unwind	63	27	8	2
To be outdoors	58	33	7	2
For solitude	19	23	35	24
To be with family	39	30	19	13
To be with friends	32	41	17	10
Fishing and competitions	2	3	11	84
Fish for sport	48	34	21	5
Fish for food	33	28	25	14

In Table 5.2 the most important factor is motivation, then resting and wanting to be outdoors follows and the least important factor as to why people do it is for food. So, Table 5.2 shows different reasons encourage people to join in this activity. This table shows the areas available in TRNC for the fishing ports. As it can be seen Famagusta has more fishing ports than the other places in North Cyprus.

Table 5.3: Fishing Ports in North Cyprus (Avni and Can, 2009)

Kyrenia	Famagusta	Guzelyurt
Old Kyrenia Port	Bogaz	Gemikonagi
Esen tepe	Kumyali	
Lapta	Taslica	
Kayalar	Balaları	
Tatlisu	Yeni Erenkoy	
	Kaplica	
	Selenoz	
	Dipkarpaz	
	Famagusta Port	
	Efendile	

5.2 Problems with the fishing in Cyprus

After 1960, the people and the government began to give more importance to fishing sector. Several projects developed in order to support the fishermen in Cyprus and to help to the reformation of the available shelters. Lack of infrastructure comes at the beginning of all problems. Another problem is the eating habits of Turkish culture. Inadequacy of the existing fishing shelters. Another problem is these shelters are not good enough to serve to the big vessels as they do not have enough capacity to do it due to their size. The other thing that matter is the size and the property of the vessel. When the year 2010 came, although the total number of the boats reached to 448 a very large number of them is not ready for non-fishing activities, they are small scaled, old and insufficient. Another major problem with the fishing in the country is the country not having fisheries policy and the country not being internationally recognized by the other countries. The biggest and the most serious reflection of this problem is the reflection of TRNC in terms of its political position by not being a member of the ICCAT (The International Commission for the Conservation of Atlantic Tunas-International Commission for the Protection of Atlantic Tuna) (Üçü lük and ahin, 2011). Üçü lük and ahin (2011) also states that Greek side has become a member of the above mentioned committee and with Turkey's initiative tuna farm in TRNC has been closed. Thus, tuna production and trade of the island passed to the Greek side. This and similar situations have become a serious problem in the country's fishing sector and foreign markets. The general structure of the Mediterranean surrounding TRNC and due to seasonal heat, and small differences and the lack of sea-going stream is making it poor in terms of nutrients of elements. Therefore, although the numbers of species are more when compared to Turkey, in terms of stock, sea water, poor nutrients and plankton are insufficient.

In order to determine the needs a new project has been designed between Turkish Republic of Northern Cyprus Ministry of Agriculture and Forestry and Ege University in Turkey. The aim of the project was to determine the appropriate sea areas, water aquaculture and (offshore cage culture) fields. According to the same project, before the establishment of the Republic in Cyprus, Turkish community was forced to live in the inner region, and this consequently reduced the relationship with the sea and the coast and due to this reason the fishing industry had not developed at the desired level (lkyaz, 1998). In the same report according to the data provided by the statistical department of North Cyprus, a total of 279

vessels were registered in the last decade, and 291 people is engaged in fishing activities sector as shown in Table 5.4.

Table 5.4: Registered vessels in TRNC (Üçü k and ahin, 2011)

Per Person Consumption	4.63 kg /year
Fish Production	450 tons /year
Registered Fishing-Boat	279 pieces
Working Fishing Boat	127 pieces
Trawl	4 pieces
Snoring	1 piece
Number of fishermen	291 pieces
The Aquaculture	At the planning stage

Table 5.5: Imports of Cyprus Fisheries (tons /year) (Üçü k and ahin, 2011)

Fresh Fish	48
Frozen Fish	159
Canned Fish	260
Total Fisheries Import	467

Almost everyone knows that 3 sides of Cyprus are surrounded by the sea and with the use of current technology this gives the country a great potential to increase the production 5 times more as a short-term goal. Many other important issues took part such as; Development of Water Chemistry Laboratory, oceanographic Investigation of Fishing Areas, Determination of Fish Breeding and finding appropriate fields, Obtaining and Supplying Fish Hunting Equipment, and Investigation of Fishing Areas and Regulating Prohibited Hunting Areas (Üçü k and ahin, 2011).

