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An analysis of existing Rights Based Management (RBM) instruments in Member States and on setting up best practices in the EU

FINAL REPORT: PART I




Submitted by

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Acronyms

AC	Autonomous Community
ANASOL	Associación Nacional de Armadores de Pesca en El Gran Sol
ANOP	National Association of POs (France)
BFT	Bluefin Tuna
BIM	Irish Sea Fisheries Board, Bord Iascaigh Mhara (Ireland)
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CECAF	Committee for the Eastern Central Atlantic Fisheries
CEFAS	Centre for Environment, Fisheries and Aquatic Science
CFP	Common Fisheries Policy
CNPMEM	Comité national des pêches maritimes et des élevages marins (France)
COPEMED	Mediterranean Fish Cooperation; FAO
CQ	Community Catch Quota
CRPMEM	Comité régional des pêches maritimes et des élevages marins (France)
DAFF	Department of Agriculture, Food and Fisheries (Ireland)
DARDNI	Department of Agriculture and Rural Development for Northern Ireland
DCAL	Department of Culture, Arts and Leisure (UK)
DCMNR	Department of Communications, Marine and Natural Resources (Ireland)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DF	Department of Fisheries (Poland)
DFMR	Department of Fisheries and Marine Research (Cyprus)
DG-FISH	Directorate-General Fisheries
DG-MARE	Directorate-General Maritime Affairs
DPPO	Danish Pelagic Producer Organisation (Denmark)
EA	Environment Agency (UK)
EAEF	Economic Assessment of European Fisheries
EEZ	Exclusive Economic Zone
EFF	European Fisheries Fund
EU	European Union
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organisation of the United Nations
FCB	Fish Commodity Board (Netherlands)
FCCD	Fishery Conservation and Control Division (Malta)
FEDOPA	Federation of Artisanal Producer Organisations (France)
FMC	Fishery Monitoring Centre (Poland)
FMS	Fisheries Management System
FMZ	Fisheries Management Zone
FQA	Fixed Quota Allocation Unit
FROM	Organisation de producteurs Fonds régional d'organisation du marché du poisson de Bretagne (France)
FROM Nord	Organisation de producteurs Fonds régional d'organisation du marché du poisson du Nord (France)
GDFA	General Directorate of Fisheries and Aquaculture (Italy)
GDP	Gross Domestic Product
GFCM	General Fisheries Commission for the Mediterranean
GLS	General Licensing Scheme
GRT	Gross Registered Tonnage
GT	Gross Tonnage

GVA	Gross Value Added
HP	Horsepower
IBSFC	International Baltic Sea Fishery Commission
ICCAT	International Commission for the Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Seas
IE	Individual Effort
IFCA	Inshore Fisheries and Conservation Authorities (UK)
IFM	Innovative Fisheries Management
ILVO	Institute for Agricultural and Fisheries Research (Belgium)
IQ	Individual non-transferable Quota
ITE	Tradable Effort Quota
ITQ	Individual Transferable Quota
kW	KiloWatts
LL	Limited Licensing
LNV	Ministerie van Landbouw, Natuurbeheer en Voedselkwaliteit (Netherlands)
LOA	Length Overall
LS	Licensing Scheme
LTL	Limited Transferable Licensing
MAGP	Multi-Annual Guidance Programme
MAPyA	Ministerio de Agricultura y Pesca (Spain)
MARD	Ministry of Agriculture and Rural Development (Poland)
MARDF	Ministry of Agriculture, Rural Development and Fisheries (Portugal)
MARM	Ministry of Environment and Rural and Marine Environment (Spain)
MCFS	Malta Centre for Fisheries Sciences
MedFiSIS	FAO sub-regional projects under COPEMED
MedSudMed	FAO sub-regional projects under COPEMED
MFA	Marine and Fisheries Agency (England and Wales)
MFL	Marine Fishery Segment (Netherlands)
MLS	Minimum Landing Size
MPA	Marine Protected Area
MS	Member State (EU)
MSC	Marine Stewardship Council
NAFO	North Atlantic Fisheries Organisation
NASCO	North Atlantic Salmon Conservation Organisation (UK)
NDMF	National Directorate of Marine Fisheries (Spain)
NEAFC	North East Atlantic Fisheries Commission
NFB	National Board of Fisheries (Latvia)
NMC	National Management Committee (Italy)
NUFTA	New Under Ten Fishermen's Association
OECD	Organisation for Economic Co-operation and Development
PAOP	North Atlantic Producers Organisation
PERMEX	Shellfish extraction permit (Spain)
PMA	Pêcheurs de la Manche et de l'Atlantique (France)
PME	Permis de mise en exploitation
PO	Producer Organisation
PolEM	Polish Environmental Management
QMCP	Quota Management Change Program
RAC	Regional Advisory Council
RBM	Rights Based Management
RFMI	Regional Marine Fishery Inspectorate (Poland)
RL	Registered Length
RSW	Refrigerated Seawater vessel
SBF	Swedish Board of Fisheries (Sweden)
SFC	Sea Fisheries Committee (UK)

SFI	Sea Fisheries Institute in Gdynia (Poland)
SFP	Special Fishing Permit
TAC	Total Allowable Catches
TURF	Territorial Use Rights in Fisheries
UN	United Nations
UQPA	Unclassified Quota for Possible Allocation
UQPC	Quotas reserved for Possible Compensation
VC	Vessel Catch Limits
VMS	Vessel Monitoring System
VTQ	Vessel Transferable Quota
WAG	Welsh Assembly Government (UK)

Executive Summary

This report presents a review and analysis of the rights-based management (RBM) systems in place in EU coastal Member States, performed under contract FISH/2007/03. Rights-based approaches to fisheries management have shown potential for promoting biologically sustainable and economically viable fisheries in several parts of the world. Whilst fisheries management is a Community responsibility, under the framework of the reformed EU common fisheries policy (CFP), economic management of fishing rights is a national responsibility and in practice, many Member States have already implemented RBM approaches in a range of fisheries across the EU. This study satisfies the need, identified by the Commission, for a review of these existing RBM practices. It analyses the attributes and effects of RBM systems and investigates their degree of success in contributing to achievement of the CFP objectives of sustainability of exploitation of stocks, matching fleet size with available fish resources, and economic viability of the fishing industry.

The accompanying Catalogue of RBM instruments in coastal EU Member States (Part II of this report) describes the features of the main RBM systems in place in each Member State and scores them against four attributes: Exclusivity, Validity, Security and Transferability. Also described are drivers for the establishment of RBM, the evolution of the systems and how the systems address or affect a number of issues: concentration of fishing rights; protection of small-scale fisheries; access of newcomers; access of nationals of other Member States; and potential effects on discards.

The definition of RBM adopted for this study is broad, including ‘any system of allocating fishing rights to fishermen, fishing vessels, enterprises, cooperatives or fishing communities’. As such, the main types of RBM systems covered are: limited non-transferable licensing (LL); limited transferable licensing (LTL); community catch quotas (CQ); individual non-transferable effort quotas (IE); individual transferable effort quotas (ITE); individual non-transferable catch quotas (IQ); vessel catch limits (VC); individual transferable quotas (ITQ) and territorial use rights in fisheries (TURF).

RBM systems in place in EU coastal Member States cover a wide range of fleet and fishery types. All Member States have implemented some type of RBM, although Slovenia has not yet closed its licensing regime. Limited licensing is a common means of restricting access to a fishery and the majority of Member States use this either as a main, or supporting means of managing one or more fisheries. In stocks managed by TAC, Member States have implemented a variety of IQ, ITQ and VC systems. In most cases, the extent of transferability officially enshrined in the system reflects national policy and concerns about the potential for rights to be captured by large and/or foreign interests. Quota-based systems are almost non-existent in the Mediterranean (bluefin tuna being the exception), where management is based on licensing and effort-based controls. TURFs have been established across the EU, mainly for inshore and sedentary stocks. Effort-based systems (IE and ITE) are also used, predominantly in the Baltic states, or in support of quota systems in North Sea fisheries.

A balance of social, economic and market factors is taken into account in the allocation of fishing rights, depending on national policy priorities. Initial allocations for quota-based systems are usually based on historical track record, mostly using a

fixed reference period. Most Member States that initially used a rolling reference period have switched to a fixed reference period because of unreliable catch records and the use of strategic fishing behaviour to attempt to increase quota allocation. Auctions as a way of allocating rights have been rarely used in Europe, and are no longer used in any Member State.

Once rights have been allocated, it can become difficult for new entries to the fishery. In most cases, if newcomers wish to enter a fishery controlled by an effort- or quota-based system, they must buy a vessel with its associated rights (licence, quota allocation etc). However, this can be prohibitively expensive and several countries (e.g. UK, Denmark) have specific schemes to facilitate new entrants to the fishery, either by starting in the small-scale sector, or by leasing quota. The most difficult type of system for newcomers to gain access to seems to be TURFs, where rights are allocated to a group of resource users. Their establishment has often resulted in the exclusion of prior users of the resource (through the conversion from an open access to a privatised regime) and subsequently it can be difficult for newcomers to gain membership of the association or group involved in the TURF.

Rights have varying validity. TURFs tend to have the longest period of validity (often in perpetuity). In some cases, validity of the right can be short (e.g. one year), but rights are renewable, effectively making the validity period much longer. In some cases, RBM systems have evolved over time, without the nature or duration of the right being specifically defined. Furthermore, a number of different ‘rights’ may be required to be able to fish (e.g. a licence, quota allocation and days at sea), in which case, the right with the shortest validity determines the overall validity of the bundle.

Markets have evolved around the sale, transfer and lease of rights, even in the case of ‘non-transferable’ rights, since vessels with rights can typically be sold together with those rights — vessels with attached licences are often sold for more than the pure asset value of the vessel itself (implying a value to the licence, or fishing right). Markets exist for individual non-transferable catch quotas (IQ) and individual non-transferable effort quotas (IE), because it is possible to buy companies that have quota and/or to sell or rent vessels with unused quota.

Transferability can and has resulted in a concentration of fishing rights in some cases (e.g. Spain, Denmark). This also implies a reduction in capacity and associated increase in economic efficiency. Restrictions on transferability by a number of Member States have been implemented specifically with the aim of avoiding the concentration of rights and protecting small-scale fisheries. However, even in non-transferable systems, a concentration of rights can occur through the purchase of fishing enterprises/companies, in the absence of other measures to restrict concentration of rights or ownership; and conversely, systems with transferability do not necessarily result in a concentration of rights. Some transferable rights systems also restrict concentration by establishing limits on ownership.

Capacity reductions can, and have, also been achieved through publically-funded decommissioning schemes. The way in which rights have been treated in decommissioning schemes varies — in some cases the rights (licence and quota) may be decommissioned with the vessel, in other cases, the quota may be transferred to another vessel. Whether or not the quota is decommissioned, it is important to ensure that decommissioning follows OECD guidelines and that the capacity cannot re-enter the fishery, or another fishery. However, decommissioning schemes are expensive and capacity reductions have been achieved through market measures (i.e. transferability of rights) at minimal cost, such as in Denmark, freeing up resources to be invested in research and innovation for the sector.

Protection of small-scale fisheries is a concern for a number of Member States, and has been addressed in a number of ways: by limiting transferability; by the establishment of TURFs; and by reserving a proportion of national quota for the small-scale segment.

Transferability of rights has resulted in the rationalisation and improved economic profitability of fleets in a number of cases where it has been implemented. Particular examples include Denmark's pelagic fishery and Spain's 300 fleet. The impact of markets for rights on social issues (social sustainability in coastal fishing communities) is not clear. However, markets for rights have resulted in the value of rights significantly rising in many cases. This can have negative implications for future potential participants in the fishery, due to the high entry costs. But in many cases, the social impacts of markets are likely to be limited due to factors constraining the free transferability of rights, even in the case of ITQs, specifically with the intention to protect historical distribution patterns.

The principle of relative stability is not threatened by transferability *per se*, because quotas to each Member State for particular species are allocated based on a set percentage of the TAC each year. However, markets for rights do have the potential to impact on the *principle* of relative stability, in terms of a constant share of benefits between Member States if market transactions for rights are not 'fair', which would result in an asymmetrical generation of benefits (for example if one rights' holder, Producer Organisation (PO) or fisheries authority pays over the market price for a species because of the need to obtain quota for that species, or just through poor quota management on the part of the institutions involved). Furthermore, there are already cases of beneficially-owned foreign vessels fishing under national quota, which do not rely on transferability of rights, but rather on the purchase of vessels with rights under the European free market.

Potential effects of RBM systems on discards are difficult to determine, as discards may be influenced by a range of factors, including undersized or unmarketable fish, highgrading and lack of quota allocation. Where discarding occurs due to a lack of quota for a particular species, transferability of quota rights enables vessels and POs to optimise the species mix to reduce discards. However, even with non-transferable rights, this optimisation can be carried out at national level through Member State-to-Member State quota swaps to ensure an appropriate species mix, although this requires more input (time and resources) from the central authorities, rather than allowing the market to act.

In most cases, the role of Member States in markets is principally in overseeing them and recording changes in ownership and/or the use of rights. Most of the markets are 'formal' (controlled or monitored by the state) even in the case of non-transferable rights; the only informal markets that appear to exist in the systems studied are those associated with the markets for rights within clam consortia (TURFs) in Italy, and cases where POs manage quota on behalf of their members. There are various administrative mechanisms used to document the RBM systems and keep records on swaps, leases or trades or fishing rights, ranging from paper-based systems to electronic databases, and at different administrative levels — central government, regional government and POs.

A range of institutions are involved in the implementation of RBM systems at various different levels, including line Ministries, central, regional and local government and private organisations such as associations and POs. The roles that POs have taken on in relation to distribution and utilisation of the fishing rights of their members vary

from country to country and from PO to PO, from the management of minimum price schemes, to being involved in the distribution of fishing rights and the management of fishing activities.

Constraints to RBM implementation and development include management constraints (e.g. the management regime does not lend itself to RBM-type approaches, or restrictions are not currently required), policy constraints (e.g. the 'quality' of rights bestowed may be restricted due to limits on transferability because of policy goals and social objectives), legal constraints (e.g. primary legislation of Member States must be flexible enough to respond to conservation and management measures adopted at Community level), and costs of implementation.

The success of RBM systems against CFP objectives (sustainable exploitation of stocks and economic performance) was explored, firstly on the basis of empirical relationships and secondly on the basis of indicative practice from a series of examples. In terms of the analysis of relationships, informative results were not forthcoming for a number of reasons: individual stocks can be exploited by fleets managed under different RBM systems; a single RBM system can be applied to a variety of fleets and target stocks; and available data on stock status and fleet economic performance do not correspond to RBM systems. The relationships are further confounded by factors such as: the adjustment period required for a stock to respond after the implementation of a new management system, a critical component in the observed relationship between RBM regimes and the health of the stock; neighbourhood effects (management systems of other countries exploiting the same stock); and enforcement effectiveness.

Determining best practice across such a wide range of fleets and stocks is no simple task. The range of species, fisheries, fleets, communities and administrations is too diverse to be able to identify best practice that would apply to all situations. More data could be collected to investigate patterns in cause and effect, but at present, the most productive line of research has been to study specific cases with the aim of deriving lessons learned that are likely to be applicable elsewhere.

A pattern is apparent among quota managed fisheries (Figure 1). In cases where catches do not exceed the overall quota, a common quota pool may be sufficient, however, as competition for quota is increased, so quota allocations and ITQs become the management tools of choice. However, while there are benefits in moving towards management systems that provide higher quality rights for participants, the approach is not an automatic panacea for ailing fisheries. RBM systems such as ITQs and TURFs will not necessarily provide the best outcome for all fisheries. It is better to think in terms of developing RBM systems through a process of evolution, supported by additional measures both to encourage desirable outcomes, such as reduction in over-capacity, and to mitigate undesirable outcomes such as concentration and/or marginalisation of small scale operators.

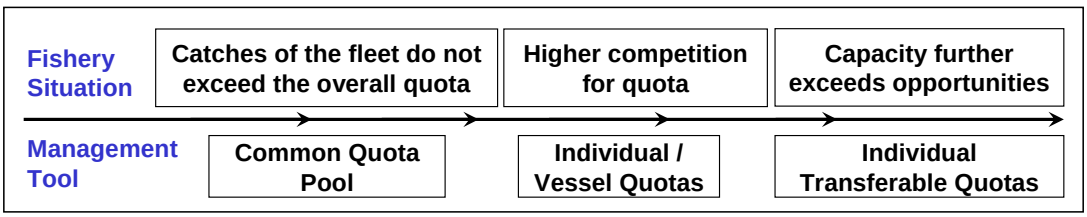

Figure 1 Pattern in quota managed fisheries

A vital factor in reaping the benefits of RBM is an industry that demonstrates a responsibility for stewardship of the resource. This was an important element in the success with ITQs shown in the Danish pelagic fishery. In this example, capacity reduction has been achieved without the need to allocate public money, good stewardship has been promoted from within the local producer organisation and fisheries remain profitable. By contrast, in the Netherlands case ITQs performed very poorly in the 1970s and '80s because of an initial failure to effectively limit fishing capacity and monitor catches. More recently, the system has improved significantly through the establishment of co-management-type framework that has increased both responsibility and compliance (van Hoof, 2008), but the beam trawl fleet is still operating at an economic loss, largely due to high operating costs.

Three of the four attributes used to characterise RBM systems, namely exclusivity, security and validity are essential; if any one of these is reduced to zero, the right becomes essentially worthless. However, while transferability can have multiple benefits, it is not essential and Member States show different approaches to its implementation. Some element of constraint on transferability is common, but markets in rights develop naturally where the rights have a clear value.

A number of Member States have purposely restricted transferability of rights with the aim of protecting national fishing interests, small-scale fishers and fishing-dependent communities. Even in systems where transferability is significant (e.g. VTQ and ITQ systems) there are often systems in place to ensure the protection of small-scale fishers and to ensure the possibility of new entrants to the fishery, such as allocating a proportion of national quota to the small-scale sector, and reserving a part of the quota for new entrants in order to build up a track record.

In the case of quota-managed fisheries, of concern at the Community level is the possible impact of quota trading on the capability to monitor and retain control over quota ownership and uptake. Current case law indicates that Member States can limit quota entitlement to entities with an economic link to the Member State, although such rules must be non-discriminatory. Such arrangements could be extended to a more regional model. In this regard it is also worth considering the distinction between quota ownership and use rights. Essentially the Member State could retain the ownership of the quota that is allocated to it by the EC, maintaining relative stability, while the right to use a portion of that quota allocation is what is sold, leased, or otherwise transferred between participants in the fishery. A more restrictive approach would be to allow only in-year quota allocations (not the use rights themselves) to be traded between participants. No matter to whom the quota is transferred, the Member State owner needs to be in a position to continue to meet its obligations under the CFP in terms of compliance with its quota limits.

There is a clear question regarding the Commission's role with respect to development of rights-based management in the EU, particularly in the context of the reform of the CFP. As stated at the outset, the economic management of fisheries is a matter for Member States. Nevertheless, there are initiatives that could be taken to both encourage and smooth the path towards better-performing fisheries and sustainable stock management. One of the significant issues that appears to undermine the realisation of benefits of RBM in EU fisheries is the erosion of exclusivity that occurs with the application of different management regimes to fleets targeting shared stocks. This is not something that impacts the use of RBM for fisheries in EEZs that are under the exclusive control of national governments outside the EU where benefits have been described. To mitigate this, the Commission could possibly take on a coordinating role that would lead to better alignment of management systems on a regional basis. At a minimum a set of

guidelines and/or minimum standards for RBM could be developed on the basis of the lessons leaned presented in this report. While management systems are complex constructs and need to evolve to meet the specific local needs, there are certainly potential pitfalls that the Commission could help Member States to avoid by identifying what has not worked well in the past.

Based on the overall study, the following general conclusions with respect to developing best practice in RBM systems emerge:

- **Local conditions**: RBM systems need to be tailored to local circumstances and objectives.

- **Scientific requirements**: A sound scientific basis for establishing exploitation limits is important for any management system. For quantitative RBM systems this requirement may be even greater. For example, management through ITQs requires accurate real-time specification of TACs, adjusted annually in response to stock fluctuations.

- **Cost-benefit assessment**: Sophisticated RBM systems can be costly to implement and maintain. Such systems may be economically warranted only for large, valuable resource stocks.

- **Economic performance**: Previous research has shown resource rent generation is highest in those systems that have the highest quality rights. Systems with weak rights showed negative or low resource rents and could not cover the management cost. These findings showed a clear link between the management regime and the opportunity for profitable fisheries.

- **Avoidance of overcapacity**: The OECD recommends that fisheries management systems are designed to prevent overcapacity and overfishing from occurring, and that there should be appropriate incentives for fishers to automatically adjust fishing capacity and effort, so as to avoid the use of expensive decommissioning schemes where possible. RBM systems that do not lead to a natural reduction in excess fishing capacity should be augmented by active decommissioning schemes to promote an improved balance between fishing capacity and fishing opportunities. Schemes should not allow capacity once removed to return to the fishery and preferably should not require the use of public funds.

- **Precautionary management**: Fishery resources typically suffer from high unpredictability, which can lead to overfishing or collapse unless specifically allowed for. The fishing industry is also impacted by numerous factors which are outside of the control of any management agency or authority, for example, oil price or world currency markets. Even well-managed fisheries may suffer shocks from external factors, which can affect their economic performance.

- **Enforcement**: Rights require enforcement, because of the potential impacts of illegal activities. Without effective enforcement, exclusivity and security have little meaning.

- **Transferability**: Enhanced transferability of rights and improved flexibility in rights management may produce a reduction of redundant capacity and enhancement of efficiency. Nevertheless, even when a right is not officially transferable, if the right is valuable, stakeholders will find some element of the

system through which this value can be expressed. In IQ systems, where there is a specific concern to restrict transferability, similar outcomes to those of ITQ systems (reduction in capacity, reduction in the race to fish, and obtaining an appropriate mix of quota) can be achieved by other nationally-implemented measures, such as decommissioning schemes and national quota swaps. This requires more input (time and resources) from the central authorities, rather than allowing the market to act. A number of Member States have purposely restricted transferability of rights with the aim of protecting national fishing interests, small-scale fishers and fishing-dependent communities. Even in systems where transferability is significant (e.g. VTQ and ITQ systems) there are often systems in place to ensure the protection of small-scale fishers and to ensure the possibility of new entrants to the fishery, such as allocating a proportion of national quota to the small-scale sector, and reserving a part of the quota for new entrants in order to build up a track record.

- **Co-management and fisher responsibility**: Effective implementation will not be realised without the cooperation of fishermen in terms of design, implementation, and compliance. The industry needs to be empowered to take on responsibility for stewardship of the resource to ensure a sustainably future for fisheries. The use of POs not only as platforms for quota management but also as platforms to develop technical measures may enhance resource sustainability. PO management of markets for rights, when based on sufficient/necessary provision of information to Member states (e.g. quota uptake), can increase the ability of fishermen to adapt fishing strategies resulting in economic and social benefits.

- **Government intervention**: Even in market-based ITQ systems, national authorities should establish the parameters and limits within which the system should work, and may wish to maintain the possibility for intervention should it be seen to not be functioning as expected. While longer-term rights are generally regarded to be higher quality, it may be prudent to include a sunset clause to enable such intervention if necessary. An RBM system may be seen as a ‘resource give-away’, unless accompanied by a system of fair user fees. Mechanisms for cost recovery should be given due consideration at an early stage, as it is much harder to implement later in the process.

- **Markets for rights**: The existence and functioning of markets in the EU, is bringing about considerable benefits in terms of resulting efficiencies and fleet reductions, in line with CFP objectives. However, Member States should be free to continue to impose limitations on the functioning of markets to protect vulnerable/ dependent fishing communities. Stakeholders must be fully involved in decisions taken by Member States as to the establishment and development of markets for rights. With increasing value of fishing rights resulting from the development and functioning of markets, special provisions may be required to assist new entrants to the fishery because of increasingly high entry costs. It need not be necessary for State administrations to retain complete control over the monitoring of transfer markets.

- **CFP objectives**: The principal driver for many of the more sophisticated quota-based RBM systems in the EU has been Commission regulations establishing TACs and quotas for a number of species, and requirements to limit fishing capacity. RBM systems are usually not sufficient in themselves to meet the objectives of the CFP. This requires a range of fisheries management measures at different levels that may constitute a ‘bundle’ of rights. Likewise, implementation of ITQs does not necessarily lead to improved economic

performance of the fleet and/or better matching of fleet capacity with fishing opportunities. Coherent policies in other sectors (e.g. economic development) are needed to avoid the undermining of RBM approaches.

- **National objectives**: These may impose constraints on the development of RBM, but do not necessarily undermine the meeting of CFP objectives. RBM systems need to be tailored to local circumstances and objectives. In this regard, moving towards IQ and ITQ management systems is necessarily an iterative process that takes a substantial period of time, and should allow opportunities for stakeholder input and revision or modification of the system as it evolves.

- **Small scale fisheries**: Schemes for small-scale fisheries, such as a separate quota allocation, and/or prevention of consolidation can be implemented alongside ITQ systems and result in their protection and continued participation in the fishery.

This study has collected information on the existing RBM systems in coastal EU Member States. However a number of data gaps have been identified that have hindered the analysis of effects of RBM systems in the context of EU fisheries. A number of areas of further research and investigation therefore arise.

The available indicators of stock status and economic performance did not line up well with the RBM systems studied, therefore it was difficult to identify correlations and draw conclusions on the effectiveness of RBM systems in contributing to the achievement of CFP objectives. Further research to investigate economic fleet performance in more detail would be of benefit, based on RBM units (i.e. fleets targeting particular stocks under the same RBM system). This would help improve understanding of the effects of particular RBM types on economic outcomes.

Nevertheless, the lack of clear patterns showing benefits should not be a reason for not moving forward with RBM. Further detailed studies on the application of RBM to European fisheries would be useful. In particular, more in-depth studies with a regional focus looking at particular fisheries (e.g. mixed fisheries in the North Sea, inshore fisheries in the Mediterranean) would be useful to draw out specific recommendations for the particular fisheries and the Member States involved.

With regard to legal aspects of RBM systems, it would be useful to compare the legal framework for European RBM approaches in the case of fisheries that are subject to management under the CFP using IQs and ITQs and which are regulated on a number of different levels (EC, national law and regulations), with other developed countries which have introduced RBM on the basis of primary legislation that clearly enshrines the legal rights so created.

In relation to markets for fishing rights, there are a number of topics that could be further investigated:

- The evolution of market for rights in Member States, as opposed to the evolution of RBM systems themselves;
- The extent to which tradable rights are actually being traded and transferred on the market; and
- The value of rights, including, what is the current value of different types of rights in existing markets at the present time, and how have these values changed?

The need for scientific data regarding stock status and behaviour is not removed by the implementation of rights-based management, and in some cases it becomes even more important. Other developments in fisheries science and management, such as the ecosystem approach to fisheries management (EAFM) requires even wider knowledge of the ecosystem than just the abundance and productivity of target stocks, or the comparative effort of each fishery. However, linking of the various ecological-state and fishing-pressure indicators used under the EAFM to tradable rights appears to be a new and relatively open field of enquiry.

1. Introduction

1.1. Background to the study

Rights-based approaches to fisheries management have shown potential for promoting biologically sustainable and economically viable fisheries in several parts of the world. While assessment of the benefits remains controversial, the use of one of the most often cited examples, Individual Transferable Quotas (ITQs), is clearly increasing. Chu (2008) has reported on the growth since 1975 in the number of countries using ITQs and the number of species they cover. By 2005, they were used in at least eighteen countries to manage several hundred stocks of more than 200 species. In 2004, the US ended an 8 year moratorium on ITQs following the recommendation by the National Research Council (NRC 1999). Economic theory is often used to demonstrate the virtues of allocating high quality rights in fisheries (e.g. expressed as high levels of exclusivity, security, longevity and transferability) to avoid the situation where overcapacity produces economic hardship and erodes management capacity. Analysis of performance in practice, however, demonstrates that successful management also requires a competent management authority able to set and enforce regulations and monitor the status of stocks. (Beddington *et al*. 2007).

Under the framework of the reformed EU common fisheries policy (CFP), economic management of fishing rights remains an exclusively national responsibility. Due to the CFP principle of 'relative stability' which is intended to ensure a predictable share of the stocks for each Member State, there is currently no possibility of rights-based management (RBM) systems at the Community level. However, individual Member States can and do implement RBM systems at a national level. The methods of allocating, sharing or transferring fishing opportunities between vessels at national level affects the economic situation of the fleet as a whole (COM(2006) 103 final).

In some instances, there may be benefits from greater coherence, standardisation and harmonisation across Member States. It should be noted that each Member State is still free to set its own objectives for fisheries management in terms of the economic, social and cultural dimensions. In practice there may be certain obstacles for some Member States in adopting particular RBM systems, where the concept of allocating private rights to what is still, in some cases, considered an open access public resource, can cause difficulties.

The aim of the review therefore, is to explore the systems currently being used at Member States level, their advantages and limitations, and the possibility of improving their efficiency by sharing best-practice across the Member States. The Terms of Reference are provided in Annex 1. The TORs state that 'RBM includes any system of allocating fishing rights to fishermen, fishing vessels, enterprises, cooperatives or fishing communities'. In addition to regarding RBM as ways of allocating rights, it also encompasses management based on rights. We have therefore interpreted this passage from the TORs as specifying RBM as management based on any fishing rights allocated to fishermen, fishing vessels and so on. This interpretation was reinforced during subsequent planning meetings with the European Commission.

This study provides information on the range of RBM instruments already in use in the coastal Member States. It analyses their characteristics, effects and seeks to

evaluate their degree of success in contributing to achievement of the CFP objectives of: sustainability of exploitation of stocks, matching fleet size with available fish resources, and economic viability of the fishing industry. RBM systems have been introduced within the Member States for a range of different reasons. Some of these systems, such as TURFs and community based-management systems, are very old indeed and represent a combination of pragmatism (in the case of sedentary species) and traditional notions of fisheries management. On the other hand IQs and ITQs have often been introduced as a pragmatic means of allocating national quota entitlements under the CFP. Indeed in some countries the process of transformation to from IQs into ITQs has been gradual, almost an organic development as holders themselves have sought to determine the full potential of their rights. All RBM approaches promote greater legal certainty. Beyond that, a number of more specific benefits are claimed for RBM approaches. In general terms the more the rights so created resemble property rights the greater benefits are claimed. More specifically, such rights create incentives for socially responsible behaviour. The sense of 'ownership' created by rights in fisheries, the ability to put a monetary value on such rights and even to transfer them, create a body of rights holders with a genuine 'stake' in the system much in the same way that rights to land and water create a stable and secure basis for investment in those resources. Investments can be made over a longer time frame with greater certainty due to security conferred by such rights (and indeed in cases where rights can be used as collateral they themselves provide the means for investments). At the same time, securing compliance is facilitated by reason of the fact that each right holder has a personal incentive in the integrity of the system that confers value on his or her rights. In economic theory only a tax or royalty based system can offer equal benefits and for a range of practical and political reasons such systems have yet to be deployed.

This final report is accompanied by a standalone Catalogue of Rights-Based Management Instruments in coastal EU Member States ('the EU RBM Catalogue'), prepared during Phase 1 of the project and attached to this report as Part II.

This study satisfies the need, identified by the Commission, for a review of existing RBM practices in the EU.

1.2. Methodology and approach

The study was carried out by a consortium with expertise in fisheries across the 20 EU coastal Member States. The consortium was composed of a combination of in-house specialists from MRAG Ltd and our partners: Innovative Fisheries Management (IFM), Denmark; Centre for Environment, Fisheries and Aquaculture Science (CEFAS), UK; AZTI Tecnalia, Spain; and Polish Environmental Management (PolEM), Poland. The Consortium was also supported by specialists from IDDRA (RBM systems in France, Belgium, Netherlands, Greece and Cyprus, and administration and monitoring of markets for fishing rights), and Poseidon (analysis of existence and impacts of markets of fishing rights)[1].

The scope of the study focused primarily on RBM systems in EU waters managed under the CFP. RBM systems that apply to other waters were also included where interesting examples arose. These included inshore/territorial waters, inland waters, and high seas areas such as the regulatory areas of the North East Atlantic Fisheries Commission (NEAFC) and the North Atlantic Fisheries Organisation (NAFO).

[1] The Consortium was also supported by Dr Ragnar Arnason (economic theory of RBM) and Stephen Hodgson (legal aspects of RBM). An expert panel comprising Gordon Munro, Colin Clark and Gary Libecap provided advice with respect to assessment of success and best practice.

The definition of RBM adopted for this study is broad, including 'any system of allocating fishing rights to fishermen, fishing vessels, enterprises, cooperatives or fishing communities'. As such, the main types of RBM systems covered are: limited non-transferable licensing (LL); limited transferable licensing (LTL); community catch quotas (CQ); individual non-transferable effort quotas (IE); individual transferable effort quotas (ITE); individual non-transferable catch quotas (IQ); vessel catch limits (VC); individual transferable quotas (ITQ) and territorial use rights in fisheries (TURF).

The first phase of the study (Task 1, a review of existing RBM practices in the EU) was carried out by reviewing available literature and using a questionnaire-based approach to obtain specific information from fisheries administrations and key informants on RBM systems in Member States. To enable comparison between different RBM instruments, between Member States and across the different regions, a set of standard data formats were developed for the collection and organisation of information within the project. The output of Task 1 is presented separately in the Catalogue of RBM systems in each coastal Member State. The EU RBM Catalogue was submitted as an Annex to the Interim Report, which was commented on by the Commission and subsequent adjustments were made, although the Catalogue remained a 'live' document until the end of the study, so that it could be updated as more information came to light through subsequent research.

The Catalogue does not, and in our view could not provide comprehensive details on all RBM systems in the EU. What it does provide is a compilation of those systems in each Member State that were identified by the project team and in-country respondents as being the key management systems that infer rights on the fishery participants. Several additional examples are also included, which may not be applied on a national level, but provide useful case studies of particular approaches and systems.

A questionnaire (Appendix 1 of the Catalogue) was developed to guide data collection in the Member States and generate information in standard formats, thereby developing a database that would prove useful for the analysis undertaken during the remainder of the project. This provided information about the RBM schemes that exist in each Member State and the fisheries to which they apply; in particular:

- Drivers for the implementation of RBM at the country and fishery level;
- Fishery-specific information such as target species, fleet size and characteristics, location, discards and bycatch, Member States and non-Member States participating in the fishery, compliance, monitoring and enforcement;
- Scoring of the RBM system against the four criteria: Exclusivity, Validity, Security and Transferability;
- Arrangements for small boat fisheries or means to protect small-scale fisheries;
- Methods of initial allocation of rights;
- Methods of transfer of rights;
- Key issues such as concentration of fishing rights, access of newcomers, access of nationals of other Member States.

Each partner involved in the project had responsibility for collecting the required data for their allocated countries (Table 1). Data were gathered from existing literature and

from semi-structured interviews (using the aforementioned questionnaire) with government institutes and industry representatives including fishery management authorities, fishery Producer Organisations (POs) and other relevant fishermen's associations. The fisheries administrations in each Member State were given the opportunity to comment on the relevant sections, and the text was revised in light of this. To the extent possible, the project team sought information on both how each RBM system is designed, and how it works in practice. The information presented in both parts of the report is derived from the questionnaires from Member States, unless otherwise referenced.

The characteristics of each RBM system were represented through the scoring of four attributes, as identified in the Terms of Reference: Exclusivity, Validity, Security and Transferability. Exclusivity relates to whether others are prevented from damaging or interfering with an owner's rights; validity is determined by the length of time the owner of a right may exercise his ownership; security refers to the certainty and enforceability of the property right; while transferability is the extent to which the entitlement to a right can be transferred by selling, leasing or trading. A scoring system was derived by the project team, based on the OECD framework (OECD, 2006) and details are provided in the Catalogue (Part II). Scores were represented in rosette-style plots to enable easy comparison of the 'footprint' of each RBM system relative to the 'perfect' system that would score 1 for every attribute (See Part II). Given the potential for variations in interpretation of scoring guidelines, and hence subjectivity of the scoring results, frequent meetings were held between Consortium partners to discuss the results and ensure consistency Scores were checked for the full range of systems to ensure consistency in scoring among Consortium partners. In addition to providing an at-a-glance depiction of the attributes, these scores were used to calculate a composite value which depicts the overall quality of the right, or Q value. This is discussed in detail in the context of best practice in Section 4.2.

The second phase of the study (Task 2) was the analysis of characteristics and effects of RBM systems. The analysis covered the following topics:

- The relationship between the analysed RBM system, and input or output constraints at Community level;
- The initial allocation of the total volume of rights and its subsequent evolution;
- The functioning of management tools used to distribute, monitor exchanges and redistribute fishing rights;
- The existence, functioning and monitoring of markets for fishing rights within and between Member States, whether formal or grey;
- The role of different institutions (central and local governments, communities), public and private associations and other actors in the management of RBM systems; and
- Any reasons for Member States not to implement RBM systems.

For each of these components of Task 2 the data collected during Task 1 were synthesised, and further information sought where necessary. Case studies that provided interesting illustrations of various issues were identified and investigated in more detail in text boxes.

Task 3 of the study involved the identification of best practice at EU level, with specific regard to the objectives of the CFP (sustainable exploitation of stocks, relationship between size of fleets and available resources, economic viability). The methods used in this regard are described in Section 4.

Table 1 Data collection responsibilities for each partner by EU Member State

	Member State	Atlantic	North Sea	Baltic	Mediterranean	Partner
1	Spain	x			x	AZTI
2	Portugal	x				AZTI
3	Malta					AZTI
4	Italy				x	AZTI
5	Slovenia				x	AZTI
6	UK	x				CEFAS
7	Ireland	x				CEFAS
8	France	x			x	MRAG
9	Netherlands		x			MRAG
10	Belgium		x			MRAG
11	Greece				x	MRAG
12	Cyprus					MRAG
13	Denmark		x	X		IFM
14	Sweden		x	X		IFM
15	Finland			X		IFM
16	Germany		x	X		IFM
17	Estonia			X		PolEM
18	Latvia			X		PolEM
19	Lithuania			X		PolEM
20	Poland			X		PolEM

1.2.1. Categorisation and naming of RBM systems

Each RBM system was categorised as one or other of the RBM types considered in this study (e.g. IQ, ITQ, TURF etc, see Table 1 in the Catalogue). In each case, the type that was considered by the project team to be the most appropriate descriptor of the management system in question was applied. However, it should be noted that the name used is not necessarily the name by which the management system is known in-country.

2. Overview of rights based management in the EU

The EU RBM Catalogue presents details of a large number (more than 40) of RBM systems in place across the EU. It is therefore a substantial document. In this section, a summary of the information contained in the Catalogue is presented, to demonstrate the types of systems in place in different regions and fisheries across the EU, their main features and their scores against the four attributes Exclusivity, Validity, Security and Transferability. The Catalogue also summarises how a number of concerns are dealt with in different RBM systems, namely:

- the concentration of fishing rights;
- the protection of small-scale fisheries;
- access of newcomers to fishing rights;
- access of nationals of other Member States to fishing rights; and
- the potential effects on discards.

Following the broad interpretation of rights in fisheries, all coastal Member States have some kind of RBM system in place and a range of RBM systems are used across the EU coastal Member States. Even licensing provides rights to fish to those with a licence to the exclusion of those without. Despite this, the RBM systems likely to be the most effective in meeting the objectives of the CFP are those that confer long-term, high quality rights to fishers and give them a 'stake' in the future condition of the resource, because of a perception that they will benefit in some way from future improvements in resource status. Such systems include quota (catch or effort) allocated to individual fishers or groups of fishers, which helps to reduce the 'race to fish', or quota allocated to individual fishers or groups of fishers who are then allowed to trade their quota allocation.

