

Teresa Schare

Europe and the "Tragedy of the
Commons": A detailed analysis of
the European Common Fisheries
Policy (CFP)

eurypa

Institut européen de l'Université de Genève

Le catalogue général
des publications est disponible
sur le site de l'Institut européen:

www.unige.ch/ieug

Publications euryopa

Institut européen de l'Université de Genève
2, rue Jean-Daniel Colladon • CH-1204 Genève

Télécopie/fax +41 22 -379 78 52

euryopa vol. 39-2006
ISBN 2-940174-40-7
ISSN 1421-6817

© Institut européen de l'Université de Genève
Décembre 2006

Table of contents

Acknowledgments	IV
List of abbreviations	V
Introduction	1
CHAPTER ONE	
The Tragedy of the Commons	
<i>Environmental and ecological effects of overfishing</i>	5
<i>Status quo</i>	10
CHAPTER TWO	
The European Common Fisheries Policy	
<i>The need for the CFP</i>	15
<i>The emergence of the CFP</i>	18
CHAPTER THREE	
The Reform of the CFP in 2003	
<i>The CFP in Crisis: sustainable fishing and resource management</i>	25
<i>Enforcement procedures and control systems</i>	30

II

<i>Community aid and subsidies for the fishing fleet</i>	32
<i>Environmental Protection</i>	36
<i>Involvement of Stakeholders</i>	40
<i>The international dimension</i>	41

CHAPTER FOUR
The Fisheries Sector of the European Union

<i>The Fisheries Sector of the Member States</i>	45
<i>The EU's fishing fleet</i>	57
<i>Landings</i>	61
<i>Employment rates and figures</i>	63
<i>The processing industry</i>	66

CHAPTER FIVE
The Challenges of the EU Enlargement

<i>Impact of accession of ten new Member States</i>	69
<i>Candidate Countries</i>	78

CHAPTER SIX
International Fishery

<i>Action plan against illegal fishing activities</i>	81
<i>Marine park conservation proposals</i>	87

CHAPTER SEVEN
Present and Future of a Sustainable Fisheries Sector

<i>Aquaculture, a means to solve overexploitation</i>	91
<i>Mariculture</i>	95
<i>Property rights and Individual Tradable/Transferable Quotas</i>	99
Conclusion	105
Bibliography	109

Acknowledgements

This piece of work is part of the DEA European Studies programme of the European Institute at the University of Geneva. Professor Victoria Curzon-Price acted as my dissertation supervisor for the last six months and I am very grateful for her patience, support, motivation and help. It is thanks to her that I became increasingly aware of the dilemma of the *Tragedy of the Commons* and the difficulty that the European Union's fishing industry is currently facing in trying to resolve this problem. The *Tragedy of the Commons* is of great relevance today and this is not only the case for the fisheries sector. Various other areas also suffer from an absence of property rights and experience a similar dilemma as the fish.

Furthermore, I would like to thank Dr. Miroslav Jovanovic from the UN Economic Commission for Europe who was willing to read my work and be a member of the jury on the 11th of May 2005. Whilst doing my research work, I was very pleased to experience the cooperation and help of various NGO's and German fisheries organisations, which were always happy to answer questions and transmit information. I was particularly delighted to speak to Mr. Jacob McLay, a fisheries officer from the department of Conservation and Protection of the Canadian government in Nova Scotia, who explained in great detail and with patience how Canada is fighting IUU fishing and he also suggested several models in trying to resolve the excessive overexploitation of fisheries resources.

I also very much appreciated the assistance in the correction and in technical questions given to me by my brother, Agi, Amy, Alex and Till. I would like to express special thanks to my parents and Kai for their critical opinions and impressions, but most of all for their support and motivation.

Abbreviations

CFCA	Community Fisheries and Control Agency
CFP	Common Fisheries Policy
EC	European Community
ECE	Eastern and Central European Countries
ECU	European Currency Unit
EEA	European Environmental Agency
EEZ	Exclusive Economic Zone
EU	European Union
€	Euro
FAO	Food and Agriculture Organisation
FIFG	Financial Instrument for Fisheries Guidance
F&O	Fisheries & Oceans
ICES	International Council for the Exploration of the Sea
IEEP	Institute for European Environment Policy
IPOA	International Plan of Action
ITQ	Individual Transferable/Tradable Quotas
IUU	Illegal, unreported and unregulated fishing
kW	Engine Power
MAGP	Multi-annual Guidance Program
MS	Member State
NGO	Non-governmental Organisation
OOA	Open Ocean Aquaculture
POP	Persistent Organic Pollutants
PPL	Production Possibility Line
RAC	Regional Advisory Council
RFO	Regional Fisheries Organisation
T	Tonnage
TAC	Total Allowable Catch
UN	United Nations
UNEP	United Nations Environment Program

Introduction

The terminology *Tragedy of the Commons* originates from Garret Hardin in 1968 who affirmed that "[...] the inherent logic of the commons remorselessly generates tragedy [...]". This statement describes the present situation of fish stock in the European Union in a precise manner. The word *tragedy* refers to the depletion of the common fish resources and the *commons* stands for common ownership, hence the absence of private ownership and property rights¹.

The aim of this essay is to outline the current effects of the tragedy of the commons which has resulted in the depletion of European fish stocks and in menace and destruction of the marine eco-system. Most fish stocks in Community waters have been classified as being below their safe biological limits for stock biomass. Stock sizes, catches and landings in ports have drastically declined within the last two decades. Many species are close to extinction. Furthermore, destructive fishing gear is employed in catching activities, which severely harms the marine eco-system and habitat, yet increases the volume of catches. For years, the EU financed an expanding fisheries sector and encouraged the fishing industry and fishermen to exploit fish resources in an unsustainable manner and without considering the negative consequences arising for future generations.

The growing scarcity of fish stock has led to an increase of market prices for fish. Thus, every fisherman has the objective to maximise his benefit and return, regardless of the damages caused for future fish stock and the fishing industry. The fact that fishermen impose negative externalities on one another and harm one another does not hinder them in continuing to pursue their business as usual. Vessel technology has experienced a revolutionary boom in recent years assisting and facilitating fishing

¹ Ayre L. HILLMAN, "Private Solutions for Externalities, Responsibilities and Limitations of Governments", in Ayre L. HILLMAN, *Public Finance and Public Policy*, Cambridge, Cambridge University Press, 2002, p. 231.

activities. Additional to this problem comes the excessive fleet capacity, burdening fish stocks even further. Only 5 of the current 25 Member States of the European Union are landlocked countries and do not possess major fishing industries. Thus, the EU has 20 fishing nations, whose economic dependency on this sector is rather large. The largest fishing nations are Spain, Greece, Italy and Portugal consisting of the largest community fleets. The excessive exploitation of marine resources and the destruction of the ecosystem and marine habitat also have a negative effect on long term productivity/benefits of fish stock

A number of solutions have been put forth by the European Commission in order to solve the tragedy of the commons and its disastrous consequences. In 2003, the European Union decided to reform the CFP and introduced a number of new regulations and obligations for Member States. It should be noted that fishermen ought to be made aware of the fact that if every one of them reduces catches to a small extent, the overall use and benefit would be more efficient and sufficient stocks are guaranteed for reproduction². Unfortunately, the strategy of maximising personal benefits by taking advantage of free resources is widely dispersed and sustainable management and conservation measures have not yet found sounding resonance amongst fishermen.

The CFP reform of 2003 initiates several measures, which burden the fishing industry and will most certainly result in negative social consequences for example through a drastic fleet reduction, new resource and conservation management (i.e. the closure of various fishing areas for reproductions measures and possibly the creation of marine parks/reserves) and most of all the end of EU subsidies for new vessel production. Retraining programmes need to be established in order to give dismissed fishermen an opportunity to transfer into other branches of the industry. Scientific advice and recommendations in the establishment and allocation of TACs has thus far been sought but

² *Ibid.*, p. 234.

eventually been ignored and not been taken into consideration as political interests play a significant role.

The EU has called for the creation of RAC's, representing all sectors of the fishing industry, in order to increase stakeholders' involvement. Besides, RACs act as an advisory body to the Commission. Yet, science-based management recommendations should become legally binding in the allocation of TACs so as to stop political debates and interests and highlight the importance of scientifically based recommendations for sustainable fishing activities. Furthermore, the EU has launched an Action Plan for the battle against IUU fishing, which considerably contributes to the excessive depletion of fish stock. Stricter control and enforcement procedures will be employed by the newly established Community Fisheries Control Agency which will undertake direct inspections on vessels and assure the correct implementation of EU regulations and catch allowances. These measures give a promising impression in trying to solve the tragedy of the commons.

Due to the fact that fisheries are common property, in most fisheries ineffective strategies for regulating access can lead to situations where the level of fishing effort wastes society's resources and overexploits species. There is a growing realisation that the only way of resolving this management problem is to create and assign appropriate access rights to wild stocks; a form of private ownership might be the solution to the problem. The absence of property rights is one key trigger for the overexploitation of fish resources. Declining quotas and the closure of fishing areas usually affect local small to medium-sized fishing companies, which would not be able to survive without state and EU subsidies. Property rights are a advantageous solution for these businesses because property rights confer privileges as well as responsibilities to the owner/fishermen. A private owner is prepared to restrict the number of fish getting caught to preserve enough fish for reproduction measures, so that there will be fish for the future.

Moreover, fish farming has become increasingly important in the European fishing industry. A large quantity of fish supplies originate from aquaculture and it is apparent that this sector will be intensified in the future. However, until present aquaculture is an

additional burden to fish resources as fish feed used in aquaculture is based on fish flour and fish oil. Scientists are eager to find plant-based substitutes to relieve fish stocks. Some aquaculture plants only breed fish for restocking purposes, which is a promising undertaking in supporting and assisting the avoidance of juvenile fish from getting caught and thereby alleviating pressure of fish stock. A second problem that is posed by aquaculture is environmental pollution through fish excreta. American scientists are experimenting and promoting a new form of aquaculture, which makes the fish excreta dilemma obsolete. Mariculture is high sea open ocean aquaculture in strong currents. This new project promises to be a lucrative as well as environmentally friendly alternative to supplement the fishing industry.

The following pages give a detailed analysis of the arising problems in the Common Fisheries Policy and the state of European fisheries in general. Major problems are outlined and suggested solutions have been critically analysed, commented and sometimes modified.

CHAPTER 1

The Tragedy of the Commons

Environmental and ecological effects of overfishing

Marine fish stocks have by tradition been regarded as a common good and hence been treated as common property. Common property resources are subject to economic problems in the long run such as overexploitation and industrial/economic waste, which usually results in biological damage to the marine ecosystem. Overfishing and the resulting depletion of future fish stock is a type of negative externality often referred to as the *Tragedy of the Commons*³. This is also the case in the European Union which has introduced the *Common European Fisheries Policy* (CFP) in the seventies as a result of international disagreements and modifications in the fishing sector. The CFP was established in the hope of managing fish stocks and community catches successfully⁴. The recent CFP reform of 2003 highlighted four main challenges: "the conservation and management of marine resources, relations agreements with non-EC-member countries and international organisations, structural measures and the common market organisation for fishery and aquaculture"⁵. Whereby the major task the EU and the CFP should concentrate on and try to resolve is the most dramatic problem facing fish, often described as: *The Tragedy of the Commons*, i.e. alleviating the fishing pressure on fish resources. *The Tragedy of the Commons* or simply the overexploitation of natural resources can also be explained as follows: It happens because people think they can take a limitless

³ Externalities can have a positive or a negative effect. A positive externality implies that both parties concerned, the person responsible for the externality and the one who is affected, have a beneficial outcome of it. A negative externality always initiates damage to the affected person.

⁴ More details can be found in the following chapters.

⁵ <http://europa.eu.int/comm>.

amount of the earth's *free gifts* (natural resources), which includes all animal species as well as forests, land and so on but in our case, the fish.

For centuries these natural and free resources have had no prices attached to them and so hence nothing to impose restraint on their use. And for centuries, nothing harmful happened; such is the seemingly limitless bounty of the Earth⁶. But on a finite globe, the limits logically have to be reached at some stage. One example is the gradual disappearance of the herring in the North Sea, where herring fishing was eventually prohibited. Overexploitation of fish stock is not only a European problem. Fish resources all over the world are in danger of extinction, the major risks being:

- An excessive fishing fleet capacity and fishing effort
- Depleted fish stock
- Low profitability (operating surpluses near zero)
- High inter-annual variability of stock size and catches
- Excessive risks of collapse of fish stocks⁷.

In order to be entirely politically correct in this matter, it should be noted that alongside these factors others such as water pollution, in particular with heavy metals, persistent organic pollutants, nutrients from agriculture and oil, in marine and coastal areas have also played a decisive role in the reducing fish stocks⁸. The December 2004 oil tanker accident in the Alaskan waters, which is a marine reserve for many endangered species clearly demonstrates the ecological disaster for the marine environment. Furthermore,

⁶ Michael MCCARTHY, "Fishing industry falls victim of the tragedy of the commons", *The Independent*, 24.10.2002 and www.commondreams.org,

⁷ J.G. SHEPHERD, "Economic Aspects of Fisheries Management" in *Sustainable Fisheries: Myth or Mirage?*, a Memorandum prepared for the Royal Commission on Environmental Pollution, School of Ocean & Earth Science, University of Southampton, April 2003.

⁸ For further information please see "The State of Environment - Europe and Central Asia, Marine and coastal areas" in *UNEP Global Environmental Outlook 2000*, <http://www.unep.org/geo2000/english/0079.htm>

this area is famous for hosting salmon aquaculture production, which suffered a great loss due to this accident. This scenario is often described as an environmental externality in economic theory⁹.

For nearly 500 years the Grand Banks off Newfoundland was a fishing paradise for every fisherman; until in the 20th century a sinister process began: the fishing effort began to outpace the ability of the fish stock to replace itself. It dwindled and dwindled, and then in 1989 it completely collapsed. As a result the fishery was formally closed in 1992, causing thousands of Canadian fishermen to become unemployed. It has not reopened and it seems unlikely that it will¹⁰.

Overfishing occurs over many years and can only be ended over many years. It is obvious that fishing pressure takes a long time to develop until it builds up to rates where the depletion of fish resources has become an inevitable result. Yet, the technological advancements in fishing gear and the discovery of resources in the last decades have also led to a short term increase in demand of fish. It is of vital importance that recovery plans and the current CFP reform are implemented now. Excessive and unnecessary delays in the enforcement procedure may otherwise jeopardize the recovery of fish resources. "The longer the delay before reducing fishing pressure and the slower the actual reduction occurs then the more severe the reductions in fishing in either quota or effort will be needed"¹¹. In order to cushion the cuts made in fishing volume to fishermen and the concerned industries and protect them from financial ruin, immediate action and implementation are indispensable¹². An additional time strain is the biological clock ticking for fish reproduction measures. Once fish stocks are below

⁹ Ayre L. HILLMAN, "Private Solutions for Externalities, Responsibilities and Limitations of Governments" *op. cit.*, p. 231.

¹⁰ Michael MCCARTHY, "Fishing industry falls victim of the tragedy of the commons", *op. cit.*

¹¹ WWF, *Templates on fish resource recovery plan*, www.wwf.de

¹² ITQs which could cushion the financial hardship once fishermen have to leave the fishing stage are discussed in Chapter 8.

biological safe limits reproduction measures may be failing, too. The term *below biologically safe limits* is used by scientists and does not just necessarily affect catching volume but also include the condition of reproduction potential of a concerned specie. The worst case scenario scientists imagine, unfortunately with justification, is that fish stocks will experience such an extreme pressure close to extinction to an extent that reproduction fails due to biologically insufficient livestock. Fish cannot be compared to other foodstuffs, let's say corn which is sown and harvested each year on the fields. Their population dynamics are complex and depend on various factors such as the availability of fish aged capable of reproduction¹³. Thus, time pressure is substantial for swift reductions in fishing effort and fleet capacity to be imposed so as to increase the probability of procreation rather than slowly implemented rules jeopardizing this attempt.

Overfishing is certainly also subject to international demand which means there is always a market for fish. In Asian countries like Japan fish is the major dietary source for protein¹⁴. The total fish production of the European Union (including catches and aquaculture) accounts for 5% of the world's fish production. With the accession of ten new Member States in May 2004, the total production of fishery products in the EU has increased by one tenth¹⁵. Denmark and Spain are the largest producers by volume

¹³ WWF, *Fette Jahre – Magere Jahrzehnte, Kosten der Überfischung von Kabeljau und Dorsch in Nord- und Ostsee*, Frankfurt am Main, WWF, 2002.

¹⁴ The case of Japanese whale fishing can also be described as a tragedy of the commons. Whale fishing is only allowed for scientific research; however the Japanese especially, seem to have a different interpretation for this term. Most of the time the meat ends up on the menus and in culinary dishes.

¹⁵ EUROPEAN COMMISSION, DG Fisheries, "Total production of world main producers in 2001" in EUROPEAN COMMISSION, *Facts & Figures on the CFP, Basic Data on the Common Fisheries Policy*, Office for Official Publications of the European Communities, Luxembourg 2004, p. 1, accessible on the web <http://europa.eu.int/fisheries>.

within the Union. In 2001, the 15 MS of the EU come third with nearly 7 million tonnes of fish after China with 51 005 810 tonnes and Peru with 8 001 024 tonnes of fish¹⁶. Japan, India, the US, Indonesia and Russia all follow the EU 15. Moreover, although the total catches in the EU as in the rest of the world is on a steady decrease due to fading fish stocks the EU remains the world's largest fishing power after China and Peru. The main catching areas of the EU fleet are the Atlantic, the Mediterranean and Black Sea. The following numbers illustrate the total EU catches by major fishing areas in 2001¹⁷:

- Atlantic Northeast 74%
- Atlantic Northwest 0,68%
- Atlantic Southwest 1,9%
- Atlantic Eastern Central 8%
- Indian Ocean, Western 3,3%
- Mediterranean and Black Sea 9,2
- Other areas 2,7%

The most requested species are pelagic species such as herring, sprat and mackerel¹⁸. According to the Commission, the EU exported nearly 5.4 million tonnes of fishery products in 2001 but in order to meet the demand of the EU internal fish markets a further 8.9 million tonnes had to be imported¹⁹. This reveals that the EU imports considerably more fishery products than it produces. Furthermore the Commission states that "since 1993, the total volume of EU exports has increased by 45% while the value of these exports has doubled"²⁰. With a total value of exports of €23 902 806 billion and €51 270 475 billion of imports in 2001, the importance of external trade in the fisheries sector to the EU

¹⁶ Here it has to be noted that this amount does not only result from fishing but also from aquaculture. EUROPEAN COMMISSION, DG Fisheries, "Total production of world main producers in 2001", *op. cit.*, p. 1.

¹⁷ *Ibid.*, p.4

¹⁸ *Ibid.*, p. 4.

¹⁹ www.europa.eu.int/comm/ *op. cit.*

²⁰ EUROPEAN COMMISSION, DG Fisheries, "External trade in 2001", *op. cit.*, pp. 30-31.

becomes clear. Moreover, the EUs processing sector which processes the imported goods relies heavily on these imports as employment numbers stand in no relation to direct employment in the catching sector of the EU. European imports and exports concentrate on fresh, chilled and frozen goods.

A successful solution in fish resource management needs to be found in order to guarantee a certain number of fishermen a workplace and a relatively stable source of income in the long run. It is a sad but true reality that many fishermen will in the future need to undergo retraining programmes or be made redundant due to the overcapacity of the EU fishing fleet. According to many economists the ultimate long term solution to the tragedy of the commons could be found in the allocation of property or access rights²¹. Property rights based approaches attempt to eliminate the common property dilemma by establishing and allocating private property rights on existing fish stocks. Additionally, diverse alternatives to fishing activities ought to be discovered and examined such as the recently inaugurated project of mariculture. Aquaculture is certainly not a new phenomenon but still seems to be a promising option and supplement in the relief on fishing pressure. It has to be noted that until now, aquaculture unfortunately also burdens fish resources because fish oil and fish flour are ingredients of fish feed used in aquaculture. At present, scientists are trying to develop a substitute based on plant products.

Status quo

The situation of fish resources in EU waters is highly critical. According to WWF 70% of fish stock in European waters suffer from the results of overfishing. The Commission published a study in which it stated that of many fish stocks in EU waters compared to figures of the 70s only a rate of 10% of the past resource level

²¹ Chapter 8.3 is dedicated entirely to the allocation of property and access rights.

are capable of reproduction²². Thereby it should also be noted that fish are not the sole group to have fallen victim to this phenomenon; the entire marine eco-system is in danger. Sea mammals and sea birds have similarly endured the destruction of their habitat caused by damaging and fraudulent fishing activities and techniques. The technological development is one inevitable factor, an unsuccessful fisheries policy with an erroneous subsidy system an unnecessary miscalculated management mistake. Approximately €1.4 billion of subsidies are annually paid on behalf of the EU into a fisheries sector that similarly loses millions of Euros per year due to the overexploitation of their fish resources²³. A study carried out by WWF on the stock condition of cod in the North and Baltic Sea confirms a drastic reduction in numbers. Furthermore, the study demonstrates a loss of around €400 million in 2001 due to stock reduction and the thereof resulting cuts in catching volume²⁴. A sustainable resource management is imperative now in order to rebuild fish resources and guarantee a biologically safe number of stocks for the future. Many activists argue that a sustainable resource management is long overdue and should have been imposed at a much earlier stage. The economic and financial gains from a sustainable fisheries management prior to overexploitation would certainly lie below the hitherto obtained amounts; yet resources would have been more stable and the current situation of ecological and economic damages would not have arisen.

The depletion of fish stock and the loss of returns are not only ecological and economic problems but they also lead to social difficulties such as an increasing unemployment rate in the fisheries sector. Hence, the European total employment rate in the fisheries sector dropped by 21% in the years of 1990 to 1998, that is 66 000

²² WWF, *Fette Jahre – Magere Jahrzehnte, Kosten der Überfischung von Kabeljau und Dorsch in Nord- und Ostsee*, Frankfurt am Mainz, 2002, p. 5.

