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## THE EFFECTS OF THE COMMON FISHERIES POLICY ON THE THEORY OF THE AVAILABILITY OF MARINE RESOURCES

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### Abstract

The aim of the paper is to present issues connected with responsibility in the fishery industry. The paper discusses the ‘tragedy of common.’ An attempt was made to formulate proposals for how to increase the efficiency of marine resource management and reduce the problem of declining fisheries. The publication analyses the current Common Fisheries Policy in the context of overfishing. It will take a great deal of serious effort for fishermen, scientists and politicians to solve the problem of the Baltic Sea. The rebirth of fish stocks will create healthier ecosystems and greater reproduction of fish populations. A higher number of fish schools may result in more balanced catch figures. It is expected that profits will increase and thereby result in more jobs and higher salaries, leading to a greater overall profitability of the fishing sector.

**Keywords:** common pool resources, exploitation of marine resources, tragedy of common, Common Fisheries Policy

**JEL classification:** Q 22

### Introduction

While fish stocks are renewable, aggressive fishing policies or environmental disasters may cause their depletion or even disappearance. When fishing is too intensive, as is often the case with today’s capacity of fishing fleets, fish stocks may shrink to a point where they will never recover. At present, much is being said about the collapse of sea fisheries.

Researchers are increasingly considering how to prevent overfishing. The proper management of marine resources and regulated access to the open sea areas will reduce the effects of overfishing. The aim of the paper is to present issues connected with responsibility in the fishery industry based on ‘the tragedy of the common policy’. An attempt was made to formulate proposals for how to increase the efficiency of marine resource management and

reduce the problem of declining fisheries. This paper analyses the current Common Fisheries Policy in the context of overfishing, while also trying to give answers to the question of whether the current reforms of the EU Common Fisheries Policy have enabled more efficient management of marine resources.

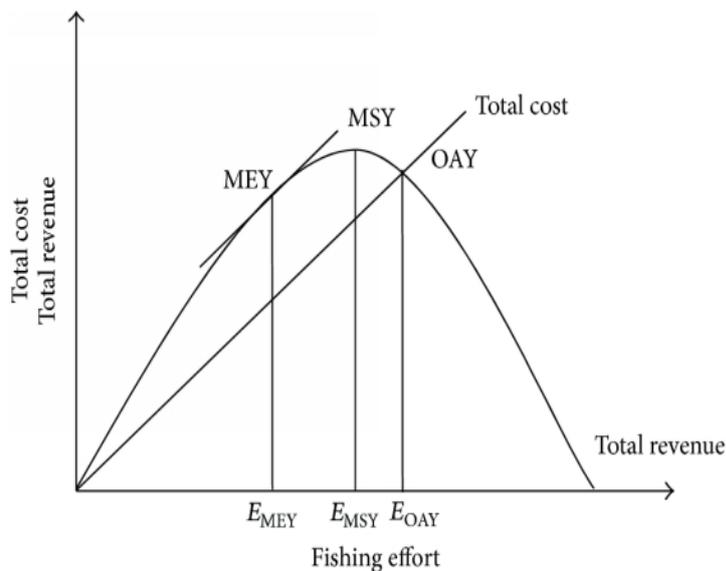
It will take a great deal of serious effort for fishermen, scientists and politicians to solve the problem of the Baltic Sea. The rebirth of the fish stocks will create healthier ecosystems and greater reproduction of fish populations. The higher number of fish schools may yield more balanced catch figures. It is expected that profits will increase and thereby result in more jobs and higher salaries, leading to a greater overall profitability of the fisheries sector. In this paper presents a case study taking advantage of comparative and photographic research, quantitative and qualitative methods, statistical data, as well as documentary analysis related to marine resource management policies. The author has evaluated the studied phenomenon by means of deduction.

## **1. Marine resources in economic terms and diversity of theories on resource accessibility**

Firstly, the main difficulty in the quantitative measurement of fish populations is the fact that shoals of fish are stretched out in space. Secondly the measured resource is underwater. The benefit of fish is undeniable as every single fisherman can go fishing and earn a living in this way. The total amount of fish is limited in each maritime area because it is obvious the same fish cannot be caught twice. Therefore, fish is defined as competitive goods in consumption (Krugman, Wells, 2012). The categorization of fish leads to common abusive practices. Intensive and excessive exploitation of resources by one fisherman will generate costs for another, because it will be harder to catch fish as a result of reduced populations. The costs of over-fishing are spread over all people. Fish stocks are not excluded goods and they belong to the public, so no one will be motivated to continue to manage them reasonably. A good solution in the case of fisheries is the implementation of common resource regulations, introduction of licences for fisheries or transferable licenses for fish resources.