The RBM systems studied range from covering a significant proportion of a Member State's total landings, to being small, location-specific examples that may have wider applicability:

- In Denmark ITQ fisheries (Pelagics plus industrial species) represents 35% of total landings by value (2007), VTQ-fisheries (demersal species) 62% and LL (mussels etc.) 3%.
- In Sweden the 3 co-management experiments (LL) mentioned represent a tiny fraction of total landings by value, but they are of local economic importance and even more of local cultural importance (Swedes are crazy about vendace roe and with coastal shrimps from Koster/Vädarö and Gullmarsfjord in the summer time; both places are very attractive holiday areas). In Sweden the pelagic fisheries counts for 45% of total landings by value.

A number of trends based on region, fishery and the Member States' approach to fisheries management are apparent.

In order to participate in a particular fishery, often a 'bundle' of rights is necessary – for example, a licence, quota allocation and days at sea.

Limited licensing (LL) is a common means of restricting access to a fishery and the majority of Member States use this either as a main, or supporting means of managing one or more fisheries. It is used as a means of restricting vessel numbers and fleet tonnage in line with Community restrictions. All Member States are believed to operate a licensing system of some sort. Those countries for which limited licensing is not indicated in the Catalogue may still use limited licensing, but as an integral part of the management system with other RBM types (e.g. in combination with IQs or ITQs); licensing was only included where it was a key RBM system for a particular fishery or fisheries. Where other RBM systems impose more significant restraints on fishing activity, and confer higher quality rights, then that RBM system was assessed and the licensing system is not necessarily included as well.

Licences may be transferable where they can be transferred between vessels, particularly where capacity (quota or tonnage) can be amalgamated together. Examples are the Netherland's and UK's licensing systems, although these work in support of quota-based management systems and thus neither has been evaluated in detail in the Catalogue. Most licensing systems have been categorised as non-transferable, meaning licences cannot be transferred between vessels, although a licence can change ownership if a vessel is sold together with its associated licence. In reality, there is a continuum of transferability, from strictly non-transferable (the licence is returned to the State and re-issued), e.g. Cyprus, France, Slovenia; to

transferable on sale of vessel (the licence is transferred with the sale of the vessel) e.g. Italy, Malta, Spain; to partly transferable (the licence can be transferred to a new owner, separately from the vessel, if the vessel is scrapped or decommissioned); to fully transferable (the licence can be transferred to another vessel and aggregated with other licences to increase the total capacity) e.g. Netherlands, UK. In practice, the last type, limited fully transferable licences, were only found in conjunction with quota systems and therefore have not been scored.

A range of (catch) quota measures are also used, in most cases to distribute the national allocation of Community TACs. As a result, North Sea and Atlantic stocks which are managed by TACs and where a Community quota is established and distributed to Member States are the main stocks for which RBM systems such as IQs, VCs and ITQs exist. The need for Member States to distribute and manage their quota allocation has been a key driver for the establishment of many of these RBM systems.

The extent of transferability of rights in catch quota-based systems varies between Member States. Most countries have established restrictions on transferability, and as a result IQ is the commonest form of catch quota system (used in Italy, France, Belgium, Sweden, Germany, Latvia, Lithuania and Poland). For many countries, transferability has been purposefully constrained with the aim of protecting national interests in fishing and avoiding the concentration of fishing rights in the hands of a few large (possibly foreign-owned) companies (e.g. in Belgium and Ireland) (see Box 32). Others Member States have established greater levels of transferability of catch quota-based rights (i.e. ITQs, or IQ systems with significant transferability features): Spain (NEAFC demersal fisheries); Portugal (NAFO demersal fisheries); Denmark (pelagic and demersal fisheries); Netherlands (pelagic and demersal fisheries); UK (pelagic and demersal marine fisheries); and Estonia (offshore herring, sprat and cod fisheries). However, even in the cases of transferable quota, there are often restrictions on transferability (e.g. only within a fleet, or only between POs/nationally-flagged vessels). Many systems show a gradual evolution towards increasing transferability, such as the UK (IQ/ITQ), where transferability has gradually increased in the system, as a result of demand from industry, although it is not a fully-fledged ITQ system. There are also differences regarding whether quotas are allocated to fishers and can be transferred independently of the vessel (IQ or ITQ), or whether the catch quota is linked to the vessel and can only be transferred with the sale of the vessel itself (VC e.g. Ireland). A further quota-based system is Community Quota, not used as extensively as IQ or ITQ, found in Portugal, France, Belgium and Poland.

Effort-based quota systems are less common than catch-based quota systems because this type of RBM system often occurs in those same fisheries for which catch quotas are in place. Usually, the catch quotas are the key instrument used to manage these fisheries, and effort restrictions have been introduced as a complementary measure to minimise bycatches, discarding and quota overshoots. Therefore, the catch quota system was judged to be the main RBM system for the fishery and the effort-based system is included as a supporting measure, but not scored. However, the more complex such arrangements become, implementation, monitoring and enforcement also become more difficult. The superimposition of effort restrictions on a quota-based system may result in reductions in economic efficiency, for example, the days-at-sea restrictions imposed on IQ and ITQ systems in the North Sea. IE and ITE systems were found for specific fisheries, e.g. the coastal fishery in Latvia (IE), salmon netting in the UK (ITE), and the coastal fishery in Estonia (ITE).

The continental shelf in the Mediterranean basin is generally narrow and fishing grounds are usually found close to the coast, within territorial waters. To date none of the Member States have claimed Exclusive Economic Zones (EEZs) in the Mediterranean although Fisheries Protection Zones have been declared in some cases (e.g. Spain and Malta). In principle, the fundamental policies underpinning the CFP have been applied and enforced in the Mediterranean in an equivalent manner to other Community areas. However, in practice, there are important differences in detail. The general paucity of data on fish stocks has meant that the conservation policy could not yet be based on a system of the total allowable catches (TACs) and quotas, even if that were the objective. The only exception is bluefin tuna where TACs have been in existence since 1998[2]. Fisheries management in the Mediterranean therefore continues to rely fundamentally on input controls (effort restriction) through limited licensing. This is reinforced by a raft of technical measures, restrictions on fishing time and limits on fishing areas. The development of marine protected areas in particular is emerging as a key management tool.

In the Baltic Sea, fisheries are managed jointly by the EU and Russia, who each set their own TACs (the 'Agreement between the European Community and the Government of the Russian Federation on co-operation in fisheries and the conservation of the living marine resources in the Baltic Sea', which should have been implemented from 01/01/2007 has not yet come into force). With respect to the EU, the fisheries are predominantly managed through IQ systems in the coastal Member States. This applies to coastal and inshore fisheries as well as offshore fisheries, for herring, sprat and Baltic cod. Some systems are a 'Community Quota' arrangement, where individual fishers fish against a common pool of quota. This occurs, for example, in the Polish coastal herring and sprat fishery, in which only 40% of the total national quota is being used, therefore there is not currently a need to allocate quota to individual fishers or to restrict fishing activities further. Estonia has opted for a more market-oriented approach and has implemented transferability in its main fishery management systems (ITQ for the offshore herring, sprat and cod fisheries, and ITE for the coastal plaice, perch, salmon and herring fisheries).

TURFs are established across all regions of the EU and are applied mainly to inshore areas and for sedentary (often shellfish) stocks. In Italy, consortia manage the inshore clam-fishing grounds; in Spain, *Cofradias* manage and control access to shellfish grounds; in Sweden and Finland there are privately-owned marine areas as well as co-management experiments in public waters for shrimp and vendace fisheries in Sweden; and in the UK there are TURFs managed by co-operatives for shellfish. In addition to TURFs for sedentary species, there are examples of a TURF approach being used for pelagic resources: sardine in Portugal, and dolphinfish (through access to FAD sites) in Malta.

The RBM systems that tend to score most highly in terms of Exclusivity, Validity, Security and Transferability, are the ITQ and ITE systems (by their very nature, indicating a high score for transferability), and TURFs, which tend to score highly on the other characteristics but low on transferability. An exception to this is the Swedish TURFs on inland and coastal waters that are under private ownership and therefore fully transferable on the land transfer market.

Limited licensing tends to score low on most characteristics. The exclusivity score is low because the resource is shared with other licence holders, and there is no

[2] Bluefin tuna is managed through a TAC set by the International Commission for the Conservation of Atlantic Tuna (ICCAT). The TAC allocated to EU Member States is subsequently allocated either as IQ (e.g. Italy) or ITQ (e.g. Spain) to fishers.

guarantee of a restriction on catches; licences are often non-transferable therefore the transferability also tends to be low.

It should be noted, however, that just because these systems score low in terms of the four attributes, this does not necessarily mean they are not an effective means of managing a fishery or achieving stated fishery policy objectives. In some cases, transferability is purposely restricted (resulting in a low score), with the aim of protecting the interests of fishing communities. There are examples of successful co-management initiatives in the Mediterranean (successful in maintaining the sustainability of the resource, reducing conflicts, and achieving social objectives) (see Box 33) that are based on limited licensing. It is therefore important to consider the outcomes in terms of sustainability of stocks, economic viability of fleets and achieving social objectives, and how the RBM system functions in each case, rather than the score in isolation.

Overall, in fisheries which are managed by a quota, there has been a trend for moving from a quota pool (community quota, CQ), when the catches of the fleet do not exceed the overall quota (e.g. Poland coastal herring and sprat fishery), towards individual quotas (allocated either to vessels, individuals or companies) once fishing capacity increases to a level where there is competition for the quota. Individual quota can help reduce the race to fish as each company/vessel has the 'guarantee' of a certain quantity of quota. These systems subsequently tend to increase in transferability, either through policy decisions (e.g. Sweden, Denmark), or through the *de facto* establishment of markets for rights (e.g. UK).

3. Analysis of characteristics and effects of RBM

This section of the report addresses Task 2 in the Terms of Reference. In essence, this seeks to examine a range of specific RBM characteristics and effects, specifically:

- Allocation and duration of rights;
- Transfer of rights and market for rights;
- Institutional aspects of RBM (roles and responsibilities); and
- Constraints to the development of RBM in EU Member States.

3.1. Allocation and duration of rights

3.1.1. Initial allocation systems

In most RBM systems used by Member States, fishing rights were initially allocated according to the historical track record of the owner or vessel. The most common approach to allocating rights was by basing them on historical catches, landings or engine power of vessels throughout fixed reference periods. For example, Danish VTQs are allocated based on landings over a fixed three-year period; the Swedish allocation of IQs is based on historical track record from 2000-2004; and similarly in Germany, fishing rights (quotas) have been allocated on the basis of fixed reference

points for vessels fishing in both the North Sea (landings in 1986/87) and the Baltic Sea (landings in 1989/90).

Some quota allocation systems were initially based on rolling reference periods, but these often resulted in strategic fishing activities in an attempt to maximise the proportion of quota received in subsequent years. As a result, rolling reference periods have generally undergone a move to fixed reference periods (e.g. France and UK). In the UK, the division of national quota among the POs and non-sector vessels was initially based on the combined track records over the previous three years of vessels greater than 10 m in length that were members of each PO or group[3]. However, the landings records were not always trustworthy and fishers changed their fishing patterns to maximise the following year's quota allocation (see Box 1).

Box 1: Change from a rolling reference period to a fixed reference period for quota allocation in the UK

The division of the UK national quota between vessels in POs and not in POs ('sector' and 'non-sector vessels') was initially based on the track record of total landings of all over-10 metre vessels belonging to POs during the previous three years. Enforcing the accuracy of these records proved difficult and led to problems, one of which was that rolling track records for individual vessels were not necessarily trustworthy. Some skippers over-declared landings in order to enhance their track records. Fishers would also strategically alter their fishing patterns during the rolling period in order to gain maximum benefit when quota was allocated for the following year. To prevent this kind of manipulation, a fixed three-year reference period in the past was agreed as the basis for allocating proportions of the national quota in terms of 'fixed quota allocation' units (FQA) linked with each vessel's licence and based on their track record during 1994–1996 to obviate strategic fishing in the lead-in period. See Hatcher *et al.* (2002) and Anonymous (2006) for further details.

An unintended consequence of this system was that vessels that were inactive for any reason (e.g. an overhaul) during the agreed reference period found themselves disadvantaged with a sharply reduced FQA from then onwards (Read 1999). This problem was subsequently adjusted with the FQA 'formula method' which allows disadvantaged non-sector vessels to join a PO with an alternative set of FQA based on landings during the previous three years (Anonymous 2008c).

In the Netherlands both historical catch landings and vessels' power are used for initial allocations. In the first instance, individual quotas received by fishermen that fished prior to 1 January 1974 were based on the highest amount of plaice and sole landed in the years 1972, 1973 and 1974. For ships under 1,250 hp commissioned after this date, quotas were based on the average performance of the vessels in the same horse power group. For ships with more than 1,250 hp, quotas were fixed by the Ministry. This system met a lot of resistance from parts of the industry because it resulted in considerable differences in quotas between vessels of similar capacity. As a result, the system was revised in 1977, adjusting IQs both to engine power and to historical performance. The 1977 allocations are still the basis of the present quota system.

[3] POs differed in how they allocated quota to members. In some, there was an equal sharing among members with leasing of additional allocations among members; others allocated quota according to the rolling track records of vessels or companies.

The allocation of fishing rights in France provides an interesting example of how a combination of factors can be used to allocate rights when licences to fish are renewed. For national licences, special fishing permits and community quota, the initial allocation is based on the three national criteria: historical track records; socio-economic equilibrium; and market orientation. In summary:

1) *Track record of each PO member vessel* — equals the average of reference landings for the years 2001, 2002 and 2003. The amount can be reduced if the PO over-fished its quotas the previous year and increased if the PO concluded an exchange of quotas with another PO. Prior to 2006, the quota reference was a sliding three-year average, but this encouraged opportunistic behaviour by fishers in an attempt to increase their track record and speculation on quota. The fixed reference point was adopted to discourage such behaviour.

2) *Market orientation* — in relation to the market and to maximise the value of landings, the Minister can fix a periodic limit of capture or landings per PO, vessel, or group of vessels.

3) *Socio-economic equilibrium* — the Minister may allocate quotas by establishing specific access criteria to a fishery for socio-economic reasons. The access criteria can be related to a *métier*, gear, region, fishing area or landing site.

The use of socio-economic factors when determining initial allocations is also prevalent in Spain, where rights are allocated using a combination of historical records (60%) and socio-economic dependency (40%) for the bluefin tuna ITQs.

Auctions have been used rarely for the allocation of rights in European fisheries. There are historical examples of the use of auctions to distribute fishing rights, for example, leases for oyster beds in the Dutch province of Zeeland were allocated through auction from 1870 until shortly after the outbreak of the First World War (van Ginkel, 1988). In terms of recent examples, the only Member State found to use auctions in allocating fishing rights was Estonia (Box 2).

In many of the TURF systems, rights and privileges have a long history and are based on historical presence community groups in a given area. In Spain this is the case with the *Cofradia*s (Box 22). In Italy, vessels fishing traditionally for clams in a given ground on a given maritime district were invited to form a consortium. An initial requirement was that the consortium must account for 80% of dredges in a given area.

There are not many examples of prior resource users being excluded by the establishment of an RBM system, although this tends to be more common with TURFs. In the Galician on-foot shellfish TURFs, part-timers were excluded from the activity (Box 3). TURFs also tend to be the most difficult RBM type for newcomers to access once the system has been established.

There is limited information available on the correspondence between different controls, such as catch allocations and days at sea. This mainly applies to North Sea stocks, where days at sea limitations were introduced to complement quota management. It also occurred in Spain, where days at sea were indirectly converted to catch allocations, and in Latvia, where days at sea were introduced to further restrict fishing pressure.

Box 2: Examples of auctions for fishing rights in Europe

Historical auctions in Zeeland for shellfish beds

The culture and harvest of shellfish has been practised in the estuaries of Zeeland for hundreds of years. Van Ginkel (1988) reports how, in 1870, the Dutch Minister of Finance decided that the Yerseke Bank, an extensive natural oyster bed, would be divided into parcels to be leased at a public auction. The first public auction was held in Tholen on May 6, 1870. At the ensuing auctions the lease fees offered sky-rocketed, due to the importance attached to leasing a quality plot so as to be able to plant oysters and secure a reasonable return on the investment. Van Ginkel also reports that the public auctions were held in taverns, which stimulated excessive drinking, and consequently, reckless bidding. Jealousy, mistrust and sometimes even open hostility also encouraged oystermen to outbid each other.

The majority of the access rights were secured by wealthy urban entrepreneurs rather than established oystermen, who consequently had to find jobs with the newly established oyster companies. Rapid industrialisation and capitalisation followed and oyster production multiplied. However, the competitive struggle to gain access rights soon led to overproduction and a shrinkage in profit margins. In 1914 the public auction was abolished, new leases were introduced, and fees were calculated as a percentage of gross proceeds at the request of the newly formed Co-operative Oyster Marketing Organisation (van Ginkel *ibid*.).

Auctions for quota in Estonia

Up until 2005, the allocation of 10% of available fishing rights in Estonia was distributed through auction each year, with the remaining 90% being distributed in an allocation based on historical track records. The allocations bought through auctions would form a part of recent catch and gear-use history (Vetemaa *et al.*, 2002). The starting price of the fishing rights at auctions was determined on the basis of the fishing fee. At the time the fee itself could not exceed 3 % of the normal value of the landing price of fish. In the first year the value of the 10% of fishing rights sold at auction was twice as high as the value of the 90% of allocated fishing rights. The price of some lots of fish increased by a factor of ten.

The auctions were stopped in 2005 as part of a rationalisation of the whole ITQ system. The demand for the additional quota through auction was low and in some years (e.g. 2003) the fishermen did not even participate in the auctions. This may have been in part because fishers were anticipating the advent of the new Fishery Act and the likely decline of the national quota. The Ministry of Agriculture indicated that auctions were abandoned for three main reasons:

1) The auctions became very unpopular among fishermen, who were not happy that they had to compete between themselves and with possible newcomers in order to buy 10% of the fishing possibilities at a high price through auctions every year. The decline of prices for fishery products in Ukraine and Russia (the main export partners at that time) and a decrease in quotas in 2003 caused a decline in profitability in the fisheries sector and a decline in demand for additional quota through auctions.
2) It was not reasonable to allocate fishing possibilities to newcomers given that fishing capacity exceeded the available fishing possibilities.
3) Investment possibilities for companies were diminished.

The outcome was the concentration of fishing possibilities with large companies – a number of small companies collapsed because of the high prices paid at auctions. It also initiated the process of balancing the fishing capacity with available resources.

Box 3: Exclusion of prior resource users in the Galician shellfish TURFs

In the 1960s, the national authorities tried to rationalise and manage the on-foot shellfish gathering activity with the introduction of new regulations. All shellfishers had to have a shellfisher card issued by the *Cofradia*, and there was a closed season from March to October. Obtaining this card was very simple, and there were no limits on their number. As a result, the number of shellfishers almost became out of control because the potential income from the activity was comparatively high, taking into account the time invested, especially during the first days of the open season. In 1974–1975, the number of shellfishers reached almost 60,000.

During the 1980s, regional authorities tried to reinforce the previous rules by introducing several regulations that refined the requirements for shellfish gathering, for instance, a shellfisher training certificate was required (Decree 116/1987, regulating the requirements for shellfishers). However, national and regional laws and decrees were insufficient to regulate the activity, mainly because there were no limits on the number of licences that could be issued and the shellfishers themselves were not organised.

In 1993, the administration introduced a system of licensing for on-foot shell fishing exploitation permits or 'Permex', creating a type of limited licensing system. At the same time, they promoted a process of professionalisation, requiring payment of Social Security by all shellfishers, and demonstration of a minimum number of days and catches per week. Only those who complied and who had a Permex shellfish licence were entitled to fish. These restrictions cut down the number of on-foot shell fishers and excluded part-timers. In 1996, there were 7,852 on-foot gatherers in 2003 that figure had shrunk to 5,563 (Mahou-Lago, 2006; Fangourdes *et al.*, 2008). Rationalisation of the activity is said to have improved resource status, increased wages and enhanced the quality of the catch, which in turn resulted in a rise in prices

Source: Mahou-Lago, 2006; Fangourdes et al., 2008.

When days at sea were introduced to the Netherlands fisheries, the allocation was dependent on the type of fishery, documents, individual quotas and engine power. For example, the North Sea beam trawl fleet was limited to a maximum of 143 days in 2007. The Netherlands opted to apply as much flexibility as possible within the limits of the rules: both the mutual transfer of days between vessels and transfer between management periods were permitted, in accordance with the relevant conditions (Vermuë, 2007).

In the UK, days at sea allocations do not correspond to quota allocations, but are allocated on a separate basis. If a vessel fished in the cod recovery box or the sole recovery box during the reference period (2001–2005), a days at sea allocation can be claimed. Vessels can transfer days at sea to other vessels, although there is a limit to the amount that can be transferred — they cannot transfer more than the average number of days they actually fished during the reference period. If days are transferred to a vessel with a different engine capacity, they are pro-rata'd according to capacity. For example, if a vessel with an engine power of 200 kW wanted to transfer 5 days at sea to a vessel with an engine power of 100 kW, the receiving vessel would receive 10 days at sea (Iain Mathieson, MFA *pers. comm*.).

In the Spanish 300 fleet, fishing was originally controlled through effort regulation and days at sea. Vessels' days at sea allocation influenced the amount of catch they

were able to take. Therefore, when quota allocations were introduced in 2006, based on the historical catch history of vessels, they were indirectly influenced by the previous days at sea allocations, although there was no direct link between the two.

Most Baltic countries do not have any fisheries where there are both catch allocations and days at sea. The exception is Latvia, where days at sea limitations were added to the IQ system to give more security that the stock would not be over-exploited. However, no further information regarding how catch quotas relate to days at sea rights was available.

3.1.2. Provisions for new entrants

RBM schemes which restrict access to fisheries inevitably have an impact on the access for potential newcomers to the sector. For fisheries managed through licensing schemes, if there is still spare capacity in the fishery, new licences can be issued fairly easily (e.g. Slovenia and some Italian fisheries). However, in most fisheries this is not the case, and all available licences have been issued. In such cases there is no specific mechanism to reserve some rights for future use either for conservation issues or in the interest of new entrants. Also, licences are typically automatically renewable at the end of their period of validity at the right-holder's request. Therefore, to obtain a right, new entrants in most cases must buy a vessel with a licence attached, given the authorisation of the competent authorities.

In Greece, the local fishermen's union and their employer (they must not work in the public sector) must agree to the issuing of a licence to the person; a vessel licence may also need to be obtained. In France there are a number of rules and priorities for issuing licences, which vary by region and fishery according to local priorities (see Box 4).

Some countries have introduced mechanisms to guide the re-distribution of withdrawn or returned licences, especially where licensing is the principal management tool. For example, Cyprus has a 'targeted new entrant' scheme which aims to re-orientate rights through specific conditions for holding them in the small-scale fishery (Box 5); and Italy has targeted the redistribution of withdrawn, cancelled or returned licences for conservation purposes (Box 6).

For quota-managed systems, the most common requirement for new entrants is to purchase a company and/or vessel with associated quota rights. This is the case for IQ, VC and IE systems in Italy (bluefin tuna), Ireland, Belgium, Germany, Latvia, Lithuania and Poland, and for ITQ and ITE systems in Spain, Portugal, UK and Estonia. In the case of decommissioned vessels, their treatment depends on the scheme — sometimes rights can be taken over only if the vessel was decommissioned without the use of public aid; in other instances, rights can be transferred from a decommissioned vessel to a new vessel (see section 3.1.5).

Where a vessel is decommissioned with public financial assistance, its licence is usually taken over by the State (France, Belgium, UK, Slovenia, etc). The licence then may be redistributed depending on the rules applied in the particular fishery or fishing segment, for example, a licence could be re-issued to new entrants, another segment, to another gear, or to another geographical area to redistribute fishing effort. A licence may not be re-issued if there is overcapacity in the fishery. Transferable quota systems (ITQ and ITE) can be slightly more flexible in allowing entry to newcomers, since they do not always have to buy a vessel with associated

rights, but can purchase the two separately (although in Spain a vessel from the census must be bought). Both UK and Denmark have specific schemes that aim to facilitate the entry of newcomers to IQ/ITQ-managed fisheries (see Box 4 and Boxes 3 and 4 in the Catalogue (Part II)).

Box 4: Examples of requirements and schemes for new entrants in RBM systems

Limited licensing in France

The Consultative Commission examines new demands for Special Fishing Permits (SFP), and advises the administration, which issues the licence. A leaving SFP holder can advise the Commission on the newcomer to whom to attribute the SFP, but the Commission and then the Administration are free to make their own final decision. Priorities for attribution of rights are defined for each SFP, based on a combination of track record, socio-economic equilibrium and market orientation. There are other variants for the regional and national licences: for a national licence, new demands for licences get third (last) priority behind renewals and renewal of the licence with renewal of the vessel; with the regional licence, the order of issuance to newcomers depends on their project for fishing diversification or in the case of older fishers, their project to switch fishing activity:

- New entrants: experience and training of the owner are taken into consideration (with a precise evaluation system), in the case of equal scoring, the date of the first demand for the given licence will be taken into account (if the demand was unsuccessfully renewed in previous years).
- New demands: the order of priority depends on the type of project: (1) diversification of fishing activities with priority given to the owner having the fewest licences; (2) switch in fishing activity especially for fishers close to the end of their fishing activity; (3) increasing a fishing enterprise with the acquisition of a new boat; (4) others.

Quota-managed systems

- France (IQ & CQ) – Since rights cannot be transferred in France, a licence for specific stocks must be obtained (under the LL criteria), and a demand for transfer of quotas must be submitted. A quota reserve has been created to provide some track record for new entrants to the sector.
- Germany IQ system – newcomers must buy a vessel with a catch quota allocation.
- Lithuania IQ system – newcomers must buy a company that is fishing (i.e. has a quota allocation through its historical track record), or acquire rights through inheritance.
- Belgium IQ system – There is no quota reserve for future use or new entrants, but the system has been designed to avoid high entry costs and thus protect the interests of future generations entering the fishery.
- Spain ITQ systems (NEAFC, swordfish and bluefin tuna) – rights can only be transferred within the census, so newcomers must buy a vessel from the census with its associated fishing rights.
- UK IQ/ITQ system – newcomers can obtain a licence entitlement with or without a vessel. A vessel can be sold with its licence entitlement, or if the vessel sinks, is scrapped or deregistered, the entitlement may be sold separately within three years. This can include vessels decommissioned with public funds, although some decommissioning schemes have also decommissioned the associated quota. Newcomers must also obtain FQA units for quota stocks if the vessel is over 10m length; these may be traded separately from the vessel. Since the purchase of vessel, licence and FQA units can be very expensive, the UK

under-10 metre vessel sector, which receives a fixed allocation of the national quota, can provide a lower-cost entry route for newcomers to the industry, from where they can work their way up to larger vessels.

- Denmark VTQ system – There is a holdback/reserve scheme through which new entrants can make a multi-annual quota loan. Every year a small proportion of the national quotas are set aside for loans to new entrants below the age of 40 (i.e. young fishers). New entrants have to apply for a loan before 31 March each year. The loan period is a maximum of eight years. After four years the loan is reduced each year. In addition, new entrants are allowed (with some limitations) to buy VTQ from existing vessels without necessarily taking ownership of the vessel. The intention is that during the loan period (especially after the fourth year), the newcomer becomes well-established and financially able to buy the VTQ he wants on normal conditions. At present there are 20 young fishers who have taken out quota loans.

TURFs

TURFs deal with new entrants in a variety of ways:

- Spain, TURFs – *Cofradias* can issue new licences if the resource is in good shape, although newcomers must join the *Cofradia* and usually need to take part in a number of courses.
- Malta, dolphinfish TURFs – newcomers can access the fishery through the lottery system, up to 130 operators.
- Italy, clam consortia – newcomers must buy a dredge with its licence and join a consortium. However, this is not very common since vessel transfer is usually carried out only between members of a consortium.
- Sweden, TURFs – For private TURFs, newcomers can gain access through the purchase or rental of land and waters; for the public TURFs access is restricted and based on historical track record and regional/local considerations.
- UK, shellfish TURFs (Solent oyster) – New entrants can only join the scheme when existing members leave the group holding the Several Order.

Box 5: Targeted reallocation of licences in the small-scale fishery in Cyprus to favour a certain category of new entrants

Fishing licences in Cyprus are not transferable or tradable, and are allocated each year. In cases where an authorised fishing vessel is sold the licence to fish is not transferable to the new owner. The new owner needs to apply for a licence to the Department of Fisheries and Marine Research (DFMR). The 2000 fisheries law and regulations establish the criteria for the granting of licences and promote the concept of a genuine link of the fishing vessel with the flag state. In addition, in the small-scale fleet, right reallocation favours entrants already working in the small-scale fishing sector. Conditions are as follows:

1. own a vessel with a total length of 4 to 12 meters;
2. owners are registered with the Social Insurance Fund and pay the required contributions;
3. owners have had at least two years' experience in fishing following sufficient and substantial occupation as an assistant to a person who holds a licence for small-scale fishing.

Box 6: Redistribution scheme of limited licences for conservation purposes in Italy

In Italy, due to the state of the resources, the law 41/1982 introduced the current conservationist policy based on a generalised licensing scheme (GLS) and, even more importantly, introduced National Triennial Plans. The issuance of limited licences is framed by the Triennial Plan which identifies fishing areas where fishing effort exerted by a particular gear should be reduced, in case of decreasing economic yields caused by resource overexploitation. For the last few years no new licences have been issued and the ban is still operating. The utilisation of the licensing scheme also includes the possibility to redistribute licences which have been withdrawn or returned to the public administration (MD 26 of July 1995). Redistribution can take place considering different fishing areas, gears and a given vessel's dimensions.

In the case of TURFs, access for newcomers is usually very difficult following its initial establishment. Newcomers must join the relevant association, consortium or group, which is sometimes only possible when existing members leave the group. Access may also be further restricted by historical track record and regional/local considerations.

A number of RBM systems include measures for the protection of coastal communities and small-scale fisheries through their initial allocation systems. These are detailed in section 2.1.2 in the Catalogue. For example, small-scale fisheries or gears may be allocated a portion of the quota, either individually or as a quota pool, and zones are often established for the exclusive use of the small-scale sector. TURFs often provide territorial rights to small-scale fisheries, and limits on transferability are established in some cases to protect the small-scale sector.

3.1.3. Validity, cancellation and redistribution of rights

The validity of rights ranges from a short time period (e.g. a year or less) to 'in perpetuity'. In general, limited licensing schemes and individual non-transferable rights (effort, quota or vessel catch limits) tend to have shorter validity periods than TURFs and individual transferable rights (effort, quota, or vessel quota) (Figure 2). However, all of the RBM types demonstrate a range of scores for validity, indicating diversity in their application[4].

Even though some rights may have a short duration, in practice they may be automatically renewable, giving a much longer-term stake in the fishery (see also Section 3.1.4). For example, in Belgium, rights are allocated on an annual basis for specific fishing periods (January–June; July–October and November–December). However, allocation of quota to individual vessels is determined by the vessel's engine power (kW). Since this remains stable through time, the vessel will always be entitled to the quota allocation, so that in effect the rights have a much longer validity.

[4] The methodology used for allocating scores for validity is explained in Part II, section 1.3.3. Where possible, we allocated scores according to the published information on the period of validity of the rights – higher scores indicating a longer period. In practice, renewal of licences often significantly favours previous licence holders (assuming good behaviour), giving the impression of a longer term right. We endeavoured to reflect this in the scoring, because, although informal, it has been recognised by (for example) the banking system, and therefore enhances the quality of the right.

In order to fish, often a 'bundle' of rights is necessary – for example, a licence, quota allocation and days at sea. In this case, the right with the shortest duration is key to determining the overall validity, since having a quota allocation and a licence to fish is useless without also having days at sea. Nevertheless, in most cases, even though licences may be valid only for a year or less, they are in practice renewable without much limit.

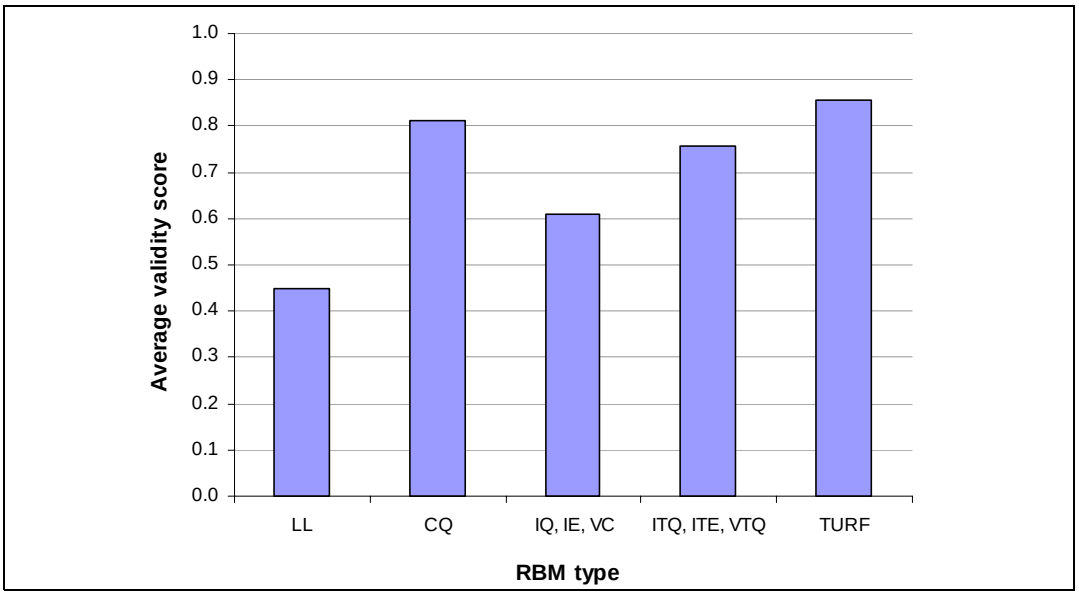

Figure 2: Average validity score of EU RBM systems, by RBM type

Licence systems generally include provisions for licences to be cancelled or revoked for certain offences, a typical case being Slovenia where a series of actions may result in the revocation of the licence, such as failure to declare fishing activities, use of unauthorised gear, and fishing in marine reserves. In practice, countries seem to use revocations sparingly.

TURFs are allocated for an indefinite period. There seems to be no question of traditional TURFs being revoked. In most cases where TURFs are given to groups (as with *Cofradias* in Spain, co-management initiatives in Sweden or clam TURFs in Italy), TURFs are not transferable, but internal rules are set to manage access to the TURF's resources. Newer types of TURF-like systems are emerging with validity and rules for redistribution that are totally different, such as the dolphinfish TURF-like system in Malta (Box 7).

In the case of IQ systems, the validity depends on the nature of the transferability which is officially built into the system. With ITQs, rights tend to be permanent, whereas IQs tend to be defined for a given period of time (usually annual, sometimes less) (Box 8). However, this difference is more apparent than real. There are exceptions though; in UK the issue of validity of FQAs has not fully been resolved. Officially, they are not permanent and therefore do not confer compensation rights for fishers if they lose their FQAs. Whatever the transferability arrangements, the practical expression of the IQs in terms of fishing possibilities is calculated as a percentage of the TAC (which varies from season to season, usually annually).

Box 7: Validity and redistribution scheme in TURF-like system in Malta

TURF management is applied to dolphinfish management in Malta. This system is based on the use of Fish Aggregating Devices (FADs). The management can be categorised as a TURF-like approach since it gives the right-holder exclusive right of exploitation in a given area. A maximum number of 130 concessions are issued each year for this activity. Rights are allocated for one year thus the validity score is low. Automatic renewal does not exist.

Allocation takes places through an annual lottery in which an operator gets access to one area in which a minimum number of FADs must be placed. However, the chances of receiving an area are high since the number of applicants does not usually surpass the number of fishing opportunities. Only vessels registered in the Maltese fleet register can participate in the lottery for areas within the 12 nm limit. Since registration of new boats is forbidden this brings exclusivity to the right. In the 12-25 nm area, foreigners can also participate, if all fishing possibilities are not taken up by Maltese operators.

In some cases, a proportion of the rights are not allocated. These rights may be used for conservation or redistribution purposes. For example, when the Netherlands Sole and Plaice ITQs were initially allocated, a small portion of the national quotas (1–3%) was not included in the allocation, but was kept as a 'National Reserve'. This reserve was meant to compensate for eventual excess landings. More recently, in the Danish pelagic fishery, some quota has been held in reserve with the aim of enticing new-generation entrants into the industry.

Box 8: Comparison of validity of rights in IQ and ITQ systems in Belgium and the Netherlands

The validity of right scores are very different in the Dutch (1) and Belgian (0.25) beam trawl fisheries despite the similarity of the fishing activity and in many ways of the management systems. This difference arises from the different standpoints adopted towards transferability and ownership of rights. While the Netherlands has opted for a system where ITQs are permanently allocated, Belgium has opted for a collective system with IQ based on kW. The validity period of IQ may be considered in different ways. On the one hand, they are granted for a short period within a year (3 periods: January–June; July–October; November–December). Unused quotas at the end of a period are pooled and redistributed for the following period, which explains the low score of right validity. But on the other hand, the attribution of individual quota is based on a vessel kW. As such, the right remains through time as long as the owner keeps his vessel. Moreover, the system offers the possibility of acquiring more quotas by adding the kW of withdrawn vessels (withdrawn without the use of public funds).

As a result, the practical impact of the difference in validity of the two systems may be rather less than might be expected at first sight. Currently, the main risk is not related to the validity of the right by itself, but to the fact that because the right is specified as a percentage of the national quota, it can be zero in the case of stock collapse.

In France where a similar system is emerging managed through the POs, a quota reserve has been created. This reserve aims to: (a) facilitate the exchange of quotas with other EU countries; (b) allocate quota to new entrants in the sector; (c) allocate quota to POs to improve the balance between fishing capacity and fishing possibilities (in particular to allow reconversion of vessels affected by the European Commission reconstitution plan). The reserve is not a fixed amount; it may increase in a number of ways, such as through the addition of unused quotas, or of penalties for over-quota fishing by some POs, and also through addition of track records from vessels that are decommissioned with public funds. In cases b) and c), reallocation is reviewed individually by the TAC and Quotas Commission.

In Belgium, a system of IQs exists. Although use has not been made of a reserve for future use (for the interest of new entrants or for conservation issues), the quota system has been specifically designed to avoid high entry costs and thus protect the interests of future generations entering the fishery. As such, the collective system itself is seen as a mechanism to protect such interests and to take into account future use (and users) in the allocation of rights.

3.1.4. Emergence of permanent rights from temporary rights

Although licences are usually issued for a limited period of time, most often one year, they tend to be renewable automatically. In such circumstances, permanent rights can emerge on a customary law basis. There do not seem to be any examples in the EU where measures have been taken to prevent this from happening.

With traditional TURFs, the rights are usually permanent. For example, in Spain, both civil society and the law recognise the role of the *Cofradias* and their traditional rights to exploit coastal areas. Not only is there no specific mechanism to avoid the permanency of this right, it could be argued that the integration of *Cofradias* into the modern management framework represents a recognition of their rights over coastal waters and a step towards the consolidation of TURFs into permanent entitlements.

Entitlements to ITQs are also typically permanent. Even if not initially intended to be permanent, it may be difficult to prevent the right from becoming *de facto* permanent, especially once it has been sold or otherwise transferred. Some countries have chosen to allocate rights for limited periods, for example eight years for the pelagic fisheries in Denmark and annually renewable rights in Estonia. Whether such restrictions make any practical difference is a moot point. Even in systems where rights are not transferable (IQs), the allocation of rights tends to be based on some kind of ‘historical record’ (or vessel power in the Belgian case) with the result that the rights tend to become informally permanent so long as owners keep their vessels.

Many of the RBM systems have evolved over time, and some issues, such as the permanence or not of fishing rights, have never been clearly defined. The Scottish Government is currently undertaking a consultation on the future of quota management in Scotland, to specify a system that might be applied if the quota management system in Scotland were to be separated from that in England & Wales. The proposal includes the definition of ‘use rights’. These would not be granted in perpetuity, but for a fixed period of time which would allow businesses sufficient certainty for medium- to long-term planning. In the case of market failure, and/or if rights were not being fished, the authorities would reserve the right to reclaim and redistribute the rights, after the issuing of an appropriate notice period (e.g. five years) (Scottish Government, 2008).