²³ *Ibid.*

²⁴ *Ibid.*

workplaces lost²⁵. The arising social costs are to a certain extent carried by community tax payers which is the result of a double edged sword. At first, the EU is supporting overfishing with subsidies (i.e. community tax money) so as to maximise the economic benefits. The catch in this procedure is that benefits were unfortunately only short-lived and the resulting costs from it have to be raised by the tax payer. For years, many concerned parties have argued that consequent protection measures would endanger fisheries. The latest state of affairs unfortunately shows that this scenario is at present of relevance and of great concern. Yet, sustainable management and protection measures for fish resources are not to blame; on the contrary due to the absence of these measures many fisheries face an uncertain future, numerous are close to losing their livelihoods. It is not astonishing that resources become scarce if a limitless amount is simply taken of them and no conservation measures are initiated to regenerate the latter. Sufficient resources for the future are under these circumstances not assured. The recent CFP reform if strictly implemented and observed, may be the last opportunity to secure the marine ecosystem, stop the tragedy of the commons and guarantee a fisheries industry for future generations.

Once using resources capable of regeneration, one always has to decide on either short or long term benefits. Fisheries tend to be managed more effectively when deciding on long term benefits. In spite of that, the difficulty of marine resources is their common property status and the deficiency of clearly allocated individual property rights. The present situation does in fact favour short term fisheries activities by encouraging fishermen to optimize benefit maximisation, thus the overexploitation of fish stock (although TACs have been introduced to guide catches). Every fisherman will of course try to obtain the maximum self benefit rather than leaving the gains to others. Fortunately this is not the exact present state of affairs. Since the seventies, the state is the main actor in a

²⁵ EUROPÄISCHE KOMMISSION, *Grünbuch, Die Zukunft der Gemeinsamen Fischereipolitik*, Band II, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2001, p. 55.

responsible fish resource management and fixes the volume of allowable catches in discussions with the Community. Besides, the state will always remain the key player in fisheries management as the largest part of the world fishery potential is located within areas of national jurisdiction. This does however not hinder the Commission in imposing legally binding conservation and management regulations upon MS as the Commission and the Council will act in accordance with RACs technical and scientific advice²⁶. Recommendations on the volume of catches given by the CFP were not legally binding and could be evaded. Marine biologists had already been consulted concerning the condition of fish stocks then and the intention was to fix volume of catches according to their advice. The following problems arose and are still of relevance today:

- Results from scientific assessments towards fish resources and recommendations given for sustainable management based on these reports were generally ignored with the excuse of imprecision. Reductions and solid economic cuts could not have been justified in front of fishermen with the presented facts.
- The absence of short term guideline systems with the definition of goals and achievements of sustainable fish stock protection measures did not motivate and persuade fishermen to pursue sustainable fishing activities.
- The knowledge and awareness of complicated marine ecosystem functions is still modest. It is not astonishing therefore that the regeneration/recovering potential of fish resources was seriously underestimated²⁷.

Nowadays it is confirmed that short term recovery measures do more harm than good. Positive achievements are a rarity, the contrary the norm. Fish resources worldwide are limited whereas the amount of fishing vessels can be multiplied without great

²⁶ The management and conservation proposal originate from the concerned national parties themselves.

²⁷ WWF, *Fette Jahre – Magere Jahrzehnte, Kosten der Überfischung von Kabeljau und Dorsch in Nord- und Ostsee*, op. cit., p. 6.

difficulty. The EU finances modernisation and construction of new vessels with enhanced technology via subsidies – investments in the conservation and recovery of fish resources have been scarce in the past. Indeed, the use of all natural resources must follow strict regulations with the principle objective of sustainable protection followed by personal economic benefits or national interests. National interests are regrettably still a driving force in European fisheries up to present.

CHAPTER 2

The European Common Fisheries Policy

The need for the CFP

"Fish resources are acknowledged as being a common heritage to the people"²⁸. Although the fishing sector might seem to be a small industry compared to others, the complexity of this heritage and the impact it has on the European Union and its citizens should not be underestimated. Throughout this paper we will see that fishing and aquaculture are important economic activities in and to the European Union. While the fishing sector only contributes less than 1% to the gross national product of the Member States, it also hosts a significant number of workplaces in the Community, which amounts to roughly 270 000 directly employed fishermen in 1995²⁹. In some areas of the European Union, predominantly coastal areas, fishing has been a long tradition and is the primary economy and source of income. Usually there are few employment alternatives in those regions, which forces the citizens to depend on fishing. This number only represents a small percentage of the Community's workforce, which justifies the question of why so much attention is devoted to this economy sector.

Edward Nevin has a simple response to this. He argues that the fishing industry attracts a certain degree of "[...] political attention [...]"³⁰. One important factor is, as already mentioned above, that the fishing industry represents whole coastal areas and regions, so if ever there emerges a problem in the fishing industry due to political

²⁸ http://europa.eu.int/comm/dgs/fisheries/missn_en.htm.

²⁹ *Ibid.*

³⁰ Edward NEVIN, "The Common Fisheries Policy (Chapter 16)" in Edward NEVIN, *The Economics of Europe*, London, Macmillan, 1994, p. 176.

decisions, the communities could exert measures which impede on regional politicians³¹.

However, more attention should be drawn to the technical aspects for the need of a common policy of the industry. As it is commonly known fishermen need a product which is obviously fish. The natural environment of fish is water; they can live in lakes, rivers or large seas like the North Sea or the Atlantic for example. Fishing is an industry with no set boundaries; it is conducted across and beyond territorial frontiers in national and international waters. Additionally, until the 1970's fishermen could not only decide freely on where they conducted their fishing but also on how much they were going to fish. There was hence neither a technical limit on the amount nor in space, with the exception of the famous 12-mile-limit around the coastal borders of any country. Within this 12-mile radius, fishermen of that specific country or, who had traditionally fished in those zones could claim *historical fishing rights*³². After WWII the fishing and vessel technology experienced a rapid change and advance. Vessels were equipped with the newest technology to find fish much quicker or to even conserve them on board which made the time-consuming return to the ports for discharging unnecessary. The new technology of conserving fish on board introduced the era of the industrial fishing industry. Vessels took on factory-like dimensions and fish were directly dealt with and prepared on board and kept refrigerated or frozen until the floating fish factory returned to the ports, sometimes weeks after its departure.

This technological breakthrough obviously resulted in higher fishing outcomes and a higher output. This phenomenon posed a serious problem over the years as the fishing industry is frequently described as suffering from income inelasticity for one simple reason: Fish is a natural resource that cannot be produced by machines. Furthermore, it takes four to five years for fish to become fertile for reproduction, this varying of course on the type of specie. The fishing industry however ignores this important aspect, as for

³¹ For example, no re-election etc.

³² Edward NEVIN, "The Common Fisheries Policy (Chapter 16)", *op. cit.*

them the reproduction of fish stock is slow and time consuming. Therefore they even catch young fish that should be left in order to supply new fish stock. Unlike the traditional theory of production increase if the demand increases, this theory is not applicable in terms of natural resources, like fish. "The higher fishing output is drawn from a stock that does unfortunately not increase with the efficiency of their hunters"³³.

The increasing demand and catch in fish with a relatively stable fish stock was sooner or later causing severe problems, even biological disasters. This is very often described with the famous terminology of the *Tragedy of the Commons*³⁴. Let us take the herring disaster in the North Atlantic as a quick example of the impact that overfishing already had by the 1970s. Between 1965 and 1975, herring stocks diminished by 1 million tonnes (a drop from 1.5 million to 0.5 million within ten years)³⁵. The reason for this was obviously that the herring population in North Atlantic fell below a point of ensuring sustainable reproduction. In order to avoid an extinction of the herring species a fishing ban was imposed.

A dramatic impact on European Community fishing appeared with a modification in international law concerning the rights of fishermen working in international waters. As earlier mentioned, the fishing industry is not restricted in space, hence fishermen can also pursue their interest in territorial waters not belonging to their country of origin. In 1971, Iceland declared exclusive fishing rights within a 50-mile-radius and later even 200-miles within its coastline, thus banning other fishermen from this area and extending it from the former 12-mile-radius³⁶. Yet, the most

³³ *Ibid.*

³⁴ Description of overexploitation, first used by Garret HARDIN in his famous essay in 1968; see previous chapter.

³⁵ Edward NEVIN, "The Common Fisheries Policy (Chapter 16)", *op. cit.*, p. 177.

³⁶ These territorial claims led to the famous "Cod War" between Iceland and the UK; two NATO allies were on the brink of war in the 1970s. Hannes H GISSUARSON, *Overfishing: The Icelandic Solution*, IEA,

profound decision was formulated by the United Nations in 1973, which allowed the establishment of an Exclusive Economic Zone (EEZ) up to 200 miles from the country's coastline. This particularly angered community fishermen, who had traditionally pursued fishing in the waters of Iceland, Norway and especially Canada before 1973. In fact, approximately a quarter of the community fishing harvest originated from these waters³⁷. As a result of the newly emerging competing markets to the EC market, the Community had to resolve this problem by establishing a cooperation or merger of the fishing industries in the EC. The result was a Common Fisheries Policy.

The emergence of the CFP

The Common Fisheries Policy is a community instrument for the management of fisheries and was created in order to manage common fish resources and meet the original Treaty obligations. In 1966, the Commission argued that according to Article 38 of the Treaty of Rome the EC requires the institution of a Common Fisheries Policy with direct effect to all Member States³⁸. The Commissions position was eventually being accepted after the new introduction of EEZs, which made fishing in international waters harder for community fishermen. The CFP declared fish a common European resource with access for everyone. By the same token, the CFP should guarantee free access to community waters with the exception of a 12-mile exclusive fishing zone to those countries whose major industry relies on fishing. This equally facilitated the life of small fishing industries with smaller vessels, which profited from the exclusive zone, as big industrial vessel factories from other nations would not be able to fish the coastline empty.

London, 2000, p. 12, Werner WEIDENFELD, (ed.), *Europa Handbuch*, Bonn, Bundeszentrale für politische Bildung, 2002, p. 427.

³⁷ Edward NEVIN, "The Common Fisheries Policy (Chapter 16)", *op. cit.*

³⁸ Stephan DEARDON & Frank MCDONALD (ed.), *European Economic Integration*, third edition, Harlow, Longman, 1999, p. 297.

Nonetheless, until the CFP came actually into being in 1983, many negotiations and disputes proceeded. Fishing nations were at that time already aware of the phenomenon of the exploitation of fish stock and feared a complete extinction of some species if no measures were to be introduced to protect them. Fish stock need to rebuild themselves and for this to happen small fish need to be left aside to allow reproduction. Aware of the competition on the market, fishermen however did not pay much attention to this³⁹, ignoring the logical fact that if small fish were not left for reproduction, the fish stock would rapidly decline and in the end the waters would be empty. Without fish, fishermen are unemployed.... Fishermen depend on fish; therefore they should treat their source of income more respectfully with a long term commercial interest on their behalf.

The Community tried to resolve this problem by introducing Total Allowable Catches (TAC) which are fixed annually by the Council of Ministers after negotiations with the Member States concerned, and by taking the country's past catching record into consideration. Setting TACs involves fixing a maximum national quota of caught fish from specific species over a certain period of time for each Member State⁴⁰. When the quota has been exhausted the fishery must be closed. It is aimed at a community wider fish stock conservation. However, fish are not all equal. Some species such as cod spend the first years of their life in areas near the Dutch, German or Danish coast before immigrating into the territorial waters of the United Kingdom⁴¹.

Moreover, not all species reside in the same waters when they are old enough to be caught, as the cod and not all species share the same value on the fish market. All these aspects need to be looked at very carefully. Elaborating on the example of cod, it is prohibited to catch young fish that have not yet reproduced themselves, so by

³⁹ They notably did not want to waste their precious time on separating old fish from young fish and drop them back into the sea.

⁴⁰ <http://europa.eu.int/comm/> *op. cit.*

⁴¹ Micheal MCCARTHY, "Fishing industry falls victim of the tragedy of the commons", *op. cit.*, and www.commondreams.org,

the time the cod is catchable it has moved to the UK. If unfortunately the cod is within the 12-mile-exclusive-zone, German, Dutch and Danish fishermen cannot catch the cod. Reversely, Britain brings forth the rather vague notion of "ownership". The island argues that its territorial waters offer 60% of the community residual caught fish, which is in fact a fallacy, as the fish originates in most cases in different waters. Hence, Britain's claim to 45% of TAC was ignored⁴². A second problem posed was that of Denmark, another traditional fishing nation. It specialised in industrial fishing and not only had the ordinary fishermen depended on this industry but also the land based factory workers. Thus, the allocation of fishing quotas or TAC signified a great importance to the Danish economy and its employment sector. An agreement to a Common Fisheries Policy had already been met by October 1982 by nearly all Member States; apart from Denmark which was still not satisfied with its TAC allocation. The Danes tried to put pressure on the Community by vetoing the policy if their TAC allocation would not be increased. By January 1983, 5000 tonnes were added to the Danish TAC and the Common Fisheries Policy came finally into being⁴³.

⁴² Edward NEVIN, "The Common Fisheries Policy (Chapter 16)", *op. cit.*, p. 181.

⁴³ *Ibid.*

Table 1: Fishing in the EC 1959-1982

Country	Nominal fish catch (000) t 1959: EC 6	Nominal fish catch (000) t 1973	Nominal fish catch (000) t 1973: EC 9	Nominal fish catch (000) t 1981	Nominal fish catch (000) t 1981: EC 10	Agreed quota in 1982 (000) tonnes
BE	62	53	53	49	49	25
FR	577	814	814	778	778	162
DE	728	478	478	331	331	186
IT	175	401	401	450	450	-----
LU	-----	-----	-----	-----	-----	-----
NL	240	344	344	434	434	92
EC 6	1782	2090	2090	2042	2042	465
DK			1465	1852	1852	305
IR			91	190	190	47
UK			1232	883	883	464
EC 9			4878	4967	4967	1281
EL					100	-----
EC 10	1782	2090	4878	4967	5067	1281

Source: Edward NEVIN, "The Common Fisheries Policy (Chapter 16)"op.cit., p.181.

It was agreed that the CFP could be reviewed after 10 years but should originally stand for 20 years. By 2003, the CFP could be renegotiated and be reformed if necessary. With the 1983 policy, Member States had to respect the allocated TAC in community waters and needed special licences indicating a certain number of vessels of other MS for the area around the Orkney and Shetland Islands. Furthermore, the CFP provided financial aid-programmes for vessel modernisation. These EU subsidies, on the other hand ended in overinvestment. The new vessels equipped with modern technology ironically worsened the fish stock situation instead of helping to preserve it. With new solar and sensor technology fishermen could locate fish more rapidly which encouraged fishermen to fish even more and this increased overexploitation.

The TACs and multi-annual guidance programmes which were originally designed to manage the community fleet turned into a failure⁴⁴.

The CFP is certainly an ambitious idea trying to solve the fish stock problem and attempting to keep overexploitation of the waters to a very minimum. In order to preserve young fish and save them from being caught minimum mesh sizes were being fixed to allow young fish to escape. Fishermen were imposed to register and record each catch in a logbook, which was subject to checks by either a Member State or an EU inspector⁴⁵. An undeniably difficult task of this policy however, was the control over fishermen. Neither the EU nor the Member States have the required sources to finance these inspectors on a regular basis. In most countries these inspectors are still today based in the capitals which are in most cases not situated on the coastline. This made inspection even more difficult and reassured fishermen to expect rather few inspections. More often than not this part of the policy is being slightly left aside. The consequences were discussed in the section of the *Tragedy of the Commons*.

One more point one should not neglect is, that the EU has enlarged over the years including the accession of two big fishing nations in 1986. Spain and Portugal are traditional fishing nations which have doubled the EU's fishing fleet with their accession. Spain in particular, consists of large fleets and was very eager to take advantage of free access to community waters⁴⁶. The Spanish fleet counted 18.000 vessels in the 1990s⁴⁷. The Spanish fleet was often considered a severe hassle and enemy to community fleets; particularly to the British fleet, because the British argued that the Spaniards would not respect the CFP rules. In 1995, two more

⁴⁴ MAGPs were introduced for Member States to control the development of their fleets.

⁴⁵ The Community inspectorate counts 25 inspectors whose role is to ensure national enforcement of community regulations.

⁴⁶ Desmond DINAN, *Ever Closer Union, An introduction to European integration*, second edition, London, Macmillan, 1999.

⁴⁷ Dr. Alan SKED, <http://www.bullen.demon.co.uk/cibcfp.htm>

fishing nations joined the EU, namely Sweden and Finland. Norway is still today refusing to join and one good reason for this might also be the regulations inflicted by the CFP.

Already by 1992, the ten year analysis of the CFP emphasised major turbulences and the EU had to admit that its subsidies ended up in overexploitation. The introduction of multi-annual guidance programmes, TAC and the CFP regulations had not been respected honestly. The review of 1992 stressed the need to make the CFP and regulations more effective⁴⁸. Might one problem be the principle of subsidiarity?? Each Member State was ordered to monitor its quota uptake but a weakness had been observed in the surveillance area. New control regulations were needed to monitor and even penalise wrongdoers across the community.

⁴⁸ <http://europa.eu.int/comm/>, *op. cit.*

CHAPTER 3

The reform of the CFP in 2003

The CFP in crisis: sustainable fishing and resource management

The fishing industries in the European Union are currently facing serious difficulties in the sustainable management of their fish resources. Resources are used as though they were inexhaustible. Imbalances between fishing capacities and resource productivity with their well-known consequences of overinvestment and overcapacity resulting in overfishing have been the norm for years. It is the adjustment of the exploitation regime to natural productivity of the resource that causes problems in fisheries rather than the efficiency of fishing operations or the management of fishing companies⁴⁹. The latter are obviously from significance to this system yet only at a later stage. The primary objective has to be a sustainable management plan as well as accurate scientific research and reliable information on the nature and condition of marine resources. Control and monitoring systems for both fishery and exploitation regime are imperative.

It is a fallacy to assume that there is one universal recipe for the management of fisheries resources and the exploitation regime. Fisheries are diverse, especially in the European Union which follows the motto of "unity in diversity". The variety of production systems, fishing techniques, the importance of the fishing industry in certain countries and the view of management and recovery plans differ and will always do so. The EU should develop general principles of policies and strategies according to this diversity which on the other hand may not find sounding resonance amongst

⁴⁹ Jean-Paul TROADEC, "Fisheries efficiency, resource conservation effectiveness and institutional innovations" in Peter Bautista PAYOYO, (ed.), *Ocean Governance, Sustainable Development of the Seas*, Tokyo, UN University Press, 1994, p. 153.

all those concerned. The general principles (unity) will include property rights regimes, a combination of quotas, TACs and a fixed amount of time to be spent at sea (direct conservation measures), as well as the reduction of fishing capacities just to name a few. If new institutional instruments are required to make the CFP reform functional they should be established, as for example the creation of the *EU Fisheries and Control Agency*. Furthermore, conservation measures used to be adopted on an annual basis which generally led to chaos and were never sufficiently effective at preserving stock. Fishermen faced difficulties in adapting to new measures at very short notice. According to new CFP rules, recovery and management plans will set long-term standards, targets and other parameters in a legally binding format⁵⁰. In the future, fisheries will be managed within long term strategies or plans in order to make conservation and recovery plans effective and practicable.

Through the introduction of a European CFP in the eighties it was attempted to control and minimise the volume of catches throughout the years in order to support the recovery of stocks by means of reducing the surplus fleet capacity through MAGPs or decreasing TACs. In the nineties it had become fairly obvious that CFP regulations were not adequately implemented and the decision-making process was far too centralised, bureaucratic and time-consuming for the generally taken short term decisions such as the annual negotiation over national TACs. Although the principle of subsidiarity is a key instrument within the EU, national fishery ministers have quite often acted in their national interest rather than following EU instructions or scientific recommendations. Quotas were generally set higher than scientifically advised and the actual catch was higher than the set quota because of poor control systems of Member States⁵¹. The CFP reform of 2003 was desperately needed as previous regulations and rules were not observed or in some cases breached. It is important to achieve economically,

⁵⁰ Magnor NERHEIM, *The new Common Fisheries Policy (CFP): Towards sustainable management and a profitable fisheries sector?*, p. 33, Eipascope, EIPA Maastricht 2004, <http://www.eipa.nl>

⁵¹ *Ibid.*

environmentally and biologically sustainable fisheries because many livelihoods depend on this resource. If sustainable measures are not introduced instantly, the fishing industry will be facing serious financial problems in addition to the environmental and biological disaster facing the marine eco-system. The reform includes four main elements: a clear strategy for sustainable management of resources, a new fleet policy, new procedures in the enforcement and control systems and the involvement of stakeholders in fisheries management.

The European Unions problem with overfishing the current resources has several roots:

1. The EU has a surplus fleet capacity, which fish stock in European waters can no longer withstand.
2. Additional to the overcapacity of the EU fishing fleet appear the technological advantages in locating fish shoals and the technical ability of increasing catches.
3. Although TACs are geared to the scientific recommendations made by ICES and the Scientific, Technical and Economic Committee for Fisheries in the EU, fisheries ministers have often set annual catch quotas on average 30% higher than scientifically advised in order to avoid possible political and social disputes at that moment.
4. The EU suffers from fundamental problems in the enforcement and monitoring sector.

The overall objective of the new policy is to ensure a fisheries management that provides sustainable environmental, economic and social conditions. Recovery management plans are set out in a long term approach which have to be legally binding for all MS. Responsible and sustainable fishing activities are of significant importance to many parties concerned in this industry: they contribute to a healthy marine eco-system with long term economic benefits for both the environment and the fishing industry. The increasing demand for fish is positive for fishermen as it gives a certain job guarantee, however it puts a strain on resources and once these are endangered fishermen will also have to fear dismissal. Supply has already started to lag behind the steady

expanding demand for fishery products. For production and reproduction to be efficient, inputs have to be used in proportion to the resources relative scarcity⁵². Reductions in the number of vessels and thus cuts in the employment sector are necessary because a safe balance between resources and capacity are imperative in creating a sustainable fishing environment. The current number of vessels is far too high for the resources that are left in EU waters.

An additional central plan in recovery measures undertaken by the CFP contains direct controls on fishing effort at sea, i.e. limiting the days for vessels spend at sea in order to avoid overfishing the set TACs⁵³. Sheperd also states that the management of fishing activities with TACs and quotas trigger severe problems such as misreporting of catches or the quantities of certain species. In his opinion direct controls in fishing efforts have substantial advantages and it would be much easier and most of all cheaper to control and enforce restrictions on fishing efforts, especially with the newly introduced GPS monitoring system, operable since January 2005. This direct control procedure fixes the time vessels are allowed to spend at sea, expressed in strict units of days. Although Sheperd argues against TACs and quotas, a complete elimination should be prevented. A combination of TACs and set quotas for all species plus a time limit for fishing activities at sea would be the ideal concept of a sustainable fishing industry. The closure of certain areas during recovery periods will be verified via the GPS radar system. Furthermore, TACs fixed by the Commission and MS should be legally binding and national as well as EU inspectors would have to control the observance. In case of failing to do so, strict penalties should be assigned such as fines or even a ban on fishing for a period of time.

