

What are the key factors for a successful design and implementation of a right-based system in the allocation of fishing opportunities in the demersal fisheries in Sweden?

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Abstract

With a background of the needs created by the landing obligation, the Swedish Agency for Marine and Water Management (SwAM) in 2017 introduced a system with individual annual fishing opportunities that can be temporarily transferred between fishermen during the year. The individual allocations are, with some exceptions, based on reported catches during the reference period 2011-14. The design of the system paid particular attention to small-scale coastal fisheries fishing with passive gears for which unallocated quotas are reserved. The new system means increased flexibility and better possibilities for individual fishermen to adjust their fishing opportunities during the year, which probably gives them better possibilities to comply with the landing obligation. The first year with the new system has recently been evaluated by SwAM. The evaluation showed, among other things, that the number of quota transfers was already high in the first year. At the same time trade frictions existed (e.g. difficulties to find someone who could transfer fishing opportunities). There are also other challenges connected with the system. Although the system allows for increased flexibility, quotas may still be limiting at the individual level. Given economic incentives to maximize the value of the own fishing opportunities, this may affect compliance as it creates incentives for high-grading and discard of unwanted by-catches. Another concern is that since the fishing opportunities are only annual, fishermen face uncertainty about what fishing opportunities and income they will have the coming years. A further challenge is that various “lock-in” effects can be observed in the present system. In case the system would be adjusted to allow for longer-term fishing rights, the design of such a system is of critical importance in order to avoid unwanted effects.

1. INTRODUCTION

1.1 Description of the Swedish demersal fisheries

The Swedish demersal fisheries can broadly be divided into the following fisheries: nephrops fishery, fishery for northern prawn, white-fish fishery and fishery for cod in Baltic Sea. Fishing is carried out with both passive and active gears, where active gears are responsible for the greatest shares of catches. The fisheries for nephrops, northern prawn, and cod in Baltic Sea is described a little closer below.

Nephrops fishery

The Swedish fishery for Nephrops takes place with the following gear categories: pots, bottom trawl and bottom trawl with grid. Before 2017, when individual allocations were introduced, the nephrops quota was divided among these three gear categories in order to ensure a high use of selective gears (trawl with grid and pots).

The conditions for those who fish for nephrops changed in many ways since 2017. The new system of individual annual allocations was introduced from 1 January 2017 and, at the same time, the European Union’s effort system (which regulated fishing effort in kilowatt days/days at sea) was abolished. This meant greater freedom for fishermen fishing with trawl/trawl with grid to allocate their fishing effort

using the gears for which they have permits. In addition, because individual allocations were introduced, no breakdown of the nephrops quota for the different gear categories was made.

The development of gear utilization in this fishery is therefore, important to follow. During the year 2017, an increase of fishing effort with trawl without grid was observed. This is worrying since, given compliance of the landing obligation, a higher use of trawl with grid would instead be expected.

While the new system gives better opportunities for individual fishermen to plan their operation and probably also provides better conditions to avoid choke species and species for which they have low or no quota, one must also be aware that incentives for illegal discards exist. This is due to economic incentives to maximize the value of their own fishing opportunities. This also shows the importance of monitoring.

Fishery for northern prawn

Another important Swedish fishery is the Northern prawn. In Sweden, there are at present 62 permits/vessels fishing for northern prawn. Regarding the allocation of fishing opportunities, this fishery is subject to the system of individual annual allocations. Data on landing sizes indicate that illegal high-grading might exist in this fishery, which is a challenge to be handled in the management in this fishery. Another issue is that many of the vessels do not have high activity and just fish sufficiently to keep their permits.

Cod in the Baltic Sea

In the Baltic Sea, fishing for cod takes place with bottom trawl and with passive gears. In the last years, the quota utilization in this fishery has been very low, and the number of active fishermen has decreased compared to 5-6 years ago. Individual fishermen have not been restricted by their allocated fishing opportunities (the trawl fishery is covered by individual annual allocations). Instead, other factors explain the low quota utilization (low-quality fish, low prices). Also, in this fishery, data indicate that illegal high-grading exists.