A review of the primary literature has shown that the problem has been taken up by numerous scientists to-date. People are dependent on natural resources but these are exposed to the threats related to common goods. A long time ago, Aristotle claimed that people pay much less attention to what is common to all. Everyone thinks in terms of their own interests. Hardly ever do they take the common interests into consideration (Ostrom, 2013). William Forester Lloyd wrote about the theory of recklessness in the use of common property in 1883. At this point, the microeconomic concept of “tragedy of common pasture” is worth mentioning - where the individual interest in making a profit by one of the participants leads to a loss for the others. According to H. Scott Gordon in *The Economic Theory of Common - Property Resources: The Fishery*: “Fish that stays in the sea has no value for the fisherman, because he cannot be sure that if he leaves it there today, he will be able catch it tomorrow” (Gordon, 1954). One of the most popular models of resource use is the static model of optimal fishing proposed by Scott Gordon in 1954. In an offshore fishery, each fisherman fishes as long as they reach a bionomic balance ( $E_{OAY}$ ), where the total income is equal to the total costs incurred. If fishermen were fishing with maximum efficiency, ensuring natural resource recovery, they would achieve significant profits referred to as maximum sustainable income ( $E_{MSY}$ ). When there are no rules as to the access to fisheries for new users and no admissible collection level has been set, each fisherman still earn an income at maximum permanent income level, which is why such a fishery remains attractive to others. As long as it is open to all, a bionomic balance will be maintained in the area instead of

maximum permanent income (Ostrom, Jessop, 2012). According to E. Ostrom, this model may be the source of weakness in that it uses economic incentives that discourage excessive resources. According to E. Ostrom, the model of over-exploitation works when entities participating in an experiment take decisions anonymously and cannot communicate with each other. You cannot just use the simplified model of reality that Gordon created. Users should be motivated to operate on the level of maximum fixed income, which requires deep knowledge of the characteristics of a given resource.



In Fig. 1 All characteristic fishing effort levels analyzed by economists are marked. The most-justified option from the economic point of view is at the  $E_{MEY}$  point, where the advantage over costs is the largest possible. The variant, at which the effort allows for the implementation of Maximum Sustainable Yield is  $E_{MSY}$ . It will be economically justified when the cost of fishing effort is zero (the Total Cost line is horizontal). The most unfavorable is  $E_{OAY}$  (the bionomic equilibrium, which threatens open-source fisheries), where the income from fishing is completely eliminated by the costs.

**Figure 1:** Gordon-Schaefer model

Source: (Larkin, et al., 2011), p.10

Another scientist who presented the problem of the tragedy of the common resource, as the excessive exploitation of natural resources, was the biologist G. Hardin. In 1968, he described this microeconomic concept in the journal *Science*, claiming that it was the action of few greedy people that led to the waste of public resources waste (Hardin, 1968). G. Hardin described the tragedy on the basis of British rural communities that grazed their cows in the pasture. When the number of cows was proper, the grass grew back and further grazing was possible. But, when more shepherds wanted to graze their cattle there, the grass had no chance to grow back and the pasture was degraded. This meant a loss for all the farmers raising their cattle in the common area. In research studies, the term “Tragedy of common” is a kind of metaphor. G. Hardin referred this theory to the problem of growth of the human population and increasing exploitation of natural resources. The biologist was of the opinion that unlimited freedom ultimately leads to the tragedy of a common pasture. The only way to save the world and people, according to Hardin, is “to take responsibility”, which means implementation of a social contract regulating the restrictions for participants to use public resource. This can be achieved by restricted access to resources through a system of limitations, taxes or privatization. Otherwise, the over-exploited economy will lead to a tragedy. At present, the Hardinian theory is claimed to have been politically practical and convenient, emphasizing the necessity of implementation of private ownership. The problem of tragedy of common was analyzed by the theory of games. It showed that the best strategy for pasture users was to graze as many animals as possible because it guaranteed maximum