3.1.5. Decommissioning schemes

OECD recommends that fisheries management systems are designed to prevent overcapacity and overfishing from occurring, and that there should be appropriate incentives for fishers to automatically adjust fishing capacity and effort, so as to avoid the use of expensive decommissioning schemes where possible. The draft principles and guidelines on decommissioning schemes from the OECD are summarised in Box 9.

Box 9: OECD draft principles and guidelines for decommissioning schemes

Principles:

- It is preferable to take preventative measures to avoid overcapacity from occurring; fisheries should have incentives for fishers to automatically adjust fishing effort and capacity;
- Decommissioning schemes can be used when urgent action is required to bring fishing capacity into line with available resources;
- They should provide value for money, be cost-effective, well-targeted and time-limited;
- They should be part of a package to address problems of overcapacity and overfishing, which includes social measures such as opportunities for retraining.

Guidelines:

- Decommissioning schemes should have well-defined and measurable objectives and reduction targets that are achievable and will have a positive impact on resource sustainability and economic profitability;
- Management policies for the fishery should be coherent and mutually supportive;
- Management arrangements should prevent capacity re-entering the fishery or other fisheries subsequent to the decommissioning scheme;
- Fishers' incentives should be appropriately aligned to facilitate self-adjustment of fishing capacity and effort in the future, which can be done by improving the specification and enforcement of input or output access rights;
- Decommissioning schemes should be part of one-off structural adjustment programmes, so as not to create an expectation of future schemes and thus distort investment incentives and plans;
- Expected benefits and costs should be evaluated to ensure a net increase in economic welfare;
- Stakeholder involvement in the design of decommissioning schemes should be encouraged.

Source: OECD (2008).

Most Member States seek to use publically-funded decommissioning schemes to reduce fishing capacity in line with EU policy, especially focussing on those vessels that are old and use obsolete gear. Once sufficient vessels have been scrapped or otherwise permanently withdrawn from the fishing fleet, a common aim is to modernise the remaining vessels to improve their safety, product quality and energy efficiency.

A common characteristic of decommissioning schemes in the EU coastal Member States is that when a vessel is removed with public aid, the licence is cancelled and

not replaced. When a vessel is removed without public aid, the licence is generally re-issued but specific rules apply depending on the state of national fishing capacity and the national strategy for the redistribution of fishing effort among resource, fishing areas and gears.

However, the treatment of quota allocations has varied in decommissioning schemes: quota allocations may be decommissioned along with the vessel; shared amongst the remaining vessels; or remain with the vessel owner who can subsequently sell, lease or transfer the allocation.

Generally, when a vessel has been withdrawn from a fishery without the use of public funds, there is more flexibility in treatment of the associated rights. For example, in Belgium the kW of withdrawn vessels can be added to other vessels (kW is used to determine quota distribution, hence this effectively results in quota allocation being transferred from one vessel to another).

In the UK, FQAs have been dealt with by publically-funded decommissioning schemes differently, depending on the scheme. Usually, owners of decommissioned vessels have up to three years to decide what to do with the FQAs as they are no longer linked to vessels. They can be associated with a PO dummy licence and leased out, or transferred to another vessel. However, in past decommissioning schemes, quota has also been decommissioned with the vessel.

The way in which decommissioning schemes in Baltic states dealt with the fishing rights of decommissioned vessels is detailed in Box 10.

Box 10: Decommissioning schemes in the Baltic and their treatment of fishing rights

Estonia
There were not many applications for the decommissioning scheme in Estonia — fewer than ten vessels were scrapped. There were no special rules dealing with fishing rights of vessels leaving industry. Their quota was simply divided among the remaining vessels in the next period, under the existing rules.

Latvia
The scale of the decommissioning scheme in Latvia was larger than planned. 52 vessels were removed form the fleet register. The main rule was for fishing rights to remain within the company, which can lead to a concentration of quota. If there is no successor to the rights, the Fisheries Commission of the National Board of Fisheries can decide on the reallocation.

Lithuania
In Lithuania, fleet capacity was reduced by nearly 30 % through decommissioning. The quota of decommissioned vessels was simply divided among the remaining vessels under the general rules. The allocation was done based on historical records.

Poland
In Poland, the scale of decommissioning was quite large and almost 40 % of total fleet tonnage was removed. In the case of individual quota, the quota of decommissioned vessels was divided among the remaining vessels under general rules. In the case of block quota (small-scale fishing, herring and sprat) only the number of quota holders changed since vessels catch within the total limit controlled by the Ministry of Agriculture.

There is also evidence to indicate that in many cases, the transferability of rights can result in the reduction of capacity in the fishery (implying a concomitant concentration of rights and increase in economic efficiency) without the need for publically-funded decommissioning schemes. This has occurred, for example, in Spain's ITQ NEAFC fishery (Box 14), Denmark's ITQ and VTQ-managed fisheries (see Box 15), and Estonia's ITQ fishery (Box 38). In the latter, a publically-funded decommissioning scheme was also used to reduce capacity, although the number of vessels removed under the scheme account for only 25% of the total capacity reduction over the period 2001–2009 (Director Fishery Resources Department, *pers. comm.*).

3.2. Transfer of rights

3.2.1. Introduction

A key driver for Member States restricting transferability is to avoid the concentration of fishing rights and a particular concern over the potentially negative impact this would have on the participation of the small-scale sector. Some MS have restricted transferability with this in mind (e.g. Belgium, Ireland, France, and Germany).

Systems with transferability have often resulted in a concentration of rights, reduction in capacity and increase in economic profitability (e.g. Denmark, Spain). However, transferability does not necessarily result in the concentration of rights (e.g. Dutch beam trawl fleet has 300 rights-holders for 300 vessels, suggesting a concentration of rights has not occurred). Where the availability of quota (effort or catch) is not a limiting factor, there is also no tendency for concentration (e.g. Estonia coastal ITE fishery, Poland's block quota fishery). Furthermore, systems with transferability can have extra restrictions placed on them to limit concentration (e.g. in Sweden any one quota-holder can hold a maximum of 10% of the national quota), or to protect the participation of small-scale fishers (e.g. the quota pool system for the UK under-10 sector, or the protection of small-scale fishers in the Denmark ITQ system).

The management systems set up at Member State and Community levels that impose 'restricted' access to fishing, have implicitly resulted in allocating an economic value to the right to fish. This economic value is directly or indirectly reflected in the various market transactions taking place in the fishing industry today. Examples of this are the sale or leasing of licences, fishing days and quotas in some Member States. More indirectly, the economic value of the right to fish is reflected in the difference in market prices of vessels with and without a licence (EU COM 2006 103 final). In this way, markets in fishing rights exist in most Member States and in some cases, between Member States.

3.2.1.1. Types of transfers

Transfers of fishing rights between stakeholders within the EU take a variety of forms. Fishing rights may be permanently sold by one party to another, with a complete transfer of ownership. Fishing rights may also be leased allowing the right to be used by a party other than that which holds ownership or title to the right, with the (usually short-term) user of the right paying a rental price for the use of the right to the rights-holder. Rights may also be traded, or swapped, between two rights-holders for a given period of time. Table 1 in the Part II of this report (the Catalogue) provides information on a typology of RBM systems and fishing rights in the EU that makes it clear that some rights are intended to be transferred, while others are not.

Key characteristics that define different transfers pertain to:

- the extent to which ownership of the right is transferred indefinitely, as opposed to being used for a defined period by a party that may not be the rights-holder;
- what is being transferred i.e. the type or portion of a right (or bundle of rights that allow fish resources to be exploited); and
- which stakeholders, or parties, are transferring rights and to whom.

Table 2 describes various different types of transfers that are made possible by current markets (see Section 3.2.2) in ascending order of the level of flexibility in the choice of recipient, along with some examples of where such transfers are in existence at present. As indicated, the characteristics of transfers are in part determined by the nature of the two parties between which fishing rights may be transferred. Either in law, or in practice based on informal rules, the owners of fishing rights may face restrictions regarding to whom they can sell, trade or lease their fishing rights.

Table 2: Different types of transfers

Type of transfer	**Examples of types of transfers in existence**
1. Only within a PO or group assigned a right	Italy TURF (clam), Spain LL
2. Only within their own PO/group or to another PO/group in the same country	Spain ITQ NEAFC and ITQ swordfish, Spain LL, UK IQ
3. Outwith their PO/group to non-PO/group members but only in the same country	None identified
4. Outwith their PO/group but only to a PO/group in another country	Germany IQ, UK IQ
5. As an individual but only within the same country	Spain ITQ BFT, Portugal ITQ swordfish, Italy LL and IQ BFT,
6. From a PO or an individual rights holder to any party they chose, including in other countries	Malta LL (in 12-25nm zone); Ireland VC; Netherlands ITQ, Belgium LL, UK IQ, and France CQ/IQ (but all difficult in practice due to social impact safeguards); Poland IQ; Portugal ITQ NAFO, Estonia ITQ

A key aspect of what can be transferred depends on the notion of divisibility, which refers to the ability to

(a) divide rights more narrowly, producing new recognised rights specified perhaps by season, region, ground, species, age or other classification; and
(b) divide the amount of quota into smaller amounts and to transfer some quota to others.

Some rights may be specifically not transferable, such as non-transferable IQs, non-transferable IE quotas, limited non-transferable licences, TURFs and community-based catch quotas. However, even where rights are not intended by the management authorities to be formally transferable, markets may still exist (Section 3.2.1.2). For example with a non-transferable TURF, while rights may not be transferable outside of the TURF holder (usually a group or cooperative of some form) members of the group or cooperative may sell, trade or lease rights among themselves. And where a PO manages all individual vessel quotas on behalf of its members to provide greater flexibility in fishing operations and strategy for its members, rights may be sold, leased and/or swapped.

3.2.1.2. Types of markets

Markets for the transfer or rights may be characterised as being either 'formal' or 'informal'. In the case of both formal and informal systems, the ability to transfer all or part of a fishing right is a fundamental requirement for a 'market' to exist. This transferability implies some form of legal basis to the fishing right which is being leased, traded or sold. However, informal markets are in no way necessary 'illegal'. Conversely, the fact that fishing rights are transferable does not necessarily mean that a market is in existence — for that to be the case, the rights must actually be leased, traded or sold.

While providing a clear definition of what constitutes formal and informal markets is not easy, a key difference is that informal markets fall outside of any formal regulation by the state, while formal markets involve at least some form of monitoring by the state of changes in the ownership or usage of rights, even if the State is not involved in the market mechanism *per se* for example by approving individual transfers. As such, informal markets may be less transparent in their workings, and by their nature tend to be difficult to observe, study, define, and measure, hence why they are often referred to as a 'grey' markets (the terms 'informal' and 'grey' are used interchangeably in this report).

It should also be noted that changes in regulations (and degrees of enforcement) as a result of policy evolution, may cause the transfer of rights to move between formal and informal market systems.

3.2.2. Existence of markets for rights

Drawing on the case studies of different RBM systems presented in the Catalogue, Table 3 presents a summary across EU coastal Member States of the extent to which:

a. Markets are found to be in existence; and
b. Markets are found to be either formal or informal.

The scale for measuring transferability used in the Catalogue suggests that a score of 0 implies that rights are not transferable, 0.1 that rights are only transferable on death/retirement, 0.25 that rights are transferable but non-divisible with limits on transferability through significant ownership restrictions (e.g. nationality), 0.5 that rights are transferable but non-divisible with some government control over the transfer market and minor limits on ownership, 0.75 that rights are transferable and divisible with some government control of the transfer market, and 1 that rights are fully transferable and fully divisible in a free transfer market. On the assumption that all fishing rights have some form of value (and offer the potential for profits to be made through exercising those rights), one would expect that wherever rights are transferable, i.e. a score of more than 0, a market should exist with rights being sold, traded, or leased. Table 3 shows that this is indeed the case, and that in all cases where rights are transferable markets are found to exist.

Interestingly, in a number of cases where the type of RBM system is of a 'non-transferable' nature (limited non-transferable licences, individual non-transferable quotas), transferability scores need not be zero, typically because licences/quota can be sold on death or retirement. This has resulted in markets evolving around the sale, transfer or lease of such rights, with vessels with attached licences being sold

for more than the pure asset value of the vessel itself (implying a value to the licence, or fishing right). Examples include markets in Denmark, Malta and Italy for limited non-transferable licences/permits. Likewise in some Baltic countries (e.g. Latvia and Lithuania), markets exist for individual non-transferable catch quotas (IQ) and individual non-transferable effort quotas (IE), because it is possible to buy companies that have quota and/or to sell or rent vessels with unused quota. In Belgium too, markets exist for limited non-transferable licences (LL), community catch quotas (CQ) and individual non-transferable quotas, with markets in existence for engine power and associated licences.

The widespread existence of markets, even for 'non-transferable' rights, means that for *all* the different types of RBM systems described, markets exist at least somewhere in the EU. This is true even of TURFs, with the clam TURFs in Italy providing an example of a situation where, while rights can not be sold *between* consortia, they can be sold/leased/traded *within* a particular consortium.

Table 3 shows that markets are generally 'formal', rather than informal. In most cases, the role of Member States is principally in overseeing markets and recording changes in ownership and/or the use of rights (e.g. through registers of owners of licences or TURFs, allocations of quota to POs or individual vessels), leaving the market to function within certain pre-defined parameters (such as restrictions on ownership by foreign nationals, limits to concentration). The generally formal nature of the markets for rights is perhaps not surprising given the widespread recognition of the need to limit access/rights to resources in some fashion, and the central role of the State in awarding such rights and imposing limits to access. The formal nature of markets is understandable in terms of quotas and all other forms of rights, given the responsibility and obligations that Member States have for recording and managing the activities of their flag vessels within the overall fisheries management system in the EU. The issue of administration and monitoring of markets, whether by the State or other parties, is discussed further in section 3.2.3.

The only informal markets that appear to exist in the case studies in the Catalogue are those associated with the markets for rights within clam consortia (TURFs) in Italy, and cases where POs manage quota on behalf of their members. In the case of PO quota management (e.g. UK, Germany, France, Denmark), while exchanges *between* POs are commonly notified to the State, POs are typically not required to notify the State of changes to quota use *within* a particular PO. This is because the obligation of the Member State is to monitor the uptake of quota for each species, and the State is thus more interested in overall quota use by each PO and potential quota overrun, and resulting triggers to initiate prohibition or controls of PO uptake[5]. Thus POs are typically only required to report on *overall* quota use by their members, not on any changes in ownership or use of rights by specific vessels within their PO that may result from the sale, lease or trade of quota. This means that the State does not necessarily record or hold all the information about who is exercising what rights.

In considering the *existence* of markets, a number of other potentially interesting subjects of research on markets for rights are evident, which are not within the scope of this study. These are discussed further in Section 4.5.3. .

[5] POs for example may have to inform their MS weekly on quota uptake once 75% of a species' annual quota has been caught.

Table 3: Existence of formal and informal markets

Country	RBM system	Trasferability Score	Markets in existence i.e. rights sold, leased or traded	Is market controlled/regulated by the state i.e. formal
Spain	LL (shellfish)	0-0.25	**Yes.** Licences attached to vessel, and vessels can be sold (within defined area).	**Yes**.
	ITQ NEAFC	0.75	**Yes.** Within 300 list	**Yes.**
	ITQ Swordfish	0.75	**Yes.** Within census	**Yes**
	ITQ BFT	0.75	**Yes**	**Yes**
	TURFs	0	**No**	-
Portugal	ITQ NAFO	0.9	**Yes**	**Yes**
	ITQ Swordfish	0.75	**Yes**	**Yes**
	CQ	0.5	**Yes**	**Yes**
Malta	LL	0.25	**Yes.** Licences attached to vessel, and vessels can be sold.	**Yes**
	TURFs	0	**No.**	-
Italy	LL	0.25	**Yes.** Licences attached to vessel, and vessels can be sold.	**Yes**
	TURFs (clams)	0.25	**Yes.** Trade not possible between consortia but is possible within consortia	**No**
	IQ BFT	0.25	Yes. Licences attached to vessel, and vessels can be sold, and unallocated quota for possible compensation (UQPC).	**Yes**
Slovenia	Licensing (unlimited so far)	0	**No**	-
UK	IQ / ITQ	0.75	**Yes** for in-year quota, FQA and licences	**Yes,** with involvement of POs
	ITE Salmon	0.75	**Yes**	**No**
	TURF (shellfish Several Orders)	0.75	**Yes** for 'Several Orders'	**Yes**
Ireland	VC	0.5	**Yes** for share of capacity of segment (GT and kW)	**Yes**
France	LL	0	**No**	**-**
	CQ & IQ	0.5	**Probable/possible**	**Little?** PO management
Netherlands	ITQ (with LL, ITE, and VC)	0.75	**Yes**	**Yes,** with involvement of POs
Belgium	LL	0.25	**Yes** for vessel engine power and associated licence or quota, but not for licence or quota alone	**Yes**
	CQ & IQ	0.25	**Yes** for engine power and associated licence, and quota swaps	**Yes**
Greece	LTL	0.25	**Yes** for licence	**Yes**
Cyprus	LL, CQ and VC	0	**No** as fishermen apply for licence each year	-
Denmark	ITQ (herring, mackerel)	1	**Yes**	**Yes** transfers recorded by State
	VTQ (Demersal)	0.75	**Yes**	**Yes** in case of permanent transfer of vessel, otherwise involvement of VTQ pools
	LL (blue mussel, oyster)	0.1	**Yes** for vessel/licence on retirement or death	**Yes**
Sweden	IQ / ITQ (herring) - IQ	0	**Yes**	**Yes**
	TURF (inland)	1	**Yes**	**Yes**
	TURF	0	**No**	-
	LL	0	**No**	-
Finland	TURFs	0	**No** for licences (but **Yes** for ownership of water areas)	-
	LL	0	**No**	-
Germany	IQ	0.5	**Yes** for vessel/quota on retirement or death. Also quota swaps	**Yes** for vessel/quota, with swaps managed by/within POs
Estonia	ITE coastal and herring	1	**Yes** in terms of swaps	**Yes**
	ITQ offshore herring, cod	1	**Yes** in terms of swaps	**Yes**
Latvia	IE coastal	0.25	**Yes** can sell or rent vessels with unused quota, or buy companies with quota	**Yes**
	IQ herring and offshore	0.25	**Yes** can sell or rent vessels with unused quota, or buy companies with quota	**Yes**
Lithuania	IQ coastal, offshore, herring and cod	0.25	**Yes** can sell or rent vessels with unused quota, or buy companies with quota	**Yes**
Poland	IQ	0.5	**Yes** through swaps	Yes
	Block quota	0.25	**Yes** through buying company with quota	Yes

3.2.3. Management tools and administrative instruments

3.2.3.1. Administration

Basic documentation and electronic record-keeping

There are various administrative systems used to document the RBM systems and keep records on swaps, leases or trades or fishing rights. These range from paper-based systems (e.g. in Estonia), to electronic databases (e.g. UK, which is developing plans for an online intranet database). Different systems also exist at different administrative levels, e.g. central government, regional government and POs.

The vessel licence underpins the system of fishing rights throughout the EU. Such licences are generally administered centrally through computerised systems. In some countries, limited licensing is still the main fishery management tool and is used to control fishing capacity (e.g. Malta, Greece, Cyprus, and Italy).

The precise arrangements vary between countries and may be extremely complicated. For instance, in Greece, the licensing of professional fishing vessels or amendment of the particulars of fishing vessels involves the regional and central departments of the Ministry of Rural Development and Food, the Ministry of Merchant Shipping, Fisheries Departments operating at Prefectural level (capital cities of Prefectures) and local Maritime Authorities. Consideration is currently being given to amending the existing institutional framework governing licensing with a view to simplifying it and, at the same time, improving the system for recording details in terms of both quality and time.

Box 11: Quota monitoring in France

Quota usage is monitored at a number of different levels in France. Each PO has an internal statistical system to monitor quota uptake. Great improvements have been made to such systems in recent years (both in terms of electronic equipment and the human capacity to operate it), enabling POs to monitor uptake in a precise and timely manner. Although some differences remain, generally speaking POs now monitor catch per individual vessel on a daily basis.

The Department of Fisheries and Aquaculture centralises the PO information and monitors quota usage throughout the year by electronic means. The information is reviewed by the Quota Monitoring Commission which is in charge of advising the Minister on catch and effort quota management. This Commission is composed of the Directorate of Marine Fisheries and Aquaculture (administration), the two federations of POs and the National Committee of Marine Fisheries and Aquaculture.

Quotas are allocated annually. The administration sends to each PO its calculation for each species with statistical details per vessel. Each PO verifies the data against its own statistics and final adjustments are made. The final document is then approved (and if necessary revised) by the Fleet and Quotas Commission.

The basic licences have various add-ons to increase the effectiveness of fisheries management and/or the quality of the fishing right. A common development is to specify the licence more fully in terms of authorised gear, fishing areas and/or fishing

period. An increasingly common option is to associate the licence with catch quotas or catch limits that are either communal (through POs) or individual.
Where rights are allocated on a territorial basis, e.g. TURF *Cofradias* in Spain, the issues are obviously somewhat different, and much of the documentation is held at the decentralised level.

With the devolution of quota responsibilities to POs, much of the administrative monitoring is now done at this level. An example is given by France (Box 11).

3.2.3.2. Monitoring of fishing right transfers

When rights are transferable (e.g. through swaps, leasing or permanent sale), an administrative authorisation is usually required (e.g. Portugal, UK, Estonia). In the case of international swaps and in the case of national swaps or quota exchanges, the exchange must at least be registered or documented by the competent administrative authorities (e.g. Portugal, UK, Estonia, and ITQ in Denmark).

The examples of UK (Box 12) and Estonia (Box 13) are illustrative of the manner in which such monitoring schemes operate.

Box 12: Administration systems to register quota trades in the UK

The majority of the offshore fishing fleet in the UK belong to POs ('sector vessels'). Vessels and POs receive fixed quota allocations (FQAs) from the Government. On an annual basis, quota is distributed according to the FQA units held. Based on the annual quota received, in-year quota swaps are allowed between vessels, POs and with other Member States.

All swaps must be cleared through the UK fisheries administrations. There had been 66 in-year swaps for 2008 up to October, and there were approximately 120 swaps in 2007. Swaps are approved if they are beneficial to the UK and do not disrupt fishing activities. It is rare that in-year swaps are disallowed, as the process is usually stopped earlier in the negotiation process (the last one was about three years ago). Before an international quota swap is finalised, the option is given to other UK POs to match the swap.

The UK fisheries administrations have a database which records all UK swaps (internal and international), called Swaptracker. It does not record lease price information, but they have a general idea of prices. The Marine and Fisheries Agency (MFA) is considering the development of an on-line intranet database to facilitate quota trading through the Quota Management Change Program (QMCP). This programme has been hindered by political issues, i.e. under-10 sector and the potential separation of Scotland from the UK's quota-management system.

Box 13: Administration systems to register quota trades in Estonia

When an Estonian company wishes to swap quota with another Estonian company, they submit an application to the Ministry of Agriculture which then checks that the companies concerned have sufficient quota to swap (i.e. that they have been allocated the quotas according to their respective three-year historic fishing rights, that they have paid the necessary fees on time and that they have not already exhausted (i.e. fished) the amount of quota that the companies wish to swap).

Once this has been checked, the Ministry makes a written (paper-based) record of the swap; in the future, the swap will also be registered electronically in the fisheries information system, and the companies can start to make use of the quota they received as a result of the swap.

If an Estonian company wishes to swap quota with a foreign company (within the EU), it also submits an application to the Ministry, which then performs the aforementioned checks and contacts the fisheries institution of the other company's country to check that they also approve of the swap. Once an approval is received, an administrative decision is made and the quota is transferred through the Fisheries Data Exchange System (FIDES) of the European Commission. Once the quota in question has been transferred to Estonia, the company can start using it (meaning that the company can now have a fishing permit issued and start fishing).

The companies can swap all of their quota for the year, or a part of it; also, one company can trade a part (or all of) their current year's quota for another company's quota in the following year — since the fishing quotas are allocated based on three-year historical rights and the national quotas, as a rule, are quite stable, the companies can trade the quota in advance. However, as the quotas for the following year are considered preliminary until fixed with an administrative decision, usually only a part of the 'future' quota is swapped. The quota swap does not affect the companies' historical fishing rights.

The above applies to the fishing carried out under a fishing vessel's fishing permit (trawlers), where the quotas are allocated as tonnes or fishing days. In coastal fisheries performed under a fisher's fishing permit, the quota is allocated as the maximum number of fishing gear (e.g. the right to fish with 10 gillnets) and such swaps are not made. Historical fishing rights for both coastal and trawl fishing can also be sold (at a notary's office), usually as a three-year package.

3.2.4. Impacts of rights markets

The CFP's original objectives were to preserve fish stocks, protect the marine environment, ensure economic viability of European fleets and provide consumers with quality food. The 2002 reform added to these objectives the sustainable use of living aquatic resources from an environmental, social and economic point of view in a balanced manner. Thus the primary objective of the new CFP is to ensure a sustainable future for the fisheries sector by guaranteeing stable incomes and jobs for fishermen while preserving the fragile balance of marine ecosystems and supplying consumers[6].

[6] http://www.europarl.europa.eu/facts/4_3_1_en.htm

Key elements of the reform include:

- Long-term approach to fisheries management and emergency measures if necessary, through the use of multiannual recovery and multiannual management plans;
- Reorientation of public aid to the fleet;
- Socio-economic measures to support the industry during the transition period;
- Access to waters and resources, and related restrictions until 2012 to preserve the most sensitive areas under traditional fisheries e.g. inside 12 miles, the Shetland Box;
- More effective, transparent and fair controls;
- More direct involvement of fishermen in the decisions that affect them, such as through Regional Advisory Councils (RACs);
- Accompanying measures such as Community Action Plans for regions (e.g. Mediterranean) and on key issues (e.g. discards, IUU, environmental protection).

The presence of markets for rights has the potential to impact on the environmental, economic and social objectives of the CFP in terms of patterns of distribution of fishing rights, social impacts, efficiency of fleets and resource sustainability. These potential impacts include:

- Changes in the pattern and distribution of fishing rights between fishing firms of different sizes, and between rights holders in different regions and even countries (social impacts). This could impact both positively and negatively on the stability of incomes in some areas, as well as impacting on the principal of relative stability;
- More efficient fishing firms acquiring rights from those less efficient firms resulting in overall increases in economic efficiency (economic impacts);
- Concentration of rights resulting in overall fleet capacity reduction through market mechanisms (rather than structural aid); and,
- Reduced levels of discarding and ‘highgrading’ impacting positively on resource sustainability (environmental impacts).

Of course, the impacts of markets for fishing rights may impact both positively and negatively on these objectives. For example, the transfer of rights from less efficient rights holders to more efficient ones may support the objective of economic efficiency and fleet rationalisation, while at the same time having negative impacts on social sustainability in some heavily fisheries-dependent regions if rights are transferred out of these regions (but see also Box 15 on the Danish ITQ system, which suggests that concentration of rights away from small-scale coastal communities need not necessarily result from transferability if appropriate limitations are put in place).

The impacts of the markets for rights are summarised in Table 4. While the information available is not sufficiently detailed to provide a consistent quantitative picture of the impacts of markets across all case studies, some general conclusions can nevertheless be made, and information from specific case studies is presented in Box 14, Box 15 and Box 16 below.

Examples with a low transferability rating may be expected to show less potential for markets to negatively impact on some social aspects while positively impacting on others. The tables above suggest that this is indeed the case. However, the tables also show that there is very little hard evidence of markets for rights having impacted either positively or negatively on social sustainability in coastal fishing communities.

The reason for this dearth of information is because of the lack of knowledge on both the *extent* of the markets for different types of rights across Member States (one of the research topics suggested for further study in Section 4.5.3), and their impacts. So while some information is available on regional dependency on fisheries such as that contained in a recent report published by the European Parliament (P. Salz/Framian and G. Macfadyen/Poseidon, 2007[7]), the extent to which any change over time in regional dependency factors is due to the market for fishing rights, as opposed to other factors, is not clear. Equally this means that any impacts of markets for rights in terms of conflicts with fishing customs and distribution principles are not clear.

While concentration of rights may have positive economic impacts, it may be also associated with negative social impacts. In a previous survey of around 400 UK fishers (reported in Hatcher *et al*., 2002), the majority wanted quota 'ownership' restricted to active fishers, and concern about the possible effects of ITQs on the regional or sectoral concentration of UK fishing activity was expressed by around two-thirds of the sector with even greater numbers of those interviewed concerned about the possible implications for new entrants to the industry.

What is clear is that market for rights have resulted in the value of rights significantly rising in many cases. Rising prices for rights on the market can significantly impact on the ability of 'new entrants' to obtain rights to fish. In the UK for example, gaining entry to the offshore fisheries by buying quota through a PO may be far too expensive for most new operators — a Peterhead 24m vessel could cost €400,000–550,000, but when the cost of licences, quota and other associated rights are included, that figure can rise about 10 times. Likewise in Spain, the value of licences for bivalve dredges in Spain increased from €130,000 to €500,000 over the period 1996–2002.

One example of the social impacts of markets in terms of rights moving between regions has been documented in some detail in the case of Spanish ITQs in NEAFC (see Box 14). But in many countries, the case studies in the Catalogue suggest that the social impacts of markets are likely to be limited due to factors constraining the free transferability of rights, specifically with the intention to protect historical distribution patterns. These factors typically include a potential new rights-holder having to be a member of a local organisation or to demonstrate some form of economic linkage with a region (e.g. any foreign-owned vessels flagged in the UK and fishing with UK quota), or some form of socio-economic criteria being used to allocate sub-quota (e.g. France). Or in the case of TURFs, rights can generally only be traded, if at all, within the organisation or group that is granted the right.

With respect to impacts on resource sustainability, again, there is little hard evidence of the impacts of *markets* (as opposed to the impacts of RBM systems) on environmental sustainability. However, as noted by Hatcher *et al*. (2002), markets for quota allow fishers the flexibility to resolve problems relating to quotas held by a vessel being out of proportion to the mix of species on the grounds, which in turn reduces the need to discard. Certainly the ability of POs, for example in the UK and France, to manage quota held by their members is likely to be having positive impacts in terms of reducing both over-quota landings and discards (in the UK 95% of the national quota is managed through POs with only 5% being managed by the fisheries agencies).

[7] The study analyses and presents statistical data on the regional (NUTS-2 level) role and importance of the fisheries sector and its four sub-sectors – fishing, fish processing, aquaculture and ancillary activities, in terms of creation of income and maintenance of employment, and dependency of the regional economies on the fisheries sector. The study also estimates the role and importance of TAC species for the national and regional fishing fleets

Table 4: Impacts of markets for rights on CFP objectives

Country	RBM system	Social	Relative stability / Potential for rights to be sold to other MS	Resource sustainability	Concentration and economic efficiency
Spain	LL (shellfish)	**Positive.** Restricts part-timers and external interests, in favour of full-time local interests, although decrease in overall employment.	**None**	**Positive.** New PERMEX for on-foot harvesting are issued only after an evaluation by cofradias and its technicians on the state of the resource. No discards or high-grading	**Some possible**, but limited by area restrictions. Concentration occurred when part-timers excluded.
	ITQ NEAFC	**Positive** for Galicia. **Negative** for other regions	**None.** Can only be transferred between 300 list vessels	**No impacts** of market on discards/high grading per se	**Yes.** Galician fleet of the PO ANASOL has 45% of rights. Basque fleet reduced
	ITQ Swordfish	**No particular impacts**	**None.** Can only be transferred between census vessels	**None.** Selective fishery	**Potential** as no restrictions, but **none reported**
	ITQ BFT	**No particular impacts**	**None.** Only transferable within national fleet	**Not known**	**Potential** as no restrictions, but **none reported**
	TURFs	-	-	-	-
Portugal	ITQ NAFO	**Potential, but unlikely.** Quota can be traded to other MS in return for other species	**None.** Quota can be traded to other MS, but in return for other species	**Not known**	**Possible** as no restrictions but not documented
	ITQ Swordfish	**Possible** if vessels on orginal census are from different regions	**None.** Only transferable within national fleet	**Not known**	**Possible** as no restrictions but not documented
	CQ	**Potential,** if quota moved between Pos	**None.** Only transferable within national fleet	**Not known** but **potentially positive**	**None.** Common pool rights for the members of the PO
Malta	LL	**Potential** but unlikely to be extensive	**Potential.** Nationals of other Member States may have special access to the 12–25 nm area of the Maltese FMZ	**No impacts** of market for vessels/licences per se	**Possible** as no restrictions but not documented
	TURFs	-	-	-	-
Italy	LL	**Potential** but unlikely to be extensive	**None.** Only transferable within national fleet	**No impacts** of market for vessels/licences per se	**Possible** as no restrictions but not documented
	TURFs (clams)	**Positive.** Protection of rights within areas	**None.** Only transferable within national fleet	**None** from market within TURFs	**Possible** within TURF areas?
	IQ BFT	**Potential** but unlikely to be extensive	**None.** Only transferable within national fleet	**No impacts** of market for vessels/licences per se	**Possible** as no restrictions but not documented
Slovenia	Licensing (unlimited so far)	-	-	-	-
UK	IQ / ITQ	**Potential** but reduced by requirement for foreign vessels to have economic link	**Potential** but unlikely	**Positive.** PO management reduces overquota landings	**Possible** as no restrictions but not documented
	ITE Salmon	**None** known	**Potential** but unlikely	**None** known	**None** known
	TURF (Shellfish Several Orders)	**Positive.** Several Orders tend to be owned by local fishers, sometimes as co-operatives	**None**	**Positive.** Some self-regulation of days	**Yes,** as Several Orders on most productive grounds
Ireland	VC	**None** known	**Potential.** Nationals of other Member States may buy capacity	**No evidence**	**Possible** as no restrictions but not documented
France	LL	**-**	**-**	**-**	**-**
	CQ & IQ	**Limited.** Potentially negative impacts minimised through socio-economic criteria used to allocated sub-quota	**Possible,** but very difficult in practice and even more difficult since the 2007 modification of quota repartition rules	**Positive.** PO rules are set in order to diminish discards and over-fishing of quotas	**Limited,** with controls in place
Netherlands	ITQ (with LL, ITE, and VC)	**None**	**Possible,** but very difficult in practice	**No** impacts of market per se	**Yes.** Dutch demersal North Sea fleet decreased by 32% between 1983 and 1998 and some evidence of increased economic efficiency.

Cont.

Country	RBM system	Social	Relative stability / Potential for rights to be sold to other MS	Resource sustainability	Concentration and economic efficiency
Belgium	LL	**None** due to limits on transferability	**Possible** but limited in practice because of the need to prove genuine economic link	**Yes.** Quota swaps may redude discards	**None** reported
	CQ & IQ	**None** due to limits on transferability	**Possible** but limited in practice because of the need to prove genuine economic link	**Yes.** Quota swaps may redude discards	**None** reported
Greece	LTL	**None**	**Possible but unlikely** due to need to be member of local organisation	**None**	**Possible,** but no significant impacts reported due to owner/operator predominance
Cyprus	LL, CQ and VC	-	-	-	-
Denmark	ITQ (herring, mackerel)	**Possible,** but not documented	**None**	**Possible,** but not documented	**Yes.** 50% reduction in the number of vessels holding herring and mackerel quotas and a significant and still ongoing modernisation of the Danish pelagic fishing fleet
	VTQ (Demersal)	**Possible,** but not documented	**None**	**Possible,** but not documented	**Yes.** 25% reduction in last 18 months
	LL (blue mussel, oyster)	**Potential** but unlikely to be extensive	**None**	**None** from market itself, although LL introduced with resource sustainabilty in mind	**None**
Sweden	IQ / ITQ (herring) - IQ	**Too early** to assess	**Very unlikely**	**Too early** to assess	**Possible**, but individual quota ownership maximum of 10% of the total Swedish quota
	TURF (inland)	**None**	**None**	**Not known**	**None**
	TURF	-	-	-	-
	LL	-	-	-	-
Finland	TURFs	**None**	**None**	**Not known**	**None**
	LL	**None**	**None**	**None**	**None**
Germany	IQ	**None**	**None,** although quota can be swapped with other MS	**None** of market for vessels/quota per se	**Possible by limited** given limitations on transferability
Estonia	ITE coastal and herring	**None** recorded	**None**	**May be negative** through discarding?	**Possible** but not recorded
	ITQ offshore herring, cod	**None** recorded	**None**	**Not known**	**Possible** but not recorded
Latvia	IE coastal	**None** recorded	**None**	**Perhaps positive** with larger quota per vessel	**Yes,** with some postitive economic results
	IQ herring and offshore	**None** recorded	**None**	**Perhaps positive** with larger quota per vessel	**Yes,** with some postitive economic results
Lithuania	IQ coastal, offshore, herring and cod	**None** recorded	**None**	**Not known**	**Not known**
Poland	IQ	**None** recorded	**None** although are some swaps to the MS	**Not known**	
	Block quota	**None** recorded	**None** through restrictions on foreign ownership	**Not known**	None

Potential effects markets for rights on discards are difficult to determine, as discards may be influenced by a range of factors, including undersized or unmarketable fish, highgrading and lack of quota allocation. However, where discarding occurs due to a lack of quota for a particular species, transferability of quota rights enables vessels and POs to optimise their species mix to reduce discards. Even with non-transferable rights, this optimisation can be carried out at national level through Member State-to-Member State quota swaps to ensure an appropriate species mix. Discards are discussed further in section 2.1.5 in the Catalogue.

Box 14: Impacts of the market for rights in Spain

The implementation of ITQs in the Spanish NEAFC fleet has resulted in a concentration of the rights to fish, a reduction in number of vessels and capacity of the fleet, and a regional shift in the fleet location — from the Basque region, to being dominated by the Galician fleet. In 1996, Galicia held 53% of the fleet whilst the Basque region held 47%. By 2006, these values had changed to 74% and 22% respectively. A decrease in the percentage of Great Sole area fishing rights which were held in the Basque region was also observed, declining from 55.8% in 1997 to 39.7% in 2003. The opposite was observed in Galicia, where the percentage of fishing rights increased from 44.2% in 1997 to 55.9% in 2003. Both regions underwent a concentration of fishing rights, demonstrated by the observed evolution of fishing rights per vessel: in the Basque region from 0.79 in 1997 to 0.92 in 2003, and in Galicia from 0.54 to 0.65 (Tables 1 & 2).

Table 1: Evolution of the percentage of fishing rights Spanish associations own in Great Sole

	1996	**2003**
Basque	55.8	39.7
Cantabria	N/A	4.43
Galicia	44.2	55.9
Total	100	100

Table 2: Evolution of fishing rights per vessel Spanish associations has in Great Sole

	1996	**2003**
Basque	0.789	0.921
Cantabria	N/A	0.804
Galicia	0.541	0.654

**N/A = not available. Figures adapted from: Laxe, 2006.*

Source: Laxe (2006) & Miguez et al. (2008)

Allowing the market to allocate quota among vessels also maximises the economic profits from quota use (Hatcher *et al.*, 2002). The principal economic argument for fully transferable rights such as ITQs is that 'the market will result in an efficient allocation of quota whereas other mechanisms for allocating quota are very unlikely to do so. The efficient allocation is the allocation which maximises industry profits given the total supply of quota.' Although strong enforcement of fixed quotas (as opposed to tradable ones) would result in some downward pressure on overcapacity in the fleet, quota trading should also greatly assist a rationalisation of fleet capacity. 'Under an ITQ system, because quota can be traded and acquires considerable value (according to the profits that can be earned from it) an adjustment of industry capacity to the overall availability of quota will be facilitated. Some vessels will increase their quota holdings in order to operate more efficiently while inefficient vessels are more likely to exit since they will be compensated to the value of the quota they sell.' This was the case in Denmark (see Box 15).