1.2 Economic contribution and social implications of the fishing activity

Swedish fishery is dominated by small companies. In 2008, there were 1 211 companies active in professional fishing, which together had about 2 000 employees. During 2015, there were 968 companies. Between 2008 and 2015, the number of registered and active fishing vessels decreased from 1 150 to just under 1 000.

2. MANAGEMENT OF THE FISHERY AND RIGHTS-BASED APPROACH

2.1 Management of the fishery in Sweden

In Sweden, the Swedish Agency for Marine and Water Management (SwAM) has the overall responsibility for how fishing is carried out and which rules apply. This also includes fishing licenses, gear permits and allocation of fishing opportunities. Another agency, the Swedish Board of Agriculture, has the task of promoting fisheries and is responsible for a marine and fisheries program.

When it comes to the allocation of fishing opportunities in the Swedish demersal fisheries, many changes have recently taken place. In order to create better conditions for the Swedish demersal fisheries to comply with the landing obligation, annual individual fishing opportunities were introduced in 2017. The first year with the new allocation system (2017) has been evaluated by the SwAM. The evaluation was largely a descriptive analysis summarizing data on, for example, quota utilization (on national and individual level), quota transfers, reported discards and gear use. In addition to the descriptive analysis, a

survey among fishermen was conducted. The questions in the survey aimed to improve knowledge about how fishermen perceive regulations, what they think about the new allocation system and whether it gives them better conditions to comply with the landing obligation, and whether there were frictions in the quota transfer market.

The results of this evaluation and the identified challenges for the future will be described in this case study.

2.2 Brief history of the former rights-based approaches used in the fishery

Allocation of Swedish demersal fishing opportunities before 2017

Until 1 January 2017, a system of catch limits, on a weekly or monthly basis, was applied for several demersal species in the North Sea. For nephrops, plaice, cod, haddock and cod (and the pelagic species mackerel), catch limitations were applied per week, while catch limitations per month were applied to Northern Prawn (with a possibility to temporarily transfer quantity since 2015). Furthermore, fishing with cod catching gear in the North Sea was limited by a fishing effort system, which required a special permit (effort permit) and fishing restrictions by kilowatt days (days at sea) for vessels with a length of at least 10 meters. A total number of kilowatt days were determined for different Member States each year by decisions in the EU Council of Ministers, which was then distributed nationally between the fishing vessels through the effort states. For fishing with bottom trawl equipped with grid (which was exempted from the EU's effort regulation), Sweden applied a national effort system. The EU abolished the system of kilowatt days in 2017. In the Baltic Sea, special permission was required for vessels of at least 8 meters in length using cod catching gears (which is also the case today). Trawling for cod in the Baltic Sea was regulated by a system of catches per year. This fishery was also regulated by a maximum number of days a vessel was allowed to fish during the year. Part of the quota was also annually allocated for passive gears.

2.3 Rights-based approach: allocation and characteristics

Background to the introduction of the new system: the introduction of the landing obligation

Within the framework of the EU's Common Fisheries Policy, an obligation to land the catches of all quota species is introduced gradually between 2015 and 2019. This new regulation, the landing obligation, aims to limit unwanted catches and discards. The goal is to minimize discards and accelerate the development of more selective fishing. The regulation means that all catches of quoted species, as a basic rule, shall be reported, landed and deducted from the quota. Even whitefish and seafood under a minimum size shall be landed and quota-deducted. The landing obligation is introduced step-by-step between 2015 and 2019 and will be fully implemented in all the fisheries on 1 January 2019.