5.3 Determining Fish Breeding and Finding Appropriate Fields

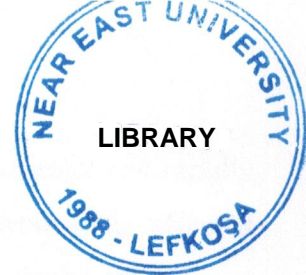
Cage system; is generally formed in the surface or in web reservoir which makes the task of carrying wood, synthetic materials such as metal or plastic. As fasteners rope polymer concrete, PVC balloon arrangements are utilized by various flotation elements. Network

pools which are prepared in different sizes with the help of the floats are placed in specific locations in the sea, lakes and streams. Network pools are usually prepared with 100% nylon (synthetic) ropes, and as a floating material wood, plastic, PVC (Polyvinyl Chloride), and steel are utilized. The shape of the fish cage to be selected will vary according to fish species. For trout and for those which live close to the surface and are fast moving circular or polygonal meshes are suitable. These limitations which results from a stress factor will be minimized, For *Semipelajik* fish types the shape does not have much significance. For these fish types rectangular or square cages are used to provide controlled units. Therefore, hydrodynamic forces acting on the cage can be listed as follows: Stimulating effect of the waves, Intensity and impact strength, and Viscosity.

Another important issue in the cage system is the fixing of the system. It is used to prevent any damage that may occur displacement due to the wind, wave or discharge of aquaculture unit. In the most general sense, these systems can be defined as anchor, vault, a fixed part, or as the interconnection element which are located at the bottom, on the land. While anchors are becoming more useful in small scale systems as this grows, they are being insufficient. Therefore, the so-called heavy vault blocks are used. Furthermore, fixing elements can be used related to the bottom structure as an alternative. Many methods can be applied for fixing the cage system. Fixing can be done from a single point or from multi-points. More commonly used than this system is fixing from multiple points. As an interconnection element wire rope, chain, or synthetic rope are used. Steel ropes and chains are not suitable for small-scale farms. The reason for this is the length of the rope is being longer than the required length and substantially increases of the vertical component of the rope. Even though these drawbacks are trying to be resolved, as a result it can be seen that the performance of the synthetic rope gives better results in all circumstances. In addition, synthetic rope is more flexible than chain and wire. In terms of obtaining lower tensile strength this is an advantage. The most important event affecting network is the blocking occurring by the fouling organisms. In the summer period due to blockage of a network replacement is required in every 20-30 days. In the winter this time period can go up to 70-90 days. To minimize this affect antifouling paint can be used to paint the network and to make it used without having any need to change it for 12 months. Like all materials found in water networks are covered by fouling organisms. After a certain period, the clog of the meshes can be observed. This prevents water in the cage to change. Due to the fact that intensive stocking is done in cages, if sufficient water change cannot be

provided, dissolving and reduction in the amount of oxygen can reveal dangerous consequences. Therefore, water in the cage must be sufficient to change. To prevent any incident that is likely to occur in the network, antifouling paints are used. However, the chemical structure of the paint that is to be selected is also important. Antifouling paints containing Tri-N-Butyll resulted with the death of salmon due to aggregates in their muscle tissues. These pools from 25 m³ volume can go up to 17,000 m³. The depth of the network pool is between 2-15 meters. Pool depth depends on the volume of environmental conditions, maintenance, supply, and financing. The lowest volume of the cage should be 120 m³, and the average required volume should be around 500-800 m³. One of the factors that influence the type of cage size is the type of the fish to be grown. For example, rainbow trout show better results in small cages while Atlantic salmon and Coho salmon are in need of a big cage. Fish farming in cages in off-shore areas has been showing significant growth and therefore, can be seen as a production area which has a potential that can enable large production in the future. At the beginning this was first seen in Norwegian fjords England, Scotland, France, Italy and Spain and these works were discussed and the method used demonstrated that this sector is expected to show development in the upcoming years. For this reason, system control is very important for efficient operation. Generally, these controls are done visually or manually, but in the use of advance technology these controls are done semi automatically or fully automatically.

The system has two main sections, land and sea. In the off-shore section, for the exchange of information telemetry, data assessment and control system, research module to find the locations, meteo-oceanographic module, power generation modules, biomass monitoring module, structural composition module, nutrient supply and control module, a water quality module are found. Land section also enables the exchange of information, telemetry, remote control module, subsystem module, module internal users, external information network and data archive, and evaluation module. Systems with high-capacity units, bears maintenance and control, business and government buildings within themselves. To large-volume cages system feed storage and feeding automats are added. However, platform scaffolding constitutes a unit in itself. Cage systems must comply with the eating habits of the species that are grown, high storage conditions, the age and the size of the fish that will be stocked. For all these reasons, they must be organized, sorted, harvested and etc.