Box 32 compares the outcomes of two quota-based RBM systems operating on beam trawl fleets in the North Sea. One (Netherlands) includes transferability while the other (Belgium) does not. Detecting differences in outcome in terms of stock status, however, is not possible since both fleets target resources that are depleted and currently under a recovery plan.

Box 15: Impacts of the market for rights in Denmark

In January 2007, Denmark began a system of VTQs, where national quotas are divided among the fleet and can be traded or pooled between vessels. Contrary to perceptions about transferability and markets necessarily disadvantaging small-scale fisheries and highly dependent regions, Danish authorities suggest that in the case of demersal fisheries, changes do not reflect any pattern in terms of large/small vessel owners or harbours, but rather just differing abilities and attitudes towards the new system, and fishing rights have actually been traded into the coastal (small-scale) segment. For example Esbjerg, once one of the very big harbours, has lost significant amounts of rights, while Thorupstrand — where they fish from the beach — is one of the most successful.

The VTQ system also appears to have had significant impacts on rationalisation of the fleet, with effective capacity in the demersal fleet reduced by more than 30 % since January 1st 2007 (based on active vessels) (Directorate of Fisheries, *pers. comm.*), and potentially positive impacts on resource sustainability with fewer vessels reducing effort and with fishermen trading and swapping rights to ensure that catches can be landed rather than discarded. Preliminary data also suggest that vessel profitability (average across all fleet segments) in 2007 was 16%, against an average of 9% in the previous three years (Institute of Food Economics, 2008). In the pelagic fleet there has also been a strong structural change towards fewer, larger, newer vessels.

The move away from public money being allocated for scrapping of vessels (instead leaving it to the market) has allowed for funds to be used for innovation and investment in quality and new products instead, with the effect that the amount of fish caught not only requires less capital input, but also yields higher prices. The ITQ system has not changed the fact that quota must be fished by a Danish-registered vessel, and Denmark still has national rules requiring nationality, a permanent stay in Denmark of at least two years, or a clear economic link to Denmark to be proven.

Source: Pers. Comm. Mogens Schou, Minister's adviser on fisheries and aquaculture; and Jesper Andersen at Food and Resource Economics.

One of the objectives of the CFP reform was to increase the ability of fishers to be involved in management decision making e.g. through RACs. The presence of markets also supports this objective of greater involvement of fishers in decision making, as it provides for greater involvement by rights-holders in decisions about whether to use, sell, trade, or lease rights so as to gain maximum advantage from the rights they hold.

In cases where markets result in rights being transferred from one country to another, there may be the potential for markets for rights to impact on the principal of relative stability. Relative stability is the system whereby Member States are consistently allocated the same proportion of 130 stocks, based on historic fishing activities. The intended objective of the principle of relative stability is to ensure the balance of the benefits of rights *among* Member States in terms of quota allocations remains constant over time, even if the total benefits from fishing may rise or fall with TAC increases or decreases.

Box 16: Potential impacts of the market for rights in the UK

Out of 6,300 registered fishing vessels in the UK (in 2006), there are currently 58 Dutch and Spanish (and a few Icelandic) vessels fishing with UK quota, with 28 of them fishing in Scotland. The proportion of foreign ownership is more of an issue in Scotland than England/Wales due to the different structure of the fleet and generally higher importance of fishing to local communities. 70% of the total quota allocated to the UK is managed in Scottish fisheries, accounting for approximately two-thirds of the landings. The Scottish fleet is particularly reliant on a small number of quota species with many small family based partnerships, and the Scottish government is particularly concerned about quota being owned by overseas interests, and is opposed to a full ITQ system due to the possible ramifications for coastal communities in terms of foreign ownership and the concentration of rights. Instead they believe in keeping fishing rights as close as possible to the people actually fishing, and their proposals for a quota management system for the Scottish fleet (independent of England and Wales) would reserve the right for the government to intervene in rights distribution (subject to a notification period) if rights were not being fished (Scottish Government, 2008).

Source: Pers. Comm. Jim Watson, head of sea fisheries quota management policy section, Scottish Government

As can be seen from Table 2 above, in terms of the case studies provided in the Catalogue, rights can be transferred to other countries from rights-holders in Portugal (ITQ NAFO), Germany (IQ), and Poland IQ (see Box 17). In the UK, out of 6,300 registered fishing vessels (in 2006), there were 58 Dutch and Spanish (and a few Icelandic) beneficially-owned vessels fishing with UK quota, with 28 of them fishing in Scotland. It is also possible in France, the Netherlands, Belgium, for quota to be transferred to other Member States, although this is less likely due to various restrictions such as the use of socio-economic criteria to allocate sub-quota, and/or the need to demonstrate economic linkages. Many Member States also take part in Member State-to-Member State quota swaps in order to optimise the quota mix available for their fleets' requirements. However, markets for rights have no impact on relative stability *per se* because quotas to each Member State for particular species are allocated based on a set percentage of the TAC each year.

Markets for rights do have the potential to impact on the *principle* of relative stability in terms of a constant share of benefits between Member States, if market transactions for rights are not 'fair', thus resulting in an asymmetrical generation of benefits.

Market transactions may be asymmetrical in terms of benefits for example if one rights' holder, PO or fisheries authority pays over the market price (whether in terms of a direct money exchange or a swap of quota) for one species because of the need to obtain quota for that species in order to be able to fully utilise a quota for another species in a mixed fishery, or just through poor quota management on the part of the institutions involved.

If market exchanges (in the form of quota transfer) are based on cod equivalents[8] this may also result in unequal benefits because of changes in the market value of other species compared to cod since cod equivalents were first introduced[9]. This is an issue with respect to exchanges of fishing opportunities provided by EU fisheries agreements with third countries in northern waters. The European Union engages in four sets of balanced quota exchanges with third countries under these agreements. These correspond to the transfer of quotas under the:

- EU–Norway Fisheries Agreement;
- Norway–Sweden Fisheries Agreement;
- EU–Faroe Islands Fisheries Agreement;
- EU–Iceland Fisheries Agreement.

The basis of the exchange is set out in the annual agreed records in which the parties negotiate an exchange of fishing opportunities. The parties apply a system of cod equivalents as a measure of the relative values of the fishing opportunities for the different species. Under the agreements, quota received by the EC based on cod equivalents is shared between Member States. These exchanges, and the different market values of the different species received by individual Member States, mean that the actual benefits to Member States received from these exchanges may differ from year to year. Member States may also swap fish provided to the EC under the agreements between themselves. The cod equivalents thus have an impact on the relative benefits of the agreements accruing to both the EC and to the third countries[10].

The transfer of quota under the northern agreements represents a market for fishing rights. Box 18 provides some information on the impacts of this 'market', in terms of the resulting benefits.

Box 17: Quota swaps in Poland's offshore fleet

One of the Polish POs, the North Atlantic Producers Organisation (PAOP Ltd) operates in the NW and NE Atlantic (NAFO, NEAFC and Svalbard areas). The PO controls the majority of Polish fisheries rights in those areas. In addition to this, individual agreements between members of PAOP and other companies are used to obtain more quota to optimise fishing possibilities and profitability. All of these transfers are carried out in compliance with the law of other vessels' flags. These transfers are temporary leasing-type arrangements, and the permanent rights remain with the third country. The Polish authorities register these transfers in their administrative system, but have no right to claim the fishing rights in the future. Each quota transfer is carried out as an individual case.

In 2007, the total Polish TAC for the north Atlantic was 5,600 tonnes, but through exchange of quotas for different species, the PAOP vessels were able to catch 18,000 tonnes.

[8] Cod equivalents relate to the weight and relative value of different species relative to cod. Each year cod equivalents are set by regulation and the total allocation of allocation and transfer of quota between vessels are calculated in cod equivalents.
[9] Cod equivalents are not adjusted to reflect changes in market values.
[10] Note that the extent of uptake of quota opportunities provided for under the agreements is probably of greater importance in terms of the resulting benefits to the EU Member States and the third countries than the cod equivalents.

Box 18: The impacts of transfer quotas under the EU Fisheries Partnership Agreements with Norway, Faroe Islands and Iceland, and under the Norway–Sweden agreement

Over the period 2003–2005, the transfers of quotas between the EU and third countries under the northern fisheries agreements represented annual catch revenues valued at more than € 150 million. Generally, the agreements tend to provide additional pelagic quota to third countries, and additional demersal quota to EU Member States. The agreements, and the 'market' in terms of quota transfers, provide for positive impacts in terms of joint management responsibilities for shared stocks, and significant social and economic benefits to all parties that would not occur if quota was not swapped at all.

Overall, for the EU Member States participating in the Agreements, the Agreements contributed some 2.5 % of the national fisheries revenues. Denmark is considered to be the most dependent, with some 8 % of fishery sector revenues (€ 29 million) derived from the EU–Norway and EU–Faroe Islands Agreements. Germany and Portugal are also relatively highly dependent on the exchanges, with revenues corresponding to 4.8 % and 4.5 % of national fishery sector income. The UK is dependent on the Agreements for 3.5 % of fishery sector revenues and Spain and France 1.7 % and 1.5 % respectively. In other EU Member States, the fishery sectors have dependencies of less than 1 % on the Agreements. Within the EU, Danish vessels derived some 29.3 % of the revenues generated by the Agreements, and the UK 24.0 %, hardly surprising considering that they both have fishing zones contiguous with Norway, and in the case of the UK, with Faroe Islands. Other significant EU stakeholders in the Agreements are France (12.2 %), Germany (10.5 %), Spain (10.6 %) and Portugal (9.3 %). Of the third countries, Faroe Islands is the most dependent on transfers under their Agreement with the EU, which accounts for 3.7 % of fishery sector income. The Norwegian fleet derives an estimated 2.5 % of income from the Agreement with the EU. The EU–Iceland Agreement has little relevance for the Icelandic fleets, accounting for just 0.3 % of landing values.

Source: Based on Eurostat catch data 2003 to 2005 and nominal unit catch values for demersal, pelagic and shrimp fisheries

3.3. Institutional aspects of RBM systems

The introduction and implementation of RBM systems in fisheries management involves fisheries institutions[11] at many different administrative levels, ranging from line ministries, decentralised and regional government authorities, to private organisations, associations and user groups. The organisational set-up differs from country to country and from one RBM system to the next. In the following sections the types of institutions involved are presented including their role in the distribution of rights to primary users (and others), the day-to-day utilisation of such rights, and the shouldering of the fisheries management costs (administration, enforcement and research). An overview of the institutions and their roles, by country and RBM system, is shown in Annex 2.

[11] The definition of 'institution' can include organisations, legal frameworks, codes of conduct, norms of behaviour etc. In this text the word institution is here used in the narrow sense of 'organisations' involved in fisheries management.

3.3.1. Institutions involved in RBM

3.3.1.1. Government authorities (central, regional and local levels)

In all the EU Member States where RBM systems exist, the government authorities at the central level are involved in some way. Their involvement varies among Member States, from dealing with RBM administrative matters at the legislative and overall regulatory level down to regulation at the operational level. Matters at the regulatory level include the overall functioning of the RBM system(s), the initial allocation of rights (quotas, days-at-sea or other entitlements) to the primary producers, groups of producers, or to lower level authorities who are mandated to make further allocation of rights and set up regulations at regional or local levels. Matters at the operational level include the control of timing, technology, purpose and quantity of fishing.

Generally, national government authorities play a role in the various levels. However, in some cases, the line ministries are only involved at the higher administrative level, such as in Germany and Finland. Here the detailed allocation of rights as well as the operational regulation and enforcement is left with the *Länder* (federal states) and the 'Fishery District' authorities respectively. In Spain, the central government is in charge of the management of fisheries from 3–12 nautical miles, but management of fishing activities in waters up to 3 nautical miles is decentralised to the Autonomous Communities (AC).

Government intervention in the fisheries sector, for example in the form of subsidies, may serve to modify the outcomes of RBM systems. Cox (2003) has reviewed the impacts of subsidies on various management regimes, including those involving property rights. Cox concludes that subsidies in rights-based regimes represent a transfer from taxpayers to the holders of the rights, with the value of the rights increasing as a result. Subsidies that support less efficient operators can also act counter to influences in RBM systems that would otherwise tend to reduce fishing capacity.

3.3.1.2. Private organisations

Private organisations include POs, business associations such as fishermen's associations and groups of rights holders. Such private organisations may have only limited functions, or they may have multiple responsibilities and tasks.

Producer Organisations are volunteer associations of fishers. They originate from the EU common organisations of the market. They were first introduced as a formal concept in the management and organisation of EU fisheries in 1970. Regulations on POs have been regularly amended, most recently in 2000 (EC Reg 104/2000). The original role of POs was to balance demand and supply in the EU first hand fish market, such as by the application of a minimum price scheme based on intervention, the planning and coordination of the fishing activities of the PO members, and the marketing of their fish products.

The roles that POs have taken on in relation to distribution and utilisation of the fishing rights of their members varies from country to country and from PO to PO. In Denmark for example the POs are traditionally only involved with the management of minimum price schemes, whereas in countries such as UK, Spain and France, the POs are also involved with the distribution of fishing rights and the management of

fishing activities. Examples are given in Box 11 (France), Box 19 (Italy) and Box 20 (Spain). The European Council has encouraged the use of POs to manage quotas since the 1992 EU regulations (CE 3759/92).

Box 19: POs and management of IQs in Italy

In Italy, the management of bluefin tuna (BFT) begins with ICCAT, which is the scientific and management authority that establishes the global TAC for the Eastern Atlantic and Mediterranean, as well as the country (or region such as EU) allocation. The EU is allocated a TAC, and subsequently allocates a share to Member States. The Italian government receives its quota share and in turn allocates shares to boat-owners/POs of fleet segments such as seiners, long-liners, recreational fisheries, traps and an unclassified quota for possible allocation (UQPA).

Once rights are allocated to sectors, POs play the role of allocating rights to members and monitoring quota uptake. BFT fishing fits with the GLS (Generalised Licensing Scheme) thus licences last eight years. However, the right to fish depends on catch history, and a right that is not used could be withdrawn by the PO. POs are not allowed to exchange rights among them. Entry of newcomers is possible if they buy a vessel in one of the above-mentioned tuna sectors. Membership of a PO is not compulsory but if a newcomer decides to become a PO member he has to abide by the PO rules. Quotas are allocated to Italian vessels only.

The POs do not exert management in the sense of establishing closed seasons, technical measures or stock assessment. The sole role of the POs in relation to quota management is distribution of individual shares to members.

Box 20: Role of POs in quota management in Spanish demersal fisheries in Grand Sole

The management of Spanish shares for hake, angler fish, megrim and nephrops in NEAFC (ICES areas Vb, VI, VII and VIII a,b,d,e) is an example of greater flexibility in quota management. Unlike the case of POs in France and UK, Spanish POs do not necessarily receive a quota allocation directly from the government. Individual quotas can be allocated directly to boat owners and then they can choose to manage their quotas through a given PO or individually. In addition, a boat owner can manage his quotas through a larger PO that has a greater ability to manage rights (e.g. PO Lugo manages its rights through ANASOL). Transfer of rights between POs is also allowed. Transfer is allowed between different regions, although the Autonomous Communities (ACs) concerned and the central government must be notified. Geographical transferability has allowed the re-structuring of the rights configuration and fleet structure between the main ACs concerned: Galicia and the Basque Country. Transferability among ACs may have been the cause of the current dominance of Galician organisations. Indeed, ANASOL currently holds 45% of national rights and 50% of vessels in these fisheries.

Thus it seems that management of the rights in these waters is flexible in addition to being transferable. POs do not have such a key role in quota management as in other Member States. However, they do offer a good optional platform to manage rights. In 2007, for example, boat owners belonging to ANASOL decided to pool their individual rights in areas VI and VII (Grand Sole).

POs also play a key role in introducing technical measures into fisheries that subsequently can be imposed on other POs and to individual quota holders. A good

example is that of the megrim fishery for the Spanish demersal fleet in Grand Sole. In late 2007, the PO-4 of Galicia imposed a limit of 2,500 kilograms of megrim (20–25 cm) per trip per vessel to associated vessels landing in the ports of Vigo and Marin. Since PO-4 in Galicia is a representative PO, the rules can be applied to other POs, in accordance with Council Regulation 104/2000 and Commission Regulation 1886/2000. Consequently, in April 2008 the government extended the aforementioned restrictions to other POs' members (beyond the PO-4) (ORDEN APA/985/2008).

Fishers' Associations exist in all EU Member States and may be established under a variety of legal structures. In some countries they are established within a nested system with local associations in each fishing community at the bottom and the national association at the top. Their involvement in fisheries management including RBM varies from country to country. In Denmark the Fishers' Association was instrumental in the establishment and design of the VTQ system applied since 2007, but it is not involved with the management of the system — that is the responsibility of the national authorities in cooperation with 'Quota pool groups', established in addition to the associations, or of individual rights-holders. Nevertheless, the associations (especially at the local level) facilitate transfers of effort rights among Danish fishing vessels under the days-at-sea regulations.

Groups of rights holders can also take many different forms in the EU Member States. Examples range from single task professional groups with or without a local community base such as the 'Biesheuvel Groups' in the Netherlands (Box 25) and the above-mentioned 'Quota pool groups' in Denmark, to multi-tasked community-based groups such as the Spanish *Cofradias* and the women's associations involved in shellfish gathering in Galicia, Spain.

3.3.1.3. Co-management organisations

In recent years there has been an increasing interest in many EU countries in devolving some fisheries management responsibilities from central authorities to local co-management organisations. Such organisations comprise various groups of stakeholders, including fishermen, local authorities and researchers, which are given the mandate to manage the fisheries at the local level. Sweden provides an example of where various forms of fisheries co-management are being systematically tested (Box 21).

It should be noted that co-management may take various forms from 'consultative' arrangements where government authorities take management advice from industry and possibly other stakeholder associations through more or less formalised 'committees', to 'executive' arrangements where the decision-making powers on primarily operational matters are transferred to co-management groups. Co-management arrangements of the first type are common in the EU Member States and most often legally established. Co-management arrangements of the second type are rarely legally formalised, but *de facto* recognised. The Swedish experiments mentioned and the *Cofradias* in Spain (Box 22) and the *Bisheuvel* groups in the Netherlands also represent different forms of fisheries co-management. The Bisheuvel groups in the Netherlands (Box 25) are a system of limited participation and devolution, a form of decentralised monitoring and surveillance for the single objective of quota management. The arrangement seems to provide benefits to the fishers, hence their willingness to participate.

Box 21: Swedish experiments in co-management

Through the Co-management Initiative (samförvaltningsinitiativet), the Swedish Board of Fisheries is trying to empower local fishers with rights to manage their own fisheries. Three different RBM systems are being used, two representing TURFs and one involving limited licensing:

1. Shrimp fisheries in the Koster/Vädarö area (West coast of Sweden, ICES IIIa) (TURF);
2. Shrimp fisheries in the Gullmarsfjorden (West coast of Sweden, ICES IIIa) (TURF);
3. Vendace fishery in the Bay of Bothnia (ICES IIId) (Limited Licensing).

The Koster/Väderö fishery is in principle open access for everyone who holds a fishing licence and complying with the rules and regulations adopted. The co-management set-up is heading towards restricted entry through restrictions on fishing gears and requirements for training (a proposal that all fishers have to attend a training course in marine ecology is in the process of being codified).

The Gullmarsfjord was made a marine protected area (MPA) in 1983. In 2003, six fishers were granted a special multi-annual 100 days/year trawl permit (Limited Licence) based on historic records. In the informal co-management arrangement established, the fishers have themselves adopted gear restrictions to avoid catching undersized shrimp and local management (allocation) of fishing days to avoid crowding and early closure of the fishery. These management measures have accomplished increased cost-effectiveness and comparatively higher product prices.

The vendace (roe) fishery was centrally managed until 1999 with limited success. In 2000 it became a Limited Licence fishery where 20 local pair-trawl teams on the basis of historic records are given exclusive rights to fish inside the archipelago where the vendace schools. Within the informal co-management system established, as an alternative to pending central regulation to protect the resources, gear restrictions and time closures have been introduced with positive impacts on both vendace catches and stocks.

Box 22: Institutions and Spanish TURF shellfish fisheries in Galicia

The Galician shellfish gathering case is an illustrative example of the roles of institutions in the management of coastal resources in Spain. Moreover, it shows how the design and implementation of polices can accompany traditional rights to improve resource status and social welfare of the people involved.

On-foot shellfish gathering is a highly important economic activity for Galician fishing communities. It generates income, supports complementary fishing activities and processing, and utilises technologies that are environmentally friendly. It is an important source of employment for women, who make up 90 % of the 5,700 on-foot shellfish gatherers. The activity takes place along 1,200 km of coast comprising the Rias Baixas, the Artabrian Arch and the Cantabrian coast. Both vessel-based and on-foot shellfish gathering are managed by the 62 Galician *Cofradias* (Molares & Freire, 2003), an ancient institution with historical rights of access to a given territory. TURFs are not allocated to *Cofradia*s, but are recognised by authorities, law and civil society. New *Cofradias* can be established, providing they include 40% of the active fishers in a given area. Even though Spanish legislation recognises rights and

establishes duties for *Cofradia*s and imposes certain rules for their management, *Cofradia*s are autonomous institutions and have the power to impose restrictions on technical measures and to legally defend their territory.

*Cofradia*s accept both crew members and vessel owners as members. New entrants are allowed, but they must become a member and abide by the *Cofradias'* rules. It also depends on an assessment by the *Cofradias*' technicians on resource availability and excludes those that do not attempt to make their living from the activity (i.e. part-timers). Obtaining a licence also requires attendance at courses. *Cofradias* allow the establishment of internal bodies, such as women's associations, which defend professional and economic interests of their sector and collaborate with *Cofradias* in the design of Exploitation Plans.

Management is carried out at three levels. Firstly the shell-fishing associations and *Cofradias* manage a given area. These institutions establish technical measures, monitor the state of the resources with the aid of the *Cofradias'* technicians, organise daily work, organise courses seeking to improve technical skills and manage the activity through the Annual Exploitation Plans. Secondly, the Directorate of Fisheries, Shellfishing and Aquaculture ('*la Conseilleria*'), the branch of the Autonomous Community (AC) devoted to fishing and aquaculture activities, draws up the policy for shellfish gathering and promotes participation of the associations and *Cofradias* in the policy and decision-making process. Finally the Spanish state plays an indirect role in the management of the activity with regard to social security issues, environment and management of harbours and coasts.

La Conseilleria has introduced several measures that have brought about good results for the full-time shellfish gatherers and the resource, including a licensing system, requirement to register with Social Security and to demonstrate a minimum number of days and catches per week. This excluded part-timers and resulted in a reduction in the number of shellfish gatherers. It is considered to have improved resource status, increased wages and enhanced product quality, which in turn has resulted in a rise in value (Mahou-Lago, 2006).

3.3.2. The roles of institutions

3.3.2.1. Distribution of rights

The documentation on the roles of institutions involved with RBM show no particular pattern between RBM system and institutional structure in terms of the distribution of rights and the devolution of distributive decision powers. In quota regimes, whether transferable or not, or whether output- or input-oriented, the allocation of rights to individual users is decided at central or federal level in all EU Member States. This also applies to most Limited Licence schemes irrespective of their specific purpose.

However, there are some examples of sub-allocation of fishing rights to individuals being devolved to organisations at a lower administrative level such as POs. Examples include Spain, Portugal, Italy, France (see Box 23) and UK.

TURFs are most often managed at the community level, including the distribution of the rights among local fishers (except private property TURFs). This implies that the right of allocating resource withdrawal and deciding on the associated terms and conditions are left with community organisations (often within a nationally-set

regulatory framework), although initial establishment of such systems was often governed at central level. *Cofradias* in Spain (Box 22) provide an illustrative example of a long-established TURF regime in which the *Cofradias* manage the distribution of rights within certain parameters set at national level (e.g. licence holders must be full-time shellfishers). In the dolphinfish fishery in Malta, rights are distributed by central government through lotteries, and the clam consortia in Italy, established initially by removing excess capacity through decommissioning, have moved from a restricted decision-making role within a regulatory framework, to a self-management arrangement.

Box 23: Role of POs in quota distribution in France

The evolution of quota management by POs started in the 1960s with the FROM and its management of North Sea herring. This was an informal management and only comprised the monitoring of quota uptake. In 1990, the Ministry formally delegated quota management to POs for flounder, sole, cod, whiting, Pollock, herring and mackerel.

The general philosophy of the devolution of management responsibility is optimal quota use for the benefit of the entire fishing fleet and preserving flexibility of fishing strategies. A quota is allocated to POs only if more than 70% of the quota was caught the previous year; if not, the quota is jointly fished by all POs and statistical records of landings are kept in case of future sharing. Quota sharing between POs are pro-rata'd on the basis of the average landings from the three previous years. If one PO is not utilising its quota of one species, it informs its PO-federation who will search for another PO in need of quota for the species in question. If one PO estimates that it will exceed its quota, the PO-federation will look for unused quota elsewhere. This system works within and between the two PO federations ANOP and FEDOPA. There is no monetary or other type of payment between the PO that gives and the PO that receives quota share. To allow for an evolution of the quota sharing, the receiving PO retains their track record of half of the exchanged quota for the following year's quota distribution.

Allocation to federations of POs (ANOP for trawlers and FEDOPA for small scale) is done on the basis of catch records. However, socio-economic dependency and market interest factors may be taken into account. It is interesting to see that these two latter criteria were added after a debate between the interested parties, in which FEDOPA was in favour of taking these issues into account. The process of quota allocation involves the Ministry to propose the quotas per species, the POs to verify individual quotas and the Fleet and Quota Commission to revisit the final proposal. A reserve of quotas has also been created. This reserve aims to facilitate quota exchange with other EU Member States, to affect the track record for new entrants in the sector and to allocate quotas to POs to improve the balance between fishing capacity and fishing possibilities.

In France, POs also rule on the transfer of landing records that previously were attached to the vessel in its passage from one PO to another (i.e. from a PO harvesting in the Gulf of Biscay to one harvesting in the North Sea). POs are part of the Quota Monitoring Commission which is in charge of advising the Minister on catch and effort quota management. This Commission is composed of the Directorate of Marine Fishery and Aquaculture (administration), the two federations of POs and the National Committee of Marine Fisheries and Aquaculture. POs have started to develop strategies to match quota use with fish market value.

3.3.2.2. Utilisation and trading of rights

'Utilisation and trading' of fishing rights may include: planning (fishing activities, habitat management); pooling of rights (for effective fishing); trading and valuation of rights; and control of compliance with terms of rights. At the operational level, private organisations are much more involved in utilisation of rights than they are in the distribution of rights. Here the involvement of local fishers' associations and groups of fishers in the decision-making on day-to-day fishing practices seems to be very strong with TURFs and some Limited Licence RBM systems. The devolution of management responsibilities to such local organisations often happens in the context of co-management arrangements. Restrictions on fishing activities may go beyond government regulations. Examples are the *Cofradias* in Spain, the Koster-Vädarö shrimp fisheries in Sweden and the Limited Licence blue mussel fishery in Denmark.

In many Member States, POs are involved in the planning, coordination and pooling of the quotas of their members and swaps between POs to manage quota uptake, monitoring of uptake and the marketing of the landings. POs may also be involved with quota trading/leasing among their members (where allowed). Spain (Box 20), France (Box 23) and the UK (Box 24), are illustrative on this account.

Box 24: POs in the UK and the ITQ-like approach

There are 20 POs in the UK. They all manage quota allocations among their members, facilitate and register quota trading and plan and monitor fishing activities. The main activities of the POs in quota management are:

1. Quota allocation
Four distinct systems have evolved to internally manage the quota allocation. They range from common 'pool solutions' to ITQ, with a gradual shift towards the latter. The four systems include:

- Pure 'pool systems': where the members' Fixed Quota Allocations (FQAs) are merged and monthly catch limits are set for each member. This system emerged at the beginning of the sectoral allocation system.
- 'Pool plus systems': where the pool dominates but is combined with members managing their own 'ring-fenced' individual quotas (IQ). The IQ is based on FQA plus quota fishermen have leased or bought.
- 'Pool plus IQs': in these mixed systems some members operate in a pool, and others operate IQs only.
- 'IQ-only systems': each vessel fishes its own FQAs, based on its track record, plus purchased or leased IQ. The sum of these make up the PO's allocation.

2. Planning and administration of quota use
POs make annual submissions to the UK authorities of their Operational Programme/ Catch Plan. However, this is more an administrative requirement than a plan of the fishing activities of the members/vessels of the PO. The POs control quota uptake by their members and ensure the enforcement of PO rules.

3. Quota trading and valuation
Quotas need to be first traded among PO members and secondly outside the PO. POs keep track of quota utilisation and prevent overshooting of quotas. Quota transfers have to be reported to the UK fisheries administrations. Trading of quotas among vessel owners is only allowed when quota holders use their respective POs as trade channels. Transfer of rights between POs is allowed. The value of rights

varies substantially according to market demand. For example, the price of North Sea cod can vary by a factor of three throughout the year.

4. Control of compliance with terms of rights

The POs in the UK have developed their own set of compliance rules. Deployment of disciplinary procedures is applied when a vessel owner / skipper breaks ranks, fails to conform under generally strong peer pressure, and is seen to be acting against the interests of the group. With the introduction of the Registration of Buyers and Sellers, vessel owners / skippers are becoming more sensitive to over-quota fishing. Under the increasing belief that offences to rules erode group interests, members are also much more inclined to report misbehaviour to PO managers. The most extreme forms of sanction reported have not been financial but an invitation to leave a PO (Nautilus Consultants, 2006).

Private groups such as the Dutch Bisheuvel groups and the Danish Quota Pools, both under ITQ regimes, tend to be more limited in the scope of their management responsibilities. These groups primarily deal with the pooling of the quotas of the members and the monitoring of quota uptake, leaving the regulation and coordination of fishing activities to authorities and the individual members respectively. This is a more restricted form of co-management.

Box 25: The Biesheuvel groups in the Netherlands

Biesheuvel fisheries management groups, named after former Dutch Prime Minister Barend Biesheuvel, were established in 1992 in response to a crisis in the command-and-control regulation applied in the Dutch beam trawler ITQ fisheries (for sole and plaice mainly).

The aim of the ten Biesheuvel groups is twofold: to arrive at an effective and efficient system of quota compliance that is supported by the fishers; and to improve economic performance within the quota restrictions. The Biesheuvel management regime hinges to a large extent on the idea and practice of social control and peer pressure.

The Biesheuvel groups are administered by a board, consisting mainly of fishermen but chaired by an independent chairman. The primary task of the management groups is to manage and control the quota of their members. Fishermen are free to choose their group. Within the groups the individual fishermen pool their individual quota and their days-at-sea. Fishermen remain the owners of their catching rights and days-at-sea but within the group they can easily and buy, sell or lease quotas and days-at-sea in the short term, in the event that they have a shortage or a surplus. In this way the individual fishermen gain more short-term flexibility and have more options to react to unexpected events. Fishermen have to deliver a ‘fish plan’ to the board. The plan must show how they want to spread their days-at-sea and catches.

Beam trawl fishers appreciate the co-governance system because it gives them a say in the management of the group and their own firm; it increases their flexibility because they can transfer quotas and days-at-sea; it provides them with the certainty to take their quota share at the time they deem economically most rewarding; and decreases the likelihood that others will dodge the rules and regulations (van Ginkel, 2005).

In Finland, owners of private water bodies are obliged to form statutory fisheries associations that collectively make management plans and join Fisheries Regions for wider management initiatives and enforcement.

3.3.3. Legal aspects of PO involvement

A number of Member States' POs are involved in quota management and the allocation of individual quotas to their members. This represents an evolutionary development: POs were originally established, under Community law, in connection with the common organisation of the market for fish and fishery products, rather than the management of fishing activity. Nevertheless although POs are creatures of Community law in terms of concept and the tasks they perform; their legal status derives from national law. While the relevant EC legislation[12] sets out the criteria for recognition of POs by the Member States, in terms of legal personality POs must simply have 'the necessary legal status under national legislation'.

In practice, different Member States have allowed the use of various forms of legal entity for the establishment of POs depending on their national laws. Thus POs are established as *inter alia* limited companies, cooperatives, cooperative companies etc. This does not appear to have created any problems to date (at least none emerge from the Catalogue). However, one potentially important legal issue that may arise concerns the fact that although POs are invariably established under private law, in the management of quotas they fulfil not only a public task but also one that may impact on the (property or quasi-property) rights of quota holders. The specific question concerns the legal mechanism for challenging any adverse decisions taken by POs: are they subject to judicial review by an administrative court on the basis of public law? Or can their decisions be challenged only under private law on the basis of (implied or explicit) contractual rights? Of course the situation may vary from Member State to Member State but overall it is arguable that any uncertainty over this matter could adversely impact on the overall quality of quota rights as the ability to assert and enforce rights is at the heart of the question of security.

This situation contrasts with the organisations on which management rights (as opposed to harvesting rights) are conferred in, for example, Spain and Italy (the *Cofradias* and *Consortia* respectively) which are clearly established under public law and thus subject to judicial review by the administrative courts[13].

Where POs form an integral part of the implementation of management at the national level, they may be held accountable for the actions of their members, and subject to sanctions for non-compliance with management requirements promulgated through the PO (in support of higher level requirements at the EU or Member state level). In practice, POs may find it difficult to control or sanction their members (see Box 26).

[12] Article 5 (2) of Council Regulation (EC) No 104/2000 of 17 December 1999 on the common organisation of the markets in fishery and aquaculture products (OJ L 17, 21.1.2000, p. 22) (as amended).

[13] The decisions of Sea Fisheries Committees in the UK are similarly established under public law and thus their decisions may be subject to judicial review.

Box 26: Producer Organisations' measures for managing quotas in France

Since 1997, POs must send a yearly management plan related to the use of quotas (allocation of quota within the PO, temporal or vessel limitation, etc) to the Minister, and must closely monitor vessel activity. In practice, it is more recently that POs began to apply a genuine internal strategy and discipline for the use of quotas. This is mostly due to: (a) higher pressure to manage quotas; (b) an increasing number of cases where a PO exhausts its quota before the end of the year/fishing season, and increasing cases of quota-overshooting; (c) more control from the administration and stricter application of sanctions, especially related to overshooting of quotas.

The sanction for overshooting a sub-quota is as follows: if a sub-quota (of a PO for example) is exceeded by 5%, this sub-quota will be reduced by 5% in the following years, and the unallocated quota will go to the national reserve. However, if the sub-quota overshoot causes the national quota to be met or overshot for a given species and the fishery to be closed at the national level before other POs or the non-PO sector have reached their own sub-quotas, the 5% may be redistributed among them in the following years as compensation for this loss.

As a result, POs began to develop strategies to avoid over-shooting quotas and improve quota usage (in relation to market demand), in particular in developing individual sharing of quotas for sensitive species. For example in the FROM Bretagne (*Organisation de producteurs Fonds régional d'organisation du marché du poisson de Bretagne*) (~ 300 vessels), quotas used to be fished in common by PO members. However in the mid 2000s, the PO was sanctioned for over-shooting its Gulf of Biscay nephrops quota. As a consequence, the PO first decided in 2006 to limit fishing effort by imposing closed periods throughout the year in order to save quota for the end of the year. Then, in 2007, it was internally decided to establish a system of individual quotas based on historical track record (average landings based on the reference period 2004–2006).

3.3.4. Management costs and cost recovery

Socially responsible fisheries management cannot be rationally considered without including the cost of fisheries management. Calculations of resource rent in fisheries generally involve the subtraction of management costs (including research) as well as harvesting costs from the gross value of landings. This means that if costs incurred by management authorities are not recovered from the fishery in some way, this can be regarded as a tacit subsidy. As indicated below, proper accounting and allocation of management costs may represent a constraint to the development of more sophisticated RBM systems because they simply cost more to implement than the fishery can support.

RBM, like all fisheries management, involves at least three main functions (Arnason *et al.*, 2000; OECD, 2003):

1. Fisheries management administration (monitoring, designing, setting and modifying fisheries management rules and measures);
2. Scientific research (biological, social and economic research to inform fisheries management decision-makers);
3. Enforcement (enforcing fisheries management rules).

All these functions of fisheries management are costly and different fisheries management systems require different research and enforcement efforts. Sophisticated RBM systems can be costly to implement and maintain. Such systems may be economically warranted only for large, valuable resource stocks. Typically, the enforcement function — monitoring fishing operations and enforcing rules — is the most costly, with scientific research not far behind (Arnason *et al*., 2000; OECD, 2003). Compared to these two functions, the cost of the administration function is usually less.

The substantial cost of research and enforcement effort required to implement sophisticated, quantitative RBM systems such as ITQs can represent a significant constraint to their development. ITQs require accurate real-time specification of TACs, adjusted annually in response to stock fluctuations. Not all stocks lend themselves well to this type of approach — notably those that show highly variable and unpredictable biomass from year to year (e.g. some shrimp stocks). In addition, research tends to focus on the highest priority stocks (those under the most pressure) and hence, for those where the cost of research is deemed to outweigh the expected benefits there may not be the necessary information base to establish anything more than the most simple of management strategies. This may therefore preclude the development of more sophisticated RBM systems, at least in the short term.

The research function is a more or less essential part of any fisheries management regime. Results from research (primarily biological, economic and social) provide the knowledge base for management. Common examples of these research activities include data collection, data analysis and stock assessment processes (Arnason *et al.,* 2000; OECD, 2003).

The role of enforcement and fishers' acceptance of the rules remain central to successful fisheries management, even under sophisticated RBM systems that infer long term and high quality rights on the participants. Rights require enforcement, because of the potential benefits from illegal activities.

Since, except perhaps in the case of shellfish, the fishers under an RBM system are harvesting a common resource, effective enforcement cannot be realised without the cooperation of fishers, in terms of design, implementation, and compliance. Generally speaking rights holders are supportive of enforcement activities that protect the target resource from exploitation by non-rights holders — without effective enforcement, the attributes of exclusivity and security have little meaning.

As with all other restrictive management measures, quotas generate incentives for avoidance and misreporting. To enforce individual catch quotas, catches or at least landings have to be monitored. Enforcement, which involves the inspection of actual catch or actual landings at numerous landing ports is often (but not always) expensive. If there are few landing places and the catch is homogeneous, or if the catch distribution chain is transparent, the cost of enforcing individual quotas may be relatively small. In other cases, the cost of enforcing individual quotas is likely to be substantial to the point of being prohibitively high in places where fish are landed from numerous small craft in a multitude of landing places with a minimum of technical devices and sold directly to consumers. In large-scale operations elaborate catch control and landing facilities may exist, making it is less difficult to keep track of the fish, however, the monitoring and enforcement costs are still significant.

Problems are also likely to arise at sea. Individual quotas sometimes give fishermen an incentive to highgrade catches. Besides being wasteful, such practices have

potentially serious consequences for management, as the recorded catches underestimate the quantity actually removed from the fish stock. This weakens the factual base on which decisions about TAC are taken.

While individual quota regimes often require substantial enforcement activity, it is interesting to note that in countries where they have been most extensively used, i.e. Iceland and New Zealand, overall fisheries management costs, as a percentage of landed values are amongst the lowest observed (Schrank *et al.*, 2003; OECD, 2003). In any case, the substantial increases in economic gains, which are almost invariably generated by individual quota systems, should be set against the enforcement costs of the system.

Despite the fact that most forms of RBM provide for the generation of resource rent, licence or quota fees to cover the costs of management are rarely collected in the EU Member States. In some Member States e.g. Latvia, Lithuania, Estonia and Poland a licence fee is collected. Most of the fees collected are of a reasonable size compared to management costs.

In other Member States, the fees collected – if any – are often of an almost token size[14]. This implies that management costs including research, administration and enforcement of RBM systems throughout the EU are shouldered mainly by the EU Member States' administrations through their national budgets. Where POs and/or other user groups are involved in fisheries management they will normally cover their own costs of operation on the basis of membership fees or income generated. These costs are usually administration costs only.