individual profit. In conclusion, according to many scholars, common ownership assets require public control as long as the effect of their use is to be economic efficiency. There are such natural resources whose ownership rights cannot be established, which is the case with seas and oceans. The Nobel Prize winner Elinor Ostrom\* devoted many years of research work to understanding the problem of CPR-common-pool-resources. In particular, she focused on the emergence and functioning of institutional systems regulating the access and use of common resources, i.e. forests, ground water, fisheries by local communities. She also indicated the possibility of managing these goods by local communities using their own institutional solutions. E. Ostrom in his publication entitled "*Managing common resources*" writes: *The tendency of political leaders to discuss CPR problems in the crisis category is much clearer when one considers that individuals attach much more attention to the perceived damage rather than perceived benefits of the same size. In addition, it is to be expected that the owners or anyone else is much more difficult to rule over resource systems that can be rapidly destroyed - like the fish population that accumulates instead of being dispersed rather than the CPR slightly more resistant to destruction. As you might expect, individuals are more likely to adopt new rules that will limit their appropriation when there are signs of resource degradation, generally considered as accurate announcements of future damage, or when the leaders are able to convince others of the imminent impending crisis*" (Ostrom, 2013). Responsible management of CPR goods can be an effective tool in the situation of fish stock depletion, where a large number of fishermen demand access to such stocks. This suggests that optimal institutional solutions should take into account the interests of multiple parties and foster local development, such as in this case coastal communities. This may happen by providing sources of income to local communities, improving the quality of life and at the same time securing resources against degradation (Wołyniec, 2013). E. Ostrom critically referred to the tragedy of goods, in order to solve the problem of excessive exploitation of resources. One does not need only to privatize or impose coercion by the state authorities. The Nobel Prize winner argues that there are other ways in which to establish stable self-governing institutions, as long as the issues of supply of the common good, resource monitoring and mutual trust between beneficiaries of a given good are regulated.

The following considerations will be related to marine resources, in particular the Baltic Sea. Poland is one of nine countries with access to the Baltic Sea, which is considered to be the largest water-borne sea in the world. It is a sea almost completely separated from the ocean, having only a narrow connection with the North Sea. The predominant species targeted by Polish fishermen in terms of catch size are cod, herring, sprats, salmon, migratory trout and plaice.

Today, it is already known that the development of the world's economies, and thus the increasing number of people, means that natural resources are being consumed faster. The use of "effective resource management" is ubiquitous, and European societies are convinced that proper management of nature's treasures will contribute to achieving the objectives of economic, environmental and social policies in an easier, cheaper and less harmful manner. In order to encourage this action, the European Commission has issued the Europe 2020 strategy (COM, 2010), where one can read that if we do not learn carefully and wisely to manage resources, we will really be exposed to irreversible changes in the ecosystem. The stockpiling of deeper marine resources in a short time will bring profits related to the growing size of catches, but then it turns out that the herds are so depleted that they will not be able to regenerate. According to Nicholas Georgescu-Roegen's theory, one of the principles of thermodynamics in sustainable development and ecology is the rule of renewable natural resources, such as fish, soil and groundwater, i.e. they should not be operated at a faster pace

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\* Elinor Ostrom (1933-2012) Nobel laureate in economics in 2009 (together with O. Williamson) for the analysis of economic aspects of management, especially by communities.

than regeneration rate (Wolszczan, 2011). The European Commission in the Green Book (Green Book, 2009) emphasized the need for changes in the approach to managing the common good of fish. A concept was introduced that assumed a departure from central fisheries management in favour of a regional approach, taking into account the special conditions prevailing in a given basin and including all interested parties in the decision-making process (Rapport, 2010). The nature of marine resources means that regulating access to them is the essence of the problem. The interested entities include government administration, which introduces regulations, ecologists who always care about nature protection, fishermen and local communities who care about the marine resources and opportunities for their own development. One might be tempted to say that the European Commission has abandoned the independent control of fisheries in the regions of its Member States, i.e. the Hardin approach to centralization of power over fisheries has been replaced, according to the author, with the approach presented by E.Ostrom.. In accordance with the assumptions, Regional Advisory Committees have been established that bring together representatives of the fishing industry, fishermen, state authorities and scientists in the field of economics and biology.