CHAPTER 6

DISCUSSION AND RECOMMENDATIONS:

FISHING AND ENVIRONMENT INTEGRATION

The annual report by Livestock Office 2012 states that when TRNC fishermen are observed and detailed information about the fishing fleet is obtained, it can be understood that in terms of typical Mediterranean Coast, there are major differences in the fisheries, and these can be summarized under the name of fishing activities. There are many differences in terms of the physical characteristics of the boats, the performance of fishers, the calculated amount of hunting and what fishers expect limited infrastructure and superstructure facilities, social security, lack of fresh water, and lack of interest among youth towards this sector. The physical characteristics of the boats that make up the fishing fleet in TRNC and their hunting capabilities, aim and the setting they are to be used is not appropriate enough and effective. Mostly fleet consists of older boats. Moreover, boat which has the physical activity to increase the amount of product for per unit effort has not been developed, and the performance of the fishers of the country in terms of hunting is less than expected. Preferably, the amount of product used for inshore fishing areas and restrict the amount of supply in terms of diversity. Apart from these, calculated hunting does not go much beyond the income to meet the costs of fishing. Due to the limited', "" infrastructure and superstructure facilities being insufficient the quality of product supply could be affected. Their interactions with seals, dolphins, turtles and other living species in the sea are more. Balloon fishing is seriously affected negatively in the country. Social security, professional organizations, socio-economic background, and marketing are very weak among fisheries. Since the lack of freshwater input to the marine environment reduces productivity. There is less demand for sea food in the country, and hence, young people are not showing interest to fishing as a profession.

In the country, the current production quantity and variety is too low to qualify as an economic resource, and in terms of production of raw materials, the country depends on outside in this sector. Some areas for production become available. TRNC and coastal ecosystems with high biodiversity and low biological productivity can be considered as a typical Mediterranean case, which makes it clear that properties are available. On the other hand, due to low rainfall values, the island's fresh water reserves are poor. These fresh

water reserves also limit the relationships. Limited fresh water-sea interactions rapidly spread on the island because of the activities with the use of coastal areas affected negatively which was almost completely lost. However, because freshwater is not associated with any difference of both chemical parameters such as chlorophyll and nutrients, and biological parameters such as plankton, benthos biomass species compositions, it means that there are big challenges for the young species in the coastal ecosystem in terms of reproduction, development, feeding and finding sheltering area. Therefore, steams, terraces, reefs and sea grass meadows of *Posidonia oceanica* privileged ecological roles such as habitats of fish-breeding-housing due to feeding areas are extremely important in terms of stock. On the other hand, under the protection of the global Mediterranean monk seal, shelter for species such as sea turtles / breeding areas in the country, this kind of interaction increases the size of the fishing seriously. Biological diversity of protected area management guarantees the continuation of the development, which is to be appropriate. Pufferfish (*Lagocephalus sceleratus*), bluespotted comefish (*Fistularia commersonii*) in the Mediterranean, the new spans two indo-pacific angm species and natural predators removed to the new ecosystem, especially two active predators are fed with the puppies and young fish. Romp mouth and development of reef in coastal areas consisting of Cyprus to be occupied is a serious problem for fish stocks.

6.1 Fishing Activities and Aquaculture

There can be many suggestions and recommendations on the improvement and development of this sector in the country and I would like to write down as many as can. The incentives and countermeasures should be taken by targeting the fishing activities. The large pelagic (tuna, akya (Lear fish), bonito, albacore, etc.) and demersal fish (mullet/Mugilidae, bakalyaro, red sea bream, etc.) with the modem equipment (particularly suitable crane and cold storage systems and electronic communication devices) with a enabled boats (suitable for fishing nets) between the depths 50-500 m. Time limits should be available for fishing that will be held in shallow waters. According to sea conditions, both the fishing boats and minimum standards regarding fishing tools must be re-considered and re-regulated. Infrastructure of fishing pier/ports and review of standards (office, cold storage, berth, maintenance-repair, etc.) should be identified and renewed. Fishing licenses, basic boating, fishing techniques and training courses might be held on

environmental ecology given to individuals who succeed as a result of a legal arrangements should be made to ensure and implemented by determining a milestone. In order to improve socio-economic conditions of fishers activities with legal and administrative requirements of professional organizations (such as mandatory membership) should be considered (e.g. chambers, associations, etc.). Aquaculture, both in terms of supply of raw materials and logistics to be dependent on foreign countries, as well as having a limited market in the country in terms of contribution to the national economy as a sector is very limited. On the other hand, keeping the production at minimum capacity, and keeping the increasing capacity depends on export opportunities to the Southern part of Island; this is commensurate with the arranging and production in the country's ability, reserves and economic contribution to the extent possible to maximize in terms may be useful.