The recently completed (October 2008) EU research project, 'Comparative Evaluation of Innovative Solutions in European Fisheries Management' (CEVIS), included the management costs of RBM (IQ/ITQ) systems applied in EU Member States. The findings of the project were rather inconclusive for two main reasons: (i) comparisons across countries were hampered by a lack of comparable data sets at country level; and (ii) in-country comparisons of management costs before and after the introduction of IQ/ITQ systems could not be made because Member States' cost data are not related to specific management systems or vessel segments.

3.4. Constraints to the development of RBM systems

The issue of management costs as a constraint to the development of RBM is addressed in Section 3.3.4.

3.4.1. Policy and management constraints

Almost all EU coastal Member States use some type of RBM system in the management of their fisheries. The exception is Slovenia, which has not closed its licensing system, because the fishing capacity limit has not yet been reached. Other Mediterranean countries (Greece, Cyprus, Malta and Italy) also show limited implementation of RBM systems, which — apart from bluefin tuna — are restricted mainly to limited licensing and inshore TURFs. The reason for this is that the management regime in the Mediterranean is not based on quotas, but is effort-

[14] In Denmark for example, since 2007 a landing fee of 0.2% has been earmarked for research, fish stock enhancement etc., down from 0.4% in previous years.

limited, based on licensing and a range of technical measures. Nevertheless, this approach can be effective (e.g. see Box 33).

Other Member States use more elaborate quota-based RBM systems, but have restricted transferability of rights (e.g. opting for IQ or VC systems instead of ITQ or VTQ) for policy reasons. The decision to constrain transferability is usually related to the objective of protecting coastal and small-scale fisheries and fishing-dependent communities, and the perception is that allowing free transferability would permit rights to be captured by large companies, and possibly by foreign interests. Examples where free transferability is not allowed as a matter of policy include Ireland and Belgium.

3.4.2. Legal constraints

The legislative competence of the Europen Community in the fisheries sector coupled with the extremely broad scope of the CFP, in terms both of spatial application[15] and substance, mean that the introduction of RBM mechanisms at Member State level must generally take place within the context of management measures adopted at Community level including measures governing access to waters and resources as well as within general principles of EC law[16]. Thus as seen in this Study, limited licences, IQs and, in some cases, ITQs have been used at Member State level to (re-)allocate at the national level fishing 'rights', expressed in terms of 'opportunities', conferred at the Community level through annual TAC and quota regulations[17].

The right of a Member State to adopt conservation and management measures is limited to the taking of non-discriminatory measures within its territorial sea provided fisheries resources are not already subject to conservation and management measures adopted at Community level. Even within its territorial sea a Member State may be constrained at the practical as to the use of RBM mechanisms in respect of those fisheries where vessels from other Member States have traditionally fished[18], listed in Annex I of Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the CFP[19].

The current legislative framework for the CFP explains why area-based RBM mechanisms, such as TURFs and other community based management approaches, are restricted to the territorial seas of Member States. The rules of the CFP, and the management mechanisms that it provides for (such as the use of TAC and quotas) apply to fishing activities: (a) within the EEZs of the Member States; (b) undertaken by Community vessels on the high seas in respect of fisheries that are subject to regional fisheries agreements to which the Community is party; and (c) undertaken

[15] The CFP applies to the 'Community waters' which are defined in terms of waters under the sovereignty or jurisdiction of the Member States with the exception of a number of overseas countries territories which are listed in Annex II of the Treaty. Included under this heading are internal waters, inland waters, the territorial sea and the Exclusive Economic Zone.
[16] Thus RBM systems must be compatible with single market and competition rules and may not discriminate against EC citizens on grounds of nationality, residence or domicile.
[17] Most recently by Council Regulation (EC) No 40/2008 of 16 January 2008 fixing for 2008 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required.
[18] Another form of fishing 'right'.
[19] (OJ L 358, 31.12.2002, p. 59).

by Community vessels in the waters of third countries pursuant to a bilateral agreement with the Community. A Member State cannot unilaterally exclude fishing vessels from another Member State from fishing within a given area of its EEZ provided such activity is permitted under the CFP.

The question then arises as to the current and potential impact of the CFP on the use of RBM mechanisms by the Member States. On the one hand, as described in the Catalogue, Member States have made use of a range of RBM mechanisms in connection with the national-level implementation of the CFP. It may be reasonable to infer, however, that because the overall initiative for the adoption of management and conservation policy lies at the Community level, Member States have been less inclined to enshrine RBM mechanisms that make use of higher 'quality' rights (as described elsewhere in this Study) such as ITQs in primary legislation due to the need to retain sufficient flexibility at the national level to be able to respond rapidly to future management and conservation measures adopted at Community level. This approach contrasts with that of Iceland and other countries that have promoted RBM approaches, where the ITQ system is enshrined in the Fisheries Law.

The next question is: does this matter in terms of the effective use of RBM tools? On one hand the fact that TACs and quotas are allocated on an annual basis does not necessarily reduce the quality of quota rights and ITQs. After all, the right is to harvest a share of the resource and not a specific quantity of fish. Long-term property or quasi-property rights in other natural resources, such as water, typically take account of natural fluctuations in the quantity of the resource that may be appropriated in this manner. Indeed the use of annual individual quotas is probably unavoidable. On the other hand, if quotas and ITQs are established on the basis of subordinate legislation (such as decrees, regulations *etc*) and *ad hoc* arrangements, from a legal perspective they are arguably less secure than rights created under primary legislation (laws adopted by parliament). In strict legal theory, correctly adopted subordinate legislation has the same normative force as primary legislation. The point, though, is that it may more easily be modified and thus arguably provides less formal security. In other words one impact of the CFP may be that lower quality, less robust, fishing rights can be created in respect of fisheries beyond the territorial sea.

3.4.3. Legal challenges to the introduction of RBM

The preparation of this Study revealed relatively few legal challenges in connection with the introduction of RBM mechanisms by the Member States[20]. Nevertheless, given the fact that an RBM approach will implicitly exclude from a given fishery those who do not hold relevant rights, the risks of legal challenge are significant. The risk of challenge seems to be particularly strong in connection with ITQ systems.

Indeed, the Icelandic RBM system has been subject to a number of legal challenges both at domestic level and in an international context. In 1998, in the case of Valdimar Jóhannesson v. the Icelandic State, the Supreme Court of Iceland held that the restrictions on freedom of employment arising out of article 5 of the Fisheries Management Act, which restricted the use of fishing vessels to those vessels in use that had previously obtained a permit, were not compatible with the principle of equality before the law under article 65 of the Constitution. Legislation (Act No.

[20] The Dutch ITQ system was initially subject to a number of unsuccessful legal challenges including one to the European Court of Justice. See Shotton *infra.*

1/1999) that substantially relaxed the conditions for obtaining commercial fishing permits was subsequently adopted. Two years later, in the case Directorate of Public Prosecutions v. Björn Kristjánsson, Svavar Gudnason and Hyrnó Ltd, the Supreme Court held that restrictions on the freedom of individuals to engage in commercial fishing resulting from Article 7 of the Fisheries Law were compatible with Articles 65 and 75 of the Constitution because they were based on objective considerations. Article 75 provides that everyone is free to pursue the occupation of his choosing although this right may be restricted by law on public interest grounds. In this case the Court noted that the quota system foreseen by Article 7(2) of the Fisheries Law, which makes catch entitlements permanent and assignable, is supported by the consideration that this makes it possible for operators to plan their activities in the long term, and to increase or decrease their catch entitlements in individual species as may suit them.

At the international level two complaints regarding Iceland's ITQ system have been referred to the UN Human Rights Committee (UNHRC). What is interesting about these cases is that they were framed in terms of breaches of human rights. The first case was rejected in 2003[21]. More recently, however, a complaint brought by two Icelandic fishermen was upheld by the UNHRC which found, by majority decision, that that their human rights had been violated (see Box 27). Although the full decision runs to some 27 pages the actual reasoning of the Committee is rather brief and not particularly compelling. As much as anything, the decision can be understand not as a criticism of Iceland's ITQ system as regards its substantive content but rather in terms of the manner in which it was introduced and the initial allocation of quotas. Furthermore, the UNHRC emphasised that it was not required to address the compatibility as such of quota systems for the use of limited resources with human rights law.

The UNHRC further expressed the view that the Icelandic State was under obligation to provide plaintiffs with an effective remedy including (i) adequate compensation and (ii) review of its fisheries management system. Within the time frame specified, the Icelandic government (Minister of Fisheries and Agriculture) formally responded by letter dated June 6, 2008. Briefly, the Minister stated that the plaintiffs could not be paid compensation, nor could the Icelandic fisheries management system be instantly transformed. However, a comprehensive study would be undertaken of the Icelandic fisheries management system in the near future with a view to effecting changes approaching the views of the UNHRC to the extent possible. Subsequently, the Human Rights Committee thanked the government and declared this case closed. The decision is clearly relevant to this Study. It does not, however, set any form of binding precedent as the findings are specific to the Icelandic ITQ system and in particular the manner in which that system was introduced.

Legal challenges have followed the introduction of ITQ systems in a number of third countries (Shotton, 2004). In general terms such systems have generally speaking not been found to be unlawful *per se*. Rather, procedural aspects of the manner in which they have been introduced have been criticised.

As such challenges are made on the basis of national constitutional or administrative law, it is not possible to describe, other than in a rather general manner, the types of illegality or for that matter the factors to which the courts will have regard. Typically, though, notions of equality, fairness, procedural propriety, proportionality and legitimate expectation will arise.

[21] Communication 951/2000, *Kristjánsson v. Iceland*, 16 July 2003.

In this connection the importance of extensive consultation before the introduction of RBM systems can be seen as an essential pre-requisite (as with other major fisheries reforms). In terms of rights allocations the importance of clear objectives and verifiable criteria cannot be overstated. Equally important is the provision of administrative review/appeal and revision mechanisms following the initial allocation, together with some form *ex-post facto* review in appropriate cases and as necessary 'tweaking' of initial allocations, again on the basis of objective criteria. In fact the use of such measures will not only reduce the likelihood of successful legal challenge but will also facilitate the process of reform.

Box 27: Human rights and ITQs — the Iceland case

The UNHRC is a body of independent experts that monitors implementation of the International Covenant on Civil and Political Rights (ICCPR), one of the basic texts of international human rights law. In addition it may examine individual complaints that allege violations to the Covenant by States parties to the First Optional Protocol to which Iceland is party.

In September 2003, two Icelandic citizens, Erlinger Sveinn Haraldsson and Örn Snævar Sveinsson (the 'Complainants') lodged a complaint with the UNHRC regarding the application of Iceland's ITQ system to ships fishing for demersal species. More specifically, Regulation No. 44/1984 (on the management of demersal fishing) provided that operators of ships engaged in fishing for demersal species during the reference period 1 November 1980 to 31 October 1983 would be eligible for fishing licences and that quotas would be allocated, free of charge, on the basis of catch performance during this reference period. Consolidating further regulations, new legislation in the form of Act No. 97/1985, stated that no one could catch *inter alia* demersal fish species without a permit with the issue of such permits being restricted to vessels that had received permits the previous fishing year. The adoption of the Fisheries Management Act No. 38/1990 (the Act), with subsequent amendments, saw the catch quota system established on a permanent basis.

During the reference period (1981–1983), the Complainants worked as captain and boatswain: they did not, therefore, hold a quota. In 1998, they established a private company and purchased a fishing vessel, which had a general fishing permit, which was registered in the name of the company. Although certain harvest rights were obtained during the period 1997-–2002, the Fisheries Agency refused to provide the Complainants with a quota, on the grounds that they had not qualified during the reference period. The result was that in order to lawfully fish, the Complainants had to lease catch entitlements from quota holders at exorbitant prices. Facing bankruptcy, the Complainants sought to force a judicial decision on the legality of the quota system by deliberately fishing without the necessary catch entitlements. Prosecuted, the Complainants pleaded guilty and were fined. Subsequently their company was forced into liquidation, the vessel was sold for a fraction of its purchase price and the Complainants were placed in an extremely difficult financial position with one of them losing his house. Following a failed appeal to the Supreme Court in 2003, the complaint was lodged with the UNHRC alleging a violation of Article 26 of the ICCPR. Article 26 states:

> All persons are equal before the law and are entitled without any discrimination to the equal protection of the law. In this respect, the law shall prohibit any discrimination and guarantee to all persons equal and effective protection against discrimination on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

The basis of the alleged violation of this article was that the Complainants were lawfully obliged to pay money to a privileged group of fellow citizens (*i.e.* quota holders), in order to be allowed to pursue the occupation of their choice. The Complainants further requested, in accordance with the principles of freedom of employment and equality, an opportunity to pursue the occupation of their choice without having to surmount barriers placed in advance, which constituted privileges for others. The key question was: were the Complainants victims of discrimination in violation of article 26 of the Covenant?

In reaching its decision the UNHRC noted that the ITQ system differentiated between quota-holders, entitled to lease or sell their quota shares, and others who were required to purchase or rent quota shares in order to be able to fish. It found that while the aim of this distinction (the protection of fish stocks) was legitimate, the system was not based on reasonable and objective criteria. Specifically the UNHRC found that while the distinction based on fishing activity during the reference period may have been reasonable and objective as a temporary measure, Iceland had not shown that the particular design and modalities of implementation of the quota system met the requirement of reasonableness through the subsequent permanent transformation of rights to use and exploit a public property into individual property. In this particular case the property entitlement privilege accorded permanently to the original quota owners, to the detriment of the Complainants, was not based on reasonable grounds.

4. Identification of best practices at the EU level

4.1. Introduction

The Terms of Reference for the study require an analysis of the degree of success of RBM in Member States, by reference to fisheries and fleet segments, with regard to CFP objectives (sustainable exploitation of stocks, relationship between size of fleets and available resources, economic viability) and corresponding conservation measures (input or output restrictions).

Such an analysis would be based ideally on objective indicators of success relative to CFP objectives that can be measured on a scale compatible with the management systems themselves. For example, ICES stock assessment data provide a measure of stock status for those that are assessed, represented on a broad four-point scale from underfished at one end, to overexploited at the other. With regard to economic viability, annual reports on the *Economic Performance of Selected EU Fishing Fleets* (e.g. DG Fish, 2006; DG Fish, 2007) provide a four-point scale ranging from very weak to strong. We found no equivalent objective measure to represent the relationship between size of fleets and available resources, however, information is available in some cases regarding the degree of capacity reduction that has been achieved as part of an RBM approach.

There is a major difficulty in showing whether and how an RBM system is partly or wholly responsible for the outcomes shown by these indicators, such that if the same, or similar RBM system were used in another fishery with similar characteristics (i.e. similar species, gear, vessels etc.), there would be a reasonable expectation that the result would be repeated. Assessment and comparison of fisheries management systems is not straightforward. Management systems are complicated constructs and there are a huge number and variety of them. As discussed in earlier sections (e.g. see the discussion of 'bundles' of rights in Sections 2 and 3), a fisheries management system is a set of formal and/or informal rules stipulating how fisheries may be conducted. These rules pertain among other things to permitted fishing times, fishing areas, fishing equipment, fishing vessels, species, harvesting volumes, discards and so on. Each different combination of rules defines a fisheries management system, and the rights-based aspect is only one part of the overall management system. Since there can be a large number of such rules, the number of possible fisheries management systems is very great. Thus, assuming the very modest number of 10 possible fisheries management rules, the total number of combinations of these rules is over 3 million[22]. Of course, many combinations will be nonsensical. However, the point is that there is a great deal of complexity in these systems and new fisheries management innovations are arising all the time. As a result, in the real world it is rare to encounter RBM systems that are identical. Although they may be broadly of the same type, they almost always differ in more particular, and potentially vital, respects.

An added complication is that the RBM systems themselves have been in place for different lengths of time, having replaced or evolved from different previous management systems, and also have been applied to fisheries in varying situations. We note that the introduction of a new management system is often itself an attempt to bring change to a system that is not working well, hence there will be a period of time needed for the new system to have some impact. Depending on the target species and environment (both biological and human) this impact may take some time to be reflected in broad scale indicators. Costello *et al.* (2008) have shown the adjustment period is a critical component in the observed relationship between RBM regimes and the health of the stock.

In light of this, we have taken two main approaches to the identification of best practice. Firstly we have undertaken an analysis across all of the RBM systems described in the Catalogue (Part II of the report) to explore potential relationships between the attributes of the systems and the outcomes relative to the objectives of the CFP. This is described in Section 4.2. As will be seen, and as predicted above, such an analysis is fraught with difficulties arising from the complexities of management systems and the fisheries to which they are applied. Our second approach, therefore is to seek best practice guidance through an assessment of lessons learned from selected individual examples of RBM in the EU. This is described in Section 4.3.

[22] The number of combinations of *n* different rules is given by $n! = n \cdot (n-1) \cdot (n-2) \cdot .....\cdot 1$

4.2. Investigating outcomes across RBM systems

4.2.1. Characterising and comparing the quality of rights in RBM systems

Having examined a large number of RBM systems across the EU, it is worth exploring the available information to see whether any general, and potentially useful patterns emerge. To do this, we use the characterisation of RBM systems presented in detail in the Catalogue. This begins with the classification of RBM systems into one or other category (i.e. LL, IE, IQ, ITQ etc.) and continues with the scoring of the key attributes of these systems with respect to the quality of the rights they provide.

In the Catalogue four key attributes are used to provide a common currency with which to make comparisons across the various systems and Member States of the EU. These attributes are listed in the Commission's staff working paper accompanying the Communication on RBM:

- ***Exclusivity***: this requires appropriate monitoring and enforcement systems.
- ***Security*** an effective legal system is required to ensure rights and the title to those rights are secure.
- ***Validity***: This refers to the effective period to which the rights holder can expect to retain title to the rights. Longer validity helps to bolster the holder's trust in the capacity of the system to respond to his/her long-term concerns.
- ***Transferability***: Transfer of rights from one holder to another requires ownership registries plus the rules and means to make them function.

A given RBM system may feature these attributes to a greater or lesser degree and it is convenient to measure this on a scale of 0 to 1 (see also Annex 3). A measure of zero means that the right in question features none of the attribute, while a measure of unity means that the right features the attribute fully. In general, the higher the scoring of these attributes, the higher the overall quality of the right in terms of its classification as a property right. In other words, on the basis of this system, higher-scoring rights will tend to have more of the features of property rights than lower scoring rights[23]. A pattern indicating a relationship between the attribute scores and stock status and/or good economic performance would be interesting, and would warrant further investigation as to what attributes in particular might be responsible for this and whether any general conclusions can be drawn.

The attribute scores from the RBM systems described in the Catalogue are listed in Table 5, colour coded according to the type of RBM system. Figure 3 plots the frequency distributions of the attribute values across all RBM types. This shows that the security of fishing rights across all the RBM systems is consistently high (0.5 or better). It also shows that there is a wide range of levels of transferability, although there is some evidence that transferability is either high or low, but usually not in the middle of the range. This is interesting in that we have seen evidence that states either allow transfers, or they do not, as a matter of policy. For example, countries such as Belgium are opposed to transferable quota with the aim of avoiding a concentration of fishing rights, which differs from some other Member States that are more willing to let the market dictate ownership of rights, such as the Netherlands or Denmark. Exclusivity is mostly spread across the range 0.25 to 0.75. This reflects the wide range of access levels to fishing across the EU, from fisheries with open access

[23] A detailed description and presentation of the results of this scoring is provided in Part II of this report.

in Sweden to highly localised TURF fisheries in Spain. With respect to the period of validity there is a large proportion of systems that infer long-term rights.

Table 5: Attribute scores for the RBM systems described in the Catalogue (Part II)

RBM system	Country	Exclusivity	Period of validity	Security	Transferability
LL	Spain	0.5	0.5	0.75	0 - 0.25 (0.125)
LL	Malta	0.25	0.5	0.5	0.25
LL	Italy	0.25	0.75	0.75	0.25
LL	France	0.25	0.25	0.75	0
LL	Belgium	0.25	0.25	0.5	0.25
LL	Cyprus	0.25	0.5	0.5	0
LL	Denmark	0.25	0.25-0.75 (0.5)	0.75	0.1
LL	Sweden	0.25	0.25	0.75	0
LL	Finland	0.25	0.5	0.5	0
LL	Slovenia	0.25	1	0.5	0
LL	Greece	0.25	0.25	0.5	0.25
ITQ NEAFC	Spain	0.75	1	0.5	0.75
ITQ Swordfish	Spain	0.75	1	0.5	0.75
ITQ BFT	Spain	0.75	1	0.5	0.75
ITQ NAFO	Portugal	0.75	1	0.5	0.9
ITQ Swordfish	Portugal	0.75	1	0.5	0.75
ITQ	Netherlands	0.75	1	0.5	0.75
ITQ	Denmark	0.75	0.75	0.75	1
VTQ	Denmark	0.5	0.75	0.5	0.75
ITQ (2009)	Sweden	0.75	0.5	0.75	1
ITQ	Estonia	0.75	0.25-1 (0.625)	0.75	1
IQ BFT It	Italy	0.75	0.75	0.75	0.25
IQ / ITQ	UK	0.5	0.5	0.5	0.75
IQ	Ireland	0.5	0.5	0.5	0.25
IQ	Sweden	0.5	0.25	0.5	0
IQ	Finland	0.5	0.75-1 (0.875)	0.5	0.5
IQ	Latvia	0.5	0.75	0.75	0.25
IQ	Lithuania	0.5	0.25-1 (0.625)	0.75	0.25
IQ	Poland	0.5	0.25-1 (0.625)	0.5	0.5
TURF	Spain	1	1	1	0
TURF	Malta	0.75	0.25	0.5	0
TURF	Italy	0.75-1 (0.875)	1	1	0.25
TURF	UK	1	1	0.75	0.75
TURF (private)	Sweden	0.75	1	1	1
TURF (public)	Sweden	0	0.75	0.25	0
TURF	Finland	0	1	0.75	1
CQ	Portugal	1	1	0.75	0.5
CQ & IQ	France	0.5	0.5	0.75	0.5
CQ & IQ	Belgium	0.5	0.25	0.5	0.25
CQ / Block quota	Poland	0.25	0.25-1 (0.625)	0.5	0.25
ITE	UK	0.75	0.75	0.5	0.75
ITE	Estonia	0.75	0.25-1 (0.625)	0.75	1
IE	Latvia	0.5	0.75	0.75	0.25

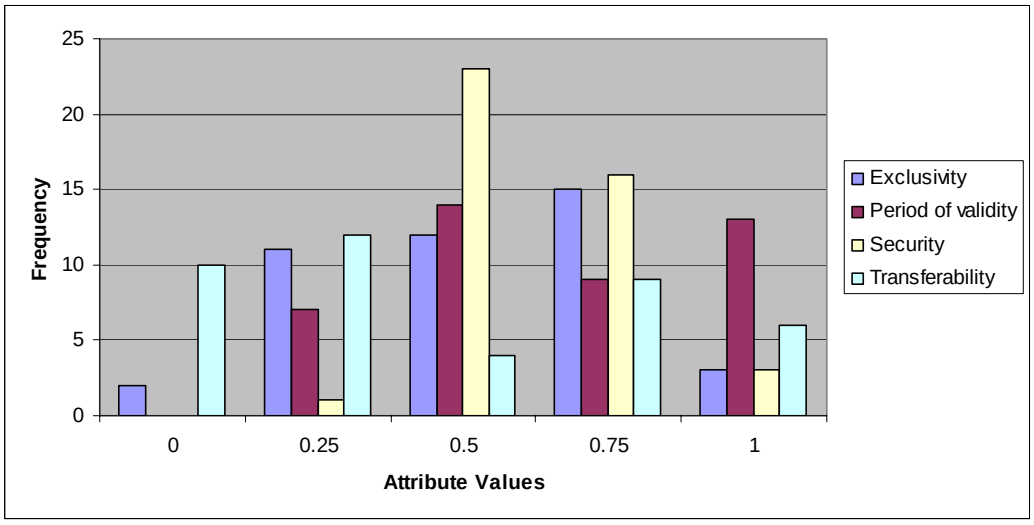

Figure 3: Frequency plot of the attribute values listed in Table 5

In Part II, the Catalogue, the value *Q* is described, which is a composite measure of the quality of the rights in each case, derived from the four attribute scores (see Annex 3 for details of the calculation of the *Q*-value). Table 6, from a paper under preparation by Ragnar Arnason, Professor, Department of Economics, University of Iceland, indicates the expected ranges of *Q* values for several common RBM systems. In all cases it is assumed that the property right itself (i.e. with respect to itself) is high quality (i.e. exclusive, secure, of long duration and, unless otherwise specified, tradable. These ranges of *Q*-values are intended to be indicative only, but they do serve to illustrate how as an RBM system infers greater exclusivity, more flexibility in terms of buying and selling rights and higher confidence through better security and longer validity, so the overall quality of the right increases. The RBM systems listed in Table 6 are described in Box 28.

Table 6: Quality of property-rights of common RBM systems with respect to the resource, starting with the highest quality rights first

System	**Rights' quality** (*Q*-value w.r.t. the resource)	**Comments**
Sole ownership	Very high (Q>0.9)	
TURFs	Very high (Q>0.9)	If resource is sufficiently sedentary
ITQs	Medium-high (Q approx. 0.7)	
IQs	Medium (Q approx. 0.5)	
Tradable effort quotas	Low-medium (Q<0.5)	
Effort quotas (restrictions)	Low (Q<0.3)	Unless effort is strongly correlated to harvest
Access licences	Very low (Q<0.2)	Unless very few fishers in which case it may become a community right)
Investment licences	Very low (Q<0.2)	
Community rights	Low to high	Depending on the nature of the community and what it does with its rights.

Source: Arnason, in prep

Box 28: Description of RBM Systems in Table 6

Sole ownership means that there is one owner of the resource in questions. His property rights, therefore, are similar to the rights of a farmer to his heard of animals living on common land. These rights are obviously not perfect ($Q<1$) because the welfare of his heard of fish depends on other fish stocks and the ocean habitat where the fish live. In other words, his exclusivity is by no means full. He will have to suffer influences (external effects) from others utilising the same ecosystem. Nevertheless, his property right is strong, hence a reasonable score for the property right's *Q*-value is $Q>0.9$.

TURFs are like a farmer's plot of land and the living organisms within the TURF (usually molluscs) correspond to the farmer's herd of animals. Thus, TURFs have the potential of being very strong property rights. TURFs however are not fenced in so the quality of the property right depends crucially on the rate of emigration/immigration of resource units with respect to each TURF. On top of this, there are the common ecosystem and habitat impacts in terms of water bodies, nutrients, infections, pollution and so on. So in the case of TURFs, exclusivity is also not perfect. Given however that the resource in question is sedentary (relative to the size of the TURF) so that emi-/immigration is negligible, the property right's value with respect to the resource (or resources) is similar to that of a sole owner or $Q>0.9$.

ITQs are extraction rights. They provide the holder rights to whatever yield the resource can provide. Someone else (i.e. a management authority) decides on the path of the resource and may set rules regarding how the extraction is carried out, although ITQ holders may also have a say in this. It follows that exclusivity as far as the basic resource is concerned is quite limited. Thus, even when duration, security of title and transferability are perfect, the overall property right's value to the resource cannot be high. Including low exclusivity into the *Q*-value formula (Annex 3) for ITQs suggests overall *Q*-values between 0.5 and 0.9. In Table 7, the mid-point of this range is used.

IQs are simply ITQs with no (or very little) transferability. It follows that the property right's value of IQ systems is likely to be less than that of ITQs.

Effort quotas confer much less exclusivity to the harvest, and therefore to the resource, than IQs. It follows that their *Q*-values must be correspondingly less. Tradability of effort quotas however increases the property right's value relative to IQs. However, as this is unlikely to balance out the reduced exclusivity, in Table 7, the possible range of *Q*-values is set from zero to 0.5, depending on the level of exclusivity actually generated by the effort quotas.

Access licences are merely rights to access to the resource. They as such provide little or no exclusivity to harvest, let alone the resource itself. As a result, the property right's value must be quite low; unless of course those with access licence combine to install their own management system on one another in which case they have, *de facto*, installed another fisheries management system. Moreover, usually transferability of access licences is quite low, although given the low exclusivity, this is not crucial. For reasonable ranges of exclusivity, e.g. from zero to 0.05, and very limited transferability, the *Q*-formula (Annex 3) yields *Q*-values below 0.2.

Investment licences exhibit even less exclusivity relative to the resource than access licences. The reason is that restrictions on investments rather than the number of extractors can hardly generate more exclusivity regarding the use of the

resource. Thus, the *Q*-value is clearly under 0.2.

Community rights are not really a fisheries management system. The community receiving the collective rights still has to select a fisheries management system for its fishers to follow. If the community decides on unhampered fishing for its members, the community's fishers are essentially in a common property situation with very low *Q*-values. If the community allocates its community rights as IQs/ITQs, effective TURFs or to one member, the individual property rights become those of these fisheries management systems listed in Table 7. If the community forms a sole owner company to run the fishery on behalf of all its members and this company can make its own decisions autonomously (although they may reflect the preferences of the community), the situation is one of a sole owner with the corresponding *Q*-value. So, with community rights, the property right's value depends on how the community uses its collective rights. It follows that under community rights, the *Q*-value may range from virtually zero to a very high value as indicated in Table 7. Note that these speculations on the *Q*-value presume that the community has virtually full and complete rights over the resource. If this is limited, e.g. by the government, the maximum *Q*-values obtainable will be less than those under sole ownership and TURFs.

Arnason (2007) has described the implied relationship between the quality of the right (here measured by *Q*) and economic efficiency. Differences in the design details of individual fisheries management systems and the underlying fish resources, however, mean that it is only possible to determine property rights' *Q*-values by reference to specific cases. Table 7 lists the calculated *Q*-values for the RBM systems described in Part II. It is then instructive to look at the relationship between of *Q*-values of individual RBM systems, relative to their expected range, as a first approximation of their degree of success with respect to the quality of the rights they provide. Figure 4 plots the *Q*-values from Table 7 alongside the approximate expected ranges based on Table 6. In some cases the calculated *Q*-values are outside the expected range. The possible reasons for this are explored below.

Table 7: *Q*-values for the RBM systems described in the Catalogue (Part II)

RBM system	Country	Q-value
LL	Spain	0.37
LL	Malta	0.28
LL	Italy	0.32
LL	France	0.22
LL	Belgium	0.22
LL	Cyprus	0.24
LL	Denmark	0.29
LL	Sweden	0.22
LL	Finland	0.24
LL	Slovenia	0.30
LL	Greece	0.22
ITQ NEAFC	Spain	0.65
ITQ Swordfish	Spain	0.65
ITQ BFT	Spain	0.65
ITQ NAFO	Portugal	0.69
ITQ Swordfish	Portugal	0.65
ITQ	Netherlands	0.65

RBM system	Country	Q-value
ITQ	Denmark	0.75
VTQ	Denmark	0.52
ITQ (2009)	Sweden	0.66
ITQ	Estonia	0.71
IQ BFT It	Italy	0.53
IQ / ITQ	UK	0.45
IQ	Ireland	0.35
IQ	Sweden	0.24
IQ	Finland	0.48
IQ	Latvia	0.46
IQ	Lithuania	0.43
IQ	Poland	0.43
TURF	Spain	0.60
TURF	Malta	0.27
TURF	Italy	0.67
TURF	UK	0.82
TURF (private)	Sweden	0.91
TURF (public)	Sweden	0.00
TURF	Finland	0.00
CQ	Portugal	0.73
CQ & IQ	France	0.46
CQ & IQ	Belgium	0.28
CQ / Block quota	Poland	0.30
ITE	UK	0.59
ITE	Estonia	0.71
IE	Latvia	0.46

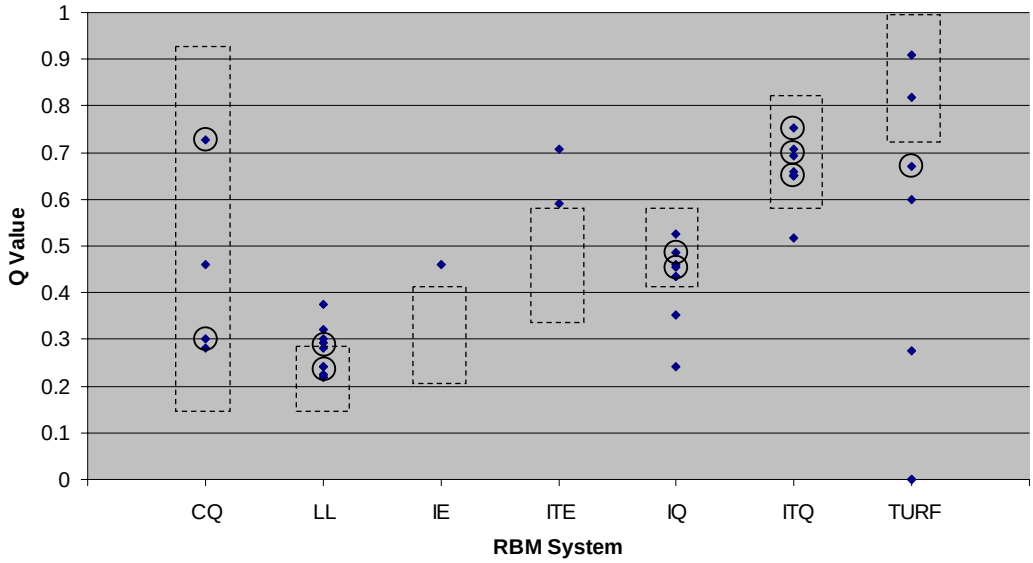

Figure 4. Q values of RBM systems in the EU as assessed during this study. The dotted lines indicate the expected range of *Q*-values for each RBM system (Table 6). The circled datapoints are those that were selected as case studies (Section 4.3).

Figure 3 above shows the *Q*-values of the rights for each RBM system assessed during this study and the expected range of rights values (as described in Table 7). In any resource access situation, exclusivity is an essential attribute and therefore has a major influence on the *Q*-value of the right. Without exclusivity, the owner has no control over the exploitation of that resource; hence the value gained from that resource is variable. Therefore, the major characteristic of rights that causes an RBM system to be outside of the expected range is exclusivity.

Although the *Q*-value for TURFs is expected to be high, there are some occasions where the value of the right is undermined. This is the case in Sweden and Finland. In Sweden, there is a TURF system in place for shrimp fisheries in public waters and as there is open access for anyone with a licence who obeys the fishing rules, there is no exclusivity. This severely impacts the quality of the right. This is similar to the TURF system in Finland. Waters are privately-owned which would suggest a high level of exclusivity; however, the owners have no opportunity to exclude other fishermen from the fishing waters. This is due to the fact that the fisheries legislation emphasises the importance of general access of fishermen to privately-owned waters.

In the case of the IQ system utilised in Sweden to manage mainly herring purse seiners and trawlers, the quality of the right is poor due to relatively low scores across all four characteristics. Most importantly, quota is only issued for a year (or less) and is not transferable. It is likely that in late 2008 or 2009 an ITQ system will be implemented which will mean that rights will be fully divisible and transferable, thus increasing the scores of quality characteristics across the board. Under an ITQ system for these fisheries, a *Q*-value of 0.66 would be expected, much higher than the current value of 0.24.

The quality of rights under the ITE system in Estonia is higher than expected. One reason for this in Estonia is that validity of the right is either 0.25 or 1, as effort quota is allocated for only 1 year, but in practice for perpetuity. To calculate the *Q*-value, a score half way between the two (0.625) was used. Another reason is that the ITE system offers more security when compared to the ITE system in the UK salmon fishery. The Estonian system is governed by clear legal regulations whereas regulations for salmon net fisheries in the UK are reviewed periodically and are often subject to seasonal or other forms of closures.

Some of the limited licensing systems have Q-values that are slightly higher than that expected. In Spain (LL in the shellfish fishery) this is the result of a high score for security, since the licensing rights are embedded within the *Cofradias* system, which enables the shellfish gatherers to defend their rights from other groups, and from local government. The *Q*-value for the Italian Generalised Licence Scheme also has a slightly higher score, because of the long period of validity (8 years and renewable) — much longer than is common for most licensing systems in which licences are usually valid only for one year. Of the other systems on the borderline, one is the Danish LL system for the blue mussel fishery, which scores highly on security, since co-management structures are strong and rules are well-respected.

Overall, the majority of RBM systems prevalent in the EU have a level of rights quality within, or close to, the expected boundaries. A range of reasons exist for the occasions where RBM systems fall outside the expected range, due to the varying nature of the RBM systems and the fisheries in which they are implemented across the EU. Importantly, aspects which modify the *Q*-value to outside of the 'expected' range are usually as a result of the interaction between different aspects of the management system (e.g. limited licences being a stronger right than a simple

licensing system due to co-management aspects that go hand-in-hand with the licensing system, or reduction in the quality of TURF rights due to other access rights coinciding with the TURF). This emphasises the issue of 'bundles' of rights, which may need to be assessed in their entirety, to determine the overall effect of interactions between the different rights, and the overall management system within which they operate.

4.2.2. Relationships between quality of rights and measures of success

Having considered the *Q*-values themselves, the relationship between these values and the measures of stock sustainability and economic performance of the fisheries under these management systems was investigated. In essence the aim was to see whether high quality rights lead to sustainable stocks and economically profitable fishing fleets, two key objectives of the CFP.

Based on 2007 and 2008 ICES stock assessment data, a judgement was made for each RBM system on the approximate status of the stocks managed under the regime. The categories used were:

1. overexploited;
2. overexploited but harvested sustainably;
3. unknown but within safe biological limits; or
4. underfished.

In cases where RBM systems are used to manage fisheries on a wide variety of stocks, these stocks were grouped into similar species in order to gain a clearer picture of stock status. There is, however, a clear limitation with respect to matching up a specific RBM system with the status of a particular target stock.

In essence, there is no simple means of directly mapping fish stocks with RBM systems, since the latter are implemented at the Member State level and fish stocks may be exploited by fleets from several Member States. As a result, a given fish stock may be subject to fishing by fleets operating under several different management regimes. Equally, a single RBM system may be used to manage a wide variety of fleets that catch a wide variety of species. In Italy, for example, limited licensing (an example of RBM with a relatively low *Q*-value) is used to manage Mediterranean trawlers, purse seiners, and midwater pair trawlers targeting a wide range of stocks with variable levels of ecological status.

There is a similar mapping problem with respect to information on economic performance. Data were taken from the reports on economic performance of EU fishing fleets (DG Fish, 2006; DG Fish, 2007). These data are compiled at the fleet level and several fleets may be fishing under a single RBM system. Economic performance was represented in four categories:

1. very weak;
2. weak;
3. reasonable; and
4. strong.

Despite these limitations, an attempt was made to investigate the relationships between *Q* and stock sustainability, and between *Q* and economic performance of

the fleets operating under different RBM systems. In cases where an RBM system is used to manage a wide variety of stocks, these stocks were grouped into similar species in order to gain a clearer picture of stock status. Figure 5 shows the resulting plot. While it is possible to see, for example, that all of the ITQ regimes have relatively high *Q*-values (as per Figure 4), the stocks fished under these management regimes range from overexploited to unknown, but within safe biological limits. The picture is similar for other management systems. The only underfished stocks are under TURF regimes.

Figure 6 shows the relationship between the economic indicators and the quality of the fishing right. A similar situation to the stock status analysis can be seen, in that fleets managed under systems with high *Q*-values display a wide range of economic performance. It should be noted also that the dataset in this case was smaller, because economic data were not available for a number of countries, including Malta, Cyprus and Ireland[24].

To investigate these relationships further a series of separate plots of the same data were prepared, one for each of the RBM types covered. These plots are provided in Annex 4. A key showing which data point refers to which RBM example is also included. While these plots help to illustrate the data in more detail, there is little additional insight to be gained in terms of possible relationships.