In September 2015, the Summit of Sustainable Development took place in New York. The issue of protection of aquatic organisms is related to Objective 14: To protect oceans, seas and marine resources and to use them in a sustainable way. Only a reasonable management of these irreplaceable resources is the path to a sustainable future. The tasks are very ambitious to be performed taking into account the final date for 2020. The most important are:

- manage and protect marine and coastal ecosystems through efforts to restore marine resources that will be in good condition for productivity,
- regulate aquatic harvesting issues, including elimination of destructive fishing practices, excessive fishing, illegal, unregistered and unregulated fishing,
- implement scientifically-based management plans that will allow the population of fish to be rebuilt as quickly as possible, at least up to a level that allows the maximum sustainable level of sustainable fishing,
- eliminate specific forms of subsidies for fisheries that contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unregistered and unregulated fishing; not to introduce new subsidies of this type, acknowledging that effective, specific and differential treatment for developing and least-developed countries should be an integral part of the negotiations on subsidies for fisheries conducted under the World Trade Organization,
- provide local fishermen fishing on a small scale with access to marine resources and to outlets (Agenda, 2015).

On February 14, 2017, the Polish government adopted the Strategy for Responsible Development, which identified more than 700 actions aimed at increasing the income of Polish citizens and strengthening social, economic, environmental and territorial cohesion in that country. The OECD has prepared a study (Agenda, 2017) to support the Polish government by analysing Poland's position in relation to sustainable development goals, and proposing policies that can help it to eliminate gaps in its activities. Familiar with the content, we find recommendations primarily to reduce the inflow of nutrients, coming from agriculture to the Baltic Sea and monitoring the condition of habitats in coastal zones and deeper waters of the Baltic Sea. The first maritime spatial development plan in the history of Poland was adopted by 2021 and will include (Report 2018):

- sustainable development in the maritime sector, taking into account economic, social and environmental criteria, including improvement of the environment and resistance to climate change,
- coherent management of sea and coastal areas, including the Baltic Sea resources by all stakeholders,

- strengthening the position of Polish seaports, increasing the competitiveness of maritime transport,
- increasing the share of the maritime sector in GDP and increasing employment in the maritime economy.

## 2. The effects of the Common Fisheries Policy in the field of marine resources

The management of the Baltic Sea resources is indispensable, because rational operation will bring not only benefits to the natural environment by maintaining the exploited stocks in good condition, but it will also benefit fishermen who will be able to fish more and more effectively, which will translate into economic viability for the coming years. The rationality of management depends on information, so the data provided by scientists about current schools of fish and their knowledge are necessary. Particularly important are the measures such as the size and quantitative structure as well as the biomass size of the reproductive potential\*. Fishermen frequently say that it is enough to assess the flock based on the contents of the net. This is important information. However, abundant catches will devastate schools, and small numbers cannot be renewed. Catches at the appropriate level would not be possible, if not for the states and their fisheries committees, which introduce legal regulations to manage fish stocks appropriately. Fisheries in the Baltic Sea are important for European consumers. The fishing sectors create a relatively large number of jobs in the fishing regions of the Baltic Sea countries. The economic and social pressure exerted on the fisheries sector is high, resulting in conflicts over fishing rights and territorial waters.

The Common Fisheries Policy was first introduced in the 1970s and reformed several times. The last reform came into force on January 1, 2014. The policy, which aims to manage shared resources, allows all European fleets equal access to EU waters and fisheries, and enables fishermen to work in conditions of fair competition (Materials, 2017). In 2004, when Poland joined the European Union, it began to be subject to the Common Fisheries Policy (Regulation, 2002). Prior to accession, the Polish fleet's fishing capacity was out of proportion to its resources. Some of the fishermen were working in the gray area and there was unreported fishing. Fishermen were afraid of opening up the fisheries of the Polish economic zone for all ships under the EU flag. A 12-mile strip of territorial waters for exclusive use remained for Poland. On the other hand, Poland received free access to EU fisheries. Of course, all member countries were and still are obliged to keep fishing limits. An important period for fishermen was the time when they obtained EU funds intended to reduce the fishing fleet to limit the amount of fishing potential.

**Table 1:** Characteristics of Polish fishing vessels, based on the number of permits due to the species of fish

Fish species	2004	2010	2014	2016
cod	865	316	597	595
herring	317	155	431	373
sprat	113	67	151	166

Source: the author's own study based on data from MGİZŚ.