The annual negotiation and setting of TACs requires an end. This is nothing more than political debates and quarrels between the

⁵² Jean-Paul TROADEC, "Fisheries efficiency, resource conservation effectiveness and institutional innovations", *op. cit.*, p. 155.

⁵³ *Ibid.* and J.G. SHEPERD, *Sustainable Fisheries: Myth or Mirage?*, *op. cit.*

Commission and national fisheries ministers trying to get the most beneficial share out of it. Long term economic interests, environmental and ecological needs of fish stock and the marine eco-system are generally ignored. Instead, the allocation of TACs and quotas should cover a period of at least 2-3 years, obviously following scientific advice. The observance of scientific recommendations in the allowances on catches should be made legally binding. In case of a stock reduction of a given specie during this period, TACs should be re-set. The allocation and setting of quotas over a longer period of time allows fishermen and fishing industries to adapt to the measures and helps to create an economically viable and sustainable industry. Furthermore, catch quotas should in general be fixed a little lower than scientifically recommended in order to allow fluctuations in stock. Therefore, the consumer will also benefit from it with relatively stable prices and supply of stock.

Various green activists argue that in order to protect certain species and for reproduction measures, fishing bans on specific fish species need to be extended. However, overfishing almost inevitably concerns several species both those who are commercially important and those who are bycatch or discards to those fisheries. When nets are cast the content is diverse, it is not only cod or mackerel, other species are also caught and if the vessel does not own a TAC or fishing rights for one of these species they have to be thrown back into the sea. They are not allowed to be landed or processed. These fish are often referred to as discards. Putting a fishing ban on a certain specie is therefore rather hard to implement. A more efficient and sustainable measure would be the closure of an affected area over a period of time. By this manner, fish stocks in this area will be given several months for recovery and reproduction without any fishing activity disturbing them. In addition, it is simpler and much more unproblematic for fishermen to observe closed areas than adjusting their net and mesh sizes in a way that the banned specie can still escape.

Enforcement procedures and control systems

The problems arising in the enforcement system are due to shortcomings and insufficient enforcement activities by EU institutions. Firstly, various Member States have not correctly implemented enforcement regulations and hence IUU and black fishing activities are continued at a large scale. Secondly, fishermen and vessels operating in EU waters are confronted with different control and enforcement systems depending on the national jurisdiction and authorities of the waters in which they operate in. It is vital to implement general principles of control and monitoring and the enforcement procedures in the EU need to be at the same standard in all 25 Member States.

The Community lacks a coherent and clearly formulated enforcement and control system for the Common Fisheries Policy. Until present, Member States are responsible for control and enforcement of CFP regulations: "They shall ensure effective control, inspection and enforcement of the rules of the CFP on their territory and in the waters subject to their sovereignty or jurisdiction"⁵⁴. The main problem is the uniformity in the enforcement procedure of CFP regulations by the respective Member States. The EU needs to introduce independent inspections and allow inspectors to penalise any state that breaches the CFP regulations. The CFP in the EU suffers from an absence of the harmonisation of sanctions against any law breaching State⁵⁵. Although the CFP reform clearly sets new targets for the responsibility of Member States to ensure effective implementation and in case of violations make sure sanctions and penalties successfully prohibit further offences, penalties from the Commission against Member States have also been introduced. The 2003 CFP review has instituted penalty measures for those Member States who do not comply with the CFP and Community rules.

⁵⁴ Magnor NERHEIM, *The new Common Fisheries Policy (CFP): Towards sustainable management and a profitable fisheries sector?*, *op. cit.*, p. 32.

⁵⁵ www.commondreams.org, <http://europa.eu.int/comm/> *op. cit.*

These punishments can impose a vessel activity reduction, deduction of quotas (TACs) or even a block in EU financial aid. In some cases penalty payments can also be inflicted on either a Member State or particular fishing industry⁵⁶. The whole control and monitoring system has to be reviewed. It is obviously not sufficient enough if only the Member States are inspected for the proper implementation of EU law or rules; fishermen also need to be inspected directly on their vessels to verify logbooks, mesh sizes of nets, the engine power and tonnage amongst others. The monitoring of fishermen is the responsibility of the Member States but should also be monitored and frequently checked by Community inspectors.

The Commission has set up a new regulatory framework of control and enforcement so as to resolve the enforcement shortcomings. By doing so, the Commission hopes to have found a response "to the need for simplification of existing provisions and better enforceability of the CFP rules"⁵⁷. These improvements are presented as follows:

- a clear definition of responsibilities between Member States and the Commission,
- uniform rules for the enforcement of the CFP, including levels for sanctions and measures to prevent the repeat of serious infringements,
- a framework for co-operation and co-ordination between national authorities responsible for the control of enforcement, a Community Fisheries Inspection Report.
- the Commission intends to create a joint inspection structure at Community level⁵⁸.

Uniform enforcement rules of CFP measures are crucial throughout the EU. The Union currently counts 25 Member States of which most have a fishing industry. So far, each Member State has had its own inspectorate with occasional inspections directly from Brussels. This has been changed since the foundation of the

⁵⁶ <http://europa.eu.int/comm/> *op. cit.*

⁵⁷ *Ibid.*

⁵⁸ <http://europa.eu.int/comm/>

Community Fisheries Control Agency (CFCA) in March 2003, which created an organisational structure with a legal mandate for enforcement and monitoring activities. In order to guarantee the uniformity of CFP rules national control and monitoring authorities, the Commission and the EU fisheries control agency will increase cooperation among and within each other. The latter will organise the deployment of the 25 EU inspectors within the EU's fishing sectors for the monitoring, inspection, surveillance and research of resources. It is hoped that enforcement activities will be carried out and applied in Member States in accordance with EU aspirations via the CFCA. Multinational inspection teams should ensure confidence in the uniform enforcement of CFP rules⁵⁹. Direct controls and inspections in ports (on EU territory) and on vessels (in EU waters) will be undertaken by the EU inspectors in collaboration with national inspection teams. Yet, the Commission has recently also been empowered to carry out direct inspections on fishing vessels without prior notices to Member States; CFCA has taken over this role of the Commission. It should be stressed that regardless of the creation of CFCA, Member States remain those largely responsible for the application, control and enforcement of CFP rules. CFCA merely assists the coordination and harmonisation of EU enforcement procedures as well as giving technical advice and recommendations based on scientific research in the management and the allocation of resources⁶⁰. However, in order to be effective and useful a close cooperation and dialog between national, international and EU monitoring and control systems and agencies are required.

Community aid and subsidies for the fishing fleet

The large overcapacity of the EU fleet is an undeniable fact of which EU institutions are aware. They also agree that this surplus

⁵⁹ <http://europa.eu.int/fisheries>

⁶⁰ IEEP, *Towards uniform and effective implementation of the CFP*, Briefing No.13, London, July 2003.

fleet capacity threatens fish resources and have therefore recently established a *vessel scrapping programme*. Furthermore, the EU admits that public aid has contributed a significant deal to the problem of overcapacity and will therefore be brought to an end at the end of December 2004. From 2005 onwards, subsidies and community aid can no longer be invested in the purchase of new vessels. However, the fleet is still eligible for public aid in the domains of safety equipment and improvement of hygiene and working conditions on board, for training measures and new technological innovations that do not increase fishing effort⁶¹. Following a Commission report of May 2002 based on scientific research, the fleet has to be reduced by 30 to 60% (that is an equivalent of 8 600 vessels) in subsequent years⁶². The necessary reduction of the EU fleet capacity will result in growing unemployment and financial hardship for citizens relying on fishing as a source of income. With a system of ITQ the problem would certainly ease financial hardship and prevent many fishermen from becoming bankrupt. Without an ITQ system the EU has to find other means to relieve those concerned with retraining programmes or with settlement of a certain sum.

It is predictable and understandable to a certain degree that national as well as EU interests were until now the safeguarding of workplaces. Short term economic benefits and the increase of productivity were until recently the main aims of the state. Now, the time has come where the state and the EU have to see to the costs and manage the problems arising from this economically completely inefficient fisheries policy. The EU paid €1.4 billion of public aid through the FIFG to the modernisation and restoration of the fleet, for the modernisation of harbours and to the processing industry. Indeed, many livelihoods are at risk, numerous dismissals are part of the rationalisation programme and the fishing industry will face financial hardship too. But it is logic that there cannot be

⁶¹ <http://europa.eu.in/fisheries>

⁶² Magnor NERHEIM, *The new Common Fisheries Policy (CFP): Towards sustainable management and a profitable fisheries sector?*, *op. cit.*, p. 32.

an industry unless sufficient resources are available for harvesting. It is a simple addition of logical facts that should convince every party involved in fishing activities: no fish, no fishing industry; no fishing industry, no employment. If the fishing industry is not undertaking measures for recreational plans now, it will be hit in a couple of years when stocks are entirely extinct and the complete fishing industry is on the verge of collapse. The CFP has to deliver sustainable fish resources for a sustainable industry and sustainable workplaces.

The surplus fleet capacity also incorporates harming effects from an economic point of view. By means of intensive overinvestment throughout the last decades, yet with decreasing fish stock and absent TAC reduction measures, the EU built up to an overcapacity of vessels operating in EU waters. Fishermen live a vicious circle; they are forced to take loans in order to be able to continue fishing activities and thus damage already depleted stock even more as they have to pay back their credits. Consequently, it is more profitable and safe for fisheries businesses to think and act for immediate benefits, though at the cost of sustainable resources and lasting income security. This is obviously not very cautious and prudent because long term profits are not assured as a result of overexploiting the present resources. The question that arises is how to change and solve this situation of constant overexploitation of marine resources? Throughout this paper various options for the management of lasting sustainable fisheries are proposed. Imagining a graph which illustrates the national economic gains of a sustainable management of renewable resources, it would translate as follows:

The economic benefits for society would be increased if the prospect fisheries policy were to pursue the objective of sustainability and if TACs were fixed at a rate where lasting conservation for fish stock is assured. In this way, the supply of fish for the consumer is ensured along with the protection of workplaces within the fisheries industry. Through renunciation of a share of the present fish stock and the thereof resulting long-term protection/conservation of stock/returns, the economic benefit for society would be larger. This statement is justified by comparing

the two PPLs (Production Possibility Line). At present, immediate gains benefit the fishermen today but production yield is limited or even depleted for prospect generations; whereas with a sustainable fisheries management the intersection of the two axes with the PPL has moved to the right and thus ensures conservation of marine fish stock and fish supply for society. The curve illustrating the economic benefits for society has also shifted to the right, which demonstrates the gain for society. Besides, fishermen acquire the assertion of employment and lasting income and the consumer benefits because fish prices will drop. This obviously implies that after the sustainable fisheries management a renewal of resource overexploitation is hindered.

Instead, the EU should pay subsidies for aquaculture. The challenge is to respond to and meet consumer demands, using production methods with a minimum impact on the environment. The aquaculture sector is already a big branch of industry which is valued at €2.5 billion per year⁶³. But it still needs to experience a boost in growth. The depleted stocks in EU waters can no longer respond to consumer demands. However, aquaculture has also put a strain on fish resources until now. Therefore, the EU should encourage and financially support research projects for fish flour and fish oil substitutes. In 2002, the Commission presented a *Strategy for the sustainable development of European Aquaculture* in which it outlined the future prospects and plans for the EU aquaculture sector⁶⁴. The new strategy mainly addresses sustainable growth rather than sustainable development measures. Thus, it was envisaged to increase employment numbers by 8 000 to 10 000 full-time jobs between 2003 and 2008 and a growth rate of 4% every year. This reform proposal is for once a positive prospect in a reform process which generally generates unemployment and shortage measures. Fishermen who are being dismissed could transfer for example to the aquaculture sector. The other main objective is to ensure healthy, safe and good quality products. Until

⁶³ IEEP, *A Strategy for the sustainable development of European Aquaculture*, Briefing No.6, London, October 2002, www.ieep.org.uk.

⁶⁴ *Ibid.*

present, unpleasant news about the use of antibiotics and hormones in fish farming have caused concerns amongst consumers. New *clean* farming technologies for both the consumer and the environment will be introduced in order to increase confidence in farming products and promote an environmentally friendly industry⁶⁵.

Environmental Protection

The environment plays a key role in the fishing industry. A damaged marine eco-system would endanger the whole fisheries sector. The protection and conservation of marine resources are obviously of significant importance because there cannot be a fishing industry without fish. However, other environmental factors play a role. Article 6 of the EC Treaty requires "environmental considerations to be integrated into the definition and implementation of Community policies, as a means of delivering a sustainable development"⁶⁶. All factors which could contribute to imbalances in the marine eco-system and habitat need to be assessed and solutions are to be found in order to prevent environmental long term damages, perhaps by introducing an eco-system based management approach established on scientific recommendations and knowledge.

Management measures on fishing conducts and harvesting activities for sustainable fishing and conservation for fish stock are equally as important as the improving fishing techniques⁶⁷. These should for example include the use of selective fishing methods, the reduction of fishing capacity and effort, management plans and the recording of bycatch and discards. So far, vessels are still operating with damaging catching techniques such as the use of driftnets,

⁶⁵ See Chapter 8.1 Aquaculture for further details.

⁶⁶ IEEP, *Action plan to integrate environmental protection requirements into CFP*, Briefing No.4, London, May 2002.

⁶⁷ Aquaculture activities can also pose serious environmental threats depending on the cultivation systems used. See Chapter 8.1.

which are a threat to the marine environment. Driftnets destroy important marine habitat, especially on the sea grounds. Furthermore, they are capable of catching a range of non target species such as sea birds or seals⁶⁸. Bottom trawls, drift nets and similar damaging fishing gear cannot be entirely prohibited but certain areas should be closed for the use of these fishing techniques.

The Commission also wants to establish plans in order to reduce bycatches and discards in EU waters which are harmful to the marine biodiversity. The activities contribute to a large extent to the problem of the overexploitation of marine resources. Thus, non-selective fishing gear and the discarding of valuable fish resources are responsible for the collapse of worldwide fish stocks, too. Bycatch and discards are clearly not only problematic in the European fishing dimension, they occur in worldwide fisheries industry⁶⁹. The FAO estimates that additional to the 85 million tonnes of fish landings worldwide another 20 million tonnes of bycatch consisting of sea mammals, sea birds and invertebrates can be counted. The bycatch is later thrown back into the seas (either already dead or dying) which is called discards⁷⁰. Living discards have no survival chance as in most cases they are severely injured. It is widely acknowledged that discards in the context of fisheries are damaging for the environment but they also contain economic consequences and harm other branches of industry. For example, bycatch and discards negatively affect the tourism industry of various areas. Approximately 7 500 pork whales fall victims to the fishing techniques for cod and turbot in the North Sea and between 10 and 12 million sharks die every year as a result of bycatch and discard activities⁷¹.

⁶⁸ WWF, *Bycatch_Brief*, Brussels, March 2004.

⁶⁹ 2.5% of New Zealand's sea lions perish in tuna driftnets and up to 30 000 individuals of the turtle family die each year as bycatch.

⁷⁰ WWF, *Millionengrab Meer, Ökonomische und ökologische Auswirkungen von Beifängen und Rückwürfen in der Fischerei*, Frankfurt am Main, WWF, Dezember 2002, p. 4.

⁷¹ *Ibid.*

This has fatal socio-economic consequences, which are generally *forgotten* and not taken into account. Many tourists are attracted by an area due to the natural attractions it offers such as whales, seals or sharks. With the killing of these mammals as a result of damaging fishing techniques and discards the tourism industry in that particular area will experience an economic slowing down and reduction. This in turn also negatively affects employment in this sector such as hotels and others. Following an ICES report of 2002, it has been established that of 2.5 million tonnes of catches in the North Sea in 2002, 550 000 tonnes of bycatch were thrown back into the sea⁷². Due to the fact that nearly all species in the North Sea are endangered and depleted, these discards directly threaten the existing and future stock.

Bycatch and discards also include young and juvenile fish which are in fact valuable offspring and which present the future resource for fisheries. Although the harvesting of baby fish is prohibited, many juvenile fish which have not yet reached the age of reproduction get involuntarily caught in nets with too tiny mesh sizes and pointlessly die in large amounts. Furthermore, with the loss of juvenile fish a guarantee for future stock and sustainable resources is endangered and the fishing industries lose both their product and their capital. This economic value of the loss is difficult to assume because bycatch and discards are not registered in any books. This however should be implemented in the interest of scientific research and the fishing industry itself. Until now it has not been possible to calculate the amount of losses and the ecological and environmental effects and cost of discards due to the lack of information. All facts are pure assumptions. Moreover, it is impossible to scientifically forecast the future of marine resources if the recording of bycatch and discards is not incorporated and successfully implemented into new reform plans and management measures.

A change in the present quota system would also facilitate the reduction of discards. The present management system allows fishermen to catch a limited amount (quota) of certain species. This

⁷² www.ices.dk

inevitably incorporates the catching of other species which have to be thrown back into the waters because of absent fishing rights. Several solutions may be found for this problem: first the right to also land bycatch species which could be utilized for either commercial use or for aquaculture feed production. Secondly, areas with large quantities of juvenile fish require a time-limited closure and fishing ban in order to protect them from becoming discards. Lastly, financial aid should be given to the output/promotion of sustainable fishing techniques; selective fishing techniques which are environmentally friendly and not damaging to the biodiversity (i.e.: that do not destroy coral reefs or plough sea grounds.) Non-selective fishing techniques may have a high profitability from a business management standpoint for the individual fisherman, however, due to bycatch and overexploitation of resources the external costs for the society are very elevated. With the use of selective fishing techniques on the other hand, individual profitability may be low but the external costs would also be minimised to a large extent and thus increase profitability of the overall national economy⁷³. Selective fishing gear is therefore urgently needed in order to guarantee harvesting possibilities and to secure income potential for sustaining and enhancing the industries capital (in our case fish stock (natural capital)). Until present, fishermen unfortunately did not have the incentive to use sustainable fishing gear. Due to the reduction of marine resources in recent years prices for fish have risen in order to balance out the losses for fishermen and the industry. Growing prices reflect the scarcity of resources on the one hand but also lead to an even greater exploitation of stocks. As already mentioned the short term economic benefit optimization is what counts.

The socio-economic factors and external costs on employees are not to be underestimated. Discards are a negative external effect of the economic activity of the fisheries sector which lead to external costs. Negative external effects have an important economic

⁷³ WWF, *Millionengrab Meer, Ökonomische und ökologische Auswirkungen von Beifängen und Rückwürfen in der Fischerei*, op. cit., p. 5.

implication and reduce the overall economic outcome and have to be faced by the general public⁷⁴. Social and economic costs of the collapse of a certain fishing economy are carried by the public. Furthermore, the public also has to face upcoming economic costs resulting of overexploitation and the depletion of fish stocks.

Involvement of Stakeholders

The Commission acknowledges the importance of transparency and consultations with the industry in developing control measures and proposes a closer cooperation with RACs in achieving this. There has long been strong criticism on behalf of the industry that decisions and fisheries management are too centralised, top-down and do not reflect the actual needs of sustainable management⁷⁵. By means of establishing Regional Advisory Councils the Commission wants to increase stakeholder's involvement at regional and local level in the decision making process especially decisions concerning management and conservation measures. RACs are composed of representatives of all parties with an interest in fishing management in a given area⁷⁶, including environmental and sustainable conservation measures⁷⁷. Although Advisory Councils conduct their work and research independently they run under the authority of EU institutions and their main task is to advise the Commission and Member States on matters of sustainable management in specific areas. It should be stressed that RACs are only advisory bodies which can make recommendations or which the Commission may consult if it wishes. The advantage with

⁷⁴ *Ibid.*, p. 7.

⁷⁵ Magnor NERHEIM, *The new Common Fisheries Policy (CFP): Towards sustainable management and a profitable fisheries sector?*, *op. cit.*, p. 33.

⁷⁶ Fishermen, representatives from processing industry, marketing, harbour management, aquaculture etc.

⁷⁷ IEEP, *Proposal on the Conservation and Sustainable Exploitation of Fisheries Resources*, Briefing No.2, London May 2002.

Regional Advisory Councils is that they are capable of making precise suggestions for CFP legislation proposals by the Commission based on scientific research and relating to the condition of fish stock in their area. If their advice is being used or followed within the CFP framework is not guaranteed. Yet, if all RACs are able to give reliable consensus-based scientific and environmental recommendations on the enhancement of fisheries management neither the Commission nor the Council will oppose or reject these. It is more efficient and most of all more reliable to take RACs comments into consideration because they are small groups focused on certain areas. The Advisory Committee on Fisheries and Aquaculture however will not lose their function; they will be assisted by RACs in the collection of viable data.

Furthermore, it is envisaged to stop the highly political debate and annual *horse-trading* on catch limits of MS, thus depoliticising the EU's fisheries management and to base the setting of TACs on scientific research and recommendations. This approach would certainly be an additional assistance in achieving the move towards more sustainable fishing practices. RACs are not new management systems or regional bodies which should reinvent the CFP. Their task is to conduct research and formulate advice and recommendations in consensus with other RACs which are then to be adopted by the Council and the Commission.

The international dimension

The community fleet is one of the largest fishing fleets in the world with currently 90.000 vessels⁷⁸; a significant part of its fishing sector depends on access to non-Community resources. Therefore bilateral and multilateral agreements with third non-EC-member countries had to be established to allow the EC fleet (in particular the deep-sea fishing fleet) to enter international waters and set quotas for allowable catches. It also became necessary because

⁷⁸ Too many vessels for the scarcity of fish resources, <http://europa.eu.int/www.ies.be/research/fisherires.html>

distant fishing vessels from the community lost access to their traditional fishing areas following the extension of EEZs in some cases up to 200 nautical miles in the 1970s. This had a drastic impact on fisheries as 90% of exploitable fish resources fell under the jurisdiction of coastal states⁷⁹. The international dimension of the CFP has therefore attained greater importance. It should be noted that almost 60% of the fish consumed in the EU comes from these third-countries. There are currently three kinds of agreements: "Bilateral fisheries agreements lay out a general framework for the access to the waters of these countries to the community fleet"⁸⁰. These are agreements between the EU and third countries.