2.4 The introduction of the new rules for the distribution of demersal fishing opportunities

The introduction of the landing obligation places great demands on adaptations of different parts of the management, for example, with regards the allocation of fishing opportunities. How to allocate fishing quotas nationally is one of several tools that the EU Member States are expected to use in order to adapt management to landing obligations. Due to the landing obligation, SwAM investigated during 2015-2016 whether the previous system of allocating quotas in demersal fisheries was compatible with the new regulations. There were a number of consultation meetings with various stakeholders on the matter. In the fisheries industry, discussions about the allocation of fishing opportunities during a landing obligation were also initiated in cooperation with the EDF (Environmental Defense Fund).

SwAM made the assessment that the previous system of distributing demersal fishing opportunities for a variety of reasons was incompatible with the landing obligation. One of the reasons was the contradiction

of the catch limit system with the obligation to land all catches of quota species with the many "breakpoints" where catches have to be matched to the permitted catches and where excessive catches are risked to be discarded. Another reason was the risk of fishing stop for all gears at risk of catching a specific species if the quota of that species ended before the end of the year. In the previous system, there was also no possibility for fishermen to plan their fishing during the year, as they had to consider the weekly/monthly catch limits.

In 2014, SwAM was given the legal right to introduce annual individual fishing opportunities that may be temporarily transferred during the year. A proposal for a design of such a system was submitted in the fall 2016, and the new regulations entered into force on 1 January 2017. The main goal of the new system was to facilitate the introduction of the landing obligation by creating better conditions for individual fishermen to comply with the landing obligation. In the design of the system, particular attention was paid to small-scale coastal fishing by establishing so-called coastal quotas, which were not distributed on an individual level. In total, seventeen demersal quotas were allocated individually.

Following approval from SwAM, the demersal fishing opportunities can be transferred between fishermen during the year. Quota transfers are denied if they, for example, mean that concentration levels are exceeded or that the transfer is considered to be in violation of compliance with the landing obligation. The individual allocations are based on historical catches during the reference period 2011-2014, where the least good year by species and quota area were eliminated. Some adjustments to historical catches have been made (such as allocation of by-catches and "base levels"). Another model than historical fishing was used for the allocation of Northern Prawn as this was suggested by the industry.

3. CONTRIBUTION OF THE RIGHTS-BASED APPROACH TO ACHIEVING SUSTAINABILITY

3.1 Evaluation by SwAM of the first year with the new system to allocate demersal fishing opportunities in Sweden

3.1.1 Purpose and limitation of the evaluation

The new distribution system introduced in demersal fishing on 1 January 2017 aims at creating better conditions for individual fishermen to adapt their fishing opportunities and comply with landing obligations. It is one of several tools aimed at enabling the implementation of the landing obligation. The first year with the new system, 2017, was evaluated by SwAM in the spring of 2018.

The primary purpose of the initial evaluation of the system was to evaluate how it has helped to increase the opportunities for individual fishermen to comply with the landing obligation. As a successful implementation of the landing obligation also means compliance with the discard ban, the evaluation also analyzed if the system contributed to compliance with the landing obligation. The evaluation also reviewed how the system administration worked out during the first year. Finally, a description of certain "lock-in" effects was made. The purposes of the evaluation are summarized below:

- The contribution of the new system to facilitate the introduction of the landing obligation.
 - This means to evaluate how the system:
 - facilitates the compliance of fishermen with the landing obligation
 - contributes to incentives for compliance. For example, how it contributes to the non-occurrence of illegal discards.
- Evaluate how the administration of the system, such as practical handling of transfers, has worked out in the first year. What worked well and what could be improved?
- Identify lock-in effects in the present system.

As only one year has passed since the new distribution system came into force, not all aspects could be included in the evaluation.

3.1.2 Methods used in the evaluation

The following methodologies were used in the evaluation:

- Data compilation (catches and quota utilization, reported discards, observed changes in fishing patterns and gear use, transfers of fishing opportunities, fishing efforts, etc.).
- Survey to fishermen.