Nuttall (2014) thinks that fishing is central to the livelihood and food security of 200 million people, especially in the developing world, while one of five people on this planet depends on fish as the primary source of protein. Moreover, according to UN agencies, aquaculture - the farming and stocking of aquatic organisms including fish, molluscs, crustaceans and aquatic plants - is growing more rapidly than all other animal food producing sectors. But amid facts and figures about aquaculture's soaring worldwide production rates, other, more sobering, statistics reveal that global main marine fish stocks are in jeopardy, increasingly pressured by overfishing and environmental degradation. This article presents a threat towards this activity and it warns people to stay away from excessive amount of fishing. Since people are trying to live healthy and eat healthy products, the demand of eating fish and towards fish products have started to increase rapidly, and therefore, it led the fish prices to increase and be even more than meat prices. This is also leading and encouraging companies and government to invest money into this sector as it provides a good future. Food and Agriculture Organization (FAO, 2002) estimate, over 70% of the world's fish species are either fully exploited or depleted. The dramatic increase of destructive fishing techniques worldwide destroys marine mammals and entire ecosystems. FAO reports that illegal, unreported and unregulated fishing worldwide appears to be increasing as fishermen seek to avoid stricter rules in many places in response to shrinking catches and declining fish stocks. Few, if any, developing countries and only a limited number of developed ones are on track to put into effect by this year the International Plan of Action to Prevent, Deter and Eliminate Unreported and

Unregulated Fishing. Despite that fact that each region has its Regional Sea Conventions, and some 108 governments and the European Commission have adopted the UNEP Global Programme of Action for the Protection of the Marine Environment from Land based Activities; oceans are cleared at twice the rate of forests. Furthermore, the Johannesburg forum stressed the importance of restoring depleted fisheries and acknowledged that sustainable fishing requires partnerships by and between governments, fishermen, communities and industry. It urged countries to ratify the Convention on the Law of the Sea and other instruments that promote maritime safety and protect the environment from marine pollution and environmental damage by ships. Only a multilateral approach can counterbalance the rate of depletion of the world's fisheries which has increased more than four times in the past 40 years.

6.2 Ecosystem Management

Ecology has important effects on fishing and fishing activates. As it has been already pointed out- in this thesis, fishing has many benefits to the economy of the country as it is a source of food, as it helps people in terms of employment, and business. However, these benefits should not be considered for today, but it should be assumed to continue to exist in the future. National Oceanic and Atmospheric Administration (NOAA, 1998) mentions that, like many human activities, fishing also can have deleterious ecological effects. Effective management of any living resource requires the maintenance of a dynamic balance between obtaining the benefits of exploitation and minimizing the impacts of exploitation. Understanding the deleterious ecological effects of fishing, and reducing them where feasible, can improve ecosystem health and productivity, potentially increasing fishery yields. Furthermore, according to the same article, historically, marine fishery resources were assumed to be almost limitless, and fishing was thought to have little impact on fish stocks and marine ecosystems. However, during recent decades, concern about the condition of fisheries has increased. Since 1989 world harvests have apparently levelled off. Many fisheries experts and commercial and recreational fishermen now recognize that fishing can have profound effects on marine fish stocks and the ecosystems they inhabit. With this change in attitude has come increased Federal responsibility to build sustainable fisheries. The recently reauthorized Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.) provides many tools for the National Marine Fisheries Service (NMFS) to meet the Nation's stewardship responsibilities for fisheries.

The Act now includes new requirements to reduce by catch, halt overfishing, rebuild overfished stocks, and protect essential fish habitat. However, implementation of a sustainable-use policy requires knowledge of the impacts that exploitation can have on fishery resources and their environmental support system. Understanding the deleterious ecological effects of fishing, and reducing them where feasible, can improve ecosystem health and productivity, potentially increasing fishery yields. It is also important to point out that overfished stocks, and protect essential fish habitat other things can be done such as; the research for pufferfish (*Lagocephalus sceleratus*) and bluespotted comefish (*Fistularia commersonii*), that adversely affect the fishing and grow rapidly in population, should be encouraged. In addition, appropriate measures for the protection of the ecosystem balance should be considered. Moreover, dolphins, caretta caretta and Mediterranean seals are important for TRNC as tourism, diving activities with other coastal activities; so, the habitat protection should be protected by proper measures. The special habitats (Vermid terrace) and the reefs along the coast should be effectively managed within the framework of a plan based on their classifications. In the areas where sea grass meadows spread, boat hoeing should be done in certain areas with vault systems, and fishing net should be limited, on the other hand spear fishing should be encouraged. Furthermore, top level applications should be considered as; aquaculture should not be installed shallower than 50 meters, the systems should be off-shore, the cage areas' flow regimes should be identified, and at least 5 times the area should be leased for the purpose of fallow as relocation planning for each cage space.