Regional fisheries organisations (RFOs) currently also manage an important part of the resources and waters to which the community has access to. RFOs are created by international agreements. The community is part of some of these RFOs. The Commission states that they are meant to strengthen regional co-operation to guarantee conservation and sustainable exploitation of fish stocks⁸¹. Unfortunately, until now it has been impossible to adopt a Community position on the control of fishing activities in the framework of RFOs. There exists therefore an urgent need to define the responsibilities of the Commission and the Member States respectively in this domain, especially regarding the implementation of monitoring arrangements adopted and applied by RFOs⁸². If the Community is not able to come to terms with these matters a continuation of the Community fleets presence in those waters might not be wanted and accepted by RFOs.

The Community also established fishing agreements with developing countries such as African and Indian Ocean countries, which are currently not fully exploiting their fishing resources, probably due to lack of financial assistance by their governments and technical underdevelopment. A financial contribution is

⁷⁹ IEEP, *Integrated Framework for Fisheries Partnership Agreements with Third Countries*, Briefing No.11, London, February 2003.

⁸⁰ <http://europa.eu.int>.

⁸¹ <http://europa.eu.int/comm>

⁸² www.ies.be, *op. cit.*

allocated by the Community to those countries where its fleet has fishing access⁸³.

Third country agreements of the EU increasingly contain development and environment measures. Through Fisheries Partnerships Agreements with various countries the Commission seeks to promote sustainable development and recovery measures for depleted fish stock in these access waters⁸⁴. European fishing vessels have bought access rights to these waters and it is thus their responsibility to rebuild resources as they contribute to the depletion of stock in these waters. Furthermore, it is evident that EU distant water vessels have to comply with rules and principles according to the coastal States' objectives. The fleet has to make sure that it uses scientific and technical advice with the aim of avoiding the overexploitation of these resources. Third countries such as Angola, Gabon, and Senegal sell fishing rights because of their dependence of additional income and the EU relies on these agreements in order to ensure workplaces and meet the demand for fish. It would be a criminal offence to take advantage of this reliance of developing countries by refraining from a sustainable resource management. Yet, partnership agreements should also have the objective to transmit technical knowledge to third countries and assist them with using their resources in a sustainable but also beneficial manner.

However, it has to be taken into account that with progressive technological change and advantage, the third countries also desire to extend and modernise their antiquated fishing industry which is perfectly legitimate. Thus, it is increasingly difficult for the EU to sign bilateral agreements with countries of stock surplus. Yet, if third countries modernise their fleets and fishing industry, this will at the same time result in an increase of scarce fish stock

⁸³ Angola, Cape Verde, Comoros, Côte d'Ivoire, Gabon, Gambia, Guinea, Equatorial Guinea, Guinea Bissau, Kiribati, Madagascar, Mauritius, Mauritania, Mozambique, São Tomé and Príncipe, Senegal, Seychelles.

⁸⁴ IEEP, *Integrated Framework for Fisheries Partnership Agreements with Third Countries*, Briefing No. 11, *op. cit.*

exploitation and equally raise competition on the extending globalising markets.

CHAPTER 4

The Fisheries Sector in the European Union

The fisheries sector of the Member States

The following table lists some facts concerning the EU fishing fleet by Member State. It gives an inside of the number of vessels, the tonnage and the amount of engine power each of the 13 countries possessed in 2002. The reason for stating only 13 countries of the 15 EU Member States in this diagram is due to the fact that two so-called *landlocked countries* are represented in the EU, namely Austria and Luxembourg. It would be a fallacy to assume that Austria and Luxembourg do not contribute to the EU fishery sector. It only refers to fleet details which these two countries do not own.

Table 2: Facts of Member States fishing fleet in 2002

Country	No.of Vessels	Tonnage	Fleet in kW
BE	130	24276	66699
DK	3874	99339	347476
DE	2247	69490	163912
EL	19747	104255	606188
ES	14887	519878	1257221
FR	8088	229749	1111330
IE	1448	72661	210624
IT	16045	215242	1289681
NL	932	200068	470031
PT	10427	116734	401186
FI	3571	19883	188800
SE	1820	45373	224450
UK	7379	246589	924218
EU 15	90595	1963537	7261816

Source: EUROPEAN COMMISSION, DG Fisheries, "The fishing fleet of the Member States in 2002", *op.cit.*, p. 14.

Austria's fisheries economy only incorporates aquaculture and freshwater fishing, due to the country's geographical situation. Experts generally use the term *landlocked country* when referring to countries which have no coastal regions and which are thus entirely surrounded by land. Austria's fish farming is concentrated on two main species, carp and trout, and their production came to 2 393 tonnes (approx. 12 239 Euros) in 2001⁸⁵. Aquaculture offers approximately 300 full time jobs, 500 part time jobs as well as around 1 500 seasonal workplaces; the processing industry offers another 100 job opportunities. Freshwater fishing accounted to 445 tonnes (2.7 Mio. ECU) in 1998 and employed 150 persons on a part time basis⁸⁶. Austrian per capita consumption of fish in 1999 amounted to a low of 11.4 kg and therefore comes last of all EU 15 Member States. They do not seem to be very fond of fish.

Belgium has a fleet capacity of 130 vessels in 2002 which is a reduction of 18 vessels in comparison with 1998, yet there has not been a decrease in the tonnage and in the engine power. On the contrary, the tonnage lies with 24 276 in 2002 (23 082 in 1997) and the engine power with 66 699 in 2002 (64 896kW)⁸⁷. Despite the decrease in the number of vessels there is an increase in tonnage and kW which should not be underestimated. The new CFP has as a major focus the reduction of the EU's fishing fleet in numbers as well as tonnage and kW in order to support a sustainable fisheries

⁸⁵ EUROPEAN COMMISSION, DG Fisheries, "Total Aquaculture production by Member State (2001)" in EUROPEAN COMMISSION, *Facts & Figures on the CFP, Basic Data on the Common Fisheries Policy*, Office for Official Publications of the European Communities, Luxembourg 2004, p. 16, accessible on the web <http://europa.eu.int/fisheries>

⁸⁶ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", Kapitel 2 in EUROPÄISCHE KOMMISSION, *Grünbuch, Die Zukunft der Gemeinsamen Fischereipolitik*, Band II, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2001, p. 59.

⁸⁷ *Ibid.*

management. Total sum of catches in 2001 lay around 30 217 tonnes; the main species being plaice, common sole, cod, skates and anglerfish. The fresh water fish farming concentrates on common carp, catfish, tilapias and rainbow trout⁸⁸. Only recently marine aquaculture, mainly for oysters and turbot, has been introduced and thus in Belgium's marine aquaculture industry is still working in small dimensions with 1 630 tonnes of fish which amounts to €6 049 million⁸⁹. Belgium employed 745 persons in the fisheries sector in 1997 of which 87 are part time employees. The total employment rate in the fisheries and aquaculture sector including the processing industry, catching sector, ship repair and industries responsible for imports and exports sums up to 2 759 employees⁹⁰. The main employment areas centre around Oostende, Zeebrugge and Bruges. The fish consumption in Belgium amounted to 20.2 kg per capita in 1999.

Denmark: The Danish fleet consisted of 3 874 vessel with 99 339 tonnage and 347 476kW of which 70% are less than 10 m long and 5% more than 20 m long. They have considerably cut their fleet since 1998⁹¹. The Danish fishing industry counted 19 266 employees in 1997. The total catches lay around 1 510 486 tonnes which makes Denmark the biggest EU fishing nation in terms of catches. From the total catches of the EU Denmark had a share of 24.69% in 2001⁹². The favourite species of Denmark are sandeels, sprat, herring, blue mussel and the Norway pout. Marine fish farming produces approximately 41 573 tonnes of fish which is an estimated value of €167 045 million. Freshwater fish production concentrates on trout and eel and this industry offers nearly 1 000 job opportunities. Furthermore Denmark has the most capital

⁸⁸ EUROPEAN COMMISSION, DG Fisheries, "Total Aquaculture production by Member State (2001)", *op. cit.*, p. 20.

⁸⁹ *Ibid.*, p. 16.

⁹⁰ *Ibid.*, p. 11

⁹¹ Please consult Table 3 below.

⁹² EUROPEAN COMMISSION, DG Fisheries, "Catches of Member States as a share of total EU catches in 2001", *op. cit.*, pp. 4-5.

intensive processing sector with 8 588 employees, of which 75% account for women⁹³, and a turnover of 1.19 billion ECU in 1998⁹⁴.

Finland's fleet capacity currently accounts to 3 571 vessels with 188 880kW and 19 883 tonnage, which is a decrease of 14%kW and 18% tonnage compared to 1998⁹⁵. Most vessels operate in finish coastal areas; big trawlers conducting mostly in the Baltic Sea have specialised in herring and sprat fishing. Additional species representing a high demand are perch, pike and whitefish. The total employment rate lies with 6 074 employees which is mainly male dominated and of which around 3 000 operate within the catching sector. Only in the processing sector 50% of the workforce represent women⁹⁶. Marine aquaculture is held in Finland's south coastal waters and concentrates mainly on the breeding of rainbow trout where it produced 13 269 tonnes in 1998, pollan and sea trout⁹⁷. The total figure of aquaculture production amounts to 15 739 tonnes which was an estimated €44 312 million in 2001; and offers job opportunities for approximately 1 000 employees. Freshwater fishing in Finland concentrates mainly on salmon and was sold at a profit of 5.8 million ECU in 1998. The economic importance of aquaculture in Finland compared to the total fishery production lies at an astounding 80%⁹⁸. Aquaculture is a key source of income in the Finish fisheries industry.

France had 8 088 vessels registered in 2002 with a tonnage of 229 749 tonnes and 1 111 330kW. Although the fleet and the engine power have declined by 8.5% and 2.64% respectively since

⁹³ EUROPEAN COMMISSION, DG Fisheries, "Total employment in the Fisheries sector", *Ibid.*, pp. 11-12

⁹⁴ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 61.

⁹⁵ *Ibid.*

⁹⁶ EUROPEAN COMMISSION, DG Fisheries, "Total employment in the Fisheries sector", *op. cit.*, p. 13.

⁹⁷ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*

⁹⁸ *Ibid.*, EUROPEAN COMMISSION, DG Fisheries, "Catches of Member States as a share of total EU catches in 2001", *op. cit.*

1998, the tonnage has increased by 8.83% which gives cause for concern regarding EU vessel tonnage regulations. 75% of the vessels measure less than 12m⁹⁹. French fishery generally concentrates on skipjack tuna, yellow fin tuna, pilchard, saithe and herring. The total catches of France accounted for 604 333 tonnes which comes to a share of 9.88% of total EU catches in 2001¹⁰⁰. Its fisheries sector employed approximately 66 804 men and women and is therefore the third largest employer country in the fishing sector in the EU. Women are mainly represented in the processing sector with 64%. Marine aquaculture produced 252 062 tonnes of fish in 2001 with a value of €474 776 million. Aquaculture has an economic importance of 41% in France's total fishery production and offers 15 853 jobs. This sector concentrates mainly on the breeding of mussels (cupped oysters, blue mussel and Mediterranean mussel) as well as rainbow trout and common carp¹⁰¹. France is the fourth biggest consumer of fishery products with approximately 30 kg per head per year¹⁰².

Germany: The German fleet reduced their capacity to 2 247 vessels with a tonnage of 69 490 tonnes and 163 912kW in 2002 compared to 2 373 vessels, 75 103 tonnage and 171 457kW in 1998¹⁰³. This demonstrates German understanding of the seriousness of overfishing. Germany accounts for 2.5% of the total EU fishing fleet. The majority of vessels measure less than 10m and therefore small fishing boats generally seizing ground fish and herring in the North- and Baltic Sea. Only 5% were longer than 20m and hence highsea trawlers¹⁰⁴. The highsea fleet is based in

⁹⁹ EUOPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 62 and EUROPEAN COMMISSION, DG Fisheries, "Catches of Member States as a share of total EU catches in 2001", *op. cit.*, p. 14.

¹⁰⁰ *Ibid.*

¹⁰¹ *Ibid.*, pp. 12-20.

¹⁰² *Ibid.*, p. 23.

¹⁰³ *Ibid.* p. 14 and EUOPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 62.

¹⁰⁴ *Ibid.*, p. 63.

Bremerhaven, Cuxhaven and Rostock. Medium-sized vessels usually catch shrimps and flat-fish. The top five species seized by the German fleet are herring, mackerel, blue whiting, horse mackerel and shrimps. The catches represented 3.45% (211 187 tonnes) of the total EU catch. The number of employees in 1997 came to 19 529 of which 4 422 are directly employed the catching sector¹⁰⁵. There is not a single record of female fishermen in Germany. Their share in the processing sector is however fairly high with a representation of 55% of a total workforce counting 11 280 employees. Marine aquaculture is a significant sector in Germany and had an economic importance of 60% compared to the total fishery production. The production came to 53 409 tonnes with a value of € 156 006 million in 2001. The breeding concentrates mainly on rainbow trout, common carp, blue mussel, eel and cupped oysters. Aquaculture guaranteed 2 865 jobs in 1997. German per capita consumption in 1999 came last but not least before Austria with 12.4 kg.

Greece: The Greek fleet owned 19 747 vessels with 104 225 tonnage and 606 118kW in 2002. Greece has complied with the EU's regulation by cutting down its fleet since 1998¹⁰⁶. Yet, the Greek fleet is the biggest in the EU with a share of 21.8% of the EU's fishing fleet. 94% of the registered vessels measure less than 12m. Greece's top five species in the fishery sector are pilchard and anchovy, picarels, bogue and horse mackerel. The total catches of Greece in 2001 represented a share of 1.54% of the total EU catches (94 394 tonnes) which is astonishing considering the size of the fleet. The total employment rate lies at 49 525 employees in the entire fishery sector where women are generally underrepresented with only 7% in the catching sector, 10% in aquaculture and 11% in the processing sector. However when comparing the 7% figure of the Greek catching sector with other EU nations, Greece demonstrates the highest female employment rate in this area. Marine aquaculture focuses on the production of gilthead seabream,

¹⁰⁵ EUROPEAN COMMISSION, DG Fisheries, "Total employment in the Fisheries sector", *op.cit.*, p. 12.

¹⁰⁶ Please consult Table 2 below for the exact figures.

sea bass, Mediterranean mussel, rainbow trout and eel. Aquaculture plays a vital role in Greece's fishery economy; its economic importance is rated at 58.6% in 2001. 97 802 tonnes of fish were produced in fish farms which comes to a value of € 344 654 million¹⁰⁷. It is surprising to note that 65% of the aquaculture production is being exported mainly to Italy¹⁰⁸. In 2001, the total employment rate in fish farming was 3 164 employees. The key processing locations in Greece are Thessalonica, Attica and Kavala, although this branch of industry does not constitute a significant part in Greece as in other EU nations. The total per capita consumption of fish lies around 25 kg per year¹⁰⁹.

Ireland registered 1 448 vessels with a tonnage of 72 661 and 210 624kW in 2002. The Irish represent one of the few countries that disobey EU regulation and that have increased the number of operating vessels, tonnage and engine power. 14% vessel increase, 16% increase in tonnage and 9.5% increase in engine power are a considerable threat for a sustainable fishing industry one might think. However, the total share of the EU fishing fleet by the Irish only represents 1.6% and is consequently not as threatening as one might suppose. 70% of the boats measure less than 15m and operate within the coastal boundaries of Ireland, i.e. within the 12-mile-zone. The total catches make up 5.8% (356 309 tonnes) of the total 15 Member State catches in 2002. The catching sector focuses mainly on mackerel, horse mackerel, herring and sardinellas as well as the blue whiting and cod¹¹⁰. The fishing sector employed 15 542 men and women. Female workers are well represented in the processing sector with 45 % of 4 920 as well as in aquaculture with 30% of 2 198 total employees. The catching sector is entirely male dominated with 6 274 employees. The total aquaculture production in 2001 accounted for 60 935 tonnes with a value of € 102 157

¹⁰⁷ *Ibid.*, p. 16.

¹⁰⁸ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 64.

¹⁰⁹ EUROPEAN COMMISSION, DG Fisheries, "Catches of Member States as a share of total EU catches in 2001", *op. cit.*, p. 23.

¹¹⁰ *Ibid.*, p. 7.

million. The economic importance of aquaculture compared to the total fishery production lays around 35% in Ireland. The main species produced in fish farms are blue mussel, salmon, cupped oyster, rainbow trout and flat oyster.

Italy has a fleet capacity of 16 045 vessels with 215 242 tonnage and 1 289 681kW, representing a downward trend in the number of vessels, tonnage and engine power compared to 1998. Most vessels are little boats, 87% of these having less than 25 tonnage¹¹¹. The Italian fleet represents 17.7% of the EU fishing fleet and is therefore the second largest EU fleet with the highest engine power in the EU¹¹². Due to the nature and size of the boats they are bound to operate in coastal zones. The total catches add up to 310 403 tonnes in 2001 which amounts to a share of approximately 5% of the total EU catches. The nets are mainly filled with the following species: Mediterranean mussel, anchovy, striped venus, pilchard and hake. The catches of small boats are generally directly sold to restaurants or on the markets. Catches of bigger vessels are usually transferred for processing to the key processing firms in Nepal, Venice, Bari and Trapani¹¹³. Italy comes second to Spain in terms of employment capacities/rates in the EU with 106 984 people. This number can be divided into 43 547 employees in the catching sector, 8 665 employees aquaculture production of which 11% are female and 6 448 employees in the processing sector; 37% of this workforce is female. Marine aquaculture produced 221 269 tonnes of fish in 2001 which is an equivalent of €475 968 million. The concentration lies on Mediterranean mussel, manila clam, rainbow trout, sea bass and gilthead seabream. The economic importance of aquaculture constitutes around 33% in the total fishery production and is therefore not the major source of income.

Luxembourg is another *landlocked country* and has no importance to the European fisheries industry. It has no fleet

¹¹¹ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op.cit.*, p. 65.

¹¹² EUROPEAN COMMISSION, DG Fisheries, "Jobs, Total employment in the fisheries sector (1997)", *op.cit.*, p. 15.

¹¹³ *Ibid.*

capacity at all, however one or two fish farms. The processing industry offers 5 jobs and if one includes importers and employees who work on vessels of other EU nations it may account to roughly 35 employment opportunities¹¹⁴.

The **Netherlands** counted 932 vessels with a tonnage of 200 068, which is an increase of 13% compared to 1998, and 470 031kW in 2002. The 932 vessels are divided into refrigerator trawler operating in high sea fishing, small mussel-catch-boats manoeuvring in the 12-mile-zone and vessels fishing in EU waters. In comparison to other Member States the Dutch fleet owns a lot of large boats; 55% of the Dutch vessels measure more than 24m¹¹⁵. The number of the Dutch fleet is however with a share of 1% of the EU's fishing fleet not very significant. The more astounding it is to observe that the Netherlands are the fifth largest fishing nation of the EU in terms of catches in 2001. Despite the insignificant number vessels the fishing sector managed to have a yield of 518 163 tonnes, 8.5% of EU 15 catches four years ago¹¹⁶. The favourite species mostly discovered in the catches are sardinellas, herring, horse mackerel, mackerel and blue whiting. The catching sector by itself guarantees 2 379 jobs of which 5% are female. In total 11 800 jobs are presented by the fishing sector. Marine aquaculture employed 404 persons in 1997 and concentrates mainly of the breeding of blue mussels, eel, cupped oysters, cat fish and flat oyster. The yield of this activity came to 52 064 tonnes in 2002 which is a return of €119 224 million. Aquaculture constitutes 25% of the total fishery Dutch production. A yearly consumption of 20.5 kg per capita was recorded in 1999.

Portugal registered a fleet capacity of 10 427 vessels with 116 734 tonnage and 401 186kW in 2002. It has to be noted that the engine power has been slightly increased from the previous 393

¹¹⁴ EUROPEAN COMMISSION, DG Fisheries, "Jobs, Total employment in the fisheries sector (1997)", *op. cit.*, pp. 11-13.

¹¹⁵ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op.cit.*, p. 66.

¹¹⁶ EUROPEAN COMMISSION, DG Fisheries, "Jobs, Total employment in the fisheries sector (1997)", *op. cit.*, pp. 4-5.

671kW in 1998. Portugal accounts for 11.5% of the total EU fleet and has registered 191 090 tonnes worth of fish yield in 2002¹¹⁷. Considering that Portugal is the prime country to consume fish with a per capita consumption of 61.1 kg per year, the total catches of 3.12% of the total EU catch is minimal. The per capita consumption of fish in Portugal is remarkably high. The EU in general notes an extraordinary record of per capita fish consumption with an average of 24.5 kg per annum. This figure exceeds the average world consumption of 16 kg per capita per annum¹¹⁸. 96% of the Portuguese ships operate in coastal areas with various catching techniques/equipments. It is therefore a matter of rather small boats with a low tonnage capacity seizing a wide spectrum of species such as pilchard, horse mackerel, redfish, octopuses and black scabbardfish¹¹⁹. The catching sector guaranteed 29 416 jobs in 1996. Fish farms in Portugal generally produce clams, gilthead seabream, rainbow trout as well as sea bass and blue mussel. Natural mussel breeding in near coastal areas is a typical characteristic in the southern Portuguese regions. The production outcome of 2002 amounted to 7 824 tonnes with a value of €59 931 million. The total employment in the fishery sector was registered with a number of 44 391 employees in 1996. Aquaculture signifies neither a significant nor a substantial economic importance compared to the total fishery production with only 17.1%.

Spain: The Spanish fleet counted 14 887 vessels with a tonnage of 519 878 and 1 257 221kW and is with a share of 16.4% the third largest fleet of the EU. Spain has considerably reduced its fleet according to EU regulations. The majority of vessels measure less than 12m and operate in coastal areas. Although Spain has a smaller disposal of vessels than Greece, they have a bigger catching capacity and come second to Denmark in terms of catches with 1 087 496 tonnes. This is a share of 17.78% of the total EU catches¹²⁰.

¹¹⁷ *Ibid.*

¹¹⁸ *Ibid.*, p. 23.

¹¹⁹ *Ibid.*, p. 7, EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 67.