The evaluation largely consists of a descriptive compilation of data from 2017. The possibility of assessing the effects of the introduction of the new system on the basis of such an analysis is limited. Major changes in management systems, such as the introduction of the new way to allocate fishing opportunities, can be expected to affect behaviour and fishing patterns in a variety of ways, which are often difficult to predict. Behaviour can also be affected by the fact that it was the first year with the new system. There are also many other factors that may be behind altered patterns, such as natural variations in the occurrence of species. Therefore, it is difficult to distinguish to what extent changed patterns depend on the system to allocate fishing opportunities.

The survey was sent in May 2018 to a total number of 244 fishermen, which are all part of the system with annual individual fishing opportunities. A total of 111 responses were received, corresponding to a response rate of 45.5 percent. The survey was to complement the descriptive part of the evaluation. Its purpose was to give the management a better picture of how fishermen perceive rules and regulations (as this, in turn, may affect willingness to comply with rules) and to give an understanding of how the transfers of fishing opportunities have worked out the first year (is it difficult to find someone to transfer quota?). The survey also had some open questions where the respondents could comment on what they see as advantages and disadvantages of the system to allocate quotas and suggestions for improvements they have.

3.1.3 Some main observations in the evaluation

Some of the main observations in the evaluation of the new system to allocate demersal species are summarized below:

- The new system means increased flexibility and better possibilities for individual fishermen to adjust their fishing opportunities during the year. The survey showed that many fishermen find the increased planning possibilities to be an improvement.
- The quota utilization in 2017 was low for many demersal quotas in Sweden. According to the evaluation, this seems to be due to a combination of factors such as the fact that many fishermen have been "cautious" and did not want to risk running out of quota and because of natural variations in the availability of fish. There are also indications that quota has been locked in because of frictions in the quota trade market (difficult to match buyers and sellers). If illegal discards have taken place, then this means that the quota utilization on the paper is lower than in reality.
- The survey and the descriptive statistics show that there were trade frictions in transfers of fishing opportunities, as also mentioned above. Many fishermen found it difficult to find certain quotas, although as indicated by the low quota utilization, there were quantities left. Several of the survey respondents mentioned that during the first year, the quota market was not working well enough.
- Despite the frictions in the quota trade market, a large number of quota transfers took place during the first year. The e-service provided by SwAM is considered easy to use.
- In the nephrops fishery with trawl, the use of less selective gears (i.e. trawl without grid) increased during 2017. As described above, 2017 meant major change for those who fish for nephrops with a bottom trawl. The effort system (days at sea) was abolished and individual allocations introduced. This meant greater freedom and planning possibilities, and greater possibilities to choose gear (as

long as you have a gear permit). The trend in gear use during 2017 is worrying with regards to compliance and may suggest that the system must be combined with increased gear regulations.

- In the Baltic Sea, codfish after cod have not been limited by their individual allocations, but the low quota utilization is due to other factors (low prices, low-quality fish, etc.).

3.1.4 Conclusions, discussion and analysis

Has the system contributed to facilitating the ability to comply with the landing obligation?

In Sweden and in the other EU Member States, choke species have been considered one of the major challenges associated with the introduction of the landing obligation. Choke species refer to quotas caught in several different gear/fish and whose national quota is likely to end before the end of the year. Distribution of fishing opportunities is considered one of several tools to handle this challenge. Other tools include the development of more selective tools, changing fishing patterns, exempting landing obligations, national quota changes and flexibility rules.

By introducing individual responsibility for fishing opportunities, the need for collective fishing stops as a result of quota closures is reduced. This was one of the reasons that a system of individual fishing opportunities was considered better suited to landing obligations compared to the previous system (with catch limitations). However, fishing opportunities can be limiting at the individual level, despite increased planning possibilities and transfer opportunities, if for example there are large differences between quota composition and catch composition (which is the case for the Swedish mixed demersal fishery).