6.3 Planning and Design

Kaboglu et al. (2008) planning is to do with restoration, repair, related to the construction of new buildings, and decisions related to all these including all kinds of details about the structural design of these structures, and their determination, and the decision process. For a standard fishing shelter many of the basic features are missing or inadequate in our country. Therefore, the demands from the fishermen also approve this fact.

Furthermore, observations done in many areas within the scope of making fisheries sector much better and improving the existing conditions these deficiencies have been identified. However, due to the restraints in the budget of the fisheries, the government, and the political situation of the country have put restrictions on this.

According to the general view, due to lack of positions in each section or available insufficient structures existing shelter breakwater stands out as the most important problem (Kaboglu et al., 2008). When existing breakwater in the harbour fails to provide adequate protection in a stormy day and damage occurs repair need every year have made the decision of strengthening the existing breakwater, and the extension of breakwater in the two existing shelters have been decided to be added. Considering technical and economic factors in TRNC maintenance and repair requirement that will be needed to be done in the future in order to keep design calculations at a minimum level breakwater needs were calculated safely and thoroughly.

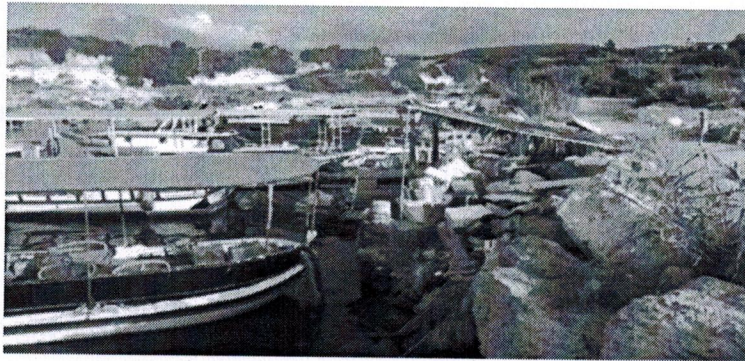


Figure 6.1: The need for additional berth in Yeni Erenköy (TRNC DAHOAR, 2013)

In the study of Kaboglu et al. (2008), Hudson and Van der Meer methods were used and evaluated together in the determination of the weight of the outer protective layer of stone. In the account used in these methods possible changes in the intervals of the parameters have been taken into consideration. In both of these methods, especially stone density and design, due to exponential functions in relation, some parameters, such as the wave height is very sensitive. Therefore, it produces relevant results over a wide range depending on the selected values of the parameters. On the other hand, in the cases in which wave observations were seen inadequate, there are numerous publications on the issue that there could be many incorrect assumptions when taking the height of the wave (Burcharth, 1987; van der Meer, 1993; SPM, 1984). Moreover, Kaboglu (2008) is also used to reflect and support my point of view to show the conditions of the shelters in case of the severe weather conditions. The stone properties that could be obtained from a quarry in Cyprus, and damages that could also occur in the region after the storm on coastal structures were carefully examined and were taken into account carefully in the formation of structural

design. Especially Yeni Erenkoy shelter breakwater is inadequate in terms of both quality of the building and size suffers from a serious damage every year.

The overall objective of this thesis is to show available and the needed facilities for sustainable fisheries for nature conservation and wider benefits to the community. The aim is to increase the productivity in fisheries and marketing in a sustainable way. There are some things that are needed to be done to help fishermen in the area in order to execute up to date marketing techniques. Fish market is needed to be provided, artificial reefs to the seabed, where the catch productivity is low will be applied, lay catch area will be installed, and with the security cameras monitoring for the fishermen marina (fishermen shelter) should be provided. New conservation zones to protect the non-target species and the support the hunting and fishing areas should be identified. Awareness should be created about international standards in productivity and seminars should be conducted in order to build the existing capacity. Information about fisheries and how to make this sector sustainable should be publicized through seminars, media, *booklets* and a documentary throughout the island. Moreover, benefits of sea food consumption should be created through media, booklet and a documentary. If artificial reefs are built in accordance with the coastal area in the northern part of Cyprus that would help providing shelter, nesting and feeding areas for sea organisms would also result in an increase of the productivity, which would then result in an increase in the fish population for the benefit of fishermen. Moreover, by making the fisheries more productive and implementing proper marketing methods, the monk seals (*Monachus monachus*) and the sea turtles (*Caretta caretta* and *Chelonia mydas*) and other species, which exist in the country, under strict conservation regulations would be protected and in situations where these species occasionally damage the fishermen nets, a support mechanism if could be formed would be implemented to replace the damaged nets. Therefore, the economic and ecological imbalance among the fishermen and the non-target species would be minimised through the elimination of "competition" among them. By considering the fishermen in our country, it would also be appropriate to increase the capacity of fishermen up to international standards in terms of hygiene, storage, and different techniques. If fishermen activities are implemented ecological balance throughout the island would be supported. In addition to everything having been pointed out, increasing public awareness about consuming healthy sea food, which is high in protein, would also help to the development of this sector. The current political situation in Cyprus and the fact that there has not been a solution to the issue has