¹²⁰ EUROPEAN COMMISSION, DG Fisheries, "Catches of Member

Additionally, it should be noted that Spain possesses the highest tonnage in the EU with a share 26.5%, and the second largest engine power after Italy with a share of 17.3 %¹²¹. The catches primarily consist of skipjack tuna, yellow fin tuna, pilchard, horse mackerel and short-fin squid. Spain is therefore the only country which concentrates its catches predominantly on tuna. Furthermore, the Iberian Peninsula seems to be the leading consumer of fishery products. As we have seen Portugal consumes 61.1 kg of fish per head, per annum; Spain comes second to Portugal with a yearly per capita consumption of 44.4 kg¹²². The Spanish fleet operates in different world wide waters such as the Indian Ocean, the Atlantic Ocean mainly in coastal areas near West Africa as well as in the South and North Atlantic. The fishery sector involves in 1996 approximately 132 631 employees, including full-time, part-time and seasonal workers as well as the processing sector, aquaculture and ancillary industries. The catching sector by itself already guarantees 68 275 jobs of which one per cent are female. The processing sector is with 75% female workers of 16 850 total employees a female dominated area¹²³. Aquaculture does not represent an eminent economic importance with 19.7% but offers 14 845 jobs. This figure makes Spain the second largest employer in aquaculture after France. The yield of aquaculture amounts to 312 647 tonnes and was hence the biggest aquaculture producer in the EU 15 in 2001. The total aquaculture production turnover valued € 444 246 million¹²⁴. Fish farms, generally situated in Galicia, usually concentrate on the breeding of the blue mussel, rainbow trout, gilthead seabream, blue fin tuna and flat oysters.

Sweden had 1 820 vessels with a tonnage of 45 373 tonnes and 224 450kW at their disposal in 2002. Sweden has a fairly small fleet and merely represents 2% of the total EU 15 fleet. Taking this into account it is astonishing to observe that Sweden accounted for

States as a share of total EU catches in 2001", *op. cit.*, pp. 4-5.

¹²¹ *Ibid.*, p. 15.

¹²² *Ibid.*, p. 23.

¹²³ *Ibid.*, pp. 11-12.

¹²⁴ *Ibid.*, p. 16.

5.10 % (311 828 tonnes) of the total EU 15 catches in 2001¹²⁵. Compared to Italy, Sweden has a bigger yield although the Italians have a considerable advantage in their number of vessels. The catching sector offered 2 634 jobs in 1997. In general the employment rate in the Swedish fishery sector is rather low with 7 186 employees¹²⁶. The vessels mainly seize herring, sprat, sand eels, blue whiting and cod in the North and Baltic Sea. Cod and herring are endangered species and the EU as well as various governments and green parties are considering of putting a catching ban on herring and cod. Greenpeace even goes a step further in proposing that marine resorts where any kind of fishing activity is prohibited should be extended to 40%. Although conservation and marine resource management measures, sustainable fishing activities and a relieve of the pressure on fish stock have to be put into force, the economic and financial hardship posed to fishermen with this action would not be supportable by any government. Aquaculture has an economic importance of merely 12.1%. The production of rainbow trout, blue mussel, charrs, eel and crayfish amounted to 6 773 tonnes which is an equivalent of €17 480 million. The employment rate in 1998 lay with 1 993 employees of which 48% are female workers.

United Kingdom: The UK fleet capacity amounted to 7 379 vessels with a tonnage of 246 589 tonnes and 921 218kW in 2002¹²⁷. 63% of the ships are less than 10 meters long; nevertheless the UK holds the third place in terms of highest tonnage in the EU 15 with 12.6% and represents 8.1% of the total fishing fleet. Besides, in terms of catches the UK is equally third largest fishing nation in the EU with a yield of 741 075 tonnes in 2001, which is a share of 12.11% of the total catches¹²⁸. The favoured species seized are mackerel, herring, haddock, cod and blue whiting. A catching ban on herring and cod in the North and Baltic Seas would also heavily burden the British fishing industry, although in the long run they would undoubtedly benefit from the conservation measures.

¹²⁵ *Ibid.*, pp. 4-5.

¹²⁶ *Ibid.*, pp. 11-13.

¹²⁷ *Ibid.*, pp. 14-15.

¹²⁸ *Ibid.*, pp. 4-5.

The whole fishery sector offered 42 788 job opportunities in 1996 of which alone 18 706 are registered in the catching sector¹²⁹. With 19 920 jobs (female representation lies with 46%) in the processing sector, the UK is the biggest potential employer in this sector in the European Union¹³⁰. The UK owns the largest processing industry within the EU, situated mainly in Wales and Scotland. Aquaculture puts the main stress on the production of salmon in West Scotland and the Shetland islands¹³¹. Additional species in which British aquaculture has specialised are the blue mussel, rainbow trout, cupped oysters and flat oysters. Fish farm activities play an important economic role in UK fishery production; 44.8% of the total fishery production derives from aquaculture. The 2001 return of aquaculture has a value of €572 461 million and is therefore the highest return of every EU 15 MS¹³². It is interesting to note that although Spain has a bigger aquaculture production than the UK (Spain: 312 647 tonnes, UK: 170 516 tonnes), the economic value of UK aquaculture production is higher than the Spanish. This probably results from the fact that the UK is the largest salmon producer inside the EU. The sector has an employment figure of 4 110 employees¹³³.

The EU's fishing fleet

The EU 15 had a total fleet capacity of 90 595 vessels with 1 963 537 tonnage and 7 201 816kW in 2002. Since 1998 the amount of vessels, tonnage and engine power have been reduced by 8.7%, 1.8% and approx. 10% respectively; however the number of vessels must still be subject to reduction in order alleviate pressure on

¹²⁹ *Ibid.*, pp. 11,13.

¹³⁰ *Ibid.*, p. 13.

¹³¹ EUROPÄISCHE KOMMISSION, "Die Fischereiwirtschaft in den einzelnen Mitgliedstaaten", *op. cit.*, p. 70.

¹³² EUROPEAN COMMISSION, DG Fisheries, "Total Aquaculture production by Member State (2001)", *op. cit.*, p. 16.

¹³³ *Ibid.*, p. 13.

depleted fish stocks and give them an opportunity for reproduction. Although vessel scrapping seems to be successful new innovations and technological developments in the last decades should not be forgotten¹³⁴.

The technological advances experienced in the vessel industry in the last 50 years have had a dramatic impact on the fishing activity itself, fish resources and the environment¹³⁵. Fishing has been simplified in the last decades; nets no longer have to be heaved on board by hand which used to be a feat of strength and a dangerous charge but small cranes installed on the deck have taken over this job. Vessels are nowadays equipped with sonar and solar radar systems capable of tracking down large shoals of fish. This new technology facilitates fishing and guarantees a lucrative catch as the boats will cast their nets in densely inhabited areas. Furthermore, homecomings to ports for unloading the daily catches has become unnecessary as trawlers have taken on factory-like dimensions. A few nations own these enormous floating factories, which prepare, process and store the fish on board, ready to sell them to the food industry when arriving in the home ports. The result of this process is time saving for the fishing industry as they can spend weeks on the sea without fearing that the fish might perish and thus increase their output.

This is all very positive for the fishing industry however on the other side of the coin Member States have never reduced their fleet which means that the same amount of vessels are shipping in Community waters equipped with modern technologies pursuing their activities only far more productive in their outcome. The overcapacity of the European Union's fishing fleet has put considerable pressure on existing fish stocks. The EU has tried to implement new policies and regulations for the reduction of the fleet through multi-annual guidance programs (MAGP's) in order to create a better and sustainable balance between the fleet capacity and fish stocks¹³⁶. According to the Commission the fleet has been

¹³⁴ Please consult Diagram 4 and Table 2 below for precise numbers.

¹³⁵ See also Chapter 2: The Tragedy of the Commons.

¹³⁶ See also Chapter 4.3 on community subsidies concerning the fleet.

successfully reduced by 10 000 vessels within 4 years and consisted of 90 000 vessels in 2002¹³⁷. Moreover, it was not only the intention to reduce the fleet in numbers but also in tonnage and engine power which has to a certain degree been successfully accomplished as visible from the following graph. The graph demonstrates the steady decline of the vessel numbers, tonnage and engine power from 1995 to 2002.

Table 3: European fishing fleet 1995-2002

	No. of Vessels	Tonnage	Fleet in kW
1995	100085	2108060	8140679
1996	97503	2066136	7921283
1997	101746	2010830	7942347
1998	100035	1984251	7797787
1999	97800	1996162	7734172
2000	95163	1995615	7547034
2001	92662	1997783	7442857
2002	90595	1963537	7261816

Source: EUROPEAN COMMISSION, DG Fisheries, "The fishing fleet of the Member States in 2002", *op.cit.*, p. 14.

Experts and environmentalist, especially Greenpeace and the WWF, feared that the vessels might increase their engine power and tonnage in order to compensate for the lost boats and their catch¹³⁸. "Tonnage and power are one of the main factors in determining the fishing capacity of a fleet and thus also the pressure which is exerted on fish stock"¹³⁹. Even though the Commission claims that the tonnage and kW has equally been successfully reduced, the following table presents very clearly that this is not the case in every country.

¹³⁷ EUROPEAN COMMISSION, DG Fisheries, "Catches of Member States as a share of total EU catches in 2001", *op. cit.*, p. 14.

¹³⁸ <http://www.wwf.de>

¹³⁹ http://themes.eea.eu.int/Sectors_and_activities/fishery/indicators

Table 4: EU Fishing fleet details from 1998 and 2002

Country	Vessels in 1998	Vessels in 2002	Tonnage in 1998	Tonnage in 2002	kW in 1998	kW in 2002
BE	148	130	23082	24176	64896	66699
DK	4648	3874	97932	99339	380877	347476
DE	2373	2247	75103	69490	171457	163912
EL	20243	19747	111933	104255	654199	606188
ES	17972	14887	589359	519878	1474421	1257221
FR	8936	088	209460	229749	1141528	1111330
IE	1246	1448	61082	72661	190625	210624
IT	16325	16045	260603	215242	1513677	1289681
NL	1040	932	174344	200068	482263	470031
PT	11579	10427	123923	116734	393671	401186
FI	3979	3571	24170	19883	219745	188800
SE	2123	1820	48840	45373	256542	224450
UK	8658	7379	253409	246589	1047690	924218
EU 15	99170	90595	2053240	1963537	7991591	7261816

Source: European Commission

When taking a closer look at the numbers we can observe that Belgium, Denmark, France, Ireland and the Netherlands have not decreased their tonnage by the same time as reducing their number of vessels. Belgium, Ireland and Portugal have also increased their engine power instead of reducing it with the number of vessels. It appears to be vital that the EU should introduce strict fines and penalties for those who breach Community law and regulations. If every MS were to reduce their fleet but on the same time increase their tonnage and engine power, the result would not be the much expected relieve on fish stocks. The EU's fishing activities need to be moderated in order to ensure a revival in fish stocks. Additionally, preventive measures and recovery programs have to be launched; one possibility is the introduction of stricter fishing bans, for example in seasons when reproduction takes place or simply a two months ban on certain endangered species so that recovery is ensured. Greenpeace wants to extent the areas of fishing

ban to 40% mainly in coastal regions. This is a very ambitious plan which will hardly come into force because many local fishermen depend on this region as their income source. Many fishermen would surely end up in economic hardship and bankruptcy. This procedure is used in Patagonia for example where during six months fishing activities for crabs are brought to a halt to guarantee their reproduction and hence a sustainable crab stock. It is a fact and common knowledge that less fish must be caught in overexploited areas and other means of production must be established.

Furthermore, the reduction and control of the fishing capacity and fishing effort is not the only area on which controls have to focus. Controls have to be extended on landings, net mesh sizes and whether bans on closed areas and seasons are really being respected. The latter is more easily controllable since January 2005 due to the obligatory GPS system on vessels measuring more than 15m¹⁴⁰. After all, despite the few exceptional countries which have not complied with the EU regulations of reducing fishing activities, a very positive downward trend in the number of vessels, tonnage and engine power in EU Member States have been observed.

Landings

According to EU Commission research publications, landings in EU ports have been on a steady decline in the recent years mainly due to overexploitation of fish resources and the thereof resulting depletion of existing fish stocks¹⁴¹. Furthermore they state that "while the volume of European landings has decreased by about 3% since 2000, their value has increased by over 9% and consequently the average price of fishery products in the EU has increased from € 1.2/kg to € 1.39/kg over the same period"¹⁴². This is the result of

¹⁴⁰ See chapter 7.2.

¹⁴¹ EUROPEAN COMMISSION, DG Fisheries, "Volume and value of Landings in Member States (2002)", *op.cit.*, p. 10.

¹⁴² *Ibid.*

scarce fish resources, hence overexploitation: the smaller the catches or more precise, as soon as a resource becomes very rare the prices rise instantly and turn the good into a luxury product. It is commonly known that rarities are luxury and luxury has its price. Seventy years ago, herring and cod used to be meals for poor people because stocks were not yet in danger and they were cheap fish. Nowadays herring and cod stocks are close to extinction and the prices have risen sharply, it is no longer a poor person's meal.

The country representing the highest landings and the highest return in 2002 was Spain with 962 823 tonnes and a value of €1 813 million, which is not surprising considering that Spain possesses the biggest catching capacity in the EU¹⁴³. This is by far the highest value represented, the nearest successors to that are Italy with €946 000, France with €835 000 and the UK with €773 000. In terms of landings, Denmark came second to Spain with 905 351 tonnes followed by the UK with 498 670 tonnes and the Netherlands with 478 159 tonnes of fish. Belgium has the lowest volume of landings with 19 874 tonnes with a value of €72 000. It is interesting to note that the Member State with the biggest fleet capacity in numbers (Greece) only lands a volume of 96 035 tonnes which is an estimated €258 000. Finland comes last in terms of value of landings with €23 000¹⁴⁴. The majority of landings in Denmark and Sweden are used for industrial purposes, i.e. production of fish oil and fish flour. All other processing industries concentrate on fish processing for consumer consumption¹⁴⁵. The total volume of landings in the EU 15 Member States amounted to 4 461 967 tonnes in 2002 which has a value of €6 219 million. This means that slightly more than half of the EU's total fishery

¹⁴³ Please note that the volume of landings include landed fishery products in all EU 15 Member States by all vessels, without distinction of their origin. *Ibid.*

¹⁴⁴ *Ibid.*

¹⁴⁵ EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in der EU", Kapitel 1.1.3, *op. cit.*, p. 37.

production (7 414 166 tonnes in 2001) is landed in EU ports and the other half in other harbours around the world¹⁴⁶.

Employment rates and figures

When speaking about employment in the fishery sector one generally tends to limit the consideration to fishermen, hence those who are directly involved in the catching sector. This is a fallacy as from the total 514 054 persons employed in the fishery sector in 1998, 251 685 were fishermen¹⁴⁷. The catching sector might offer the majority of jobs; however it is not the only industry. The remainder operate in aquaculture, in processing sectors or ancillary industries such as marketing, distribution or shipbuilding. These branches of industry are often overlooked; however they do contribute a great share to the fishery sector. The following table lists the EU production and employment numbers by sectors of 1998, as well as the assumed share of female and male workers. The net production should actually be rated slightly lower as parts of it are used for the fisheries industry itself, i.e. fish oil and fish flour production for fish feed in aquaculture¹⁴⁸.

¹⁴⁶ EUROPEAN COMMISSION, DG Fisheries, "Volume and value of Landings in Member States (2002)", *op. cit.*, p. 1.

¹⁴⁷ "Einzelstaatliche Statistiken und Regional Socio-Economic Studies on employment and the level of dependency on fishing", DG Fisheries 2000, in EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in der EU", *op. cit.*, p. 54.

¹⁴⁸ *Ibid.*

Table 5: Production and Employment in EU Fisheries Sector (1998)

Sector	Production Volume in 1000 t	Val. in Mio. €	Employment				
			Full+Part time	Male	Male %	Female %	
Catching sector			241010	226065	94%	14 943	6%
Processing	n.a.	1025	89468	36503	41%	52965	59%
Marine aquaculture	845	1370	50329	36035	72%	14294	28%
Freshwater aquaculture	261	605	11569	9 856	85%	1713	15%
Freshwater fishing	104	258	9521	n.a.	n.a.	n.a.	n.a.
Other*	n.a.	n.a.	112147	n.a.	n.a.	n.a.	n.a.
Total	7511	19771	514 054	308460	78%	83914	22%

* Ancillary industries such as distribution, shipbuilding, etc.

Source: "Einzelstaatliche Statistiken und Regional Socio-Economic Studies on employment and the level of dependency on fishing", DG Fisheries 2000, in EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in der EU", *op. cit.*, p. 54.

The figures in Table 5 illustrate in a clear manner that female representation in the fishery sectors is still divided in a much stigmatised manner whereby the catching sector is predominantly male orientated. In some countries not a single woman works in the catching sector. Yet, in aquaculture and even more obviously in the processing sector female representation is higher. The latter has the highest participation of women, in some regions more than 50% of the entire workforce. Denmark and Spain have the maximum representation of female workers with 75% of the total workforce¹⁴⁹. The processing sector offered 89 468 jobs in 1998 and is followed by aquaculture with 61 898 jobs. Freshwater fish

¹⁴⁹ EUROPEAN COMMISSION, DG Fisheries, "Employment in the fishery sector by industry and gender (1997)", *op. cit.*, p. 12.

farming is much smaller with 9 521 employees. Marine aquaculture therefore constitutes 80% of the total aquaculture production. Spain, Greece and Italy had the highest employment rates in 1997 with 68 275, 41 334 and 43 547 respectively. The principal aquaculture areas are in Greece and the UK, especially Scotland, where salmon and seabream/seabass are intensively bred. As already mentioned the UK has the highest production return in aquaculture, yet the employment rate only lies with 4 110 employees¹⁵⁰. Freshwater fish farming employs 11 569 persons and is mainly situated in Germany (2 825), Austria (2 300) and Italy (2 142)¹⁵¹.

Spain, France, Italy, Portugal and the UK are the largest employers in the fishery sector ranging from 132 631 employees in Spain to 42 788 employees in the UK. In 1997, Spain had the highest representation of fishermen in the EU with 68 275, succeeded by Italy with 43 547, Greece with 41334, Portugal with 29 416, France with 25 084 and the UK with 18 706. Belgium, Denmark, Finland, Germany, Ireland, the Netherlands and Sweden count less than 7 000 fishermen¹⁵². DG Fisheries officials have noticed a steady decline in the employment level by 21% during the years of 1990-1998¹⁵³. A further reduction of the fleet capacity which is needed in order maintain a sustainable fishing industry and guarantee sufficient fish stock for future generations would lead to supplementary unemployment. The EU and regional fisheries organisations must launch retraining programmes or create other employment possibilities/facilities in order to cushion the socio-economic impact of the CFP reform. Areas where the dependency on fishery activities is very elevated and where few employment alternatives are available are especially affected. Diversification of

¹⁵⁰ *Ibid.*, p. 13.

¹⁵¹ EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in den einzelnen Mitgliedstaaten", *op .cit.*, p. 59, 63, 66.

¹⁵² *Ibid.*

¹⁵³ EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in der EU", *op .cit.*, p. 55.

economic activities in these areas should be considered a priority by the governments concerned.

The processing industry

Processing is an important market of the fishery industry in the EU. It guarantees essential occupation possibilities in areas which are greatly dependent on fishery activities for example in Spain, France, Denmark, Ireland and the UK. The plants are generally small to medium-sized enterprises with around 20 employees and they are situated alongside coastal areas, close to ports. The main types of processed fishery products include preparations of fish caught in vessels operating in coastal zones which do not process their yield directly on board, along with preserving and tinning fish, crustaceans and molluscs¹⁵⁴. The total return of the processing sector of the 15 Member States in 2001 amounted to €16 216 193 million. The UK, Spain, France and Germany lead the principal processing industries with the highest value of output ranging from €2 939 300 in the UK to €2 169 000 in Germany¹⁵⁵. The total employment rate in 2001 came to 101 845 persons; of which the leading employers are Spain (22 263), the UK (20 926), France (14 453) and Germany (11 953). The successors employ less than 7 000 persons¹⁵⁶. The sum of European processing and marketing industries was 3 393 industries in 2001 of which 2 022 employ more than 20 persons. The top three processing countries in terms of number of firms are Spain (683), France (487) and Italy (459). Although the UK is the leader concerning the return in the processing industry it only has 370 firms of which 138 offer more than 20 jobs. Austria, Belgium, Ireland and Portugal possess less than one hundred processing industries. However, all four of them

¹⁵⁴ EUROPEAN COMMISSION, DG Fisheries, "The Processing Sector (2001)", *op. cit.*, p. 28, 29.

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

employ more than 20 people in their enterprises¹⁵⁷. The European processing industry, especially in northern countries such as Germany, Denmark, Belgium and Sweden, relies heavily on imported raw goods from third countries for processing. The EU supports the industry by lowering import tax for goods originating from third countries. The main species imported are tuna, crustaceans and so on¹⁵⁸. A possible reduction of the fishing effort would need to be compensated with additional processing of aquaculture products in order to guarantee jobs. The EU's intention is to balance out diminished catching activities with higher aquaculture production; on the one hand to guarantee jobs in the processing industry and on the other to satisfy consumer demands.

¹⁵⁷ *Ibid.*

¹⁵⁸ EUROPÄISCHE KOMMISSION, "Die Fischwirtschaft in der EU", *op. cit.*, p. 56, 57.

CHAPTER 5

The Challenges of the EU Enlargement

Impact of accession of ten new Member States

The European Union experienced a historical moment in May 2004 with the accession of ten new Member States, most of them former Soviet bloc countries. It is historical in two ways: firstly the EU has undergone the largest enlargement process in its history by adhering ten new members at once and secondly and probably the most significant point was the accession of eight states from the former eastern bloc. Since the collapse of communism in 1991, ECE countries possessed and demonstrated their strong desire of a "return to Europe". This event has been of significant importance to these countries as they always claimed to have fallen victim of communism and hence been forced to abstain from the integration process of west Europe.