Of the fisheries managed through limited licensing, all are either overexploited but harvested sustainably, or of unknown status, but within safe biological limits. In terms of economic performance, this is either weak (e.g. Belgium and Finland), or strong (Spain, Italy, Greece and Malta). As indicated above, the fisheries managed using ITQs and IQs cover the entire range of outcomes in terms of stock status and economic performance. The best in terms of economic performance are fisheries managed using individual quotas in the UK (under 10m), Lithuania and Sweden. There are only a few examples of fisheries managed using ITE (salmon in the UK; coastal fisheries in Estonia) and IE (coastal fisheries in Latvia). All have higher than expected *Q*-values due to medium to high scores across all attributes (Table 5). Economic performance is very weak in the Estonian fishery and reasonable in the Latvian fishery, even though the former has a higher *Q*-value due to the transferability of the fishing rights. While the TURF and Community Quota RBM systems show a broad range of *Q*--values, of those for which data exist, none are regarded as overfished and none have a very weak economic performance.

The difficulties faced in the analysis present a number of issues for consideration. One is that the *Q*-values are sensitive to particular numerical value assignments for each of the four attributes. For example, two of the examples of TURFs have *Q*-values near or at zero, driven largely by zero values for exclusivity. That is, in this case, some changes in the exclusivity values would shift the *Q*-values for the two TURFs significantly.

There are also many sources of variation that are not accounted for by the graphical representations, such as the length of time a particular RBM system has been in place, and the nature of the system it replaced, if any. If an RBM system has been in place for a long period of time, the *Q*-value could possibly be weighted higher than

[24] There is a difference in the number of RBM systems represented in Figure 5 and Figure 6 due to availability of data from different sources. The stock status data were obtained from ICES and the economic performance data were from the 2005 Economic Performance of Selected European Fishing Fleets report. Data were unavailable from one or other source for some fishing fleets and/or stocks.

that of a recently implemented system, given higher levels of stability of management. Alternatively, exclusivity in the *Q*-value could be adjusted to reflect more time in operation. Further research could indicate what relevant time ranges are appropriate, since they likely vary across species, although identifying a clear shift in the management regime may also not be entirely straightforward given the way in which systems tend to evolve over time.

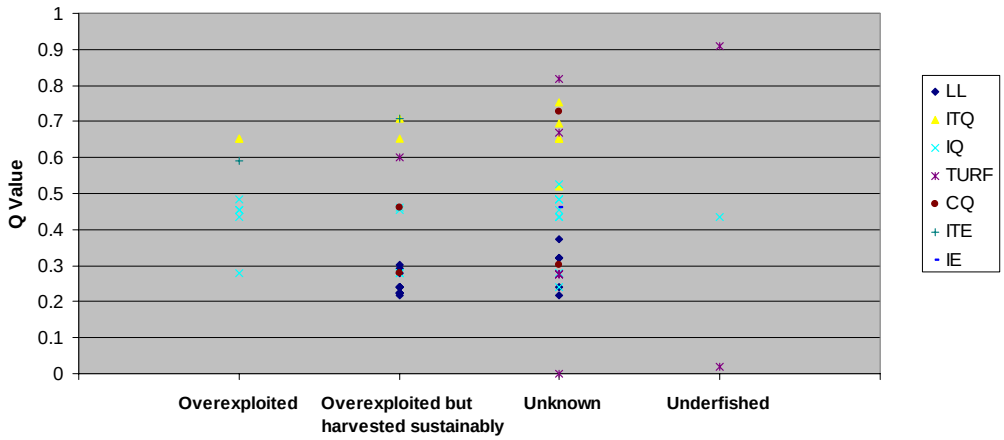

Figure 5 Relationship between Q value and Stock Status by RBM system

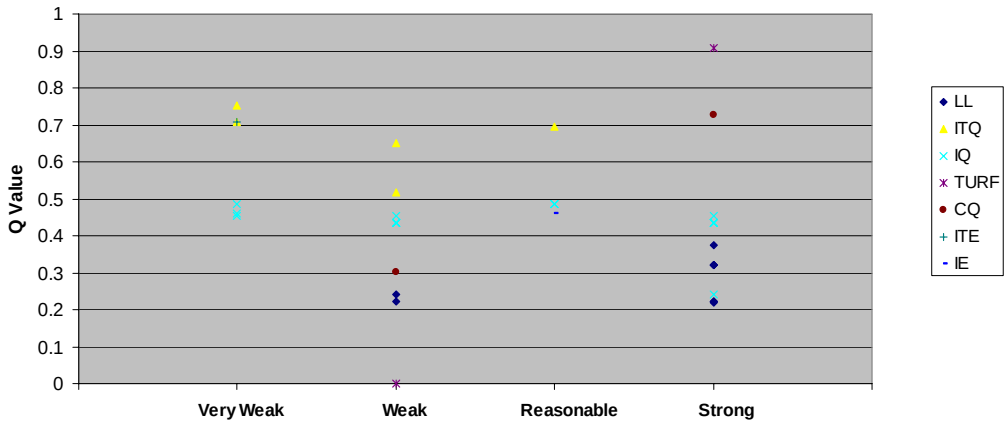

Figure 6 Relationship between Q Value and Economic Performance by RBM system

Neighbourhood effects on RBM regimes are likely to be critical as well. While the CFP sets the annual total allowable catch and allocates that catch across Member States, there could be important variation in the management regimes implemented by two or more EU Member States exploiting the same stock, such as in the Mediterranean (swordfish and bluefin tuna) and Baltic fisheries (herring). Different countries exploiting the same fishery use different RBM regimes; for example, some with ITQs others with limited licensing. Since the latter has lower *Q*-values, its use could have negative stock effects that also show up for the country using ITQs. In the same way, different countries accessing the same fishery could have different enforcement regimes even with the same RBM instrument. This could include varying levels of enforcement and varying standards in adhering to catch allocations. In this case as well, the relationship between the stock and the strength of the RBM regime *Q*-value could be low.

A final issue has to do with TURFs. They are typically granted high *Q*-values for exclusivity, durability, security, transferability. However, decision-making and coordination breaks down as groups become more heterogeneous and larger in number. Where the size and composition of the fleet is changing and the value of the species harvested is rising, the ability of a TURF to provide relatively strong rights may decline. This again suggests that a longer time frame might be considered in assigning *Q*-values to TURFs to reflect recent changes in the fleet and fishery.

In summary, clear relationships between RBM systems or the quality of rights and CFP outcomes (stock status and economic profitability of fleets) were not found. This is due to a number of confounding factors in the analysis, such as: stocks being targeted by fleets from several Member States using different RBM systems; a single RBM system being used to manage a variety of fleets targeting a range of stocks; lack of data on stock status and fleet economic performance in some cases; length of time an RBM system has been in place and the state of the fishery when it was implemented; recovery times for different fisheries; neighbourhood effects; the size and heterogeneity of fleets targeting particular stocks; and enforcement effectiveness.

4.3. Case studies of RBM in the EU

4.3.1. Introduction

This study has focussed principally on empirical studies of RBM systems in the EU. It has also covered a very wide range of management approaches used by Member States following the broad interpretation of the meaning of RBM elaborated in the Terms of Reference and during meetings with DG Mare. The concept of best practice in this context is somewhat subjective. It is by no means certain, for example, that current practice in Member States will provide informative results with respect to determining 'best' practice that is applicable elsewhere. Nevertheless, while the deeper complexities of RBM systems require more detailed and longer-term analysis, there is significant benefit in applying, as we have done in the RBM Catalogue (Part II), a standard quantification of attributes across a large number and range of RBM systems. This approach has the potential to demonstrate patterns of success and/or failure at the macro level when set alongside information on stock status and economic performance of fishing fleets. While it has not been possible to elaborate clearly such patterns during this study, the reasons why this is so have been discussed, and the exercise itself has been extremely informative in terms of illustrating the level of information on RBM systems across the European Union generally and more specifically regarding cause and effect with respect to the objectives of the CFP.

The degree of variability in the design and implementation of management systems, and the indirect alignment of management systems with fish stocks make empirical analysis extremely complex and results difficult to interpret in a way that can be transported to other fisheries. Nevertheless, more work can be done, and as more RBM systems are elaborated and those that exist are in place for longer, so patterns of success and failure, such as those predicted by economic theory, may start to emerge.

In the mean time, it may be more instructive to look in more detail at a smaller number of iconic examples of RBM to seek out lessons learned that will be of value in developing and elaborating RBM approaches for specific applications in the

shorter term. In this section, the task of analysing the degree of success of RBM in Member States has therefore been approached with reference to a series of examples from a selection of EU fisheries under a variety of RBM systems. These fisheries have been described previously in the RBM Catalogue (Part II) and in many cases also in Section 3. In the following boxes these case studies are presented with the aim of describing aspects of the RBM systems where they have resulted in positive outcomes, and also where the systems have not performed according to expectations. More information on the fisheries in question can be found in Part II, the RBM Catalogue.

4.3.2. Selection of case studies

The selection of case studies by the project team was undertaken to provide an informative range of examples that provide lessons learned which are expected to be of value in the future development of RBM systems in the EU and elsewhere. The case studies were selected to provide examples from a range of RBM systems, fleet types, fishery types, and geographic coverage of the various regions of the EU. Furthermore, the case studies represent a range of *Q*-value scores, and differing success in terms of stock status and economic performance (see graphs in Annex 4). The selected case studies and their features are outlined in Table 8.

Table 8: Summary of case studies

Case study	RBM system	Fleet type	Fishery type	Geographic coverage
Spanish NEAFC '300' fleet (Box 29)	ITQ	N and NW trawlers / Galician purse seiners / 300 fleet	Hake, nephrops, lings, whiting, anglerfish, flat fish, pollock	NEAFC waters (ICES Zones Vb, VI, VII, VIII a,b,d,e)
UK whitefish (Box 30)	IQ / ITQ	Under 10m vessel sector	Cod, haddock, whiting, flatfish, rays, shellfish, Nephrops	ICES Zones IV, VIIa,d,e,f,g, VIa
Transferable quota systems in Danish fisheries (Box 31)	ITQ	Danish seiners / gillnetters	Herring, mackerel	ICES Zones IIa, IVab, IIIa, IVabc, Via, IIIa, IVabc, IIId (sprat only), Vb1,b2, VIab, IVc, VIId
North Sea beam trawl: Netherlands ITQs and Belgium CQs (Box 32)	ITQ CQ & IQ	Beam Trawl Flatfish fishery	Flatfish (plaice, sole)	North Sea ICES Zones IIIa,b,c,d
Gulf of Lions trawler fleet: Limited licensing in the French Mediterranean (Box 33)	LL	Trawlers	Mixed	Mediterranean
Resource rent generation in Nordic Fisheries under various RBM systems (Box 34)	Various	Various	Various	Sweden, Denmark, Finland
Limited Entry Licences for Danish blue mussel (Box 35)	LL	Mussel dredging	Blue mussel, oyster	Limfjord, Kattegat and Wadden Sea
Community Quota for Portuguese sardine (Box 36)	CQ	Coastal purse seiners	Sardine	Portuguese coast
Clam consortia and self-management in Italy (Box 37)	TURFs	Clam harvesting in Italy	Clams	Italian coast
Comparison of IQs in Poland and ITQs in Estonia (Box 38)	ITQ IQ	Pelagic trawlers Pelagic trawlers	Herring, sprat and cod. Cod, salmon, sprat, herring, turbot, carp bream, pike-perch, flounder	Baltic Sea ICES 24, 25, 26, 27 (rarely)

4.3.3. Case study boxes

In discussing lessons learned in these examples, the following issues have been covered, amongst others:

- Sustainability of the resources;
- Race to fish;
- Fishing capacity vs. fishing opportunities;
- Economic viability;
- Protection of small-scale fisheries; and
- Discarding practices.

Box 29: Spanish NEAFC '300' fleet (ITQ)

Sustainability of resources
The fleet known as the Spanish '300' is an offshore fleet operating in the geographical limits of the North-East Atlantic Fishery Commission (NEAFC) in the fishing grounds of Grand Sole (ICES V b, VI, VII, VIII a, b, d, e). This is the most important Spanish fishery in terms of landings and represents 13% of total national landings. The management of the '300' fleet is described in the EU RBM Catalogue (Part II). This fleet was managed through the individual effort quotas from 1986–2006 and is now managed through individual catch quotas (2007 to date). Landings in this fishery have fluctuated, with an increasing trend over the period 1994–2004 (Figure 2), but it is unclear whether this trend is linked to the RBM approach or is the result of other measures such as decommissioning schemes or the recovery plans on the main species, including Northern hake (implemented in 2001). These recovery plans may have positively impacted stock status. The Spanish share of the hake TAC was increased by 12% in 2005–2006 and from 2007 has been kept around 19,000 tonnes (increasing to 19,625 tonnes in 2009).

Race to fish
The introduction of transferability for the effort rights in 1997 (Law 23/1997), has speeded up the reduction of the fleet and resulted in changes in the geographical distribution of vessels and rights. In 1996, the Galicia AC held 53% of the fleet whilst the Basque Country held 47%. By 2006, these values had changed to 74% and 22% respectively. Hence, it seems that the RBM approach and individualisation and further transferability of rights have provided flexibility to allow individual or group decisions (e.g. through POs). Other factors that have allowed capacity reduction in this case were decommissioning and the incentives provided by Orden 157 of 1/7/1992 that allowed accumulation of rights from decommissioned vessels. Thus a scrapped vessel could transfer their right to vessels from the same company, other company, harbour or PO. This regulation specified that the withdrawn boat owner was eligible to receive a bonus for scrapping even when he transferred its right. This incentive may have speeded up the substantial fleet reduction of up to 30% in the period 1992–1997. Consequently, the race for fish has significantly been reduced during the life span of the RBM approach.

Economic viability and fishing capacity versus fishing opportunities
One of the main and most noticeable outcomes of the introduction of the RBM approach to the demersal Spanish fisheries has been capacity reduction (Figure 1). The reduction in fleet size through decommissioning (under MAGP) was already taking place during the early and mid-1990s, with a rapid change over the period 1994 to 1997. Capacity is now better matched with fishing opportunities. Indeed, the '300 list' now comprises 200 vessels. The reduction in fleet size has had an associated impact on the number of

fishermen employed (see Figure 3). This reduction in employment and the changes in fleet geographical distribution mentioned above are likely to have had some impact on the social fabric in the fishing communities concerned. There has also been some renovation of the fleet. In 2005, 81 vessels (40% of the fleet) were under 12 years old. The value of landings has shown a steady positive trend since 1999 (Figure 4) although profitability of the Spanish fleet in Grand Sole has declined over this period (Figure 5). The rise in landings price depends on a number of factors including market value, which may in turn reflect an increase in costs. The rise in the price of fuel is likely to have been an important factor in the reduction in profitability.

Protection of small-scale fisheries

There are no small-scale fleets in this fishery, as the fishing grounds are in distant waters, requiring vessels capable of long trips. However, the government has established a separate management system for boats <100 GRT (order APA/3773/2006). This can be understood as a form of protecting smaller boats. Until 2007, boats <100 GRT had a separate quota (21 % of the TAC), which was managed under a common pool approach for all participants. Since 2008, they now have their quotas allocated individually (order APA/3844/2007).

Discarding

Due to this being a mixed fishery it is likely that high-grading and consequently discarding have been practiced throughout the history of the fishery. It is unclear weather the inception of the transferability characteristic in the RBM approach (first in the effort based model and then in the catch quota model) have had any significant impact on this practice. It is expected that the most important influence with respect to discard rates is the use of more selective mesh sizes and surveillance under the recovery plan.

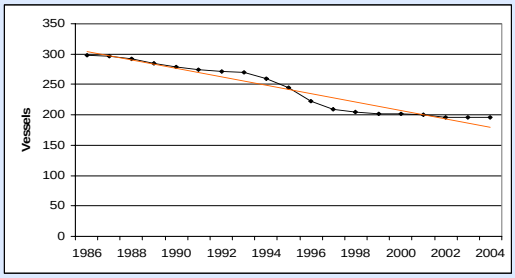

Figure 1. Number of vessels in the Spanish fleet in the Grand Sole. Source: EU, OECD, 2006

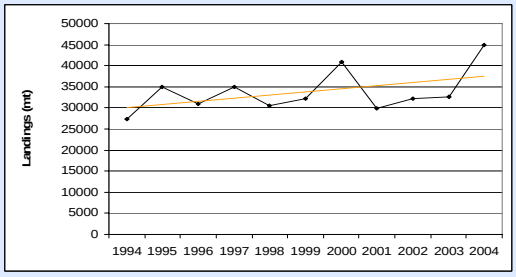

Figure 2. Landings in the Spanish fleets in Grand Sole 1994 - 2004. Source: EU, OECD, 2006

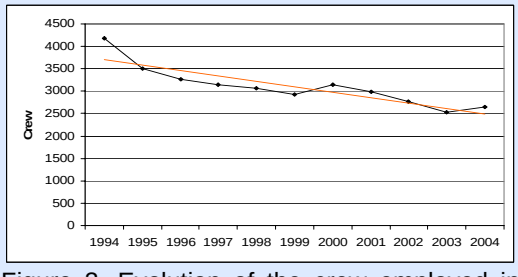

Figure 3. Evolution of the crew employed in the Spanish fleets in Grand Sole. Source: EU, OECD, 2006.

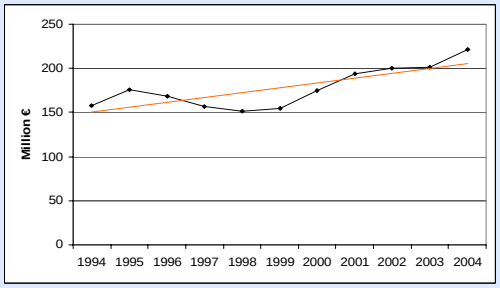

Figure 4. Evolution of landings value 1994 – 2004. Source: EU, OECD, 2006.

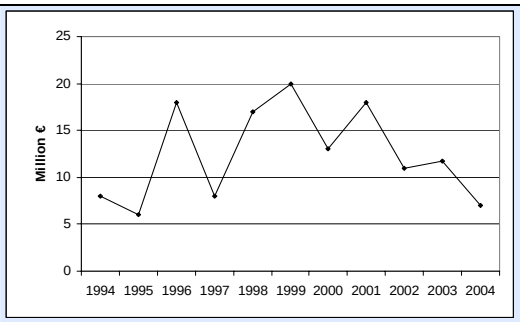

Figure 5. Evolution of fleet profitability in the Spanish fisheries in Grand Sole. Source: EU, OECD, 2006.

Box 30: UK whitefish (IQ/ITQ)

Sustainability

The UK system of quota management for marine fisheries primarily exists to allocate the UK national quota. The system only plays a part in ensuring sustainability insofar as it implements the quota limits agreed at the EU level, which are intended to be set at levels that promote sustainable fisheries.

Race to fish

UK quota management together with days-at-sea restrictions (in 2007) appear to play a part in slowing the race to fish, because each vessel may only catch up to its FQA, and further fishing for some quota species as by-catch is limited by the time the vessels are allowed to fish. In theory, therefore, a vessel may take its FQA at any time during the year and need not 'race'. In practice though, many European marine fisheries are operating mainly on recently recruited fish, with reservoirs of older, larger fish being low. Consequently, those fishing earlier in the season, including non-UK vessels, are expected to benefit from higher catches per unit of effort of the fish large enough to be landed and marketable. Also, the most powerful and efficient vessels will continue to catch these fish when others cannot, thereby encouraging fishers to invest competitively in more efficient boats and equipment. Due to the limitations in exclusivity of the rights as a result of other Member States' vessels having access to the same stocks, UK fishery organisations have little incentive to promote conservation of fish stocks for the long-term future when those fish are likely to be caught by fishers from other nations. Imperfections in the enforcement of landings quota around Europe, as well as the widespread practice of discarding of fish that are not registered under landings quota, further detract from the effectiveness of UK quota management as a means for slowing the race to fish.

Economic viability and fishing capacity versus fishing opportunities

The UK fishing industry has contracted substantially in recent years (Cotter *et al.* 2006) implying poor economic viability. Fish stocks are mostly at low levels because of sustained, heavy fishing pressures. Unfettered trading of ITQs is considered to bring about better matching of fishing capacity with fishing opportunities. In the UK, administrative and PO involvement with the ITQ trading process brings about delays (Hatcher *et al.,* 2002) suggesting that the match of capacity and resource is often less than optimal. Additionally, European TACs are mostly adjusted annually and sometimes vary widely. This, as well as uncertainties over future availability of cost-effective days-at-sea, creates difficulties for fishers wishing to adjust their investment

in vessels and gear to match the future allowable and available catch of fish in an economically efficient way (Kell *et al.,* 2005; del Valle *et al.,* 2006). Furthermore, because of incentives to catch scarce fish resources early in each season, fish will not necessarily be landed with timings that maximise first-sale market prices. Instead, prices vary widely over each season reflecting gluts and dearths in supply. This reasoning suggests that UK fisheries are likely to be over-capitalised with respect to economic efficiency. A further issue that affects economic viability is the superimposition of both input and output controls: days-at-sea restrictions added on to existing quota restrictions. This acts to reduce the potential profitability of the fleet, by restricting their operations.

Protection of small-scale fisheries
With respect to the protection of small-scale fisheries, quotas for the under-10 sector as a whole are now under-pinned, and under-10 vessels may now join POs in order to improve their quota allocations when necessary. The under-10 sector now includes the majority of vessels in the UK fishing fleet and might therefore not be considered 'small-scale' any longer.

Discarding
Discarding of under-size fish by UK trawlers is generally high (Cotter *et al.,* 2006), reflecting the need to target young fish in order to make a living. CFP regulations mostly relate to retained and landed fish and prohibit the landing of under-sized individuals. This effectively promotes discarding of small fish that are caught with legal mesh sizes. The alternative of banning discarding would, however, be difficult to implement effectively unless small fish have a market value. High-grading is seldom seen by sea-going observers in UK fisheries because of the scarcity of fish, especially large individuals.

Box 31: Transferable quota systems in Danish fisheries

In January 2003, Denmark began using a system of ITQs in the herring fisheries on a trial basis. Based on the positive experiences in terms of fleet economic performance and modernisation, the ITQ system was made permanent from January 2007 and was expanded to include other pelagic species such as mackerel, horse mackerel, sprat, blue whiting and also sandeel. The ITQ fisheries account for 35% of the value of the Danish fish landings.

At the same time, a system of Vessel Transferable Quotas (VTQs) were introduced in the demersal fisheries and applied to cod, saithe, plaice, haddock, hake, sole, turbot, monkfish, nephrops, and prawn fisheries that altogether represent 55% of the value of the Danish fish landings. The main difference between the ITQ and the VTQ systems is that in the latter quotas and vessels are (with few exceptions) inseparable. In the VTQ system the national quotas are divided among the fleet and can be traded (with vessels) and pooled between vessels through loan, lease or swap arrangements. However, from January 2009 the VTQ system has become an ITQ system; the quotas can now be traded (with few limitations) without any ties to the fishing vessels to which they were initially allocated.

Sustainability of resources
The implementation of ITQs in the Danish pelagic fisheries has, among other things, paved the way for members of the Danish Pelagic Producer Organisation (DPPO) to apply for MSC certification for member vessels fishing for North Sea herring, Atlanto-

Scandian herring, and mackerel in 2008. A Code of Conduct for DPPO members adopted in 2007 that codifies good fishing practice addresses issues of importance to resource sustainability such as avoidance of untargeted species, including also ETP species, and collaboration with fisheries scientists.

Preliminary assessments of the VTQ system suggest potentially positive impacts on resource sustainability, with fewer vessels reducing the total effort, and with fishers trading and swapping rights to ensure a quota mix for each vessel that enables catches to be landed rather than discarded.

Fishing capacity versus fishing opportunities and the race to fish
ITQ and VTQ have changed the planning horizon of the vessel owners and skippers and reduced the 'race to fish' that existed under the previous ratio- and period-based management systems. The introduction of ITQ and VTQ also marks a move away from public money being allocated for scrapping of vessels (instead leaving it to the market). This has allowed for public funds from EFF to be used instead for innovation and investment in improved product quality and new fish products that yield higher prices.

Both the ITQ and the VTQ system have had significant impacts on rationalisation of the fleet. In the pelagic fleet the number of vessels holding herring quotas has been reduced by 150% since 2003 and now amounts to 34 vessels in total. Some vessels holding large ITQ shares are new and have replaced vessels more than 25 years old. The VTQ fleet has been reduced by more than 30 % since January 1st 2007 in terms of the number of active vessels (i.e. vessels making landings). This is primarily a result of pooling of vessels.

In a recent assessment of the capacity of the Danish fishing fleet the Institute of Food and Resource Economics (2008a) found a good fit between the overall capacity of the active part of the fleet and the fish resources presently available for Denmark. However, some structural changes within and between the fleet segments would be required to make the fit optimal.

Economic viability
The economic viability of the Danish fishing fleet has improved significantly with the introduction of ITQ and VTQ (Institute of Food and Resource Economics, 2008b). For the large pelagic vessels with ITQs (purse seiners) the average profitability since 2004 has been in the range of 25%. For the Danish fleet in total the profitability in 2007 was 16%, up from an average of 9% for the years 2004–2006. This increase is despite an overall 7% reduction in the quotas of fish for consumption from 2006 to 2007 and a 25% reduction in quotas of fish for fish meal and oil.

Protection of small-scale fisheries
The Danish VTQ system includes a sub-programme aimed at protecting coastal fishers. This programme allows small-scale operators with VTQ vessels up to a maximum length of 17 meters to obtain additional rations of fish species under quota regulation. (see Box 2 in the Catalogue).

The VTQ system also includes provisions to enable new entrants to the fisheries. Each year a small percentage of the national quotas are set aside in a 'New Entrants Pool' from which new entrants can obtain quota loans for a period of up to eight years. The VTQ system also allows new entrants with a registered fishing vessel to buy up to 25% of the quotas of an existing VTQ (see Box 4 in the Catalogue).

Discarding
Since the introduction of the VTQ system there has been extensive trading and swapping of quotas to provide each active fishing vessel a quota mix that enables all the components of mixed catches to be landed rather than discarded. However, quantitative information on this outcome is not yet available.

Box 32: North Sea beam trawl: Netherlands ITQs and Belgium CQs

This case study compares the outcomes from examples where fleets from two Member States target the same resource, with similar fishing methods, but operate under different RBM systems. The Dutch and Belgian beam trawl flatfish fisheries target the same species (mainly sole, plaice and cod) and stocks using the same fishing gear. Moreover, the two management systems have evolved in parallel with perhaps only one major and crucial difference between them: Belgium has taken a position against transferability of fishing rights while the Netherlands introduced ITQs in 1975.

Sustainability
Both fleets target overexploited stocks, which are under recovery plans and whose biological status has worsened over the past ten years. It is difficult to see major differences between the two systems in terms of conservation success. As they have evolved, both systems have had a positive impact on conservation with respect to compliance with national quota, even if the stock status of some resources has continued to deteriorate. In both cases, analysis of impacts and outputs of each system is made difficult because each individual country does not have the control of the full process (the way TACs are set, compliance of other countries with quota regulations, etc.), while these externalities have a direct impact on the success of national management systems.

Fishing capacity versus fishing opportunities and the race to fish
In the Netherlands, the ITQ system was introduced in 1975 for the two major target species of this fishery in the North Sea: plaice and sole. Initially the system was not very successful and the administration was not prepared for the large system needed to keep track of landings of individual vessels in Dutch and foreign ports. The race for fish was not eliminated; the Dutch fleet expanded, both in terms of total capacity (in horsepower), in supply of fish (in weight and real value) and in employment. Heavy investment in the fleet, financed through easily-accessible loans, resulted in overcapacity and many fishermen faced a significant discrepancy between their fishing rights and their fishing capacity. Non-compliance and false landings declarations resulted (Smit, 1997), with catches continuing to exceed the national quota.

Belgium opted initially for a collective quota management system. The management system was centralised but based on a bottom-up approach. During the late 1970s and 1980s, the number of vessels in the Belgian fleet decreased drastically, but fishing capacity (mostly engine power but also length) increased considerably.

Around 1987, the capacity of both countries' fleets peaked. At the end of the 1980s both countries were forced to intervene to improve the control of fishing capacity and their level of quota consumption, bringing in a range of supplementary measures. In the Netherlands in 1987 enforcement efforts were intensified, the system was

strengthened through licensing, input management (maximum days at sea) and maximum gear width for double beam trawlers and engine power restrictions. The Belgian Government put a limit on fleet size through a licensing scheme, input restrictions on engine power and days-at sea, and moved towards an IQ system. These measures resulted in reductions in fleet capacity in both countries.

In the Netherlands, the days-at-sea restriction had a strong impact. The sector responded by decreasing the fleet, mostly by quota- (or flag-) hopping (only a small part of the reduction was supported by decommissioning schemes). This concentrated the quotas onto a smaller number of vessels, which gradually also opened opportunities for more days-at-sea per vessel. However, these regulations (limited access and input control) were not sufficient to reach the twin objectives of establishing an effective system of quota compliance (and hence the underlying objective of biologically sustainable fishery), and an economically viable and competitive fishing fleet and fishing economy as a whole.

The introduction of IQs based on kW in Belgium resulted in a rapid rationalisation of the fleet; the number of vessels reduced quickly (from 209 in 1990 to 107 in 2006), although fishing capacity fell only slightly. Despite the fact that transferability is not allowed, fishers have an opportunity to increase their share of quota by acquiring a vessel that has been withdrawn without public aid. The registered engine power of the withdrawn vessel may be added to the registered engine power of an existing fishing vessel. In this way, the vessel owner receives extra catch possibilities for those stocks that are allocated in function of kW. As such, part of the value of quota is included in the price of a withdrawn vessel. This management feature was an extra incentive (other than decommissioning schemes) towards the rationalisation of the fleet.

Economic viability

In the Netherlands, the introduction of an ITQ system without an adequate management framework (to limit capacity and monitor catches) in place led to disturbances in the market (low prices, decreasing economic returns) for the fishing, the processing and the trade sectors (Smit, 1997). At the beginning of the 1990s, a co-management system was established as an extra step in the improvement of the ITQ system both in conservation and economic terms. Most (97%) of the beam trawl fleet joined the self-management 'Biesheuvel' groups (see Box 25) and by the mid-1990s, there was positive evidence of increased economic efficiency (increased prices, improved profitability of individual vessels, high price of quotas, higher volume of quota exchanges).

The Dutch ITQ system has improved over the last 15 years and there was an improvement in vessel profitability in the 1990s and signs of increasing extracted rent. However, the analysis of economic fleet performance in 2002, 2003, 2004 showed that Dutch beam trawler fleets (both >24m and ≤24m) are operating at an economic loss (negative net profit) (EAEF, 2004).

Both fleets suffer from high operating cost of the gear, rising fuel cost, and high dependence on overexploited resources. It is anticipated that the current Dutch ITQ system (with the opportunity to buy, lease and sell quota within Biesheuvel groups) gives flexibility to individual operators to adapt their strategy and will facilitate further rationalisation of the fleet with minimum state intervention. Nonetheless, in both countries, the effect of declining operating profitability is causing the value of fishing rights to sharply decline.

In Belgium, the non-transferability of IQs was considered important to avoid any additional increase in operating costs, which was a major issue faced by the beam trawl fleets in the late 1990s and the beginning of the 2000s. The EAEF study shows that both beam trawler fleets (>24m and ≤24m) have a small positive net profit (EAEF, 2004), although another study shows that both fleets were operating at loss in 2004 and 2005 (Despestele *et al.*, 2007). In 2007, partly due to the fuel crisis, but also a reflection of the general economic status of the fleet, the value of a kW dropped to about € 250 and prices paid for vessels decreased considerably. In 2000, some vessel owners paid eight times this value per kW.

Protection of small-scale fisheries

The flatfish fishery in the Netherlands is not considered to be a small-scale coastal fishery. The restriction of transferability in the introduction of IQs in Belgium aimed to protect the vessels of the small-scale sector which can operate only within a limited radius. In allocating North Sea sole quotas on an individual basis, the group share for the small-scale segment was calculated on the basis of the historical share of the catch.

Discarding

In the Netherlands, discards are high in the bottom trawl fishery. Some discarding results from quota limits. While ITQs provide a mechanism to reduce such discards, the limitations of transferability may reduce the potential benefits of this effect. ITQs do not help directly to reduce discarding of undersized fish. Other mechanisms that appear to be having a beneficial impact on discarding are reduced fishing effort and measures taken by fishers to reduce discards (i.e. fishing techniques).

In Belgium also, discarding may occur of either undersize catch or if the quota limit has been reached. To limit this effect, the Quota Commission of the PO formulates recommendations on quota management and the level of bycatch, for species where a catch limitation on a vessel basis exists. Quota swaps between Member States is another approach to reduce discards. Alternatively, vessel owners who have more plaice quota available can also choose to fish in the central North Sea, where the abundance of plaice is higher and the abundance of sole is lower.

Box 33: Gulf of Lions trawler fleet: Limited licensing in the French Mediterranean

This case study focuses on the outcomes in a fishery managed through limited licensing, which continues to be a major part of fisheries management systems within the European Union, particularly in the Mediterranean, where there are no TACs (with the exception of bluefin tuna). The hake fishery in the French Mediterranean is a typical example of what a licensing system (supported as necessary by other management measures) can and cannot achieve, in particular with respect to the objectives of the CFP.

There is, to date, no hake management plan as such. Instead, fishing activity is managed on the basis of a licensing system where licences allow trawlers to undertake both pelagic and demersal trawling. This system is used in the Gulf of Lions to try to adjust the fishing effort of the highly polyvalent trawler fleet between the demersal and pelagic resources, particularly because the former are considered to be fully exploited. It has long been clear, however, that, on its own, such a licensing system is insufficient and hence it has been supplemented by other management measures, the objective of which is principally to reduce the efficacy

and increase the selectivity of both the vessels and their gear. Some use has also been made of decommissioning to reduce the number of licences. An important feature of the licence is that trawlers must have an engine power less than 430 HP and be less than 25 metres long. Other standard supplementary management measures include a minimum mesh size and a ban on trawling in coastal areas, broadly speaking within 3 miles.

A fishing calendar, based largely on propositions put forward by the fishing industry, has also been introduced. This imposes a number of restrictions on fishing activity, such as no fishing at weekends, fishing days restricted to between 03.00hrs and 19.00hrs (with some very minor variations in some ports) with an obligation to land catch daily, and further extra fishing bans (e.g. in Sète, the principal port for trawlers, fishing is banned during the Christmas and the New Year period and also around St. Peter's day). In total, these extra closures reduce fishing time by 2 to 3 weeks per annum.

Sustainability of the resources

The overall effect of the licensing scheme, which has limited the number of fishers, together with supplementary measures, which have limited to some extent the effectiveness of the fishing activity and in particular the operating area of the trawlers (even if the refuge hypothesis has still to be confirmed), has been to enable the hake fishery to continue sustainably over a number of years. This is the most valuable single fishery in the French Mediterranean. In maintaining the production, the management system has contributed to CFP goals in particular of conserving fish stocks whilst promoting the continuation of professional fishing activities in Community waters.

The fishing calendar has the effect of substantially reducing the effective fishing time compared to that which would be available in an unregulated system. More importantly, by restricting daily fishing time, the system limits the area that the trawlers are able to exploit and in effect creates a refuge area in the zone which is outside of their operational range.

In the case of the hake fishery, this refuge includes a number of deep-water canyons that are important reproduction and nursery areas. These canyons, which may be over 50 km long, are important habitat for the biodiversity of the coastal area and the continental shelf. It would appear that the fishing calendar implemented by the fishermen has protected these canyons which have continued to ensure adequate recruitment to the fish stock. The role played by these canyons is the subject of a study being undertaken from November 2008 by the Marine Protected Areas Agency (which is part of the French Ministry for Ecology, Energy, Sustainable Development and "Aménagement du Territoire"). It is particularly important to understand this role given that a fleet of Spanish longliners operate in the Gulf of Lions, targeting in particular hake in the submarine canyons of the continental shelf at a depth of 160m to 500m.

Fishing capacity versus fishing opportunities and the race to fish

The licensing system suffers from the problems that tend to undermine licensing systems the world over. In particular, a licensing system has problems dealing with the race for fish, which leads to 'capital stuffing' of various kinds as fishers seek to enhance the effectiveness of their vessels within the licence constraint. For example, newer trawlers tend to be much larger (in volume terms) than those that they replace within the 25m length constraint (and most vessels have engines fitted that are considerably more powerful than 430HP). The use of Kort nozzles is also

widespread, and there has also been substantial investment in electronic equipment. As a result, technical creep has been estimated to be in excess of 1% per annum (Kirkley et al, 2004).

Economic viability
It is also difficult to evaluate economic viability within the licensing constraint because fishers are free to switch target species, which they tend to do from time to time depending on the catch rates of different species and their markets. In particular, when anchovy catch rates and prices are good, there is a tendency for a substantial proportion of the segment to switch to targeting this species. The use of broad definitions of segments does not facilitate management. It does seem clear however that the economic viability of the segment is relatively weak; in particular its resilience to shocks is quite limited as was demonstrated recently by the (very great) increase in fuel costs. Furthermore, there is a high level of government subsidies in French fisheries, where subsidies represent 18% of the landed value of the fish (OECD, 2004). This cannot be disassociated from the economics of the fleet.

Protection of small-scale fisheries
This fishery is aimed at a specific fleet segment and many of the management measures are aimed at protecting small-scale fisheries (e.g. limits on vessel size). The management scheme has also contributed at the social level by keeping a greater number of fishers in activity than would probably have been the case under management schemes focussed more directly on the economic performance of the fleet.

Discarding
As with any trawl fishery, some discarding occurs. However, in the past, this problem has been relatively limited due to the fact that there is a very strong market for small-sized fish. As a result, juvenile hake (and other high-valued species) have tended to be landed and sold. Despite this, the stock has apparently remained in good condition which raises interesting questions about management strategy. For the moment, the approach is to try to protect juveniles by increasing mesh size and banning sales of small fish. There does not seem to have been a bioeconomic study of such a strategy compared with other options.

Box 34: Resource rent generation in Nordic Fisheries under various RBM systems

The Nordic Council funded a research project *Focus on the economy in the Nordic Fisheries. Case study reports from Iceland, Norway, the Faroe Islands, Sweden and Denmark* (Neilsen *et al.*, 2007), which analysed the resource rent generation of five fisheries with different associated rights for the 2001–2003 period:

1. ITQ managed trawl fisheries in Iceland (76 vessels)
2. IQ managed coastal fisheries in Norway (1,145 vessels)
3. ITE managed Faroe Island pair-trawl fisheries (29 vessels)
4. Catch ratio managed Swedish pelagic fisheries (57 vessels)
5. Limited License managed Danish blue mussel fisheries (63 vessels) (see also Box 35).

Economic viability and resource rent
A positive resource rent implies that labour and capital are better rewarded in the

fisheries sector than in the other productive sectors of society whereas a negative resource rent indicates the opposite.

Even if the resource rent is influenced by factors such as resource productivity and product prices it is plausible to compare the fisheries mentioned from a rights perspective. The Iceland ITQ case was associated with strong rights and was therefore expected to generate a high resource rent. The Norway case related to rights that were non-transferable. As it is the transferability that enables the individual fisher and the industry at large to adjust fishing capacity and fishing effort in the short and medium term and thus to generate resource rent, the expectation was that non-transferability results in a lower resource rent. The Faroese case had strong rights even though it was an effort-based management system, which is therefore susceptible to long-term problems related to increases in productivity (technology creep). The Swedish ratio system had low exclusivity, because the pelagic fishery at the time of analysis was open to other fleet segments. In fact the ratio system in the Swedish pelagic fisheries was abolished in 2007 with the introduction of an IQ system. The Danish limited license blue mussel fishery has developed strong rights over time through limitation of the number of licences and strict regulations on entry, capacity and fishing effort.

The findings of the project with respect to resource rent (%) were as follows:

	Iceland	Norway	Faroe Islands	Sweden	Denmark
Resource rent	28	-34	20	-20	44

The resource rent is highest in Denmark followed by Iceland and Faroe Islands. These countries have strong rights. Norway and Sweden, both with weak rights, showed negative or low resource rents and could not cover the management costs. These empirical findings demonstrate a clear link between the management regime and the opportunity for profitable fisheries.