resulted with an isolation of the northern part of Cyprus from developments elsewhere in Europe and in the world. In relation to this, the economic recession in the northern part of Cyprus, has been found to affect all sectors especially the rural sectors that are much less advanced. Furthermore, this had negative effects on social and cultural lifestyles of the people living in rural areas. Central policy makers have failed to answer the needs of the sectors operating in the rural areas due to the lack of funds allocated for rural development; inadequate technical infrastructure and not being able to employ enough personnel. Therefore, the rural sectors could not move forward and develop their potential. As a result of these negative effects, the sectors in the rural areas could not progress in catching up with international standards, nor could they implement proper management such as; administration and marketing that would help to develop their capacity, or create sound sustainable development strategies.

Considering these problems, instead of solving the problems of the local people, the method of "avoiding the problem" has been adopted and activities in the rural areas have been largely abandoned. The rural sectors have become the focus of secondary activities as a second job or hobby to more feasible areas such as having a public job. In the long run, the rural areas have been abandoned and migration towards cities or more densely populated areas has begun. This reality, keeping in mind the fact that the resources are limited could create major socio-economic problems in the near future. As a result of the problem analysis in the light of this thesis that has appeared, to affluence the people in these areas are a need. The social and cultural development of the rural areas can only be achieved through people living in the areas and through creating an ownership mentality. Anything that is being planned should aim to support the already existing fishing activities in the rural areas. The fishing activities can be classified as "hunting" through traditional fishing nets in the northern part of Cyprus. Due to the condition and situation of Cyprus fishing sector has generally failed to catch up with international standards in terms of sanitation, productivity methods, hygiene, marketing, environmental conservation, etc. In North Cyprus it is estimated that about 500 families, earn their livelihood through fishing. Nevertheless, it should be noted that there are a high number of families, who have abandoned the profession of fishing because of low income levels. The volume of fish, which is rich in protein and one of the healthiest food sources, results in the fact that sea-food is sold at very high prices in the market to the consumer. Even though, there is not any healthy statistical data, it is believed that consumption of sea food is relatively low in

the Northern part of Cyprus. All fishermen should be gathered under the umbrella of a cooperative system (the current status of the association permits direct sales of the catch; after thorough analysis the association will be converted into a cooperative organization). The most concrete support mechanism of the proposed action would be the creation of a "fish market". The fish market concept, which would allow the fishermen to store sell at wholesale or direct to the consumer, will increase the fishermen income level by at least 70-80%. Fishermen should purchase and follow the latest technology, international standards, and would facilitate further investments for the fishermen. As it can be seen that the cooperative system would be highly profitable, therefore it will be a sustainable business.

Building a new laying catch area will decrease the maintenance expenses. Distribution of new nets for the fishermen would be done to increase the productivity levels of the fishermen and would support the fishermen until the "Cooperative Insurance System" is in place. Fish are renewable natural biological resources, but constitute an inexhaustible source (reserve or stock). Due to the fact that fish can go to different regions and in this region being hunted down means that fish were parts of a common heritage. Therefore, it is necessary to put common rules to the fishing activity which may lead to a reduction of resources when it is uncontrolled and management of fishing resources should be complied as a whole. Fisheries management analyses the current situation of fishing and identifies the rules and principles, and puts forward the goals and objectives by indication what should be done in terms of performing and watching. In order to achieve the management plan at the beginning of the process all stakeholders should be determined. Without the participation and support of stakeholders, it is difficult to have a successful plan. Stakeholders can be listed as follows: government, local resource users (all fishermen), Non-Governmental Organizations (NGOs), science and research institutions, other fisheries areas, boat owners, such as tourism. The basic approach here is to create "management" mechanism. More precisely, to ensure the work done together to achieve a common goal of the various stakeholder groups and a compromise measure /or must have the basis. However, the responsibility of taking decision does not mean deciding based on the majority of vote. When general and a brief description of fishing is done in the country "a typical Mediterranean coastal fishing called Artisanal fishing methods" will be perceived as appropriate and sufficient at the beginning. However, when detailed information is obtained about fishermen and on the fishing fleet significant differences