If only looking at quota use at the national level, the low quota utilization may give the idea that limiting species were not a problem in 2017. However, the low quota use may be due to several different reasons. The ability to plan fishing over the year may have contributed to the fact that fishermen could, to a greater extent, avoid catches of quotas for which they have low allocation. In addition, there are other factors that may have affected this phenomenon as well, such as weather and nature. Although quota use has been far from full for many species, the evaluation showed that it has been difficult to find available quantities of these species. Another reason for the low quota use may be illegal discards. When comparing the catch composition in trawl fisheries (without grid) in the North Sea, it deviates substantially from the expected catch composition, which is quite remarkable. This might indicate that illegal discards are taking place.

It is difficult to determine how the system, during the first year, contributed to managing the challenge with choke species. It is, for example, difficult to know which of the transfers were intended to handle this particular issue. However, the high number of transfers in the year 2017, of both target species and those that can be caught as by-catch, is a good sign that the desired flexibility of the system is working quite well already the first year.

Individual allocation of fishing opportunities and incentives

In a system of individual annual allocations, everyone must relate to the fishing opportunities they have been allocated and/or that they obtained through temporary transfers. In order to be able to fish throughout the year with the quotas allocated to a license holder, it may be necessary to adapt fishing patterns, fishing methods, equipment use and, if necessary, try to use the possibility of temporary transfers. The requirements for such adjustments will be particularly important if the composition of quotas available in fisheries today does not match the catch composition in previously engaged fishing. There is also an economic dimension to consider; economic incentives to maximize the value of their fishing opportunities can in the worst case lead to illegal discard of bycatches for which the quota is missing or subject illegal high-grading

Prior to the introduction of the landing obligation, the imbalance between catch and quota composition seemed to be one of the major challenges, given previous fishing patterns and catch compositions. Because of the high quota on nephrops and low quotas for fish (such as cod), one would expect a higher usage of more selective tools, such as grid. Therefore, the increased use of trawl with grid is remarkable.

The fact that the economic incentives for discards are contained in systems with individual allocations are well known in both theoretical literature and practical experience. Research points to several factors that, in addition to fisheries control, affect regulatory compliance. In addition to the traditional economic factors, literature addresses factors such as personal perception of fairness, regulatory legitimacy, perceived involvement in the design of rules, norms, social control and how one experiences the ability to comply with the regulations (which could, for example, be that the individual allocation of different quotas is in line with the catch composition). If the individual allocation of quotas is deemed unfair, too small or incorrect, it may contribute to incentives for non-compliance. In view of the above research and experience, and given the fact that many of those who fished a mixed fish fishery (without grid) in the North Sea probably have a combination of individual fishing opportunities that do not match the catch composition of previously engaged fishing, it is likely that financial incentives for illegal discards exist.

Quota utilization, transfers and possible lock-in of fishing opportunities

The possibility of transfers during the year is an important part of the system as it is this part that is intended to contribute to the flexibility and ability to adapt their fishing opportunities to the landing obligation requirements.

The low quota use of many demersal quotas in 2017 appears to be due to a combination of different factors, including the fact that many have been "careful" and wanted to be sure of remaining fishing opportunities until the end of the year and that there were trade frictions in the market for transfers. Many questionnaires suggest that the matching of transferees and receivers did not work well enough.

There is, therefore, a need for improvements in the match of transferees and recipients in order for fishing opportunities to be used by those who need them. Of those responding to the survey, there was a relatively high proportion that stated that they were unable to acquire fishing opportunities due to their inability to find available quantities (25 percent of respondents) or because the demanded compensation was too high (16 percent of respondents). Although the number of transfers was high during the first year of the new system and the e-service that SwAM provides is considered easy to use, the evaluation suggests that some of the quantities may have been locked in because of frictions in the market.

3.2 Sustainable use of the resources

As indicated in the description above, the new system to allocate demersal fishing opportunities in Sweden was introduced in order to create better conditions for individual fishermen to comply with the landing obligation through better planning possibilities and more flexibility.