\* Biomass stock - mass of stock of a given fish species, capable of reproduction, i.e. that part of the population that is sexually mature. Its size determines the size of the first year of the flock in the next year.

In 2004 when Poland joined the European Union, 1373 vessels were registered (including 976 boats, 398 cutters) and at the end of 2010, 793 (including 643 boats, 146 cutters). 220 million zlotys were spent on EU funds for scrapping. The state of marine resources, particularly valuable for Polish cod fishermen, deteriorated. Fishermen, due to the unprofitable economic fishing, began to retire from the profession. However, the most significant incentive was to obtain huge EU funds for scrapping ships, as a compensation for fishermen, often also called a social pension. Ships were scrapped, and for those who remained, fishing became more profitable because the individual amount of fishing grew. The year 2010 saw what became known as "Trójpólówka"<sup>\*</sup>, which also encouraged the liquidation of fishing boats. Fishermen who wanted to stay in the profession, seeing the potential in the growth of individual fishing quotas began to modernize their boats. The Polish fishing fleet had never been modernized before. Measures were taken to reduce the labor intensity of fishing crews while unloading goods. Reconstruction of pelagic vessels increased deck load capacity. Seventy-seven million zlotys were spent on modernization from the EU SOP Financing Program 2007-2013. The situation changed, however, when demand increased in the area of fish processing for fish kept for fodder<sup>†</sup>. Despite EU recommendations on the need to reduce the fleet, new vessels were registered, which should be regarded by specialists as an error. The increase in the number of fishing vessels again resulted in the fragmentation of individual catch limits, which led to inefficiencies in catches. According to associations of sea fishermen, it appears that the increase in the number of vessels also has a different background. The fishermen register boats so that they can trade quotas and receive compensation for stoppage during fishing bans. It is unfair to the fishermen who want to run a business. The continuation of the re-compilation system spoils the fishing business, leading to disgruntlement among some fishermen (Karnicki, 2016, p. 7). Today, it can be stated that the reduction of Polish fishing capacity was carried out too slowly, without careful analysis of individual fleet systems.

The technical fishing capacity of the fleet can therefore reduce biomass to such a low value that it is not able to rebuild the stock. Fish as a living resource are renewable and have the ability to recover, but are also depleted. EU Member States, in accordance with the fisheries policy, determine the amount of allowable catches that regulate the size of catches of a given species. Fishing on the territory of EU waters is managed by the so-called Total Allowable Catch. The TAC, in accordance with the EU assumptions, is set at the EU level, taking into account the recommendations of the advisory committees. Then the total amount of fishing allocated to the country is distributed internally to the fisherman. Researchers say that these values are often overstated not according to their recommendations.

**Table 2:** Characteristics of polish catches of the main marine fish species

Fish species	2004			2014			2016		
	Fishing limit	fishing		Fishing limit	fishing		Fishing limit	fishing	
		tons	%		tons	%		tonn	%
cod	15 825	15 120	95.5%	21 574	11 896	55.1%	13 262	10 335	77.9%
sprot	110 880	96 658	87.2%	62 053	58 575	94.4%	61 342	60 057	97.9%

<sup>\*</sup> Trójpólówka- in the years 2009-2011, the 'three-field system' was in force. The temporary exclusion of cod fishing applied to 2/3 of the vessels. In 2008, the cod fishing quota was used early, and fishermen were paid PLN 300 million in compensation. This led to a situation where the amount in those years was 45% higher than the value of cod caught and accounted for almost half of total fishing income in the Baltic.

<sup>†</sup> Fodder fish - in the Baltic Sea they are pelagic fish - those that "inhabit" the highest parts of the water column, f.e. herring and sprat. Fishing for "feed" is fishing, and then it is used for the production of fishmeal and oils.

herring	28 870	28 410	98.4%	30 655	28 137	91.8%	52 805	44 056	83.4%
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Source: The author's own study based on the Regulations of the Minister of Agriculture and Rural Development in 2005 and 2015, 2017 <https://www.mgm.gov.pl/rybolowstwo/rybolowstwo-morskie>, internet access [22/06/2018].