Pre- accession, the Commission maintained, enlargement should not pose any difficulty to the fishing industry¹⁵⁹. Indeed, due to the fact that a few of the ECE countries are *landlocked countries*, namely the Czech Republic, Hungary and Slovakia, it is apparent that their fishing activities are limited. Yet, aquaculture plays a key role in several of these countries. By looking at the statistics shown below which indicate the number of catches of each new MS no real threatening fishing power can be seen. The number of catches in 2001 is relatively low; the external trade sector, especially imports, is of vital importance to the ECE countries though because local supply does not satisfy national demand. Even the two island states Cyprus and Malta have an insignificant impact on the EU in terms of catches. Due to various arising concerns on behalf of the new MS some changes have been adopted since May 2004 such as a limitation on fishing effort in the Gulf of Riga and the restricted

¹⁵⁹ <http://europa.eu.int/comm>

access to the 25-mile EEZ around Malta¹⁶⁰. Furthermore, the Community will have to expand Community inspections to guarantee the compliance of CFP rules and seek potential criminals to the fishery sector. Further talks on fishing effort in terms of fleet capacity in the EU are needed. However, because of the rather small fishing sector of the new MS cuts in their fleet size and capacity will be moderate. A reallocation and re-negotiation of TACs with all EU Member States will be inevitable in order to keep a biological safe balance between fishing effort and fish resources. If the Community leaves TACs and catches of the new countries the way they currently are, overexploitation will worsen and fish stocks will sooner or later be depleted. The Community has to find a means to keep fish stock in safe limits allowing a reproduction whilst allowing all Member countries to pursue fishing. The new allocation of TAC will result in a reduction for old Members. TACs are already kept to a minimum in order to resolve the tragedy of the Commons, so fishermen will most probably not be over-enthusiastic to share the little fish stocks with the newcomers.

¹⁶⁰ <http://europa.eu.int/fisheries>

**Table 6 : Summary statistics of the fishing sector in new
Member States and Turkey**

Candidate Country	Total Catches (TONS)	Total Import of Fishery products (TONS)	Total Import of Fishery products (Mio. EURO)	Total Export Fishery Products (TONS)	Total Export Fishery Products (Mio. EURO)
Cyprus	75 803	18 314	38 766	790	6 123
Czech- Rep.	4 646	68 554	99 110	13 635	35 497
Estonia	104 994	64 815	49 931	163 381	143 227
Hungary	6 638	55 165	55 529	4 274	6 483
Lithuania	150 831	103 910	102 993	65 255	68 273
Latvia	125 433	46 612	51 276	131 822	118 950
Malta	882	17 360	25 659	2 269	14 744
Poland	225 062	280 895	413 027	179 228	275 521
Slovenia	1 827	13 630	31 706	2 340	5 216
Slovakia	1 531	26 182	36 460	531	1 820
Turkey	575100	98662	55900	31005	94170

Source : Eurostat 2004

Cyprus counts around 700 vessels of which 85% measure less than 12m and therefore operate in coastal regions. Total catches in 2001 amounted to 75 803 tonnes, the main specie caught being pickerel, accounting for 30% of the total catches. The fisheries sector plays a vital socio-economic role as it employs 1 350 people, 1000 of which are directly operating in the catching sector. Due to the fact that most fishery products are freshly sold to the consumer the processing sector in Cyprus is only recently starting to build up. For the moment the industry processes products from aquaculture and offers approximately 100 jobs. Aquaculture production is on a steady increase and produced nearly 2 300 tonnes in 2003. The employment rate is reckoned to be over 100 people. The main species produced are gilthead seabream, sea bass, rainbow trout,

Indian white prawn and shaprnsnout seabream¹⁶¹. Freshwater fish farming takes place in the mountains and produces around 100 tonnes of trout. Cyprus imported 9 000 tonnes of fish in 2002 to supplement the countries own production of 4 000 tonnes; that is 70% of the locally consumed fish is improted. As a result of being one of the larger fishing islands in the EU Mediterranean area, Cyprus retains a per capita consumption of 22.3kg per annum in 1999 and comes second after Malta concerning the annual per capita consumption of the newly adhered MS¹⁶².

Czech Republic being a *landlocked country* has limited fishing activities which usually take place in freshwater. The annual yield in 2001 came to 4 600 tonnes. By reason of operating exclusively in freshwater zones, the Czech Republic does not contribute to the overexploitation of fish resources and the depletion of marine fish stock. Employment in the Czech fisheries sector is estimated at 2 600 jobs of which around 700 are directly involved in the catching sector. Species seized are to a large extent carp, freshwater bream, pike, pike-perch and grass carp. The processing industry is not very significant and is limited to freshwater and some aquaculture products. It employs some 100 people. Aquaculture in contrast is a very lucrative and economically important industry in the Czech Republic. The employment rate reached 1 900 people in 2001. Aquaculture produced around 20 000 tonnes of fish, mainly dominated by common carp but also bighead carp, rainbow trout, grass carp and tench. It generated a total turnover of €57 million in 2001. 40% of the total production of 13 600 tonnes are being exported which demonstrates the weight of foreign trade to Czech fish farms. 12 000 tonnes of exported fishery products are fresh, frozen or chilled. The annual per capita consumption of fish is rather low with 9.7 kg¹⁶³.

¹⁶¹ EUROPEAN COMMISSION, DG Fisheries, "Top 5 species produced in aquaculture by new Member State (2002)", *op .cit.*, p. 25.

¹⁶² *Ibid.*, Information on Cyprus: Info_cyprus_en.pdf. accessible on www.europa.eu.int/fisheries, enlargement.

¹⁶³ Information on Czech Republic: Info_czech_en.pdf, *Ibid.*

Estonia has a fleet capacity of 150 vessels longer than 12m and 500 small vessels operating in Estonian coastal boundaries. The Baltic Sea is the prime fishing area supplying around 70% of the total 105 000 tonnes caught in 2001 for these vessels. Fishing generally concentrates on the following species: sprat, herring, prawn, smelt and halibut¹⁶⁴. However the fleet also owns a distant-water fleet counting 15 vessels which despite a reduction in recent years still represent significant 15% of the total catches (mainly shrimp). The catching sector guarantees 5 400 jobs for fishermen which accounts for little more than half of the total employment number (10 000). The processing sector plays a vital economic and social role in Estonia providing 40% of the total export volume and offering 4 500 jobs. Estonia exported 163 000 tonnes of fresh, frozen and canned fish in 2001 whilst it imported 65 000 tonnes. Aquaculture is a very small but expanding sector in Estonia. In 2001 it produced 467 tonnes with a value of €1 451 million with the production of three main species: rainbow trout, common carp and eel. Aquaculture provided 60 jobs. Estonia is trying to help minimise the effects of overfishing by growing fish entirely for restocking measures especially salmon, trout, whitefish, pike, perch-pike and tench. This is a very positive, thoroughly thought through and convincing model because young fish are not subject to catches¹⁶⁵.

Hungary is another *landlocked country* but consist of an intense inland freshwater fishery. The fisheries sector provides 5 000 jobs in total. Aquaculture and inland fisheries activities produced 20 000 tonnes of fish. The inland fishery yield amounted to 6 600 tonnes. The catches in Hungary are divided between 3 500 commercially fishermen and 370 000 recreational anglers who concentrate on various carp species and pike. The processing industry is very limited and small because the majority of fish is directly consumed or exported fresh. Hungary presents a low annual per capita consumption rate with only 3.8kg. This is the lowest rate of the ten

¹⁶⁴ EUROPEAN COMMISSION, DG Fisheries, "Top 5 species produced in aquaculture by new Member State (2002)", *op. cit.*, p. 24.

¹⁶⁵ Information on Estonia: Info_estonia_en.pdf, *Ibid.*

countries of the recently enlarged Union. Just 20% of all imports are destined for human consumption. Total exports came to 4 272 tonnes (€ 6 483 million) in 2001 of which 70% contained fresh, chilled or frozen fish products. Aquaculture concentrates mainly on the carp family as well as catfish, eel and pike; the total production volume came to around 1 300 tonnes in 2001 with a return of €25 283 million. This sector provided 1 400 jobs¹⁶⁶.

Latvia consists of around 200 vessels operating in the Baltic Sea and the Gulf of Riga in addition to 20 smaller boats fishing in coastal zones and small boats generally without engine operating along the shoreline. The catches in 2002 came to 125 433 tonnes and consisted of herring, cod, salmon and sprat. The fishing industry is extremely important along the coastline as few employment alternatives are available. 1.2% of the active population are directly employed in the fisheries sector, that is 13 900 people. In general the processing sector processes locally landed products and produces approximately 155 700 tonnes of canned, chilled and frozen fishery products, 90% of which are for export use. Aquaculture in Latvia is an expanding market in recent years and produced 430 tonnes of fish with an estimated value of € 710 thousand in 2001. The main species bred originate from the carp family, but also crayfish rainbow trout, pike and sturgeon. Aquaculture becomes an important alternative business for farmers in Latvia¹⁶⁷.

Lithuania has three different types of fleets: the Baltic Sea fleet consisting of 71 vessels measuring 18 and 30 meters, and second fleet operating in the coastal areas counting 100 vessels and a high sea fleet with 25 vessels. The catches came to 150 831 tonnes in 2001 and contained herring, cod, sprat and flounder. The fisheries sector offers 5 900 jobs of which 2 400 fishermen are directly involved in the catching sector. Fish production is of significant economic importance in Lithuania as it makes up 15% of the total

¹⁶⁶ Information on Hungary: Info_hungary_en.pdf, *Ibid.*

¹⁶⁷ EUROPEAN COMMISSION, DG Fisheries, "Top 5 species produced in aquaculture by new Member State (2002)", *op. cit.* and Information on Latvia: Info_latvia_en.pdf, *Ibid.*

agriculture production. The processing sector delivered 64 000 tonnes of fishery products. It is an important sector offering 3 000 job opportunities. One part (40%) is entirely dedicated to the Lithuanian market and consists of smoked, salted and dried fish. The remainder contain frozen products intended for the external market. Aquaculture production has a yield of 2 000 tonnes in 2001 with a return of €2 816 million. Fish breeding concentrated mainly on common carp (95%), goldfish, rainbow trout, pike and whitefishes. 35% of aquaculture products are exported to adjacent countries. The total per capita consumption amounts to 19kg per year¹⁶⁸.

Malta's fishing industry is only a small scale industry. The fleet counts 1 900 vessels (90% measure less than 12m) operating in coastal areas and seizing dolphin fish, bluefin tuna, swordfish, dogfish, mackerel and pilot fish. Total catches in 2001 amounted to 882 tonnes. The Maltese fishing industry is heavily dependant on the economically important sector of tourism. 2 000 fishermen rely on this sector. The processing sector is very small. Due to the elevated annual per capita consumption of 31.1kg Malta relies on supplement imports to answer the national demand; it had to import another 17 400 tonnes fresh and processed fish. The Maltese fish consumption is the highest amongst the new Member States. 2 300 tonnes of fresh, frozen or chilled fish were exported with a return of €14 744 million. Aquaculture is gradually gaining importance and the market is steadily growing. The volume of production in 2001 came to 1 235 tonnes which is an estimated value of €3 439 million. 80 people are directly employed in the fish farming sector which concentrates not only on the breeding of sea bass and gilthead seabream but also on the fattening of bluefin tuna¹⁶⁹.

¹⁶⁸ EUROPEAN COMMISSION, DG Fisheries, "Top 5 species produced in aquaculture by new Member State (2002)", *op. cit.* and Information on Lithuania: Info_lithuania_en.pdf, *Ibid.*

¹⁶⁹ EUROPEAN COMMISSION, DG Fisheries, "Top 5 species produced in aquaculture by new Member State (2002)", *op. cit.* and Information on Malta: Info_malta_en.pdf, *Ibid.*

Poland's fishing fleet has experienced serious cuts in recent years. The deep sea fishing fleet has dropped to only three vessels in 2004; apart from this fleet Poland counts 860 boats measuring less than 15m and fishing in Polish waters within the state's boundaries and 400 cutters (between 15 and 50m). Total catches came to 225 000 tonnes in 2001. The main concentration in catches lies in cod, herring, sprat, krill and Alaska Pollack. The fisheries industries provides 30 000 jobs of which 5 400 are fishermen. Poland consists of a large and socially important processing industry producing a total volume of 273 000 tonnes of fresh and frozen fish fillets and canned fish. The processing industry employs 14 000 people which is nearly 50% of the total employment in the fisheries sector. Polish exports are registered with 179 228 tonnes which is an estimated value of €275 521 million; imports are a lot higher with 280 895 tonnes and an estimated value of €413 027 million. The per capita consumption in 1999 came to 9.6kg a year which is very little compared to the European average consumption of 24.5 kg. Aquaculture includes the breeding of rainbow trout, sturgeons, torpedo-shaped catfish and carp species. The total production amounted to 35 460 tonnes with a turnover of €71 706 million. Similar to Estonia Poland also breeds salmon and trout for restocking purposes. Commercial fishermen have an annual yield of around 5 000 tonnes caught in inland waters. Aquaculture and inland fisheries provide some 4 500 jobs¹⁷⁰.

Slovakia has a very modest fisheries industry due to being a *landlocked country*. Total catches of inland fisheries amounted to 1 500 tonnes and the number of fishermen is minimal. The catches are dominated by common carp which amounts to 60%, 30% are rainbow trout and the remainder are pike-perch, goldfish and freshwater bream. The processing sector prepares approximately 15 000 tonnes of imported sea products and an additional 500 tonnes of their own freshwater production. 1 000 people are employed in this sector. The total processed production is worth €30 million.

¹⁷⁰ EUROPEAN COMMISSION, DG Fisheries, "Employment in the fishery sector by industry and gender (1997)", *op. cit.* and Information on Poland: Info_poland_en.pdf, *Ibid.*

Slovakia relies on imports in order to cover the national annual demand of 6.8kg per head. Slovakia is the second lowest consumer of the new MS. Slovakia noted an export volume of 531 tonnes with a value of €1.8 million and imported 28 182 tonnes worth €36.5 million. Aquaculture provides Slovakia with 1 000 tonnes of fishery products 70% of which are rainbow trout, 25% common carp and the rest silver carp, goldfish and brook trout. 700 people are employed in this sector which has a return of €2 406 million¹⁷¹.

Slovenia: due to Slovenia's geographical position it only retains a coastline of 47km. The fleet therefore only contains 110 vessels with a tonnage 965 tonnes. 90% of the vessels are small scale vessels measuring less than 12m. Total catches in 2001 came to 1 800 tonnes of pelagic species; 70% of which consist of pilchard¹⁷². Other species targeted are anchovy, common carp and common cuttlefish. In total, 130 jobs are provided by the catching sector. Slovenia's processing industry is rather small and has specialised in canned and smoked fishery products. The low annual national demand of 6.9kg per capita however exceeds local production so that 13 630 tonnes of fresh, frozen, chilled, dried or salted crustaceans and molluscs as well as canned fish with a value worth €31 706 million had to be imported in 2001. The export volume amounted to 2 340 tonnes worth €5 216 million. Aquaculture is to a great extent based in inland waters which are of high quality in Slovenia. Furthermore this sector is increasingly expanding due to national demand and the fact of good quality water. In 2001 the total production volume came to 1 300 tonnes mainly dominated by rainbow trout (832 tonnes) and others species such as common carp, sea bass, mussels and brook trout. The production value adds up to €3.9 million. 150 workers were employed in 2001¹⁷³.

¹⁷¹ EUROPEAN COMMISSION, DG Fisheries, "Employment in the fishery sector by industry and gender (1997)", *op. cit.* and Information on Slovakia: Info_slovakia_en.pdf, *Ibid.*

¹⁷² Pelagic species are those living in the upper layers of the water.

¹⁷³ EUROPEAN COMMISSION, DG Fisheries, "Employment in the fishery sector by industry and gender (1997)", *op. cit.* and Information on Slovenia: Info_slovenia_en.pdf, *Ibid.*

Candidate Countries

The EU has three additional candidate countries wishing to join the club: Bulgaria, Romania and Turkey. Bulgaria and Romania only have a limited amount of catches accounting for less than 8 000 tonnes. Furthermore, the two ECE countries do not contribute to the overexploitation and the depletion of fish stock as such in European waters such as the Baltic and North Sea neither in the Atlantic nor in the Mediterranean as they exclusively operate in the Black Sea. Bulgaria and Romania are therefore not affected by TAC allowances for EU waters. The fleet mainly target sprat, carp, sea snails, goldfish and freshwater bream. Aquaculture production amounted to 1 613 tonnes worth €5 085 in Bulgaria and 10 818 tonnes valuing €19 473 in Romania in 2001 focusing mainly on the breeding of rainbow trout, species from the carp family, goldfish and Danube sturgeon. The annual per capita consumption of Bulgaria and Romania is very modest with 4.3kg and 2.2kg respectively¹⁷⁴.

Turkey on the other hand is a potential key player in the 'Tragedy of the Commons' in the Mediterranean although the fleet also operates in the Black sea. The volume of catches is in comparison with European Union standards fairly high with 527 733 tonnes in 2001. Once adhered to the EU Turkey would be the fifth largest nation in terms of catches after Denmark, Spain, the UK and France. Yet, the catches do not necessarily target endangered species such as cod or herring. The fleet focuses on anchovy, mullets, bonito, blue whiting and horse mackerel. Turkish fish farming produced a total volume of 67 241 tonnes of fish, generally common carp, trout, Mediterranean mussel, seas bass and seabream, which is an estimated value of €160 million. The annual consumption of 9kg per head falls under the annual world average consumption of 16kg per capita. In case of a future accession of

¹⁷⁴ Information torn from the EUROPEAN COMMISSION, DG Fisheries, "Employment in the fishery sector by industry and gender (1997)", *op. cit.*

Turkey the EU would have to negotiate and agree on new TACs and Turkey must adopt security and hygiene regulations on their vessels.

CHAPTER 6

International Fishery

Action plan against illegal fishing activities

Illegal, unreported and unregulated (IUU) fishing is found in all capture fisheries, irrespective of the location, species targeted, fishing gears employed or level and intensity of exploitation¹⁷⁵. Combating illegal fishing activities is one of the EU's highest priorities. The state of important international and European fisheries is worrying, if not disastrous, as exemplified in previous chapters; therefore a great deal of effort is put into the sustainability of fisheries. The international community, the European community, NGO's and RFO's are all cooperating in the establishment of rules and obligations for a sustainable and responsible fisheries management¹⁷⁶. Unfortunately, these positive efforts and measures are regularly put at risk by the criminal and fraudulent behaviour of those who pursue illegal fishing activities. The article *Combating illegal fishing* by DG Fisheries explains that illegal, unreported and unregulated fishing (IUU) is practised as it is very profitable: "the conservation and management measures taken at international level and backed by international law are not respected by vessels flying flags of convenience (FOC) because these rules, adopted to ensure sustainability, imply a sacrifice in terms of catch and/or effort restrictions"¹⁷⁷. Vessels flying flags of convenience are allowed to conduct their activities under a national flag though without that state controlling their activities and catches.

¹⁷⁵ UNITED NATIONS FAO Report 2000, "Selected issues facing the fishers and aquaculturists, property rights and fisheries management" in UN FAO, *The state of world fisheries and aquaculture*, "Part 2 Illegal, unreported and unregulated fishing", Rome, United Nations 2000.

¹⁷⁶ www.europa.eu.int/fisheries; Combating illegal fishing, 21.01.2004

¹⁷⁷ *Ibid.*

IUU fishing is held responsible for overfishing and the depletion of certain valuable fish stock. Overexploitation of resources is certainly not only a result of IUU fishing but according to the FAO "IUU catches account for 30% of the total catches and is not only subject to high sea fishing but also occurs within the 200-mile EEZ"¹⁷⁸. When speaking of IUU fishing three different types are meant as the name already implies: illegal fishing, unreported fishing and unregulated fishing.

- Illegal fishing: concerns vessel which violate the laws of the fisheries under which they operate in. This does not only relate to fisheries governed under national jurisdiction but also to high sea fisheries administrated under international law or by RFO management.
- Unreported fishing: (false information on catches) involves misreported or unreported catches to relevant national authorities; hence breaching national or international law and regulations.
- Unregulated fishing: generally applies to vessels flying FOC's that do not operate in a manner that RFOs or other responsible organisations dictate. Vessel might furthermore be fishing in a manner which is contrary to or not in accordance with the regulations set by the responsible regional fishery management. Unregulated fishing might also imply the breach of out-of bounds fishing areas or seizing banned/protected species¹⁷⁹.

The negative and harmful effects of IUU fishing become apparent in several dimensions:

- Environmental: technical, conservation and management measures are generally not respected and violated which in turn can cause drastic environmental damages,
- Social: most FOC vessels are suspected of breaching the security and safety rules on board as well as social rights of the workers,

¹⁷⁸ *Ibid.*

¹⁷⁹ IEEP, *Action Plan on IUU*, London, 29 May 2002; accessible on web: www.ieep.org.uk

- Economic: unfair competition on the markets is caused as illegally acquired products are introduced into the same markets, generally for dumping prices¹⁸⁰.

Due to the seriousness of this dilemma worldwide the UN Food and Agriculture Organisation (FAO) has launched a project to combat and eliminate IUU fishing, known as the *International Plan of Action* (IPOA). It is a voluntary plan which was adopted within the framework of FAO *Code of Conduct for Responsible Fisheries*¹⁸¹. The EU, being a member of the FAO has signed up to this IPOA and is obliged to implement the IPOA at EU level. Therefore, the European Commission elaborated a *Community Action Plan*, as part of the 2003 CFP reforms, which is legally binding upon all Member States. The Action Plan proposes a variety of measures involving different stages at regional, national, community and international level as well as close partnerships with developing countries involved. The IPOA is an urgent necessity, which all parties must take seriously and where cooperation and dialogue are key components.

Fishermen are encouraged to be attentive in identifying IUU vessels and informing appropriate authorities at regional or national level. These in turn should establish data bases collecting information on IUU vessels. The national data base is to be forwarded and incorporated into a community data base, which in turn should cooperate on an international level with different monitoring agencies. Once information on IUU vessels is circulated the success of tracking them down would be greatly enhanced. Furthermore, those pursuing IUU fishing would be deterred. The aim is to eventually eradicate IUU activities and guarantee stable and fair competition on world fish markets on the one hand and sustain valuable and endangered species on the other. This in turn requires greater international cooperation and close partnerships. The monitoring agencies should however not only focus on

¹⁸⁰ UNITED NATIONS FAO Report 2000, "Selected issues facing the fishers and aquaculturists, property rights and fisheries management", *op. cit.*

¹⁸¹ IEEP, *Action Plan on IUU*, *op. cit.*

deterring and eradicating IUU fishing, they also ought to surveille and register catches and regularly verify catches and logbooks in order to trace falsely reported catches; monitoring landings directly in ports might be a promising solution. This procedure is already practised in Canada. It is called *Dockside monitoring* and impedes IUU criminals from pursuing their activities. The Canadian model is taken into deeper consideration further on in this chapter.