Box 35: Limited Entry Licences for Danish blue mussel

The blue mussel fishery in Denmark is a single species, single fleet fishery. Fishing vessels are small and all use dredges. The total annual landings of mussels have been between 55,000 and 111,000 metric tonnes in the last eight years. The main management instruments used are vessel entry restrictions, capacity limitations (expressed in terms of engine power, length, breath, draught, and tonnage) and individual quotas. The total number of licences is restricted to 62. In agreement with the fishers, weekly and daily quotas per vessel are set by the Directorate of Fisheries. A minimum size of mussels also applies.

Sustainability of the resources

Although stock estimates are carried out, they serve as indicators for the sustainability of the stocks and not for the determination of quotas. Thus no TAC is set for the mussel fishery. There is a strong element of co-management through direct involvement of the fishers in the management of the fishery. Formerly, the weekly quota in the Limfjord area was set at 110 tonnes per vessel, but the fishermen claimed that a lower level was needed, which was then approved by the

fisheries authorities.

Fishing capacity versus fishing opportunities and the race to fish
There is no 'race for fish' in this fishery. The fishermen themselves decide the number of fishing days (with regard to the daily and weekly quotas) as well as deciding when the season will start and end. The fishing capacity restrictions are sufficient to restrict effort to a level which ensures a biomass above critical biological limits. The number of licences is unlikely to increase in the future.

Economic viability
The Danish mussel fishery is very effective economically. Resource rent, after deduction of public expenses (management costs) was 44% in 2001-2003. Total remuneration amounted to DKK 114 million (€ 19 million) corresponding to 85% of the total landing value; whereas total remuneration in alternative use averaged DKK 34 million (€ 4.5 million); i.e. 25% of the total landing value. The difference between these two values, DKK 80 million (€ 11 million), gives the current resource rent *before* the deduction of net public expenses. This is a significant positive value corresponding to 60% of the total value of landings (see also Box 34).

Protection of small-scale fisheries
The fishery is undertaken by small-scale operators only. Licences are automatically renewed. This provides the fishers involved with a high level of security. Limited opportunities for new entrants exist, however a change in ownership of existing vessels by crew members or relatives is normal.

Discarding practices
No information on discarding practices in the mussel fishery was available. However, undersized mussels are reset.

Source: Laursen Cozzari *et al.,* 2007.

Box 36: Community Quota for Portuguese sardine

The Atlanto-Iberian purse seine fishery for sardine is the most important resource in Portugal in terms of economic value (33% of the total national value) and landings (36% of the total national landings). A co-management approach that involves POs is currently in place and has allowed authorities and the ten POs involved in purse-seining to ensure the control and surveillance of the sardine fishery.

Sustainability of the resources
Sardine is co-managed under the 'Action Plan for Sardine'. This plan aims at wider protection for the juvenile component of the stock, and regulates harvesting and marketing. The sardine fishery is currently being assessed under the standards of the Marine Stewardship Council (MSC) certification. This indicates that they are confident the resource is in good shape and sustainable.

Fishing capacity versus fishing opportunities and the race to fish
The measures adopted include restrictions on catch and catch handling and marketing, complemented by technical restrictions such as a ceiling of 180 days per year for fishing activities, bans on fishing at weekends, closed areas, and an average ceiling of 75,000 tonnes for the POs (there is no TAC for sardines). Authorities also grant management rights to POs that are consequently empowered to impose restrictions (i.e. daily catch limits) on fishing boats. POs play a key role in that

assessment and boats that do not belong to a given PO will not be considered as part of the evaluation.

Figure 1 shows a decline in fishing effort (days) and Figure 2 shows a drop in the number of vessels over the period 1998 to 2004. This reduction has been linked to the management measures described above and a consequent reduction in the race to fish. The restriction on days per vessel (180 days per year) imposed by the POs ensures that effort per vessel does not increase. Landings have also fallen and have not surpassed the 75,000 ceiling since 2000 (Figure 3).

Economic viability

Despite the reductions in effort and fishing capacity, profitability has fallen (Figure 4). This may be due to increases in operational costs, particularly high fuel prices.

Protection of small-scale sector

This is a small-scale activity thus all management measures have been devised to protect the interests of the small-scale owners.

Discarding

No information on discards is available. However, it seems that due to the nature of the fishing activity, based on a single species, discards might be related to an excess of fish that may push prices down. In that context, The PO has as a primary goal to ensure good market prices for their associates. The POs have procedures to prevent price dumping by freezing excess fish and releasing them to the market during the closed seasons. These market mechanisms may prevent discarding of fish when prices are falling.

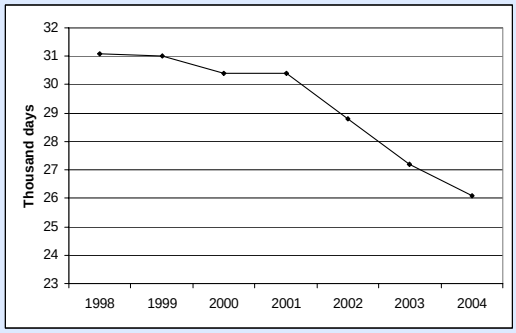

Figure 1. Fishing effort in the Portuguese sardine fishery. Source: EU. Own elaboration.

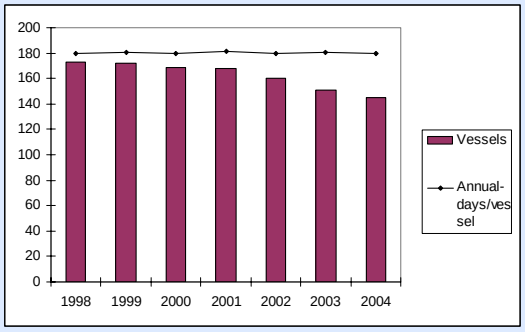

Figure 2. Fleet capacity and average effort levels per vessel in the Portuguese sardine fishery. Source: EU, Own elaboration.

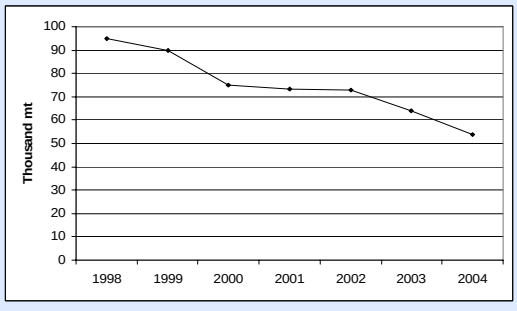

Figure 3. Total landings in the Portuguese sardine fishery. Source: EU. Own elaboration.

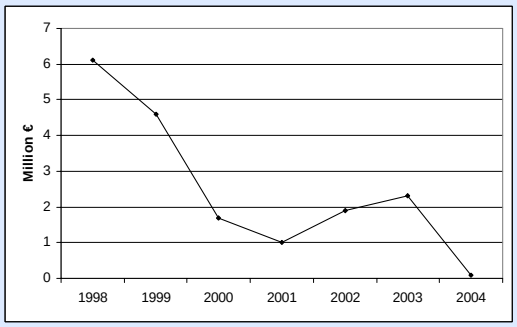

Figure 4. Profitability in the Portuguese sardine fishery. Source: EU. Own elaboration.

Box 37: Clam consortia and self-management in Italy (TURF)

Sustainability of the resources

The clam fishery is one of the most important fisheries in Italy in terms of landings and represents 6% of the total value of national landings. The TURF and self-management approach applied in the clam dredge fishery in Italy is a good example of how close control of landings and implementation of technical measures such as minimum sizes, closed seasons and areas can promote sustainability. Figure 1 shows a diminishing trend in landings since the implementation of the Consortia self-management approach.

Fishing capacity versus fishing opportunities and the race to fish

The decommissioning scheme implemented by the Italian Government reduced the fleet size. Figures 2 and 3 show decreasing trends in capacity and fishing effort respectively over the period 1998 to 2004. These factors may have helped reduce catches, leading to higher market prices, and an overall increase in landings value since 1998 (Figure 4).

Economic viability

Improved organisation of fishing activities may have also reduced costs and thereby improved profitability in the sector. Profitability is highly variable, but has shown an overall increasing trend since 1998 (Figure 5). Higher profitability is reflected in an increase in the values of a fishing licence for an active dredge. In 1996, when decommissioning schemes began, the value of a dredge licence was € 130,000. By 2002, it had more than doubled to € 300,000, indicating a positive impact of the RBM on the value of access rights to the fishery. This is despite the ageing of the fleet: in 2005, 50% of the fleet was more than 20 years old.

Protection of small-scale sector

Although highly mechanised, this is a small-scale fishing activity. Boats are 12–18 m in length and employ only two men. The only measure applied to protect this small-scale fishery is that aquaculture of clams and other bivalves can only undertaken in lagoons, leaving the coastal areas reserved for dredges. In addition, decommissioning schemes included measures to prevent social problems which could have been caused by the reduction of the fleet. In the period 1996–1998, fishers leaving the fishery received a compensation of € 6,500.

Discarding

No discard information is available for this fishery. However, technical measures are devised to prevent harvesting of undersized individuals and thus minimise discards.

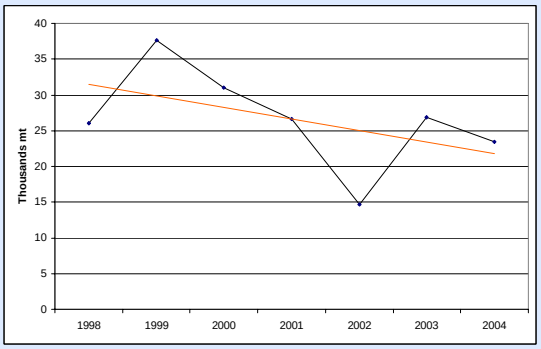

Figure 1. Landings of Italian clam fisheries 1998-2004. Source: EU. Own elaboration.

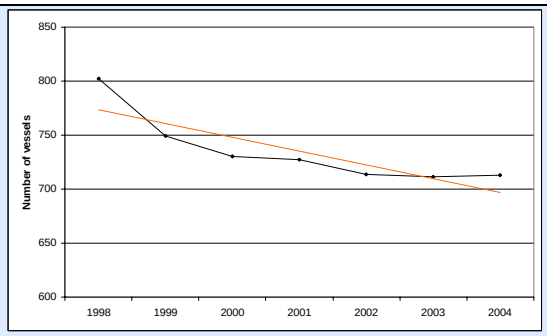

Figure 2. Fleet size in Italian clam fisheries 1998-2004. Source: EU. Own elaboration.

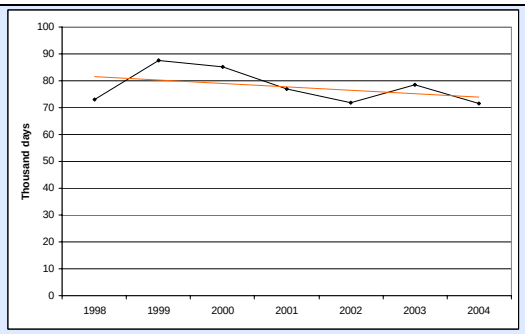

Figure 3. Fishing effort in Italian clam fisheries 1998-2004. Source: EU. Own elaboration.

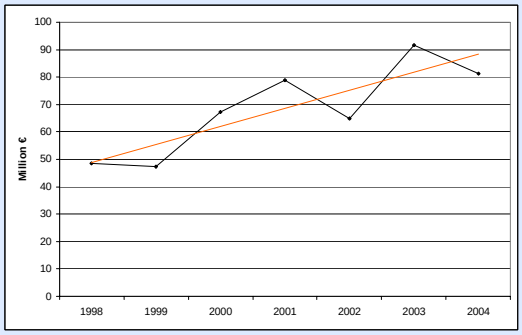

Figure 4. Landed value of Italian clam fisheries 1998-2004. Source: EU. Own elaboration.

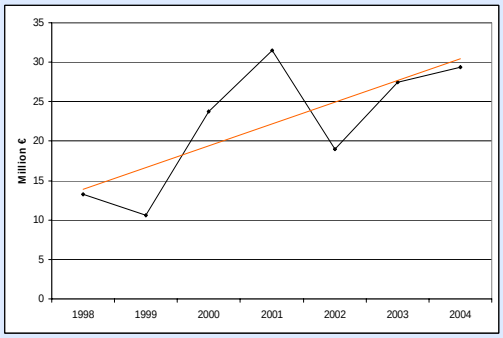

Figure 5. Profitability of Italian clam fisheries 1998-2004. Source: EU. Own elaboration.

Box 38: Comparison of IQs in Poland and ITQs in Estonia

Sustainability of the resources

In Poland, fishing pressure on coastal fisheries (e.g. herring, turbot, and sprat) is generally low. Cod stocks that are targeted by the Polish fleet have been associated with high fishing pressures and are under recovery.

The Estonian fishing fleet managed under ITQs fishes offshore for herring, sprat and cod. Herring is considered by ICES to be harvested sustainably. The cod stock which is caught by the Estonian fishermen, but at the same time also by many other states around the Baltic (including Russia which sets its own TACs), is considered to be harvested sustainably. According to ICES, the sprat stock is at risk of overfishing.

Fishing capacity vs fishing opportunities and the race to fish

In Poland, landings from the cod fishery have sometimes exceeded the national quota. In the last two years, Poland's quota was exhausted during the first half of year and the fishery was closed to all vessels under the Polish flag. Under Regulation 107/2008, the EC deducted 8,000 tonnes of Poland's cod quota over four years starting in 2008 (800 tonnes in 2008 and 2,400 tonnes in 2009–2011). The management system does not appear to be working well in terms of sustainable exploitation of stocks. There appears to be substantial over-capacity in the fleet, and as a result the race to fish still exists, leading to early overshooting of the quota.

In Estonia's ITQ system, fishing companies swap quotas between each other under the supervision of the Ministry of Agriculture. It is all also possible to trade future rights to

catch and swap quotas. This system functions successfully, mainly due to the small size of the sector. Fishing opportunities have been allocated to companies according to historical fishing rights, which has resulted in a stable and sustainable fishery. Due to the stability and predictability of this system there is no race to fish in Estonia.

Economic viability

In Poland, IQs are used for managing fisheries for cod and salmon by vessels over ten metres in length. This sector receives about 90% of Poland's total quota. The remaining portion is allocated to small scale (<10m) vessels (see below). Each year the vessels' agents complain about the size of the quota. There have been attempts to introduce different methods of quota distribution between agents but no method has been fully approved by the sector. Fishing companies complain that the quota is not sufficient to cover their costs, so the fishing is not economically viable. This is an indication of continued overcapacity in the fleet.

Taking into account the influence of the ITQ system in Estonia on economic performance, the profitability of fleets has increased. The fishing capacity of the fleets is better matched with the fishing possibilities, which has ensured stability in those fleet segments. In 2001, when the ITQ system was introduced, there were 154 registered fishing vessels fishing in the Baltic. In 2009, the fishing vessel register contained 71 vessels operating in the Baltic; only 20 of the vessels were removed from the register with the support of a scrapping premium.

Protection of small scale fisheries

Every year, a block of approximately 10% of the total Polish quota for cod and salmon (the most in demand stocks) is set aside for allocation to small-scale vessels (under 10m in length, see table below). To obtain a block quota fishing permit there is a requirement to catch the specific stock in previous years (detailed rules change each year). From 2008, vessels under 8 m length will no longer be required to do this in the case of cod quota. In the case of sprat and herring quotas, small vessels are given the block quota under the same rules as the other vessels.

Block quota for small scale fishing in Poland		
Year	% of total cod quota	% of total salmon quota
2005	6 %	9 %
2006	6 %	10 %
2007	6 %	10 %
2008	10 %	11 %

The system is designed to cover all the needs of this sector (particularly economic viability). The main problem is in the quota reporting. Under the Polish fishing law, all vessels under 10 m length are required to submit a monthly catching report to the Polish Fishing Monitoring Centre in Gdynia. As it takes time to process all of the reports that are submitted, it can lead to over-shooting of the block quota and also of the total Polish quota. Because of this, the pace of the race to fish has not changed significantly. It is also difficult to control all the small vessels because they operate from small ports where there are not enough fishing inspectors.

In Estonia, the fisheries covered by the ITQ system are offshore fisheries. However, it is worth mentioning that there are also systems in place to ensure the sustainability of the small scale coastal fisheries. These include:

- different RBM system – no individual catch quota, just effort quota and/or block quota;
- a divided coastal zone – vessels from the offshore zone cannot fish in the coastal zone, to help protect the fishing ground; only flounder vessels are allowed to enter

deeper waters;
- no obligation of prior notification of coming to port;
- no VMS system for vessels smaller than 15 m; and
- log books have to be sent just once per month to the Ministry of Agriculture.

Discarding practices
Discarding is not a major issue in the IQ managed Polish fleet, with a low amount of undersized fish being discarded. In Estonia, as there is a minimum landing size for cod, discards of undersized fish still exist.

4.4. Lessons Learned from RBM in the EU

The first and perhaps most important lesson learned from the case studies and more broadly from the project as a whole is that RBM systems within the EU are not specifically aimed at meeting the objectives of the CFP, but are generally tailored to local circumstances and objectives. Rights to fish take many forms and, unsurprisingly, RBM systems have evolved independently and diversely in most parts of Europe and may be significantly driven by local business and/or political needs. Nevertheless, RBM systems have contributed to sustainable biological productivity and improved economic performance of some fisheries where rights are exclusive, easily enforceable (secure), long term and tradable.

However, the benefits of RBM systems have proved difficult to demonstrate for the international marine fisheries governed by the CFP. Here, the principal instruments for control are TACs and technical measures set at the European level. TACs are divided among countries by fixed political agreement, using the principle of 'relative stability', (although annual quota can be adjusted by quota swaps negotiated between countries). Rights' allocation occurs within countries for the purpose of partitioning the available national quota among the fishing interests within that country. These national RBM systems can help to rationalise national fishing effort even though some systems are cumbersome, complicated, and expensive to administer. However, their contribution to the economic efficiency of fishing, to the slowing of the race to fish, or to motivating better husbandry of international stocks can be undermined by the non-exclusivity of access (essentially a problem of design), and/or poor implementation.

A pattern is apparent among quota managed fisheries (Figure 7). In cases where catches do not exceed the overall quota a common quota pool may be sufficient, however, as competition for quota is increased, so quota allocations and ITQs become the management tools of choice. However, while there are benefits in moving towards management systems that provide higher quality rights for participants, the approach is not an automatic panacea for ailing fisheries. RBM systems with high *Q*-values, such as ITQs and TURFs will not necessarily provide the best outcome for all fisheries. It is better to think in terms of developing RBM systems through a process of evolution, supported by additional measures both to encourage desirable outcomes, such as reduction in over-capacity, and to mitigate undesirable outcomes such as concentration and/or marginalisation of small scale operators.

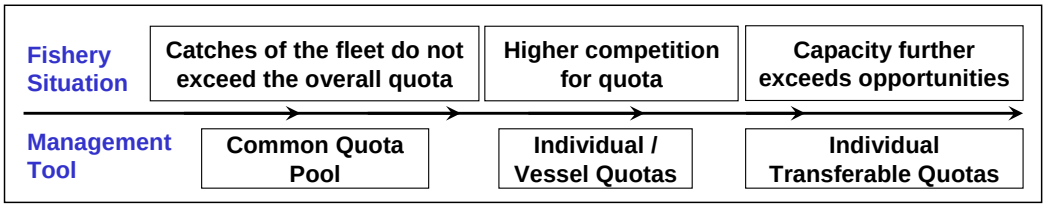

Figure 7 Pattern in quota managed fisheries

A vital factor in reaping the benefits of RBM is an industry that demonstrates a responsibility for stewardship of the resource. This was an important element in the success of ITQs shown in the Danish pelagic fishery. In this example, capacity reduction has been achieved without the need to allocate public money, good stewardship has been promoted from within the local producer organisation and fisheries remain profitable. By contrast, in the Netherlands case, ITQs performed very poorly in the 1970s and '80s because of an initial failure to effectively limit fishing capacity and monitor catches. More recently, the system has improved significantly through the establishment of co-management-type framework that has increased both responsibility and compliance (van Hoof, 2008), but the beam trawl fleet is still operating at an economic loss, largely due to high operating costs.

Involving the resource users in establishing and enforcing management measures can have significant benefits across a range of fishery types and regions. With respect to TURFs, there are a variety of institutional structures that can be used for their implementation, including associations, consortia, groups of users and POs, which can be involved in co-management approaches as platforms to launch technical measures to enhance resource sustainability. Where the establishment of TURFs involves the exclusion of previous users of the resource it must be carried out in an equitable manner, and compensation should be provided where appropriate.

Three of the four attributes used to characterise RBM systems, namely exclusivity, security and validity have been shown to be essential. If any one of these is reduced to zero, the right becomes essentially worthless. However, while transferability can have multiple benefits, it is not essential and Member States have shown different approaches to its implementation. Some element of constraint on transferability is common, to protect national interests and implement national policies, but markets in rights develop naturally where the rights have a clear value.

Aside from allowing the exit of less profitable operators from the fishery, transferability can be beneficial in mixed fisheries such as in the North Sea, because vessels can obtain the optimal mix of quota to maximise profitability and minimise discards. This mechanism appears to have been particularly active in the Danish VTQ system for demersal fisheries, now replaced by an ITQ system, as of January 2009.

In IQ systems, where there is a specific concern to restrict transferability (e.g. the Belgian flatfish fishery), similar outcomes to those of ITQ systems (reduction in capacity, reduction in the race to fish, and obtaining an appropriate mix of quota) can be achieved by other nationally-implemented measures, such as vessel decommissioning schemes and national quota swaps. This requires more input (time and resources) from the central authorities, rather than allowing the market to act. In Poland, the problems of overcapacity and the race to fish remain in the IQ-managed coastal fishery. The offshore fishery in Estonia, managed using ITQs, however, now

has fishing capacity that is well matched with fishing opportunities and the profitability of the fleet, although low, is increasing.

A number of Member States have purposely restricted transferability of rights with the aim of protecting national fishing interests, small-scale fishers and fishing-dependent communities. Even in systems where transferability is significant (e.g. VTQ and ITQ systems) there are often systems in place to ensure the protection of small-scale fishers and to ensure the possibility of new entrants to the fishery, such as allocating a proportion of national quota to the small-scale sector, and reserving a part of the quota for new entrants in order to build up a track record.

In the case of quota-managed fisheries, of concern at the Community level is the possible impact of quota trading on the capability to monitor and retain control over quota ownership and uptake. Current case law indicates that Member States can limit quota entitlement to entities with an economic link to the Member State, although such rules must be non-discriminatory. Such arrangements could be extended to a more regional model. In this regard it is also worth considering the distinction between quota ownership and use rights. Essentially the Member State could retain the ownership of the quota that is allocated to it by the EC, maintaining relative stability, while the right to use a portion of that quota allocation is what is sold, leased, or otherwise transferred between participants in the fishery. A more restrictive approach would be to allow only in-year quota allocations (not the use rights themselves) to be traded between participants. No matter to whom the quota is transferred, the Member State owner needs to be in a position to continue to meet its obligations under the CFP in terms of compliance with its quota limits.

The requirement for extensive management and monitoring of quota uptake in quota-based RBM systems can be a problem for some Member States and some lower value or small-scale fisheries. Administration costs include the costs of trading rights among owners, the costs of other organisations such as POs and national authorities which are also involved, plus the costs of record keeping and enforcement without which there is no security or exclusivity of rights. These costs are on top of the costs of managing the fisheries generally through monitoring and the setting of TACs or other controls. Reliable information on all of these costs is very hard to obtain across all countries but is relevant to the assessment of economic efficiency. Cost-benefit analysis of any proposed changes to RBM systems is highly desirable. Involvement of executives from the fishing industry and POs would probably assist the collection of cost information. Also of importance, is the careful consideration of cost recovery at an early stage in the design of any new RBM system.

It appears that moving towards IQ and ITQ management systems is best viewed as an iterative process that can require a substantial period of time, and the resulting management system may be made up of a range of input and output measures, both RBM and non-RBM. The use of combined mechanisms of decommissioning schemes and RBM can support effective capacity reduction, deterring the race to fish and allowing for the modernisation of the fleets. While effective provisions for scrapping vessels may support the removal of the poorest performers in the fleet, the efficient allocation of high-quality fishing rights supports the improved economic performance for those who remain in the fishery. For example, the management of the Spanish 300 fleet has recently moved to ITQs, but the active decommissioning process that took place well before ITQs replaced the individual effort quotas was a significant management success.

It is important to ensure that decommissioning follows OECD guidelines and that the capacity cannot re-enter the fishery, or another fishery, after being withdrawn.

However, decommissioning schemes are expensive and capacity reductions have been achieved also through market measures (i.e. transferability of rights) at minimal public cost, such as in Denmark, freeing up resources to be invested in research and innovation for the sector.

As shown by the example of the French Mediterranean Gulf of Lions trawl fishery, more straightforward, and potentially cheaper to administer, licensing systems can be an effective means of managing fisheries, when complemented with other management measures to reduce efficacy (in terms of fishable area in this case) and increase selectivity of both the vessels and their gear. The race to fish remains a problem, however, resulting in technical creep that needs to be carefully monitored.

RBM systems do not avoid the need for sound scientific data about fish and fisheries. ITQs, for example, need an annual stock assessment and the setting of a TAC. Unfortunately, both of these scientific aspects have been criticised extensively under the current CFP management system. However, if RBM successfully reduces fishing pressures on a stock, the need for TACs to be highly accurate to avoid stock collapse can be reduced somewhat. Effort-based rights, such as ITE, might prove easier to manage in some fisheries but, similarly, the technical aspects of evaluating the effort attributable to different types of gear are substantial.

4.5. Conclusions and further research

4.5.1. Assessing best practice

Determining best practice across such a wide range of fleets and stocks is no simple task. It is important to reiterate that the range of species, fisheries, fleets, communities and administrations is too diverse to be able to identify best practice that would apply to all situations. More data could be collected to investigate patterns in cause and effect, but at present, the most productive line of research has been to study specific cases with the aim of deriving lessons learned that are likely to be applicable elsewhere.

Nonetheless, both the analysis in Section 4.2 and the case studies in Section 4.3 provide valuable insights into quality of rights and lessons learned for different fisheries, fleets and EU regions. The case studies in particular provide examples of how different management systems have attempted to overcome obstacles, whether they are ecological, social or economic. In cases where they have proved successful, they could be seen as best practice for similar fisheries or stocks in other regions. Thus, grouping similar fisheries and/or stocks such as the Mediterranean fisheries inshore sedentary stocks or quota-managed stocks in the North Sea can allow comparisons between management decision success and failure.

4.5.2. General conclusions

In addition to the specific lessons learned described in Section 4.4, the following general conclusions with respect to developing best practice in RBM systems emerge:

- **Local conditions**: RBM systems need to be tailored to local circumstances and objectives.

- **Scientific requirements**: A sound scientific basis for establishing exploitation limits is important for any management system. For quantitative RBM systems this requirement may be even greater. For example, management through ITQs requires accurate real-time specification of TACs, adjusted annually in response to stock fluctuations.

- **Cost-benefit assessment**: Sophisticated RBM systems can be costly to implement and maintain. Such systems may be economically warranted only for large, valuable resource stocks.

- **Economic performance**: Previous research has shown resource rent generation is highest in those systems that have the highest quality rights. Systems with weak rights showed negative or low resource rents and could not cover the management cost. These findings showed a clear link between the management regime and the opportunity for profitable fisheries.

- **Avoidance of overcapacity**: The OECD recommends that fisheries management systems are designed to prevent overcapacity and overfishing from occurring, and that there should be appropriate incentives for fishers to automatically adjust fishing capacity and effort, so as to avoid the use of expensive decommissioning schemes where possible. RBM systems that do not lead to a natural reduction in excess fishing capacity should be augmented by active decommissioning schemes to promote an improved balance between fishing capacity and fishing opportunities. Schemes should not allow capacity, once removed, to return to the fishery and preferably should not require the use of public funds.

- **Precautionary management**: Fishery resources typically suffer from high unpredictability, which can lead to overfishing or collapse unless specifically allowed for. The fishing industry is also impacted by numerous factors which are outside of the control of any management agency or authority, for example, oil price or world currency markets. Even well-managed fisheries may suffer shocks from external factors, which can affect their economic performance.

- **Enforcement**: Rights require enforcement, because of the potential impacts of illegal activities. Without effective enforcement, exclusivity and security have little meaning.

- **Transferability**: Enhanced transferability of rights and improved flexibility in rights management may produce a reduction of redundant capacity and enhancement of efficiency. Nevertheless, even when a right is not officially transferable, if the right is valuable, stakeholders will find some element of the system through which this value can be expressed. In IQ systems, where there is a specific concern to restrict transferability, similar outcomes to those of ITQ systems (reduction in capacity, reduction in the race to fish, and obtaining an appropriate mix of quota) can be achieved by other nationally-implemented measures, such as decommissioning schemes and national quota swaps. This requires more input (time and resources) from the central authorities, rather than allowing the market to act. A number of Member States have purposely restricted transferability of rights with the aim of protecting national fishing interests, small-scale fishers and fishing-dependent communities. Even in systems where

transferability is significant (e.g. VTQ and ITQ systems) there are often systems in place to ensure the protection of small-scale fishers and to ensure the possibility of new entrants to the fishery, such as allocating a proportion of national quota to the small-scale sector, and reserving a part of the quota for new entrants in order to build up a track record.

- **Co-management and fisher responsibility**: Effective implementation will not be realised without the cooperation of fishermen in terms of design, implementation, and compliance. The industry needs to be empowered to take on responsibility for stewardship of the resource to ensure a sustainably future for fisheries. The use of POs not only as platforms for quota management but also as platforms to develop technical measures may enhance resource sustainability. PO management of markets for rights, when based on sufficient/necessary provision of information to Member states (e.g. quota uptake), can increase the ability of fishermen to adapt fishing strategies resulting in economic and social benefits

- **Government intervention**: Even in market-based ITQ systems, national authorities should establish the parameters and limits within which the system should work, and may wish to maintain the possibility for intervention should it be seen to not be functioning as expected. While longer-term rights are generally regarded to be higher quality, it may be prudent to include a 'sunset clause' to enable such intervention if necessary. An RBM system may be seen as a 'resource give-away', unless accompanied by a system of fair user fees. Mechanisms for cost recovery should be given due consideration at an early stage, as it is much harder to implement later in the process.

- **Markets for rights**: The existence and functioning of markets in the EU is bringing about considerable benefits in terms of resulting efficiencies and fleet reductions, in line with CFP objectives. However, Member States should be free to continue to impose limitations on the functioning of markets to protect vulnerable/dependent fishing communities. Stakeholders must be fully involved in decisions taken by Member States as to the establishment and development of markets for rights. With increasing value of fishing rights resulting from the development and functioning of markets, special provisions may be required to assist new entrants to the fishery because of increasingly high entry costs. It need not be necessary for State administrations to retain complete control over the monitoring of transfer markets.

- **CFP objectives**: The principal driver for many of the more sophisticated quota-based RBM systems in the EU has been Commission regulations establishing TACs and quotas for a number of species, and requirements to limit fishing capacity. RBM systems are usually not sufficient in themselves to meet the objectives of the CFP. This requires a range of fisheries management measures at different levels that may constitute a 'bundle' of rights. Likewise, implementation of ITQs does not necessarily lead to improved economic performance of the fleet and/or better matching of fleet capacity with fishing opportunities. Coherent policies in other sectors (e.g. economic development) are needed to avoid the undermining of RBM approaches.

- **National objectives**: These may impose constraints on the development of RBM, but do not necessarily undermine the meeting of CFP objectives. RBM systems need to be tailored to local circumstances and objectives. In this regard, moving towards IQ and ITQ management systems is necessarily an iterative

process that takes a substantial period of time, and should allow opportunities for stakeholder input and revision or modification of the system as it evolves.

- **Small scale fisheries**: Schemes for small-scale fisheries, such as a separate quota allocation, and/or prevention of consolidation can be implemented alongside ITQ systems and result in their protection and continued participation in the fishery.

4.5.3. Suggested areas of further research

This study has collected information on the existing RBM systems in coastal EU Member States. However a number of data gaps have been identified that have hindered the analysis of effects of RBM systems in the context of EU fisheries. A number of areas of further research and investigation therefore arise.

The available indicators of stock status and economic performance did not line up well with the RBM systems studied, therefore it was difficult to identify correlations and draw conclusions on the effectiveness of RBM systems in contributing to the achievement of CFP objectives. Further research to investigate economic fleet performance in more detail would be of benefit, based on RBM units (i.e. fleets targeting particular stocks under the same RBM system). This would help improve understanding of the effects of particular RBM types on economic outcomes.

Nevertheless, the lack of clear patterns showing benefits should not be a reason for not moving forward with RBM. Further detailed studies on the application of RBM to European fisheries would be useful. In particular, more in-depth studies with a regional focus looking at particular fisheries (e.g. mixed fisheries in the North Sea, inshore fisheries in the Mediterranean) would be useful to draw out specific recommendations for the particular fisheries and the Member States involved.

With regard to legal aspects of RBM systems, it would be useful to compare the legal framework for European RBM approaches in the case of fisheries that are subject to management under the CFP using IQs and ITQs and which are regulated on a number of different levels (EC, national law and regulations), with other developed countries which have introduced RBM on the basis of primary legislation that clearly enshrines the legal rights so created.

In relation to markets for fishing rights, there are a number of topics that could be further investigated:

- The evolution of market for rights in Member States, as opposed to the evolution of RBM systems themselves, including:
    a. What have been the key factors that have impacted on the development of markets for rights and how they operate, and how/why?
    b. Were there any particular organisations that were the main driver for the development of rights? If so what was the nature of these organisations (e.g. private, state, etc)?
    c. Are trends resulting in increased use of markets inevitable? And to what extent have/should markets be regulated and/or allowed to develop naturally?
    d. On the basis that markets may bring about a range of benefits, what can and is being done to improve/promote markets e.g. ability to trade within POs and/or individually, simplifying logistical issues around

State involvement while maintaining sufficient reporting or collaboration, POs having quota on dummy vessels to distribute to over-quota vessels?

- The extent to which tradable rights are actually being traded and transferred on the market. Questions could relate to the % of the number, value or volume of different types of rights that are being traded, leased or sold respectively (see Box 18 in Section 3.2.4 for an example).
- The value of rights, including, what is the current value of different types of rights in existing markets at the present time, and how have these values changed? And what have been the main factors determining any changes in values of rights traded? (e.g. reduced numbers of rights holders, stock status, changes in operating costs impacting on margins, etc).

The need for scientific data regarding stock status and behaviour is not removed by the implementation of rights-based management, and in some cases it becomes even more important. Other developments in fisheries science and management, such as the ecosystem approach to fisheries management (EAFM) requires even wider knowledge of the ecosystem than just the abundance and productivity of target stocks, or the comparative effort of each fishery. However, linking of the various ecological-state and fishing-pressure indicators used under the EAFM to tradable rights appears to be a new and relatively open field of enquiry.

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Annex 1. Terms of Reference

Lot 4: An analysis of existing Rights Based Management (RBM) instruments in Member States and on setting up best practices in the EU

Brief description of the objectives of the study

The aims of the study are in three distinct phases. Firstly, it shall survey RBM systems in place in the different coastal Member States. Secondly, it shall examine a range of specific RBM characteristics and effects. Thirdly, it shall recommend best practices for different types of fisheries in the EU.

Background of the study

The Communication from the Commission to the Council and the European Parliament on improving the economic situation in the fishing industry[25] includes, among its longer-term measures and initiatives, the economic management of fisheries. In this respect, the Communication stated that "While economic management of fishing rights is an exclusive national responsibility, the methods of allocating, sharing or transferring fishing opportunities between vessels at national level also have a bearing on the economic situation of the fleet. A debate at Community level on these issues on the basis of a Commission Communication is planned later this year".

The debate was launched on 26 February 2007, with the adoption of the Communication of the Commission on rights-based management tools in fisheries[26]. On that date a public consultation was also launched. In order to facilitate it, a dedicated website and e-mail address have been created[27] to receive comments from stakeholders and any other interested third parties.

After the public consultation, further actions (e.g. meetings, hearings) will be taken by the Commission during the remainder of 2007 to further animate the debate. The Commission will sum up the debate and assess the need for follow-up at Community and national levels in the first quarter of 2008.

The present study will directly feed into the debate. The results will also contribute to the Commission's assessment of the need for follow-up.

Terms of reference of the study

For the purposes of the study, RBM includes any system of allocating individual fishing rights to fishermen, fishing vessels, enterprises, cooperatives or fishing communities. RBM can be grouped within two categories[28], namely access rights and

[25] COM (2006) 103 final of 9 March 2006.
[26] COM (2007) 73 final of 26 February 2007.
[27] http://ec.europa.eu/fisheries/cfp/governance/consultations/consultation_260207_en.htm
[28] Different systemisations exist as well, in particular those grouping access rights and input rights together and examining output rights separately.

withdrawal (harvest) rights.

- Access rights are allocated in the form of access authorisations, either limited entry licences or territorial use rights in fishing (TURFs).

- Withdrawal or harvest rights can be divided in input rights and output or catch rights.
  - Input rights mean more specifically the right to use or exploit a stock: the right to a use of "capacity" (e.g. in terms of tonnage or engine power), the right to a fishing time or a time at sea in a certain area ("days at sea"), or the right to use certain types of gear, etc., whereby these aspects of input rights are often combined (e.g. X days at sea when using Y gear).
  - Output/Catch rights specify the authorised quantity of landings within a certain duration of time and are a part of Total Allowable Catches or "TAC" on Community level. TACs are allocated among countries, fisheries, communities or individual fishermen; a share of a TAC may be allocated to a collective/cooperative or to an individual.

Technical content and methodology of the study

The contractor will be asked to:

(1) Review of Existing RBM Practices in the EU

a) To review existing RBM practices in coastal Member States, in the light of the four criteria defined in the staff working paper accompanying the Communication COM(2007)73 (exclusivity, security, validity and transferability)[29,30].

b) As part of the review, the contractor shall focus on whether and, if so, how, the following issues are dealt with either by public authorities and/or by specific initiatives by industry or communities:
   - the concentration of fishing rights,
   - the protection of small-scale coastal fisheries,
   - the access of newcomers to fishing rights,
   - the access of nationals of other Member States to fishing rights, and
   - potential effects on discards, in particular by highgrading.

   In particular, the review should focus on how the actual design of RBM in terms of the four criteria mentioned in paragraph b) is intended meeting concerns regarding the above mentioned issues. Regarding the transferability criteria, the review should elaborate on the existence of formal or grey markets for fishing rights within and between Member States, including in the latter case an estimation of the part of the available rights directly or indirectly controlled by nationals and/or firms from other Member States, as a consequence of

[29] http://ec.europa.eu/fisheries/publications/factsheets/legal_texts/sec_2007_247_en.pdf
[30] The OECD study Using Market Mechanisms to Manage Fisheries (2006) constitutes a useful, additional methodological reference.

quota swaps and/or "quota hopping" practices.

c) To identify the drivers for setting up RBM systems (e.g. industry-driven) in coastal Member States.