In addition to fishing quotas, the state may introduce a conservation period for a given species or regulate the intensity of fishing by specifying a number of fishing days. The schedule of traditional fisheries was changed and announced on 15 July 2016. Regulation of the European Parliament and of the Council (EU) 2016/1139 of 6 July 2016 establishing a multiannual plan for the cod, herring and sprat in the Baltic Sea has changed the rules for cod fishing. Earlier, there was a ban on fishing for cod in July and August, when spawning took place. They could fish up to 8 miles inside the coastal zone, where there are no spawning clusters. Larger vessels could fish for cod 5 days a month up to 12 miles during the holiday season. The new plan introduced a ban on all fishing activities from 1 May to 31 October in the Bornholm, Gotland and Gdansk zones. New protective periods, if necessary, will be introduced by the regulation at the request of states, which will significantly reduce the time of the current procedure. Holiday catches of herring and sprat are so small that fishermen use the remaining part of the catch limits in the autumn, when the individuals are larger and have a higher price. The solution of the current Baltic problems requires time, substantive discussion and finding solutions that do not consolidate with the Common Fisheries Policy (Materiały, 2016).

The previous Common Fisheries Policy (2007-2013) was wrong in terms of over-fishing, namely in so far the issue of discards<sup>‡</sup> and by-catches was concerned<sup>§</sup>. As we read in the publication entitled "Common Fisheries Policy" by Elżbieta Berkowska (Berkowska, 2011), it is apparent that TAC contributes to the creation of a significant number of discards that could be avoided. The fishermen caught a given species of fish; when other species appeared in the net, they were discarded due to the economic value of catches associated with the quoted fishing quotas. This behavior of the fishermen means that fish stocks are reduced. This is the issue in the understanding of the Hardinian tragedy of sharing the resource. Not only overfishing of a given species, which is unable to renew its biological mass, but in general the stock of fish in the sea was also reduced due to the catches unwanted by the fisherman and thrown overboard (often dead by-catch). One of the more important reasons for this behavior was in line with the principles of fisheries and the use of minimum fish sizes for landings and total allowable catches. Fish species are sold at different prices. The fisherman, guided by the economic stimulus, because of the limited cargo space of the ship, rejected fish that were not valuable due to the future low market value. The new fisheries policy has changed the rules so dramatically that further fishing is subject to sustainable fisheries management in the Baltic Sea. It is the catch limits (often inconsistent with scientists' recommendations), discards and by-catches often associated with illegal fishing that have led to a biological decline of the Baltic Sea species valuable for fishermen. The discard ban has a direct positive effect on the management of marine resources by the fisherman, which makes his catch more effective. The catch and by-catch are also an indispensable measure of the characteristics of marine resources, giving an indication of the size and quality of resources, which is necessary to improve the efficiency of fisheries management.

The European Union is adopting different solutions regarding fishery management. Another possible tool is fishing rights. Marine biological resources are a common good, so fishing rights should not be treated as property rights, but as a kind of usage or harvest rights.

<sup>‡</sup> discard - part of the general fishing material (either dead or alive, because they are undersized) that is thrown back into the sea.

<sup>§</sup> by-catch - accidental catch of non-target species, including marine mammals, birds.

These systems should support economic efficiency in compliance with the assumptions of the Common Fisheries Policy to ensure the profitability of the fisheries sector, as least where it is dependent on public finances (Dokument, 2007). Current management systems fall within the responsibilities of the Member States. In Poland, during the privatization of the fisheries sector, a system of individual fishing quotas was introduced, eg for cod. It was a one-year transferable system introduced by the relevant ministry. Due to the interest of shipowners in this system, transferable amounts have become non-transferable. In manageable marketable amounts, one can distinguish (Acheson, Apollonio, Wilson, 2015): individual transferable quota (ITQ) and individual fisheries quota (IFQ) - individual, transferable amount transferred to the fisherman for his discretion; individual vessels quota - individual amount allocated to boats; community development quota - when the amount is allocated to a given community, e.g. fish-gathering; territorial use in fisheries TURFS, when quotas - rights belong to a given geographical area. The individual ITQ transferable amounts are for the fisherman the exclusive right to access to marine resources, eg. catch amounts. These amounts may constitute a kind of market incentive granted to a fisherman to be competitive. For fishermen who achieve good results, they can develop their potential through the purchase of transferable fishing quotas from those in the industry who are withdrawing from the activity or are interested in catching species for which there is no ITQ. The goal of ITQ is to improve the economic conditions of existing fisheries and adapt fishing capacity to the size of fish stocks. In the Baltic Sea region, the experience of Denmark can be held up as an example. Iceland and the Faroe Islands also have valuable tips on the functioning of transfer fishing quotas. Unfortunately, these systems, despite their advantages, such as increased profitability of fishing, did not eliminate the main problem, which is the reconstruction of marine resources, destroyed due to overfishing. Its function in this area is questionable. Will it help Polish fishermen? The amendment to the Act on Maritime Fisheries (Act, 2018) provides for the possibility of exchanging the individual fishing quota for another individual fishing quota of another owner of a fishing vessel and enabling the transfer of individual fishing quota between vessels of the same owner who is also their owner. In the opinion of the president of the Association of Sea Fisheries Fishery Owners in Kołobrzeg (Mr. Ryszard Klimaczak), the vast majority of shipowners legally exchanged amounts between themselves when they were not needed at the moment or because of the lack of appropriate fishing gear. Each shipowner who has a registered fishing vessel in the registry should be protected with quotas for fishing from national limits that will ensure his minimum profitability. The value of the amount it will have in a given year would cover the fixed costs of staging the unit in the port, its insurance and securing the minimum wage for cutter crews (PAP, 2017).