The dialogue between the EU and developing countries needs to be enhanced along with financial and technical assistance for monitoring, control and surveillance activities against IUU fishing¹⁸². These are the central proposal undertaken by the *Community Action Plan*. They do sound very promising; however, there is no time limit or implementation deadline set for the Community Action Plan, which would be from great importance for both MS and concerned marine resources. Some initiatives have already been put into practise others require more input or coordination and most of all time for agreement. The creation of a European Fisheries Control Agency is an important and very significant establishment for the control of proper enforcement and ratification of EU laws and regulations as well as in the combat against IUU fishing¹⁸³.

In order to control the community waters' fishing effort and vessels in a better and more efficient manner, all vessels measuring more than 15m need to be equipped with a satellite GPS sensor from January 2005 onwards. This new system allows the EU to directly control vessels by placing their location. The intention is to actively combat and deter IUU fishing. Vessels flying FOC will have greater difficulty in pursuing their activities, as the proper authorities retain lists of each Member State on which all authorised vessels are recorded. Additionally, the EU authorities hope to control restricted catching areas and marine reserves more consistently. Fisherman breaching the ban of these areas will be directly located, banned and penalised for their criminal offence. Furthermore, with a possible launch of direct controls of fishing

¹⁸² *Ibid.*

¹⁸³ See chapter 4 for further details.

effort (i.e. quantity of days at sea) the GPS system would probably not abolish IUU fishing activities but would most certainly assist in reducing the latter. The newly established satellite monitoring system allows the direct and strict control of the fishing effort of vessels. Although the acquisition costs have to be carried by the fisherman himself, the majority of fishermen welcome this move and support the battle against IUU fishing. Only a few criticise the fact of being constantly monitored¹⁸⁴.

As previously mentioned unreported and unregulated landings/fishing heavily burdens valuable fish stocks and contributes to overexploitation. Canada is using various promising methods to prevent and reduce these misconducts. The success is astounding and leaves Canadian fishery officers optimistic in opposing unregulated and unreported catches. Every Canadian port employs so-called dockside monitors. These persons are directly employed by the department of fisheries for the direct inspection, monitoring and registering of landings. Catches are weighed and registered by the dockside monitor. The logbooks of every single vessel which has entered the ports and landed its catches is verified and compared to the record of catches of the responsible inspector. Furthermore, if the quota is accidentally exceeded by a fisherman he will not be fined but the exact amount will be registered and deducted from the following year's quota. Canada possesses a 200-mile EEZ in which solely small in-shore vessels retain fishing rights. Large trawlers owned by big vessel industries are only for off-shore use, spending weeks in open waters before returning to their home ports. An additional difference to the EU is the allocation of in-shore vessels to regions. Each vessel has precise instructions on where to operate and would infringe its order if fishing in other regions and be seriously penalised. Despite the success of the applied method in Canada, this would under no circumstances find approval or be used in the EU due to historical and long-standing fishing rights established between states previous to the foundation of the European Communities. These rights are

¹⁸⁴ Marietta SLOMKA, *heute sendung des ZDF* 21.12.2004.

exclusive fishing rights which have been acknowledged and been taken over by the European CFP.

IUU fishing and black market activities also remain to be a burdening problem for the Canadian fisheries and oceans department. Criminal activities like these are very lucrative as a result of the high black market prices. The price for 100 pounds of tuna lies at \$50 for example. The black market, especially for the much desired and valuable lobster and tuna, has developed into a large industry which together with IUU fishing leads F&O officials to call for immediate action and the creation of *Fishery Officers* in the similarly new-established *Conservation & Protection Department*. The - James Bond alike - inspectors of the coastlines usually pursue their work from ships controlling and monitoring the coastline, hidden bays and suspicious boats. The location of this workplace allows them to act immediately once they have located the law-infringers. The procedure that awaits these people is one of being fined, sent to court for trial and in the worst case of being sentenced to prison. The fishing license is confiscated and thus a return to fishing activities impossible and unthinkable. Fishermen operating in respect of the laws are encouraged to identify and report suspects directly to the fishery officers who will follow the complaint. Due to the interest of lawfully operating fishermen to eradicate criminal activities the number of reports is surprisingly high. Serious culprits or habitual offenders will be directly sentenced to prison whereas the ordinary criminal will be sent to trial, fined and be dismissed. Since the introduction of dockside monitors and fishery officers, criminal activities in the Canadian fishery sector have been drastically reduced. People have become aware of the seriousness and harm of IUU fishing and black market activities. Furthermore, they recognize and appreciate the importance and professionalism with which the Canadian government fights against IUU and black market activities¹⁸⁵.

¹⁸⁵ Jacob MACLAY (Fishery Officer, Department Conservation & Protection), *Measures undertaken to fight IUU fishing in Canada*, interview with Teresa SCHARE in Meteghan, Nova Scotia, Canada, 24.08.2004

Canada proposes a variety of promising methods in the battle against illegal fishing activities such as the direct controls by dockside monitors and conservation and protection fishery officers which have experienced an astounding success. The EU should adopt similar measures in order to actively combat fraudulent activities in their water constituencies. The European Control Agency as previously mentioned is the best organisation to handle these problems.

Marine Park Conservation Proposals

Greenpeace is known for being a very active NGO with the aim of preserving the nature and endangered species around the world. Recently, news and media covered Greenpeace activists which operate directly in EU waters, protesting against overfishing, sometimes even occupying vessels with the intention of hindering fishermen in pursuing their activity. They want to attract public attention and inform the public about various serious issues such as fraudulent fishing activities and destructive fishing equipment. Most of all however they want to promote their newly presented project of marine reserves. In July 2004 they launched a project calling for marine reserves especially in the North and Baltic Seas in order to preserve endangered fish stock like herring and cod. Greenpeace question the effectiveness of the CFP conservation measures and call for an integrated approach "with a firm legal basis" rather than the present "uncoordinated patchwork of policies, laws, action plans and programmes on regional, national and international level or by a sector by sector approach"¹⁸⁶. They propose that 40% of the seas should be declared marine reserves¹⁸⁷. In their view these kind of national parks, seven proposed for the North Sea and 10 in the Baltic Sea, are the sole method to guarantee

¹⁸⁶ GREENPEACE, *Europe must row together to save its seas*, Brussels, Media Advisory, November 2004, <http://eu.greenpeace.org>

¹⁸⁷ GREENPEACE, *Greenpeace calls for 40% of the North and Baltic seas to be declared marine reserves*, July 2004, <http://eu.greenpeace.org>

sustainable fish resources for future generations. The project of marine reserves is based on studies on already existing marine reserves in New Zealand and the Philippines. The success of the Leigh Resort in New Zealand and the Apo Island Reserve in the Philippines proves that protected areas of the sea lead to a relief of pressure on fish stock and to the regeneration of fish and other marine mammals¹⁸⁸.

Greenpeace are not the sole group to demand marine resources or reservoirs; the UNEP's Conservation and Monitoring Centre urgently calls for the establishment of Marine Protected Areas (MAPs) and states that only one per cent of the world's oceans and seas are currently marine protected areas¹⁸⁹. Moreover, the department of sustainable environment development under the direction of Prof. Callum Roberts of University of York also anticipated the establishment of marine resorts. Prof. Roberts demands 20 to 30% of the ocean being marine parks in order to sustain fish stock. In an interview with the BBC the professor stated that 8 billion pounds are at disposal for the construction of these off-limit fishing areas in international waters worldwide¹⁹⁰. This action finds its roots in a World Summit of Sustainable Development of 2002 where coastal nations pledged for the establishment of marine parks by 2012. The justification for this request lies in the hope of stopping the steep decline of fisheries resources which puts the environment into biological danger. Besides, human mankind relies on marine resources as part of their protein diet and thus has a vast interest in preserving fish stock in a sustainable manner in order to prevent human suffering for future generations.

A recently undertaken study on the costs of the building of these marine parks lying between US\$ 5 to 19 billion dampened the

¹⁸⁸ *Ibid.*

¹⁸⁹ UNITED NATIONS, *Overfishing: a threat to marine biodiversity*, in a leaflet distributed at UN Summer School Graduate Programme, Geneva UN, July 2004.

¹⁹⁰ BBC WORLD NEWS, Interview with Prof. Callum ROBERTS on *The Establishment of Marine Parks*, London 15.06.2004.

enthusiasm¹⁹¹. These figures exceed the currently raised expenditure on marine parks by far. Yet, Roberts argues that the investment is worthy as the explicit protection of fish stock will in the long run increase the catching ability and allowances. Reproduction of fish within these marine parks will also have a favourable effect on their surroundings: "Marine parks promote the recovery of fish stocks within their borders and export fish and their offspring into fishing grounds. In places like the Philippines and St. Lucia, well managed parks have doubled catches in surrounding fisheries. Even a 20 per cent catch enhancement arising from the global park system would pay for management costs"¹⁹²

Furthermore, if subsidies which are presently spent on environmentally damaging commercial fishing activities and therefore supporting fish overexploitation, were to be in parts allocated to the marine park project the start-up and management cost would largely have been carried. Roberts is also convinced that marine parks will create long term employment possibilities for up to 1 million people. If 20 to 30% of the oceans are transferred into marine parks this number would be realistic. This in turn may well be a promising job alternative for dismissed or ruined fishermen.

Although the marine park projects by Professor Roberts and Greenpeace are possibly key tools in a sustainable conservation management measure, many aspects such as funding and locations of these parks remain to be discussed. It is doubtful that the parks will be instituted by 2012 and actually cover an area of 30% of the oceans. Many industrialised countries may have the financial means and the will to establish the parks; however developing countries will have difficulties in funding the plans. In the case of Greenpeace the call for 40% of the oceans to be turned into marine reserves is very ambitious. Considering that 6.5 billion people on this earth rely on fish for food or as a source of income Prof. Roberts proposal of 20 to 30% is a lot more realistic as it has to be borne in mind that fishing is prohibited in marine parks. The EU

¹⁹¹ Cullum ROBERTS, *Costs of a worldwide system of marine parks*, State of the World, July 2004, www.york.ac.uk

¹⁹² *Ibid.*

may approve the importance and the necessity for marine parks for a sustainable fishery worldwide but due to the embryonic status and uncertainties in various domains, they remain dissociate to this project in the interim.

CHAPTER 7

Present and Future of a Sustainable Fisheries Sector (New forms of fish breeding)

Aquaculture, a means to solve overexploitation

Aquaculture or fish farming plays a vital role in the Community compared to that of the traditional fishing industry. In 2001, EU aquaculture produced 1 296 638 tonnes of fish and shellfish which is a total value of €2 993 547 billion. At the global level European aquaculture production represents 3% of the global aquaculture production¹⁹³. Aquaculture is probably the best alternative to sea fishing at the moment and it has already been experimented for some time by the EU. Aquaculture represents 33% of the total value and 17% of the total volume of fish production in the EU¹⁹⁴. The Community has subsidised aquaculture programmes in the hope, that the latter would experience a rapid expansion and thus ease pressure of fish stocks in Community waters. The economic importance of aquaculture varies from MS to MS. Finland, Germany and Greece as well as landlocked countries from the new ECE countries heavily rely on fish farming. In the case of Finland and Germany has an economic importance of 80% and 60% respectively compared to the total fisheries production in 2003¹⁹⁵. In fisheries extensive countries such as Portugal and Spain, fish farming is not pursued to a great extent in comparison with total catches and landings¹⁹⁶. CFP reform plans do however stress the

¹⁹³ Franz FISCHLER, Speech on *The future of aquaculture in Europe*, www.europa.eu.int

¹⁹⁴ *Ibid.*

¹⁹⁵ EUROPEAN COMMISSION, DG Fisheries, "Total Aquaculture production by Member State (2001)", *op. cit.*, p. 19.

¹⁹⁶ Despite this fact Spain still produced 312 647 tonnes of fish in fish farms with a return of €444 246 million in 2001 which made Spain the

significance of fish-farming and envisage extending the branch of industry in order to relieve marine fish stocks. Due to the growing significance of aquaculture in the EU, the Commission presented a *strategy for the sustainable development of European Aquaculture* in 2002; this is actually the first EU policy which is exclusively directed towards the aquaculture industry, addressing sustainable and environmental issues. The EU tries to encourage MS to pursue more aquaculture activities and intends to increase employment number by 8 000 to 10 000 new full-time jobs within five years from 2003 onwards additional to raising the growth rate of 4% each year and community aid.

So far, aquaculture production centres four specific species: salmon, trout, mussels and oysters. In 2001, the entire mussel production (blue mussel and Mediterranean mussel) amounted to approximately 530 000 tonnes, rainbow trout account for 226 549 tonnes, the salmon production came to 162 267 tonnes and the cupped oyster had a production outcome of 133 551 tonnes. This is very positive however hardly easing tensions in cod or herring whose stocks are fully exploited if not already near to extinction. Technology has to be advanced in order to make fish farming for more endangered species available and possible. Nevertheless, aquaculture has greatly contributed to global fish markets¹⁹⁷.

Furthermore, aquaculture is obviously another employment sector ensuring some 56 thousand of jobs in countries and regions pursuing aquaculture. It offers a good new job opportunity for fishermen who may have to leave fishing activities due to fleet reduction measures or financial problems. Though, this does imply that aquaculture activities need to be extended in coastal regions. To give an impression of steadily growing aquaculture production in the Community from 1995 to 2001, please consult the table below:

largest producer of aquaculture products in the EU 15.

¹⁹⁷ <http://www.fantasyfacup.com/matthew/essays/fish.htm>

Table 7: Aquaculture production 1995-2001

Member State	Volume in T 1995	Value in ECU 1995	Volume in tonnes 2001	Value in Mio Euro 2001
BE	846	3456	1630	6049
DK	42205	105038	41573	167045
DE	58264	124726	53409	156006
EL	32644	120283	97802	344654
ES	138260	198216	312647	444246
FR	280785	507182	252062	474776
IR	31922	64866	60935	102157
IT	224865	380064	221269	475968
NL	83285	51289	52064	116224
AT	4058	11619	2393	12239
PT	4981	21575	7 824	59931
FIN	17345	53160	15 739	44312
SE	7573	19184	6 773	17480
UK	93838	202873	170 516	572461
EU 15	1020871	186350	1296363	299357

Including aquaculture production, Source: Eurostat/FAO

The negative side of aquaculture is that it does unfortunately not ease the pressure on marine resources as it was/is envisaged. Critical voices from opponents and environmentalist have progressively become louder. They argue that "farmed fish is fatty, stuffed with antibiotics and hormones and fish farming is polluting the surroundings"¹⁹⁸. This statement is unfortunately true; the fish is fatty compared to their wild relatives because it is crammed in crowded cages and does not have much room to move around; farmed fish is administered with hormones and antibiotics in order to promote faster growth and in order to prevent diseases and the overuse of these is harmful to both human and marine health.

¹⁹⁸ "The promise of a blue revolution", Special report Fish Farming, *The Economist*, August 2003, p. 19.

Finally, aquaculture does indeed pollute the near environment because fish excrements are not torn away by strong water streams as a result of the location of fish farms which is generally in coastal waters. This is also true for uneaten food and dead fish in fish farms. This is where mariculture production, i.e.: high sea fish farming with strong currents would evade an environmental pollution of the sea. Environmental provisions concerning fish farming have implemented regulations which avoid the extensive use of antibiotics and hormones in aquaculture. Recently developed vaccines have made the administering of antibiotics and other chemicals obsolete¹⁹⁹. Yet, the use of hormones for the promotion of faster growth and thus an increased financial return for the producer is harder to abolish. It would only be possible to eliminate this problem with policies or the rather unlikely good will of the producer who recognizes the health danger exposed to the public.

Furthermore, it should be mentioned that there are two kinds of fish: on the one hand plant-eating fish *tilapia* (or vegetarians) which are the 'good guys' and which do not harm marine fish stock on the other fish-eating fish such as salmon and other species which are fed with fish flour and fish oil which originates from fish caught in EU waters. At the global level, fish farms use about 40% of the world's supply of fish oil²⁰⁰. Therefore, it can also be noted that aquaculture puts an additional strain on wild fish stock rather than easing the pressure. Until scientists create plant-based substitutes as fish feed, fish farming will remain a threat to marine resources. A main component in fish oil is omega 3, a fatty acid which is healthy²⁰¹. Replacement feed containing vegetarian components such as soya, rapeseed oil or corn gluten are being developed and tested throughout the world. Alternatively, bycatch species could be used for the production for fish feed. As mentioned earlier, million of tonnes of bycatch are accidentally and inevitably caught each year due to non-selective fishing techniques, some of them being unsuitable for human consumption. The logic conclusion is to

¹⁹⁹ *Ibid.*, p. 21.

²⁰⁰ *Ibid.*

²⁰¹ *Ibid.*

utilize these for the production of fish feed. It will be a great success for the aquaculture industry if plant-based ingredients substitute fish oil and fish flour. The creation of fish farms of the two types is ideal in fighting environmental pollution as mussels, sea snakes and tilapia fish species will make use of arising aquaculture waste.

Restocking measures which are undertaken in many of the new EU Member States are a very promising initiation to cushion environmental degradation. Through this initiative, heavily depleted stock can be assisted in being reproduced and hence it can be attempted to balance out the eco-system. Consequently, endangered species will have the opportunity to reproduce and grow without the threat of becoming bycatch and discard. Once attaining a certain age they may be released into open waters.

Aquaculture has one significant advantage compared to sea fishing activities; governance is much easier because aquaculture plants are usually situated within national jurisdictions. Environmental pressure from various directions forces the industry to undergo changes by improving and modernising plants and thus ensuring a better quality. Safety and hygiene measures for employees are currently increased via community aid. The production costs for aquaculture ought to be reduced and profits augmented in order to increase attraction for investments and new job vacancies. Fishermen can only improve their fishing volume in order to meet consumer demand which in turn pressurize resources. Thus, for the moment aquaculture causes concerns amongst environmentalists for various factors and this with justification but it still remains the main key alternative for a future fishing industry.

Mariculture

A slightly new form of fish farming is currently under way from the United States and is called mariculture. Mariculture is a synonym for *high sea fish farming* or *open ocean aquaculture* (OOA). Marine scientists from the US and Canada are experimenting fish farming with floating cages of incredible dimensions. The

justification for this experiment is simple and plausible. Open waters basically offer more space than coastlines, where harbours, beaches or marine reserves limit the space. Most fish stock biomasses are below their biological limits. The currently existing cod, halibut and tuna stocks have diminished by nearly 90% since the beginning of fishery activities; moreover approximately 60% of the commercially used stocks are overfished²⁰². These figures demonstrate that wild fish stock dwindle away and become a very rare good. Scientists, marine biologists and fishery experts have come to the conclusion that fish farming is therefore the sole method to meet and guarantee the current global demand for fish of 16.1 kilograms per capita per year in the long run. The total per capita consumption in the EU 15 comes to 24.5 kg/head/year and is hence considerably higher than the world average. Aquaculture, as we have elaborated above, is already a significant and substantial branch of the fisheries industry. Every fourth fish on German plates originates from aquaculture, which proves the importance of this sector²⁰³. Richard Langan, head of the Open Ocean Aquaculture Programme (OOA) at the University of New Hampshire built a submarine *fish house* with a diameter of 25m where he breeds fish. The fish house lies 6km ahead of the New Hampshire coastline 20m under the water surface. Due to the fact that the farm is situated under water it does not hinder any ships or beaches, the submarine space is proficiently and cleverly used. A completely new approach/dimension to fish farming was developed by Cliff Goudey from the Massachusetts Institute of Technology. In a joint development programme with the US-based firm *Ocean Spar Technologies*, Goudey has designed floating fish cages with proportions of football stadiums. The objective of his idea is that the *Ocean Drifter* should drift with the current, assisted by little drive and steering motors, and transport fish within the Gulf Stream of the Atlantic directly from New York to Lisbon²⁰⁴.

²⁰² Robert THIELICKE, "Mastvieh aus dem Meer, Meeresfarmen stehen vor einer Zeitwende", *Focus*, nr. 38/2004, pp. 81-84.

²⁰³ *Ibid.*

²⁰⁴ *Ibid.*

A similar project has been launched in Spain, where a huge offshore tuna unit is supposed to breed red tuna during its journey to Japan, where tuna is much desired and exceptionally high prices are obtained²⁰⁵. Until now, this project has unfortunately not been able to attract enough solvent sponsors to develop a prototype for further research and experiments.

These projects are more vision than reality for the moment. Yet, it is astounding to perceive the dimensions in which the fishing industry considers a future for mass fish production. Marine biologists observe these developments in a rather sceptical and somewhat critical manner. Boris Worm, marine biologist at the University of Kiel, Germany, for example argues that "fish degenerate into fattening livestock" and compares them to battery hens²⁰⁶. The mass breeding of fish involves special feeding, machine vaccination and unfortunately the frequent administering of hormones and antibiotics²⁰⁷. The administering of hormones promotes faster growth which is desired in fish farming because it expands the fish stock and thus increases and optimizes the return. An additional point is the genetic manipulation of the sex of fish; this measure is undertaken due to the biological fact that females grow three to four times quicker than their male counterparts. Greenpeace and green activists are regularly contesting and demonstrating against these genetic modifications hoping to acquire public awareness of possible health risks posed by the consumption of genetically modified fish. The environmental damages caused are equally not to be underestimated. Environmentalists fear a scenario where genetically modified salmon with his growth advantage escapes an aquaculture farm into open waters and reproduces with wild salmon. This in turn would initially lead to a depletion of wild salmon stock and would eventually be followed by their complete extinction. Therefore strict regulations and controls need to be put forth, for example the sterilisation of fish

²⁰⁵ *Ibid.*

²⁰⁶ *Ibid.*, p. 82.

²⁰⁷ The administering of hormones and antibiotics is also a problem in aquaculture production. See Chapter 7.1.

originating from aquaculture which is designated for sale. In this case there is a certain guarantee that no reproduction with wild fish is likely to happen. Fish, which is selected for breeding should be accommodated in protected and safe farms, perhaps situated inshore or even in land-based aquaculture plantations.