However, the presence of economic incentives for illegal discards (high-grading and discard of bycatches) is a challenge. With regards to sustainable use of the resource and the compliance of the landing obligation, it is important to consider this in future adjustments in the management.

3.3 Economic viability of the fishery

According to an annual report on balance between fleet and fishing opportunities, which EU member states annually have to submit to the Commission of the European Union, economic indicators show critical values only for the segments fishing with passive gears. For trawl fisheries, the report shows no critical values for the economic indicators.

Annual allocations mean uncertainties in income from year to year. For example, it may be unclear if one can do the same quota transfers each year. This has also been pointed out by respondents in the survey to fishermen. Several of the respondents hope that the system will be further developed to a system of long-time fishing rights.

3.4 Social equality

Taking account of social considerations may mean for example protection of small scale fisheries, regional concerns, recruitment of fishermen and avoidance of "harbour death". In the new system of annual individual fishing rights in the Swedish demersal fisheries, social considerations are made in different ways. For example, unallocated quotas are set aside for the small scale fisheries, concentration limits are applied, and there are in some cases rules for how transfers can be made. In 2018, regional quotas of cod were introduced for the regional trawlers fishing for cod in the Baltic Sea.

4. MAIN CHALLENGES AND WAY FORWARD

The new system means increased flexibility and better possibilities for individual fishermen to adjust their fishing opportunities during the year, which probably gives them better possibilities to comply with the landing obligation. It may however, also be concerned with challenges that have to be considered in future adjustments of the system. For example, although the system allows for increased flexibility, quotas may still be limiting at the individual level. This, in turn, may affect compliance (illegal high-grading and discard of by-catches) because of economic incentives to maximize the value of one's own fishing opportunities. Another concern is that since the fishing opportunities are annual and can only be transferred during the year, individual fishermen's long-term planning is impeded because of uncertainty about what fishing opportunities and income they will have in the coming years. This may, in turn, contribute to a reluctance to invest in better and environmentally friendly technology. Also, in the survey to fishermen, several respondents commented that although they think the new system is an improvement, they would prefer a system with longer-term fishing-rights.

Another challenge is that various "lock-in" effects can be observed in the present system. This relates to the presence of "quota vessels" and license holders who are not active fishermen. The current system of annual allocations in combination with the catch requirements for renewed permits, which gives an individual allocation of fishing opportunities for the next year, has led to a situation where fishing vessels with no real fishing operations remain in the system. The fact that fishing license holders want to keep permits/ships even though they do not conduct any real fishing may be due to several factors. For example, they may want to keep the licenses for the future, or they may want the fishing opportunities to be transferred to another vessel where the fishing is actually carried out. Keeping these "quota vessels" in the system involves a cost for the fishing companies, and it implies a burden on the environment.

At the moment, the SwAM has no legal possibility to introduce a system with permanent or long-term fishing rights for the demersal fisheries in Sweden. In case the system would be adjusted to allow for longer-term fishing rights, the design of such a system is of critical importance in order to avoid unwanted effects. Such unwanted effects include, for example, a too high concentration of fishing rights by certain actors and/or in certain regions and unwanted structural change. However, it might be a way to increase profitability for active fishermen, and thereby also improve compliance. It might also be a way to mitigate the lock-in effects described above.

A key question is, therefore, how to successfully design and implement a right-based system in the allocation of fishing opportunities in the Swedish demersal fisheries.

This raises, for example, the following sub-questions:

- Initial allocation: What is the role of the initial allocation of fishing rights and their duration?
- System design and social goals: How can goals regarding consideration and protection of the small scale fisheries be met in a right-based system? How can unwanted structural change connected with unwanted capitalization and high prices be avoided?
- System design and compliance: What are the key factors for achieving compliance with regulations? How can the challenge of limiting quotas and choke species be met?
- System design and environmental concerns: How can incentives for use of selective and environmental friendly gears be created? How can an ecosystem approach be considered within a right-based system?