In Poland, coastal fishing which takes place within 12 miles of the shore is the pillar of the Polish fisheries economy. It is also a key element in the development of the local community and the source of acquiring good quality fish while respecting the natural environment. Taking experience from other countries, the conditions of this system should be precisely defined so as not to cause the degradation of the coastal fleet, which is the basic place of work of fishing communities. Many valuable tips for introducing individual marketable amounts were presented by the LIFE -Low Impact Fisheries of Europe organization in the rights-based regulation and small-scale fishing in the EU. Human rights and property rights. It is important that the system introduces a regulation limiting the excessive concentration of concessions in the hands of one shipowner, and thus the transfer of rights as a permanent source of income. It would be good to link the fishing law with the ship, which will enable the fishermen leaving the profession to receive financial benefits, and the buyer to modernize the fleet based on fishing capacity, quantified as GT - vessel capacity and KW - engine power. We need to care for small-scale coastal fishing and allocate quotas on the basis of performance criteria rather than historical catches, which will also allow the entry of

young fishermen who are often willing to pursue the family traditions of local coastal communities (Ordinance, 2016). It should be borne in mind that economic mechanisms will not guarantee success in fisheries. Frequently, if the efficiency decreases, the intensity of fishing increases.

Currently, fisheries management is based on the so-called Model MSY (COM, 2006) (Maximum Sustainable Yield) - Maximum Sustainable Yield. It allows you to determine the safe amount of fish that you can catch, i.e. the maximum profit that can be achieved so that the stock<sup>\*\*</sup> is not threatened. This concept is in the field of environmental economics and natural resources, because to ensure the stability of the population of a given fish species, and thus the sustainability and stability of the sector, the size of herds (biomass) must always exceed the level of MSY (Niewolewska, 2015) (explanation in Figure No. 1).

The assumptions of the fisheries policy for Poland, in line with the EU policy, introduce limitations related to the conservation of the resource, i.e. the limitation of fishing days, fishing opportunities or the introduction of protected areas. These restrictions cause loss of income for the fishermen. Fisheries are therefore subsidized by the state in the form of subsidies. And here always the question will arise: what form of subsidies is appropriate? How long should the situation of subsidizing the restriction to fish stocks last? To ensure the sustainability of jobs, the fishermen must introduce sustainable fishing with good profitability of their catches. The claim attitude of Polish fishermen should disappear. Osprey management is a complicated process. National and foreign institutions dealing with fishery must take into account not only biological aspects but also ecological reasons guaranteeing the stability of resources in the Baltic Sea.