An additional environmental problem occurs with the typical coastal aquaculture where the fixed cages lie in calm waters with reduced currents and that is exactly where the environmental problem lies. A salmon plantation counting 200 000 fish generates as much sewage as a town with 20 000 inhabitants, the difference being that aquaculture sewage is conducted untreated into the sea²⁰⁸. The consequences reflect in environmental damages. Marine biologists discovered that fish excreta destroy all life under the fish cages. With the intention of reducing the environmental pressure, scientists are experimenting on a new farm model with an integrated mini-ecosystem. In their view seaweed, mussels and snails would solve the problem of fish excreta as well as being a commercial benefit. If seaweed, mussels and snails would be cultivated and kept close to the fish cages, they utilize it. Furthermore, this cultivation is a second source of income because mussels, snails and seaweed are requested gourmet delicacies.

With offshore aquaculture akin to the Spanish *Tuna Unit* or the *Ocean Drifter* this dilemma is obsolete. Even the Open Ocean Aquaculture fish-house-model presented by Richard Langan does not face these problems. Langan's model is a fixed offshore fish-battery. Due to the strong current in the open ocean, fish excreta are torn away and diluted by huge quantities of water distant from traceability.

The most severe, critical and crucial dilemma however is, that aquaculture production also contributes significantly to overfishing. Contrary to what might have been expected, fish farms do not ease the strain on fish stock, they present an enormous pressure on fish resources too. Fish oil and fish flour happen to be an essential part of the aquaculture diet and if the branch of industry expands, the demand of fish oil and fish flour will similarly rise. For that reason

²⁰⁸ *Ibid.*, p. 84.

and due to the fact that these are the most expensive components of fish feed, scientists are eager to find a substitute. Once a substitute is found aquaculture and mariculture will most certainly experience an economic boom.

One of the benefits of the currently applied aquaculture over oceanic fisheries is, that it is practised within state boundaries and hence the allocation of property rights is guaranteed. The American *OOA* and *Ocean Drifter* projects are currently financed through government and research subsidies as well as by the industry which has an interest in this business. The revenue of sold fish is refinanced in favour of the projects. The allocation of property rights and the revenue benefits for a potential mariculture industry in the long run have not yet been established. Before fish farming in form of mariculture becomes an international business in big dimensions, international common standards need to be determined²⁰⁹. Mariculture seems to represent a new useful and promising innovation in the branch of fisheries industry for the future. The current problems are justified as mariculture is still in an embryonic state of evolution. Scientists and the industry are convinced that in a few years mariculture becomes a fix part in aquaculture production.

Property rights in form of Individual Transferable & Tradable Quotas (ITQ)

"Overfishing is one part human nature and two parts poor management"²¹⁰. One problem of the *Tragedy of the Commons* in EU waters is that the natural resource "fish" has been assigned common property. Hence, every fisherman assumes that he can fish a limitless amount to the point where fish stocks are still available; unfortunately they are in one way or the other forced to overexploit existing stocks in order to obtain a small economic benefit. Sadly,

²⁰⁹ "A new way to feed the world, Fish farming is a good and promising thing, despite the environmental worries", *The Economist*, p. 9, p. 19ff.

²¹⁰ THE ECONOMIST, 21st May 1998, www.economist.com.

the EU has come to the point where fish stocks are in great danger of extinction, which in turn can lead to a biological disaster if conservation measures are not adopted rapidly. Other significant fishing nations often describe CFP provisions as *welfare fishing*; declare it a failure by pointing out that "fishing is no longer a viable industry in Europe, while the CFP is simply a political means of propping up failing communities"²¹¹. Their proposed solution to the ineffective strategies of regulating access to this common resource is the allocation of property rights to fishermen. A choice of different property right regimes is already applied in several major fishing nations as in form of territorial use rights, community fishing rights in the case of China for instance or with Individual Transferable or Tradable Catch Quotas (ITQs)²¹².

ITQs already operate successfully in various parts of the world, such as Australia, Chile, Canada, Iceland and New Zealand and constitute a primary status in their fisheries management systems. They were initially instituted by the Icelandic government (on the initiative of capelin boat owners to be precise) in 1983/84 to resolve the cod and herring mortalities²¹³. The idea of this system does however not aim to define property rights in fish stocks themselves, but rather allocating individual harvesting rights in a certain stock, hence an "indirect property right"²¹⁴. The ITQ system places a constraint on TAC of any fish and quotas are created and allocated

²¹¹ Roger BATES, *The Common Fisheries Policy: A sinking Ship*, Wall Street Journal, June 2000.

²¹² J.G. SHEPHERD, "Chapter 3 Economic Aspects of Fisheries Management" in *Sustainable Fisheries: Myth or Mirage?*, *op. cit.* and UNITED NATIONS FAO report 2000, "Selected issues facing the fishers and aquaculturists, property rights and fisheries management" *op. cit.*

²¹³ TAC was introduced by government as a measure to preserve the still existing herring stock at the time of the herring disaster in the 1970s. TAC had already been made transferable at the initiative of herring boat owners in the late 1970s. For further information please consult Hannes H. GISSUARSON, *Overfishing: The Icelandic Solution*, London, IEA, 2000, p. 16.

²¹⁴ *Ibid.*

within these TAC's either by auction or by gift to fishermen. These quotas are tradable among individual fishermen and thus allow them to buy and sell a quota of the Total Allowed Catch at a market price. It persuades successful fishermen to buy fishing rights from colleagues, whose business no longer runs productively. By this manner, inefficient fishermen are guaranteed certain compensation payments, allowing them to leave the stage not totally economically ruined²¹⁵. Those, who have bought a certain ITQ are automatically regarded as owners of a share of the TAC and are encouraged to exercise their property rights responsibly by fishing exclusively within their own quota. Additionally, they should observe that other fishermen operate in the same manner. Introducing a market mechanism based on property rights is the way to create a self-sustaining fishing industry. It encourages fishermen to preserve and rebuild marine resources as larger fish stocks are more cost-effective. Besides, the ITQ system allows environmentalist and NGO's to act immediately, when they believe certain species are in severe danger of extinction, by permitting them to buy quotas and thus preventing fishermen from overfishing this specie.

Yet, ITQ does still require high levels of investment in scientific research especially at the beginning of their implementation, in broader and additional monitoring systems and in effective enforcement mechanisms²¹⁶. The positive results of ITQ experienced in New Zealand and Iceland are astonishing; fishermen have become increasingly more responsible and aware of the need of a sustainable fishing manner as well as conservation measures. In New Zealand, the value of fisheries have apparently doubled in recent years and according to Hannes Gissuarson the catches in both nations have voluntarily been reduced in order to guarantee sufficient stock for future generations. Gissuarson adds: "Because fishermen have the property right to secure future benefit from the

²¹⁵ Roger BATES, "The Common Fisheries Policy: a sinking ship" *op. cit.*

²¹⁶ The TAC/ITQ allocation should be based on scientific research of marine specialist and not be the victory of a political debate as this is mortal for both fish stocks and the fishing industry.

resource, they are prepared to wait and hence optimize their returns"²¹⁷.

This idea of managing catches and fish with individual fishing rights in form of the ITQ system is unfortunately a very challenging project to realise in the European Union, especially from a supranational point of view. It should be recalled that the EU is a community made up of 25 countries hosting many fisheries and a lot of political interest involved in them. It is no novelty that Spain, Britain and Denmark demand larger catch allowances in form of higher TAC every year. Each year, we observe the same procedure of, what Roger Bates calls *political horse riding*, i.e. the annual renegotiations over TAC's by the Council of Ministers; and this definitely needs to be ended.

The personal interest in higher output and the egoistic thinking - if I don't catch the fish others will (and perhaps even from another nation) so what is the point in me abstaining from the catch? - is largely dispersed among European fishermen. This example illustrates that fishermen themselves impose negative externalities on one another "because they are competing for the same fish. They may each catch too many fish and by their overfishing deplete future stock of fish"²¹⁸. This phenomenon does not only involve the lack of consideration for others but also has a damaging effect on the fisherman himself. His economic and financial benefit is only short-lived; once stocks are depleted his is financially ruined. The ITQ system would help easing pressure on fish stocks and by the same token securing fishermen's future benefits as we have seen in Iceland. So, the best place for starting this system would initially be the nation state, thus applying the principle of subsidiarity. Individual MS, who appreciate and comprehend the benefits of this system, should begin to establish ITQ within their own EU quota and thereby acquire the benefits. Hopefully other MS will follow this example and the EU will ultimately ease pressure on fish stocks

²¹⁷ Roger BATES, "The Common Fisheries Policy: a sinking ship", *op. cit.*

²¹⁸ Ayre L. HILLMAN, "Private Solutions for Externalities, Responsibilities and Limitations of Governments" *op .cit.*, p. 230 - 1.

and guarantee employment and most importantly fish for future generations.

The ITQ project and the allocation of fishing/property rights is an *indirect* privatisation measure. Privatisation is a standard process in functioning social market economies where common property is being allocated private ownership. This in turn leads to concentration of major players (those who are most flourishing); unemployment and financial disadvantages cannot be ruled out; some profit enormously from this process and others lose. So, the dark side of this privatisation project is that due to a concentration of the most efficient fishermen, unproductive fishermen lose out and are basically forced out of fishing within the ITQ system; a simple but harsh reality of winners and losers. A result will be higher unemployment in this sector, but Europe has too many fishermen anyway, the fleet has to be cut and numbers have to fall in any case. It is no secret that EU fishermen are only able live barely above the poverty line as a consequence of EU subsidies. Without this financial backing they would not be able of affording a livelihood. Although the ITQ system will create unemployment it allows those fishermen to sell their quota and generate a financial benefit to secure a living above the poverty line until new employment is found. This might be accomplished perhaps through retraining facilities in other fishing sectors such as aquaculture or the processing industry. After all it is obvious and essential that some form of private tenure must be introduced in the EU in order to guarantee an effective fishing management that will sustain fish resources in biological safety; the ITQ system currently being the most effective as proven by other fishing nations. A new trend has recently been noticed: Instead of arguing for higher TACs every year, fishermen have become interested in conservation measures, because it affects the capital that is tied up in the ITQs²¹⁹. Private ownership can help rescue fishermen and the society from the tragedy of the commons, because a private owner has an interest in maximising his economic benefit and thus manage his fishery in a sustainable manner.

²¹⁹ www.ies.be.

Conclusion

This paper had as attempt to explain the Common Fisheries Policy of the European Community and the problem of overexploitation of marine resources, which the EU currently faces. International changes in the dimensions of fishing have called for the need to establish a merger and co-operation in the frequent use of community waters. Fish resources have been treated as common property as it was considered a natural resource that everyone had access to. This however turned into a catastrophe soon after WWII. Technical changes and advancement such as solar and sonar search machines increased vessel catching capacity; a further revolution in the fishing industry is the building of huge 'floating fish industries' which allowed fish conservation on board and thus enabled vessels to stay out in the sea for more than a day. Sometimes, nowadays they only return to the ports on a monthly basis. This increased catches and sooner or later resulted in the *Tragedy of the Commons*. The immediate problem is that fish stocks are becoming seriously depleted due to overexploitation of fish stocks, some are in great danger of becoming extinct in EU waters.

How did it ever get to this point? Two things are to blame. Firstly, as already mentioned fish stocks have been treated as common property, and secondly the EU's subsidies have been encouraging fishermen to fish more. Treating fish stocks as common property means that nobody owns the fish, which in turn means that whoever fishes most gets the maximum benefit. Even if individual fishermen wanted to conserve fish stocks and were to fish less, this would simply mean a bigger catch for the more aggressive fishermen. There is no incentive whatsoever in a common property system to conserve. This is a classic case of the *Tragedy of the Commons*. Abolishing individual property eradicates the incentive to make good use of common property.

With the introduction of modern, highly efficient fishing techniques the balance has shifted to the point where fish stocks are no longer an infinite resource. On top of this comes the second problem, which is the EU's subsidy programme. Some of the subsidies the EU distributes are specifically targeted for increasing

capacity by modernizing the fleet. At the same time, the EU is also subsidizing the removal of capacity because there's already too much of it. From 1992-1996, a MAGP was set up for a structural policy to protect the resource and the reduction of fishing effort. By 1996 the community fleet was cut by 7%.²²⁰ It is in certain ways a contradictory and a dead end, on the hand the EU subsidizes fishing and vessel modernisation which obviously results in an increase of vessels, and on the other hand it spends a lot of money for the disposal of excess vessel capacity. The Community should rather invest in research programmes for aquaculture, especially in the research of plant-based fish feed substitutes or to find other means for fish farming outside community waters such as the newly launched American project called mariculture. One achievement of the CFP reform is the end of the subsidies programmes: since the beginning of 2005, public finance can no longer be used for investment in new fishing vessels.

The community has adopted measures to solve the stock problems in community waters, by introducing TACs, which did certainly contribute to stock conservation; however the allocation of property rights in form of ITQs would most certainly assist fishermen and would also be favourable for fish stocks. Additionally, aquaculture has attracted a high degree of importance because it puts more weight in fish farming which is a possible solution and a substitute for sea fishing.

Furthermore, stricter measures have to be adopted as to penalise Member States who breach CFP regulations or TACs. Vessel inspections and logbook inspections have to be carried out on a more regular basis and independently by Member State inspectorates on the one side and Community inspectors on the other. These measures will certainly not solve the *Tragedy of the Commons* but could perhaps ease the fishing pressure and help maintain species by allowing them to reproduce themselves. The EU hopes to achieve the decline in fishing effort by a reduction of Member States' fleet capacities. The resulting negative social

²²⁰ <http://europa.eu.int/comm> *op. cit.*

consequences need to be cushioned by the EU via retraining facilities for example.

Indeed, recent CFP conservation and protection measures (i.e. closure of endangered fishing areas) have contributed a significant deal to marine and environment protection. The EU has introduced long-term sustainable resource management measures which promise to ease fishing pressure in EU community waters. Yet, these economic long-term conservation measures have to be considered more seriously. As long as fishermen's livelihoods depend on the overexploitation of fish resources and until they do not appreciate their benefit from sustainable fisheries management, it is very hard to implement and achieve sustainable fishing activities. The only means to resolve the 'Tragedy of the Commons' is to catch fewer fish and allow them time for reproduction. Unfortunately, scientific recommendations and advice given by biologist or marine specialists in the allocation of TACs have often been ignored because political interests have dominated the debates. With a stronger involvement of stakeholders and science-based resource management programmes, it is hoped to recede from this custom. The desired increased cooperation on local, regional, national and international level in the battle against IUU fishing is hoped to having been achieved via the creation of CFCA. It is evident though that dialogue and cooperation are vital in solving this tragedy.

I would like to finish these pages with a quote from Garret Hardin, the inventor of the term the *Tragedy of the Commons* in 1968, who accurately summarised and explained his idiom in two sentences:

"Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in a freedom of the commons. Freedom in a commons brings ruin to all"²²¹.

Tragedy refers the depletion of fish stock and *the Commons* to the problem of common ownership.

²²¹ <http://www.independent.org/publications/article.asp?id=197>

Bibliography

Articles:

BATES, Roger, "The Common Fisheries Policy: A sinking Ship", *Wall Street Journal*, June 2000, http://www.environmentprobe.org/enviroprobe/evpress/0700_wsj.html

HEISSMANN, Nicole & MÜLLER, Hardy, "Aus dem Meer in den Mund", *Stern*, nr.7, Februar 2005, pp. 124-137.

NERHEIM, Magnor, "The new Common Fisheries Policy (CFP): Towards sustainable management and a profitable fisheries sector?", *Eipascope*, EIPA Maastricht 2004, <http://www.eipa.nl>

SCIBERRAS, Anne Marie, Integrated Coastal Zone Management - A challenge for the EU in the 21st century", *Eipascope*, EIPA Maastricht 2002, <http://www.eipa.nl>

SHEPHERD, J.G., "Chapter 3 Economic Aspects of Fisheries Management", *Sustainable Fisheries: Myth or Mirage?*, a Memorandum prepared for the Royal Commission on Environmental Pollution, School of Ocean & Earth Science, University of Southampton, April 2003.

"A new way to feed the world, Fish farming is a good and promising thing, despite the environmental worries", *The Economist*, August 2003, p. 9ff.

"The promise of a blue revolution", Special report Fish Farming, *The Economist*, August 2003, p. 19 ff.

THIELICKE, Robert, "Mastvieh aus dem Meer, Meeresfarmen stehen vor einer Zeitwende", *Focus*, nr. 38, September 2004, pp. 81-84.

Books:

BORGESE, Elisabeth Mann, *The Oceanic Circle, Governing the Seas as a Global Resource*, New York, UN University Press, 1998.

DEARDON, Stephan & MCDONALD, Frank (ed.), *European Economic Integration*, third edition, Harlow, Longman, 1999.

DINAN, Desmond, *Ever Closer Union, An introduction to European integration*, second edition, London, Macmillan, 1999.

GIARINI, Orio, LOUBERGÉ, Henri, SCHWAMM, Henri, *L'Europe et les ressources de la mer, ou le débat sur la croissance économique*, St-Saphorin, Editions Georgi, 1977.

HILLMAN, Ayre L., "Private Solutions for Externalities, Responsibilities and Limitations of Governments" (Chapter 4.1), in HILLMAN, Ayre L., *Public Finance and Public Policy*, Cambridge, Cambridge University Press, 2002.

GISSUARSON, Hannes H, *Overfishing: The Icelandic Solution*, London, IEA, 2000.

NEVIN, Edward, "The Common Fisheries Policy" (Chapter 16) in NEVIN, Edward, *The Economics of Europe*, London, Macmillan, 1994.

HORNBY, Jim, "How we use our resources: The North Lake Fishery" (Section 2), in PEABODY, George, MCGREGOR, Carolyn & THORNE, Richard (ed), *The Maritimes: Tradition, Challenge and Future*, Nova Scotia, Maritext Limited, 1987.

PAYOYO BAUTISTA, Peter (ed.), *Ocean Governance, Sustainable Development of the Seas*, Tokyo, UN University Press, 1994.

WEIDENFELD, Werner (ed.), *Europa Handbuch*, Bonn, Bundeszentrale für politische Bildung, 2002.

Internet sources:

<http://www.commondreams.org>
<http://www.cei.org>
<http://www.esc.eu.int>
<http://www.europa.eu.int>
<http://www.europa.eu.int/fisheries>: combating illegal fishing
21.01.2004
http://www.environmentprobe.org/enviroprobe/evpress/0700_wsj.html
<http://www.fantasyfacup.com>
<http://www.fao.org>
<http://www.geodata.soton.ac.uk>
<http://www.ieep.org.uk>
<http://www.ies.be>
<http://www.ices.int/committe/acfm/comwork/report/2004/oct/o-3-4.pdf>
<http://www.independent.org/publications/article.asp?id=197>
<http://www.parliament.the-stationery-office.co.uk>
http://reports.eea.eu.int/environmental_assessment_report_2003_10/en/kiiev_chapt_02_5.pdf
http://repository.eea.eu.int/reports/technical_report/87/full_report/en/pdf/customized
http://themes.eea.eu.int/Sectors_and_activities/fishery/indicators
<http://www.teriin.org>
<http://www.unep.org/geo2000/english/0079.htm>
<http://www.wwf.de/naturschutz/lebensraeume/meere-kuesten/fischerei/>

Publications:

BRANDT, Hartmut, *Perspektiven für Entwicklungszusammenarbeit in der Fischereiwirtschaft*, Deutsches Institut für Entwicklungspolitik, Berichte und Gutachten 13/1995, Berlin 1995.

EUROPEAN COMMISSION, DG Fisheries, *Facts and Figures on CFP, Basic Data on the Common Fisheries Policy*, Luxembourg, Office for Official Publications of the European Communities, 2004.

COMMISSION EUROPÉENNE, *Troisième Rapport sur la Cohésion Economique et Sociale (Com (2004) 107 du 18 février 2004)*, "L'impact des politiques communautaire : compétitivité, emploi et cohésion", Luxembourg, Office des publications officielles des Communautés Européennes, 2004.

EUROPEAN COMMISSION, *Financial Instrument for Fisheries Guidance, Instructions for use*, Luxembourg, Office for Official Publications of the European Commission, 2003.

EUROPÄISCHE KOMMISSION, *Mitteilung der Kommission über die Reform der Gemeinsamen Fischereipolitik, Fahrplan*, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2002.

EUROPÄISCHE KOMMISSION, *Die gemeinsame Marktorganisation für Erzeugnisse der Fischerei und Aquakultur*, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2002.

EUROPÄISCHE KOMMISSION, *Grünbuch, Die Zukunft der Gemeinsamen Fischereipolitik*, Band I, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2001.

EUROPÄISCHE KOMMISSION, *Grünbuch, Die Zukunft der Gemeinsamen Fischereipolitik*, Band II, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2001.

EUROPEAN COMMISSION, DG Fisheries, *Aquaculture and the Environment in the European Community*, Luxembourg, Office for Official Publications of the European Commission, 1995.

Europäischer Wirtschafts- und Sozialausschuss, *Die Gemeinsame Fischereipolitik, Rückblick und künftige Herausforderungen*, Luxembourg, Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften, 2002.

Fisheries and Oceans Canada, *The Acadian Fishery in Nova Scotia*, Dartmouth NS, Communications Branch Fisheries and Oceans Canada Maritime Regions, 2004.

Fisheries and Oceans Canada, *The Management of Fisheries on Canada's Atlantic Coast, A Discussion Document on Policy Direction and Principles*, Ottawa ON, Atlantic Fisheries Policy Review, 2001.

WWF, *Fette Jahre – Magere Jahrzehnte, Kosten der Überfischung von Kabeljau und Dorsch in Nord- und Ostsee*, Frankfurt am Main, WWF, 2002.

WWF, *Millionengrab Meer, Ökonomische und ökologische Auswirkungen von Beifängen und Rückwürfen in der Fischerei*, Frankfurt am Main, WWF, Dezember 2002.

Non-published sources:

BBC World News, Interview with Prof. Callum Roberts on *The Establishment of Marine Parks*, London 15.06.2004.

FISCHER, *Aktueller Stand der EU-Fischerpolitik*, Deutscher Fischerei-Verband e.V., Union der Berufs- und Sportfischer Hamburg, Vortrag gehalten in Husum 2003.

MACLAY, Jacob, Fishery Officer, Department Conservation & Protection, *Measures undertaken to fight IUU fishing in Canada*, interview with Teresa Schare in Meteghan, Nova Scotia, Canada, 24.08.2004.

SLOMKA, Marietta in heute Sendung des ZDF, Studio Mainz 21.12.2004.