have been obtained compared to fishing on the Mediterranean coast. In our country, without being organized, based on coastal competition, personal and completely unsupervised fishermen continue their hunting activities. In addition to other fishing activities (amateur fishing, harpooning, etc.) being in a serious conflict, the result of the conflict of the same resource can be described as the use of the same space, so can be said affecting ecosystem seriously.

CHAPTER 7

CONCLUSIONS

To summarize everything having been said above there are lot of things that are needed to be done to improve the conditions of fishery in TRNC, and as there are lots of things needed to be improved as Koray (2012) claimed that fishing shelters for the development of fisheries in the TRNC, improving the use of larger fishing vessels and tuna fish from the quota for the international organization are the issues that should be resolved. However, this is not the only existing problem in Cyprus. Also the size of the vessels needs to be re-thought and the fishing ports are needed to be thought. These are only possible if the authorities in TRNC show more interest to help fisheries whose income depend on this sector and they need to bring money to their homes to support their families (Cochrane, 2002).

The shelter status of fisheries is needed to be improved, electricity infrastructure is needed to be sorted out, the conditions and as well as the size of the boats should be dealt with, and fishing farms should be improved. There are also some restrictions put in the country towards some fish types and this is also needed to be resolved. Furthermore, research institute should be established in the country that would make people aware of the existing fishery problems and fishers are going through and the resources should be protected accordingly. So the underdeveloped country should be able to protect its rights in the field and find ways of improving itself. There should be a program and an action plan to help people deal with the available problems. Unless these precautions these problems would not be solved. Although the government in the country have financial struggles and is unable to help to the improvement of this field, may be if people and authorities are really willing to help and see as a need, they can ask European Union to help financially. European Union is a big organization helping the countries in need to develop. With the help they get from EU the shelters in Kuruyalı, Erenköy and Elenoz can be fixed. Despite everything fishermen in the country must be encouraged, marketing should be improved. Fishing without having a market to sell would not bring any benefit to anyone, and it would be a big disadvantage. However, we cannot under estimate the real reason behind this because the population of Cyprus would not allow this sector to grow bigger, and due to this reason no one can guarantee that the fish caught will be sold. The prices of fishing

equipment should be dropped down as they are very expensive, and rather than trying to catch with traditional methods. They should try to improve their techniques and move away from traditional methods to more advance ways. As all these negativity is pointed out in this part of the thesis it can be seen that there is nothing really that motivates and encourages fishers in the country, and this makes the job even harder.

As a result, fisheries resources are limited, naturally, are in the form of renewable resources and their movement filld three continents (Europe, Asia and Africa), combines an integral part of the Mediterranean coastal borders with 21 countries having common heritage. In order to benefit from the fishery as a whole monitoring, maintaining and managing mandatory are needed to be addressed effectively. It should be noted that; Fishing is a lifestyle, not just a profession. It's not just one area of employment but it is also providing a livelihood and household food and income for rural areas. Fish constitute a renewable natural biological source, but it is not an infinite source. Finally, fish consumption should be more by the local people and everyone should be more aware of the benefits and drawbacks that it will bring to the country, economy and the people.

A lot of things have been said and pointed out in this thesis and my aim is to reflect what is needed to be done in the country to solve the problems. I believe anyone who will be reading my thesis will become more aware of the mentioned issues and try to do something to change the existing conditions. Since we live in an island it would be a big mistake and a shame not to envisage the benefits it would bring to the economy of the country if fishing is done accordingly, at its best. In order to improve fishermen's shelters some policies to find solutions are needed to be provided. These are; fishing cooperatives should be established, fishermen associations should be created, fish production farms should be increased and checked regularly, political authorities should take more active role, and therefore, the decisions they give must be clear and precise. This sector should not be undermined by political concerns. Hence, the first reason for the sector not developing as required can be shown as political instability. In addition to all the solutions being provided, and suggestions made, grant programs should also be implemented when choosing boats for coastal fishing, and the aid being provided should be used efficiently and effectively to help fishermen and fisheries.