The ambitious provisions of the new Common Fisheries Policy binding in January 2014 from the EU countries are a chance for rebuilding sea resources and completing overfishing. Over-ordinate goal is to restore fish stocks above the level corresponding to MSY, i.e. to reduce fishing mortality. Such a solution will constitute a kind of "safety margin" for the environment the new fisheries policy also regulates the issue of discards, striving for a total ban on fishing rejection due to the fishing quota being exceeded or the size of the fish. Fishing crews will be required to bring all the fish they catch to the port and the catches will be recorded and counted in to the fishing quotas. The above provisions are supplemented by the maintenance of fleet capacity in particular Member States. The next important feature of the Common Fisheries Policy is the rules applicable to fishing in third country waters. The Allies EU can fish only in the case where a third country does not use his own catch limits. EU fisheries ministers are responsible for the effective and complete implementation of the provisions of the CFP. In addition, the European Parliament set up in 2016 a multi-species management plan for cod, herring and sprat. The Baltic Sea has an ambitious plan, part of the Common Fisheries Policy. It will ensure sustainable exploitation of stocks and stability of fishing opportunities. Cod, herring and sprat are the main species caught in the Baltic Sea, with strong biological interactions between them. In contrast to the single species management applied so far, multi-species management takes into account the impact of cod on herring and sprat stocks and vice versa. The stock biomass is not only dependent on fishing or environmental conditions. Often, its size is influenced by interspecific dependencies. This is the case for sprat and cod. When cod biomass grows, sprat is more intensely broiled, which contributes to its decline (Luzęńczuk, 2012). Flat fish<sup>††</sup> is another important aspect of the new plan. Often, this species appears as by-catch. The plan is an innovative proposal in the sensitive Baltic Sea ecosystem. EU politicians say that fishing in the Baltic will be conducted

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<sup>\*\*</sup> stock – school of fish- in fisheries management, the term defines the population of fish of a given species whose individuals move together and reproduce, for example, the eastern cod stock in the Baltic Sea. For EU fish stocks, EU fisheries miners set fishing limits - total allowable catches every year.

<sup>††</sup> flat fish - fish with a characteristic flat shape, such as: sola, plaice, turbot, flounder.

in a sustainable, reasonable and economically viable way that will not create unnecessary burdens on the environment. Ecologists like this view. Fisheries communities, the scientists' environment as well as the legislation of the Baltic countries place great hopes on this plan.

## Conclusion

Polish fisheries are in a very difficult situation. The problem concerns the entire Baltic Sea and fishing quotas dropping as a result of diminishing fish stocks. The problem of overfishing results mainly from fishing robberies in previous years, when the previous Common Fisheries Policy was in force. Also, the excessive capacity of the fishing fleet relative to the fishing quotas, illegal / unreported catches of fish were especially notorious. The fishing power of the Baltic fleet lies not only the number of fishing vessels, but also in also its capacity, tonnage and engine power. The modern equipment of fishing boat and better skilled crews mean that fishermen are more effective in fishing than before. Here, the Hardinist tragedy presents an obvious mistake that the fishermen make in the excessive exploitation of fisheries. The problem of a small amount of fish in the Baltic Sea is also influenced by other factors. As a semi-enclosed sea, the Baltic Sea is subject to periodic infusions from the North Sea of well oxygenated and infiltrated water, which causes the water to be separated, which in turn causes periodic shortages of oxygen in the bottom layer. The water resources of rivers, contaminated by nitrogen and phosphorus compounds, also have an impact on the water body's condition. The Baltic Sea is subject to the eutrophication process. In the sea there are also eco-systemic dependencies. The ecosystemic imbalance means that some fish are food for other species of fish or other animals, such as cormorants or seals. Human impact on the marine ecosystem, i.e. the physical destruction of ponds caused by the construction of fortifications or the extraction of sand and aggregates, cannot be overlooked. There are many aspects that decrease the number of fish in the Baltic Sea. In my opinion, it is a good idea to consider periodically shutting off water reservoirs so that stocks of marine fauna, especially fish stocks, can multiply, so that fishing is profitable for fishermen and safe for the preservation of biodiversity of individuals. A good direction, with the growing consumption of fish and huge overfishing, is to increase the breeding of aquaculture resources from aquaculture in order to meet the needs of consumers. Additionally, it is worth running promotional campaigns for an informed consumer who chooses certified fish marked with the information that the resource comes from sustainable sea fishing. Time will tell whether the new assumptions of the Common Fisheries Policy of European Union and the provisions of the multi-species fisheries plan for the management of cod, sprat and herring will help in the reconstruction of Baltic water resources. Fishermen must trust scientists, and everyone should live in harmony with mother nature, because only human responsibility for the common good will be a remedy for the restoration of underwater wealth. The future of Baltic fisheries requires constructive dialogue, exchanging of views and mutual understanding.

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