REFERENCES

- Atun, A. (1999). KKTC'de Balıkçılık ve Deniz. KKTC'de Balıkçılık ve Deniz Koordinasyon Toplantısı Raporu.
- Avrı, H. and Can, K. (2009). Kuzey Kıbrıs Türk Cumhuriyeti Kıyı Balıkçılığının Yönetimi Projesi. Retrieved April 12, 2015 from http://www.ilkyaz.eu/doc/ilkyaz_1998_3.pdf.
- Benli, H. A., Cihangir, B., Kata an, T., Bizsel, K. C., Kaya, M., Koray, T., Cirik, .., Kırkim, F., Sever, T. M., Çınar, M. E., Salman, A., Küçüksezgin, F., Tırma n, E. M., Ünlüo lu, A., Akçalı, B., Pazı, .., Darılmaz, E., Konta , A., Altay, O. ve Önsoy, B. (2004). Kuzey Kıbrıs Deniz Alanlarının Biyoekolojik Ara tırmaları. 2003 Yılı Güz Dönemi Raporu, (s. 91), Lefko a-KKTC: Tarım ve Orman Bakanlığı Hayvancılık Dairesi Müdürlü ü.
- Cochrane, K.L. (2002). A Fishery Manager's Guide, Management Measures and their application. Retrieved April 17, 2015 from http://www.academia.edu/3071827/FISHING_AND_PROBLEMS_IN_CYPRUS.
- Dedeçay, S. (2002). Kıbrıs'ta Balık Çiftçili i ve Balık; Deniz. Süngerli Avcılı ı; Tuz Gölleri. Lefko a Özel Türk Üniversitesi Yayınları, 17, Lefko a: KKTC.
- Eurostat (2011). Europe in Figures. Retrieved May 15, 2015 from http://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_6_raporlar/1_5_eurostat/eurostat_year_book_2011.pdf.
- FAO (2009). Fisheries and Aquaculture in our Changing Climate Policy brief of the FAO for the UNFCCC COP-15 in Copenhagen. Retrieved May 10, 2015 from ftp://ftp.fao.org/EI/brochure/climate_change/policy_brief.pdf.
- Henry, G.W. and Lyle, J.M. (2003). The National Recreational and Indigenous Fishing Survey. FRDC Project No. 99/158. Canberra, Australian Government Department of Agriculture, Fisheries and Forestry. Retrieved May 10, 2015 from <http://www.environment.gov.au/system/files/pages/5886ef12-7b4a-40fd-aea5-e08e7621-ecbf/files/co62nationalrecreationalfishingsurvey.pdf>.
- Johannesburg Summit (2002). Report of the World Summit on Sustainable Development, Chapter 1.2, Plan of implementation of the WSSD. Retrieved May 18, 2015 from <http://www.Johannesburgsummit.org>.

- Kaboglu, G. (2014). Improvement Project of Northern Cyprus Fishing Ports. Retrieved May 18, 2015 from [http://www.researchgate.net/publication/268121100_Kbrs_\(elonez_Kumyal_ve_Yeni_Erenk\)_Balk_Barnaklarnn_yiletirilmesi_Projesi_\(Improvement_Project_of_Northern_Cyprus_Fishing_Ports\).](http://www.researchgate.net/publication/268121100_Kbrs_(elonez_Kumyal_ve_Yeni_Erenk)_Balk_Barnaklarnn_yiletirilmesi_Projesi_(Improvement_Project_of_Northern_Cyprus_Fishing_Ports).)
- Nader M., Indary S. and Boustany L.. (2012). FAO EastMed The Puffer Fish *Lagocephalus sceleratus* in the Eastern Mediterranean .
- NEFSC (2015). The Historical Development of Fisheries Science and Management. Retrieved April 17, 2015 from http://www.nefsc.noaa.gov/history/stories/fsh_sci_history1.html.
- NOAA (1998). National Oceanic and Atmospheric Administration. Ecological Effects of Fishing, NOAA's State of the Coast Report. Silver Spring, MD: NOAA.
- Nuttall, N. (2014). Overfishing: a threat to marine biodiversity. Retrieved April 17, 2015 from http://www.un.org/events/tenstories/06_story.asp?storyID=800.
- Sibley, A. (2007). World Summit on Sustainable Development (WSSD), Johannesburg, South Africa. Retrieved April 17, 2015 from <http://www.eoearth.org/view/article/157161>.
- TRNC Department of Animal Husbandry Office Activity Reports (DAHOAR) (2012). Received from Department of Animal Husbandry Office.
- Üçü ik, S.E. and ahin, G. (2011). Geographical Distribution of Trout Farming in Turkey. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 7, 9-25.