(2) Analysis of Characteristics and Effects of RBM

a) To describe the relationship between the analysed RBM system and input or output constraints on Community level, in particular:
- whether the system is part of Member States' implementation of input or output restrictions agreed on Community level,
- whether the rules of the system analysed result in exploitation constraints being added to those established on Community level.

b) To explain the initial allocation of the total volume of rights and its subsequent evolution. As part of this task, the contractor shall explain in detail:
- The way in which rights were initially allocated, especially whether prior users of the resource in question have been excluded or could not be considered at the level of prior use,
- The interrelation between input and output fishing rights, in particular how individual catch quotas correspond to days at sea-rights within the initial allocation of rights, and how subsequent exchanges/transfers of rights and re-allocation of rights is influenced by this relationship,
- In the particular case of rights allocated through auctions, how the auction was organised, the attribution criteria used and the price of rights,
- Examine mechanisms that reserve for future use, collect, reallocate, and/or permanently withdraw these rights from the market, e.g. for conservation concerns or in the interest of future entrants, and
- Assess how vessel decommissioning schemes have dealt with the respective rights of vessels leaving the industry.

c) To analyse the functioning of the management tools used to distribute, monitor exchanges, and redistribute the fishing rights, addressing, among others, the following questions:
- What are the administrative instruments used to document the attribution of a right and exchanges?
- Are these instruments and their use, centrally documented and supported by electronic means?
- What is the validity period of the rights, what are the rules for cancellation and re-distribution after expiry of the initial period, especially when the total volume of rights will have to be reduced in the following period?
- How does the system avoid that over time the rights consolidate into permanent entitlements?

d) To elaborate on the existence, functioning and monitoring of markets for fishing rights within and between Member States, whether formal or grey. Is the existence of these markets in conflict with other fishing customs and distribution principles (concerning certain fleet segments, regional fleets, or the "relative stability" among Member States)?

e) To review the role of different institutions (central and local governments, communities), public and private associations and other actors in the management of RBM systems (e.g. right distribution, valuation, trading). This should include assessing whether and how the cost of management of these systems is shared between the different actors.

f) Finally, the review shall elaborate on the reasons why certain coastal Member States, if any, have not deployed RBM.

(3) Identification of Best Practices at EU level

a) Analyse the degree of success of RBM in Member States, by reference to fisheries and fleet segments, with regard to CFP objectives (sustainability exploitation of stocks, relationship between size of fleets and available resources, economic viability) and corresponding conservation measures (input or output restrictions).

b) On the basis of the results of the analysis performed under the previous heading, the contractor shall identify best practices for different types of fisheries, fleets and EU regions with regard to the objectives of the CFP.

Annex 2. Summary of institutional roles in RBM systems

RBM system	Countries where applied	Institutions involved	Role of institution	Cost sharing
ITQs[31]	Spain (demersals in NEAFC and swordfish in ICCAT)	a) MARM (*Ministerio del Medio Ambiente y Medio Rural y Marino*)	i) Allocation of TAC on a given species to boats /POs. ii) Sanctions on quota over shooting.	Borne by government
		b) MARM and Autonomous Community (AC)	i) Allow (or not) geographical mobility of vessels.	
		c) POs	i) Allocates rights among members ii) Transfer of rights among POs. iii) Inform government on quota transfers and uptake. iv) Boats can trade rights directly when they do not use POs as a channel. v) boat-owners from a given PO can chose to trade their rights through other PO[32] vi) when boatowners decide to transfer rights without using the PO they have to inform the government directly v) Representative POs can impose rule to their associates that can be subsequently extended to non associates[33]. This has been the case of the PO-4 of Galicia that, in December 2007, required government to impose restrictions for their associates on trip catch limits on megrim. These trip limits were established in 2,500 tones for fish (20-25 cm.) landed in the harbours of Vigo and Marin. In April 2008, the government[34] extended these trip- restrictions to the whole Spanish Grand Sole's[35] fleet landing in the aforementioned harbours.	Borne by the PO
	Spain (BFT in ICCAT)	a) MARM	i) Allocates rights among sectors (i.e. pole and line in the Cantabrian Sea) ii) Implements a fund of manoeuvre if quotas are getting from other MS through exchanges. This fund aim at compensating quota overshooting.	Borne by government

[31] In Spain and Portugal, POs are an optional platform to trade rights). In UK, rights trade is a privilege of the POs.

32 10 boats from OP-Lugo of Galicia manage their rights through Anasol of Galicia, which is the biggest boat-owner association of the Spanish fleets in NEAFC.

[33] Council Regulation 104/2000 and Commission Regulation 1886/2000

[34] *ORDEN APA/985/2008*

[35] Grand Sole comprises ICES areas Vb, VI, VII and VIII abde

		b) cofradias	i) Unclear whether they will allocate rights among members in each fleet. The new regulation[36] does not specify the role of cofradias in the allocation of individual quotas of BFT to their members. ii) Boat-owners are able to trade their rights but only within their fleet. It is not clear whether cofradias will intervene in quota trade. It is not specified in law.	Borne by the cofradia
	UK	a) DEFRA	i) Allocates rights among POs	Borne by government
		b) POs	i) Allocates rights among members. ii) Transfer of rights among POs and even to foreign vessels flagged in UK through "dummy licenses". iii) Quota transfers have to be reported to the government. iv) Control of quota uptake and enforcement. v) Boatowners only trade rights using their respective POs as channels.	Borne by the PO
	Portugal (NAFO, ICCAT)	a) Ministerio de agricultura e des pescas	i) Allocation of TAC on a given species to boats /POs ii) Regulations offer the possibility of transferring not fully covered rights to non-Portuguese fleets.	Borne by the government
		b) POs	i) Allocates rights among members ii) Transfer of rights among members. iii) Boatowners can trade right rights without using POs as a channel for trade.	Borne by the PO
	Netherlands	a) Fish Directorate of Min. of Agriculture, Nature and Food quality	i) Allocation of national quotas among fishing vessels. (ITQ)	Borne by Government
		b) Biesheuvel groups[37]/PO's	i) Management (trade/lease) of quotas and days-at-sea among members Monitoring of quota up-take	Borne by group
	Denmark	a)Min. of Food, Agriculture and Fishery, Directorate of Fisheries	i) Allocation of quotas to individual vessels (ITQ and VTQ) ii) Registration of quota transfers (ITQ) iii) Approval of quota transfers (VTQ)	Borne by Government
		b)Pool groups [38]	i) i) Management (merger/lease/swap) of quotas among members Monitoring of quota up-take	Borne by the groups
	Estonia	a) Ministry of Environment	i) Allocation of national quotas among fishing vessels; supervision (control and monitoring) of quota market	Fishing permits fee
TURFs	Spain (coastal resources)	a) MARM	i) Recognition of territorial rights	Government
		b) cofradias	i) defence of territorial rights (i.e. banning of certain technologies such as pelagic trawling in the Bay of Biscay) ii) daily allocations (i.e. shellfish in Galicia) iii) Give room to associations within the cofradia such as association of women shellfish gatherers in Galicia.	Cofradias Regulations also see that AC aid to cofradias could be devised if required

[36] *ORDEN ARM/1244/2008,*

[37] Groups of fishers/vessels (mainly beam trawlers). There are 8 such groups

[38] There are 11 pool groups in Denmark in 2008 comprising 670 VTQ fishing vessels

	Malta (dolphin fish)	a) Ministry of Rural Affairs and Environment	i) Allocation of annual rights through lottery. ii) Not allocated rights may be allocated to other EU-nationals outside 12 nm off the coast.	Government
	Italy (clams)	a) General Directorate of Fisheries and Aquaculture	i) Allocation of territorial rights to consortia (consortia need to count on 80% of dredge owners to be considered as such). ii) creation of inter-consortia committee.	Government
		b) Consortia	i) Management and enforcement of rights. ii) Maximum daily catches and other technical measures. iii) Rights are not transferable but trade of dredges and attached rights is up to owners.	Consortia
	Greece[39]			
	Sweden	a) *public waters*: Swedish Board of Fisheries (SBF) and local co-management groups	i)SBF has initiated co-man experiments where local co-management organisations. make and implement management plans.	SBF and the parties involved
		b) *private waters*: property owners	i) Management of habitats and access rights (private licence issuing)	
	Finland	a)Public authorities: the State and 11 Fishery Districts	i) Policy formulation and implementation ii) License issuing iii) Formulation and implementation of district fisheries management plans	Government Payment of licence fee
		b)Private sector: Fisheries Regions and Fisheries Associations	i) fisheries management at local level ii)technical regulations iii) private license issuing	Fisheries Associations collect license fees for fish stock maintenance etc.
IQs[40]	Italy (bluefin tuna)	a) Minister	i) Allocation of TAC to boat-owners/PO and unclassified quota for possible allocation (UQPA)	Government
		b) POs	i) Allocation to members. No trade of rights. No transfer among POs. ii) Control of quota uptake	PO
	Ireland	a) Department of Communications, Marine and Natural Resources	i) Establishment of monthly quota allocations ii) allocation of vessel quotas iii) allowance to other MS to buy in capacity[41]	Government
	Belgium	a) Flemish Government	i) Allocation of catch quotas and days at sea to POs	Government
		b) PO's	i) Allocation of catch quotas and days-at-sea to members.	PO
	Sweden	a) Swedish Board of Fisheries, SBF	i) Allocation of IQs and days-at-sea to individual vessels	SBF
	Germany	a) the BMELV (Federal Ministry of Food, Agriculture and Consumer Protection)	i) quota allocation to individual vessels/ POs and overall management	Government

[39] under consideration to protect small-scale operators

[40] vessel catch limits in the case of Ireland

[41] Transference of rights is not allowed. Both national and foreign fishers must buy capacity in order to access the fishing opportunities.

		b) Regions (Länder) 14)	i) consultative role in quota allocation ii) operational management functions	
		c) POs	i) consultative role in quota allocation ii) operational management functions where quotas (fishing permits) are allocated to POs.	
	19. Latvia	19. Ministry of Agriculture (National Board of Fisheries)	19. Allocation of quota supervision of quota transfers and divisions	Lease fee
	20. Lithuania	20. Ministry of Agriculture (Fisheries Department)	20. Allocation of quota; administration of reallocation market[3]	License fee (low cost)
	21. Poland	21. Ministry of Agriculture (Fisheries Department)	21. Allocation of quota; supervision of quota transfers[4] record of quota take-up	License fee
Tradable effort quotas	Netherlands	10) Same as ITQs	10) Same as ITQs	
	Denmark	14a) Directorate of Fisheries	14a) Allocation of days-at-sea, monitoring.	Government
		14b) Local Fishermen's Associations	14b) Facilitation of transfers (informal role)	Fishermen's Association.
	Estonia	a) Ministry of Environment	i) Allocation of quota ii) Administration of quota market[42]	Government
Non-tradable effort quota	Latvia	19. Ministry of Agriculture (National Board of Fisheries) and companies with rights	19. Companies own fishing rights; administration have total control of quota exchanges or transfers[1]	Lease fee
Community rights	France	a) Government	i) Allocation of TAC to boat-owners/PO ii) creation of quota reserve iii) rules on transferability of vessels and track-records	Government
		b) POs	i) set up of sub-quotas ii) control of PO quota overshooting iii) able to allocate individual quotas or métier if needed iv) Privilege on trade of rights with other POs. Boats cannot trade rights on their own.	PO
	Portugal (sardine)	*Direcção-Geral das Pescas e Aquicultura* (DGPA)	i) allocate quotas to PO and non-PO purse seiners	Government
		POs	i) Manage global quota and transfer it to other POs ii) Establish daily limits to associates that can also apply for non-PO vessels[43]	PO
	Belgium	a)The Flemish Government	i) allocation of catch quotas and days-at-sea	
		b) POs	i) management of catch quotas and days-at-sea	

[42] [5] Fishing rights are fully transferable and fully divisible under official market with some governmental control. The government receives information about the transfer and gives approval to the transfer agreement, if the basic conditions are fulfilled. The government does not make rules on which an Estonian company can transfer its rights or what the ratio of the transfer should be.

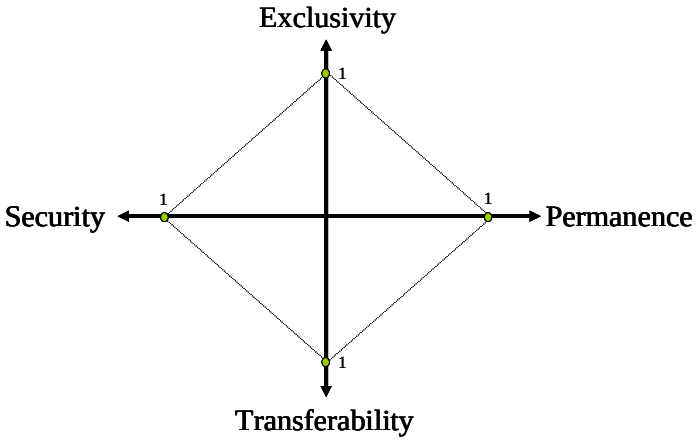
[43] Portaria n.º 543-B/2001

Annex 3. Measuring the quality of rights.

(the following is an extract from a paper under preparation by Ragnar Arnason, Professor, Department of Economics, University of Iceland)

As suggested by Scott (1989), it is helpful to visualise the characteristics of rights as measured along the axes in four-dimensional space (see Catalogues for an explanation of the four attributes). This is illustrated in Figure 1. Obviously, if more than four characteristics are needed to describe a property right, the number of axes in the diagram would be correspondingly increased.

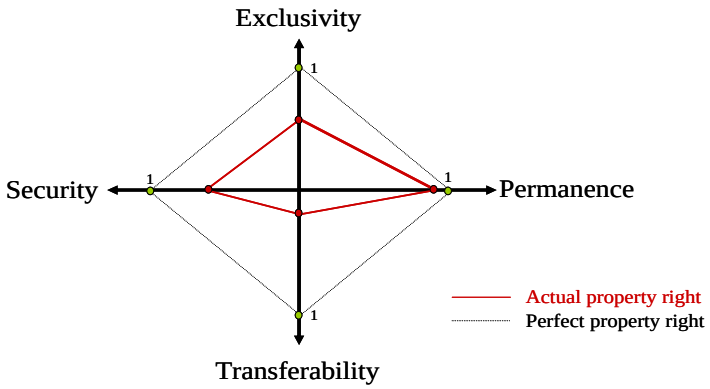
Figure 1
Rights characteristics



A given right may feature the different rights characteristics to a greater or lesser degree. It is convenient and totally unrestrictive to measure the degree to which a given characteristic is featured on a scale of 0 to 1. A measure of zero means that the right in question features none of the characteristic. A measure of unity means that the right features the characteristic fully. Given this we can draw a picture of perfect rights, i.e., a right which features all the 'property rights' characteristics fully, as a rectangle in the space of the four rights characteristics. This is illustrated in Figure 1.

We refer to the map of the rights characteristics as in Figure 2, as the *characteristic footprint* of a right. Obviously, the characteristic footprint of a perfect right represents the outer bound for that of any right. It follows that the characteristic footprint of any actual right must be completely contained within that of the perfect right as illustrated in Figure 3.

Figure 2
Characteristic footprints of an actual and a perfect right



The fact that any real right must be contained within the characteristic footprint of a perfect right (see Catalogue for explanation) suggests the ratio of the area enclosed by the footprint of a real right to that of the perfect one as a simple measure of the quality of any real right. This measure has the convenient property of always being between zero and one. In addition, it satisfies the requirement that the closer the characteristic footprint of a real right is to that of a perfect right, the higher is the measure. Furthermore, it is easy to calculate and generalizes in a straight-forward manner to any number of rights characteristics. Thus this measure has many useful properties. However, it also has the significant limitation of treating all rights characteristics equally.

To remedy this, the so-called *Q*-measure of rights quality has been developed (Arnason 2000). A general formula for the *Q*-measure is:

$$(1) \qquad Q \equiv \left(\prod_{i=1}^{N} x_i^{a_i}\right) \cdot \left(w_1 + \sum_{j=N+1}^{M} w_{2,j} \cdot x_j^{a_j}\right).$$

This *Q*-measure applies to *M* rights characteristics. The first *N*, x_i, $i = 1,2\ldots,N$, are essential, i.e. characteristics that render the Q-measure zero and, consequently, the right worthless if they are zero. Hence the multiplication represented by the symbol $\prod_{i=1}^{N}$. The remaining *M*-*N* characteristics denoted by x_j, $j = N+1,N+2,\ldots,M$, are non-essential. Even if they are all zero, the *Q*-measure would not necessarily be zero. The exponents, a_i, $i = 1,2\ldots,M$ are all positive. They essentially define the importance of the respective characteristic to the right. The first *N* of them (those for the essential characteristics) measure the percentage change in *Q* when the respective characteristic increases by 1%. The weights, w_1 and $w_{2,j}$, area also positive and sum to unity. They essentially define the relative importance of the non-essential characteristics relative to those which are essential.

It is easy to check that since all characteristics are measured between 0 and 1, the *Q*-measure takes values in the interval [0,1]. A *Q*-value of zero means that the right has no quality; it is worthless. A value of unity means that the right is perfect.

In the simple case of the above four rights characteristics, the *Q*-measure is defined by the expression

(2) $Q \equiv S^{\alpha} \cdot E^{\beta} \cdot P^{\gamma} \cdot (w_1 + w_2 \cdot T^{\delta})$, $\alpha, \beta, \gamma, \delta, w_1, w_2 > 0$ and $w_1 + w_2 = 1$

where *S* denotes security, *E* exclusivity, *P* permanence and *T* transferability. Note that in this version of the formula the first three rights characteristics are considered essential and the fourth, transferability, non-essential.

Obviously, to apply the *Q*-measure defined by (1) and (2) the values for the relevant rights characteristics have to be determined as well as the values of the exponents and the weights. This is the empirical work which is needed to apply the *Q*-measure (see the EU RBM Catalogue in Part II).

Annex 4. *Q*-value plots by RBM system

The table below provides a summary of the RBM systems implemented in the EU. The table includes the following information:

- the fisheries they manage;
- the target species;
- a measure of the quality of fishing rights (Q-value) they infer;
- an assessment of the stock status of each particular RBM system;
- an assessment of the economic performance of the fleets managed under each RBM system; and
- an indication of which RBM systems have been deemed to be examples of good practice and discussed in detail in Section 4 of Part I.

No	RBM system	Fishery	Target Species	*Q*-value	Stock Sustainability Assessment	Economic Assessment	Best Practice Case Study?
1	LL (shellfish) Spain	Shellfishing Galicia	Clams, other bivalves, goose barnacle	0.43	3	4	
2	LL Malta	Polyvalent	Sardine, prawns, demersal fish, bluefin tuna	0.35	2	n/a	
3	LL Italy 1	All Italian fisheries in the Adriatic, Tyrrenian and Mediterranean	Anchovy, sardine, hake, pilchard, red mullet	0.46	3	4	
4	LL Italy 2	All Italian fisheries in the Adriatic, Tyrrenian and Mediterranean	Albacore, swordfish	0.46	3	4	
5	LL Italy 3	All Italian fisheries in the Adriatic, Tyrrenian and Mediterranean	Cephalopods, octopus, shrimp, nephrops, clam	0.46	3	4	
6	LL Slovenia	Coastal and offshore fisheries	Anchovy, sardine, cephalopods, mullet, seabass, pandora, steenbass	0.30	2	n/a	
7	LL France	All fisheries	Mixed	0.22	2	n/a	✓
8	LL Belgium	Flatfish fishery	Plaice and sole	0.22	2	2	
9	LL Cyprus 1	Small scale fishery	Bogue, mullet, octopus, cuttlefish, red mullet, seabreams, dentex, grouper, picarel	0.24	2	n/a	
10	LL Cyprus 2	Polyvalent or longliners	Tuna, swordfish, mullet, bogue, seabream, dentex	0.24	2	n/a	
11	LL Cyprus 3	Bottom trawler	picarel, mullet, pagellus, octopus, cuttlefish, squid, bogue	0.24	2	n/a	
12	LL Cyprus 4	Purse Seiner	Bogue, Picarel, sardinella	0.24	2	n/a	
13	LL Cyprus 5	Tuna purse seiner	Bluefin tuna	0.24	2	n/a	
14	LL Denmark	Mussel dredging in Limfjord, Kattegat and Wadden Sea	Blue mussel, Oyster	0.33	2	n/a	✓
15	LL Sweden	Pair trawl	Vendace for bleak-roe production mainly	0.22	3	4	
16	LL Finland	Coastal salmon fishery	Pike, perch, pikeperch, trout, salmon, herring, sprat	0.24	3	2	

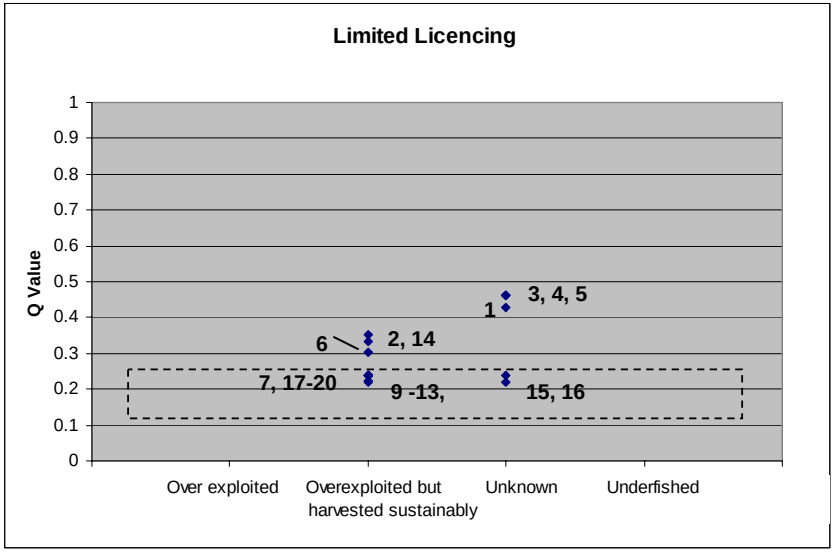
No	RBM system	Fishery	Target Species	*Q*-value	Stock Sustainability Assessment	Economic Assessment	Best Practice Case Study?
17	LL Greece 1	trawl fishery	hake, red mullet, cephalopods, shrimps	0.22	2	4	
18	LL Greece 2	Purse seine fishery	sardine, anchovy, bogue, Mediterranean horse mackerel and Scorbidae	0.22	2	4	
19	LL Greece 3	Multi gear fishery (vessels over 12m length)	targeting Merlucius merlucius, Dicentrarchus labrax, sparus aurata, Dentex dentex, Sepia officinalis	0.22	2	n/a	
20	LL Greece 4	Small scale fishery	Multiple species (over 100 identified)	0.22	2	n/a	
21	ITQ NEAFC Spain	Demersals in NEAFC	Hake, nephrops, lings, whiting, anglerfish, flat fish, pollock	0.65	1	n/a	✓
22	ITQ Spain	Swordfish in ICCAT	Swordfish, shark	0.65	3	n/a	
23	ITQ BFT Spain	Bluefin tuna in Mediterranean, Gibraltar and Mediterranean	Bluefin tuna	0.65	2	n/a	
24	ITQ NAFO Portugal	Demersals	Cod, shrimp, mackerel, blue whiting, herring, red fish, tusk, Greenland halibut, ray, sarda	0.69	3	3	
25	IT Portugal	Swordfish in ICCAT	Swordfish, shark	0.65	3	2	
26	ITQ Netherlands 1		Cod, whiting	0.65	1	n/a	
27	ITQ Netherlands 2		Flatfish (plaice, sole)	0.65	3	n/a	✓
28	ITQ Netherlands 3		Herring, mackerel	0.65	3	n/a	
29	ITQ Denmark		Herring, mackerel	0.75	3	1	✓
30	VTQ Denmark		Demersals	0.52	3	2	
31	ITQ Estonia	Offshore	Herring, sprat and cod	0.71	2	1	✓
32	IQ BFT Italy	Italian bluefin tuna in Mediterranean	Bluefin tuna	0.53	3	n/a	
33	IQ / ITQ UK 1	Under 10m LOA	Cod, haddock, whiting, flatfish, rays, shellfish, Nephrops	0.45	2	4	✓
34	IQ / ITQ UK 2	Over 10m LOA demersal	Roundfish, flatfish, Nephrops, scallops	0.45	1	2	
35	IQ / ITQ UK 3	Pelagic	Mackerel, herring, horse mackerel, blue whiting	0.45	1	1	
36	IQ / ITQ UK 4	Deep water	Black scabbardfish, greater silver smelt, roundnose grenadier, blue ling, forkbeard, shark, others	0.45	3	n/a	
37	IQ VC Ireland 1	Polyvalent	Monkfish, megrim, haddock, whiting, cod, Nephrops,	0.28	2	n/a	
38	IQ VC Ireland 2	Specific sector	Mussels, scallops, razor clams, lobsters, crabs	0.28	3	n/a	
39	IQ VC Ireland 3	Beam trawlers	Sole, plaice, megrim and monkfish	0.28	3	n/a	
40	IQ VC Ireland 4	Pelagic	Mackerel, herring, horse mackerel, blue	0.28	2	n/a	

No	RBM system	Fishery	Target Species	*Q*-value	Stock Sustainability Assessment	Economic Assessment	Best Practice Case Study?
			whiting				
41	IQ VC Ireland 5	Deep water	Orange roughy, argentine, redfish, scabbardfish, blue ling, grenadier, tusk, forkbeard	0.28	1	n/a	
42	IQ Sweden		Herring	0.24	3	4	
43	IQ Germany 1	Polyvalent	Herring, flatfishes, eel, freshwater species (pike, pike-perch, perch)	0.48	3	1	
44	IQ Germany 2	Trawl	Brown shrimps, sole and plaice	0.48	3	3	
45	IQ Germany 3	Demersal trawl	Cod, flounder, plaice, sole	0.48	1	3	
46	IQ Latvia	offshore	Herring, cod	0.46	2	1	
47	IQ Lithuania 1	Coastal Fishery	Smelt, cod, pike-perch, turbot, herring, bream, sprat, flounder	0.43	3	4	
48	IQ Lithuania 2	Offshore herring and sprat fishery	Herring, sprat	0.43	4	4	
49	IQ Lithuania 3	Offshore cod fishery	Cod, flounder	0.43	1	4	
50	IQ Poland 1	coastal fishery	Cod, salmon, sprat, herring, turbot, carp bream, pike-perch, flounder	0.43	3	2	✓
51	IQ Poland 2	salmon fishery	Salmon (Salmo salar)	0.43	3	2	
52	IQ Poland 3	cod fishery	Cod (Gadus morhua)	0.43	1	2	
53	TURFs Spain	Coastal fisheries	Shellfish, coastal fish	0.60	2	n/a	
54	TURFs Malta 1	Trawlers		0.27	3	n/a	
55	TURFs Malta 2	Drifting surface longline		0.27	3	n/a	
56	TURFs Malta 3	Kannizzati Fishing	Dolphinfish	0.27	3	n/a	
57	TURFs Italy	Clam harvesting in Italy	Clams	0.67	3	n/a	✓
58	TURF UK		Oysters	0.82	3	n/a	
59	TURF Sweden	Fishing in privately owned waters	Salmon	0.91	4	4	
60	TURF Sweden	Fishing in public waters		0.02	4	n/a	
61	TURFs Finland	Coastal - freshwater fishery	Pike, perch, pikeperch, vendace, whitefish, Baltic salmon, Baltic herring, trout	0.00	3	2	
62	CQ Portugal	Sardine	Sardine	0.73	3	4	✓
63	CQ & IQ France	Flatfish fishery	Plaice and sole	0.46	2	n/a	
64	CQ & IQ Belgium	Flatfish fishery	Plaice and sole	0.28	2	n/a	✓
65	CQ Poland	sprat and herring	Sprat and herring	0.30	3	2	
66	ITE UK	salmon netting	Salmon	0.59	1	n/a	
67	ITE Estonia	coastal	Plaice, perch, pike-perch, salmon, eel, herring	0.71	2	1	
68	IE Latvia	Coastal	Sprat, herring, perch, pike	0.46	3	3	

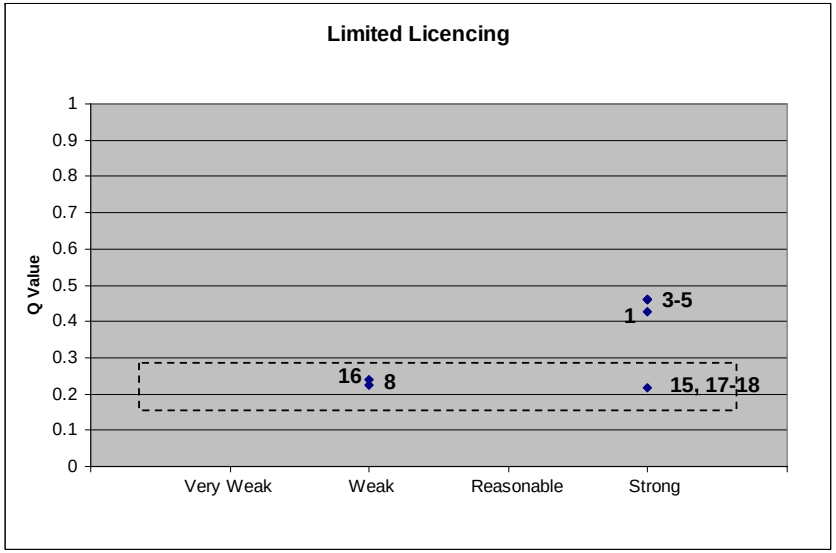
n/a – assessment unavailable due to data limitations

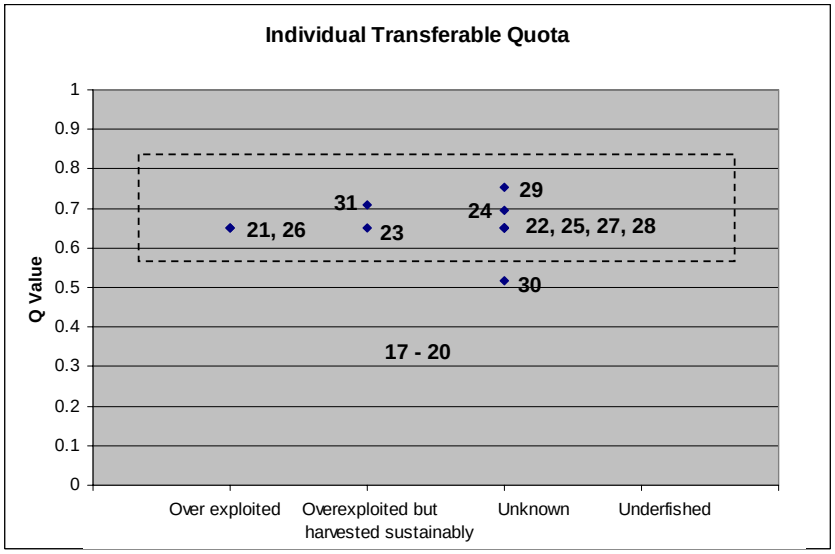
Each RBM system has been analysed in terms of the quality of fishing right (Q-value) compared to the two indicators – stock status and economic performance. This analysis is presented in the charts below. The number attributed to each RBM system can be used to identify each system on the charts.

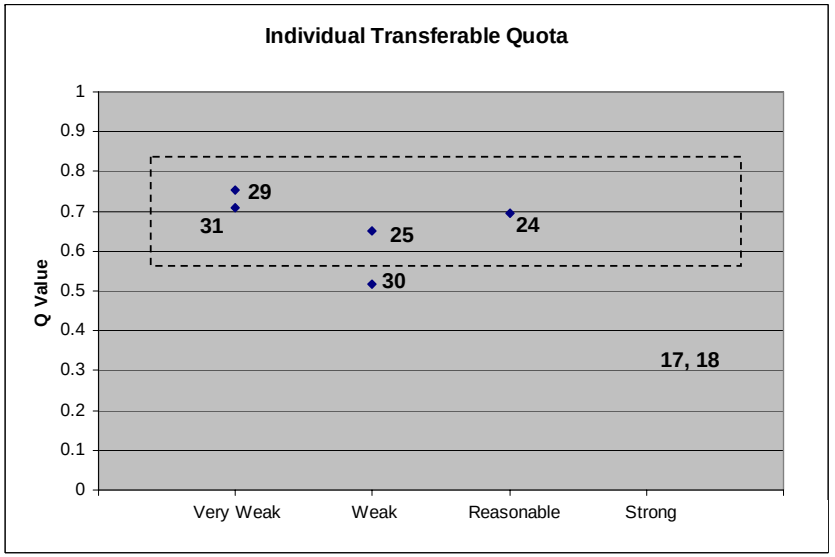
Stock Status

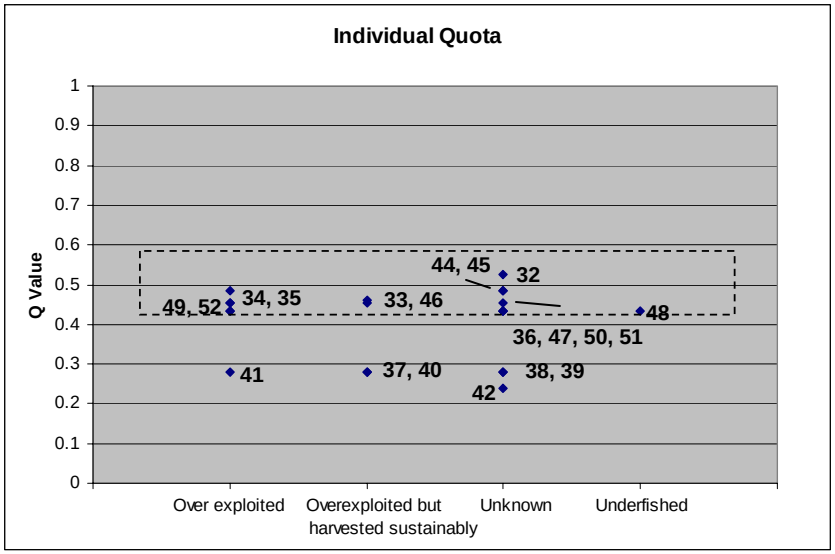


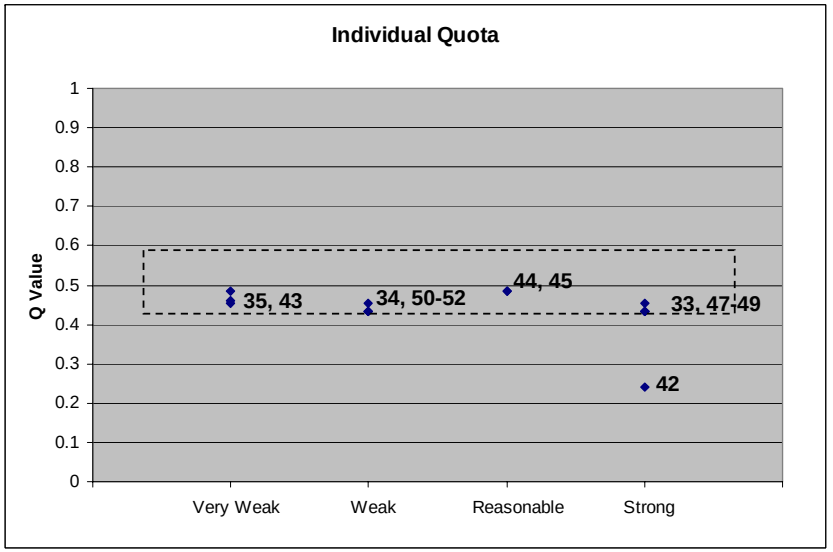
Economic Performance

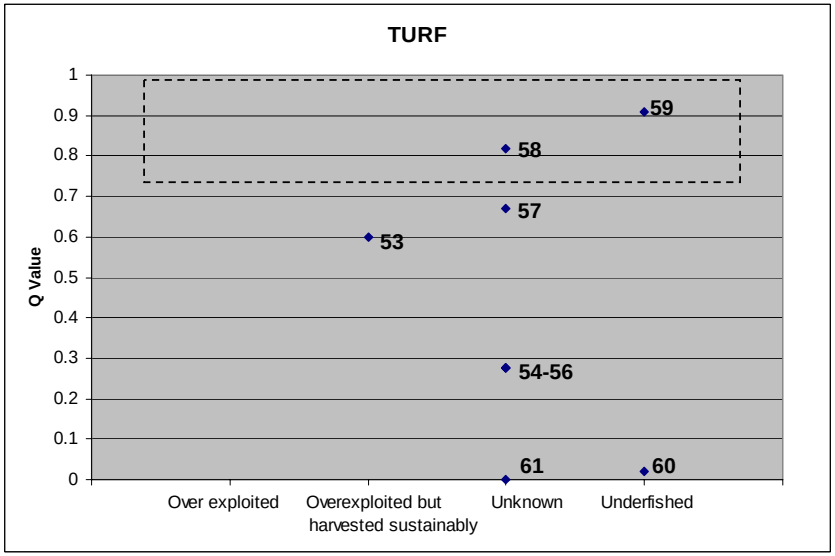







Individual Quota
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
44, 45
32
49, 52
34, 35
33, 46
48
36, 47, 50, 51
41
37, 40
38, 39
42
Over exploited
Overexploited but harvested sustainably
Unknown
Underfished


Individual Quota
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
35, 43
34, 50-52
44, 45
33, 47-49
42
Very Weak
Weak
Reasonable
Strong


TURF
Q Value
1
0.9
0.8
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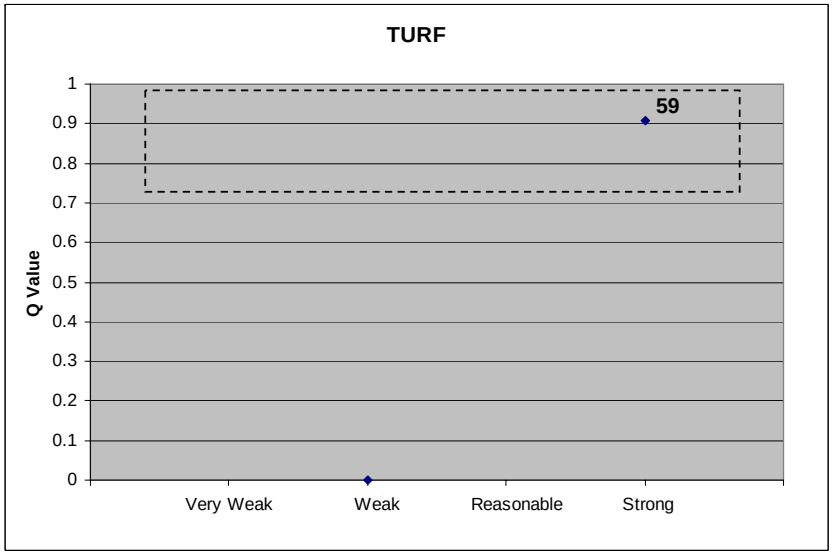
0.6
0.5
0.4
0.3
0.2
0.1
0
59
58
57
53
54-56
61
60
Over exploited
Overexploited but harvested sustainably
Unknown
Underfished


TURF
Q Value
1
0.9
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0.6
0.5
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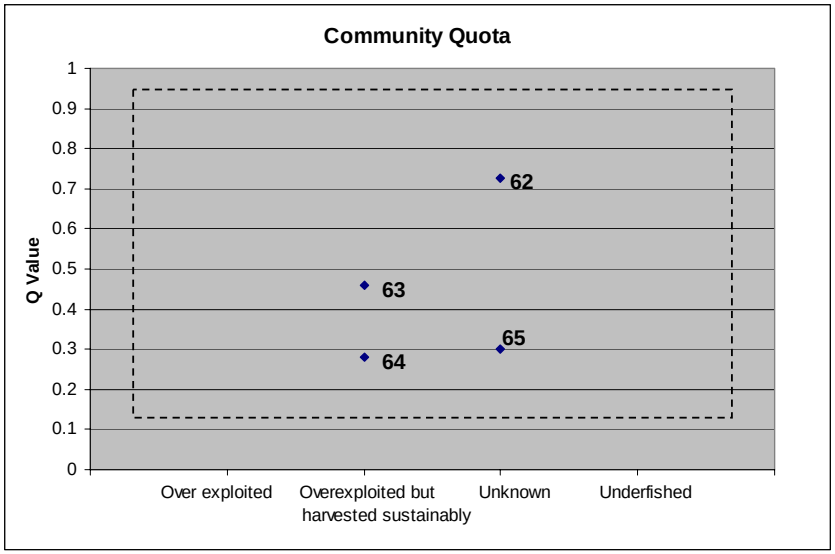
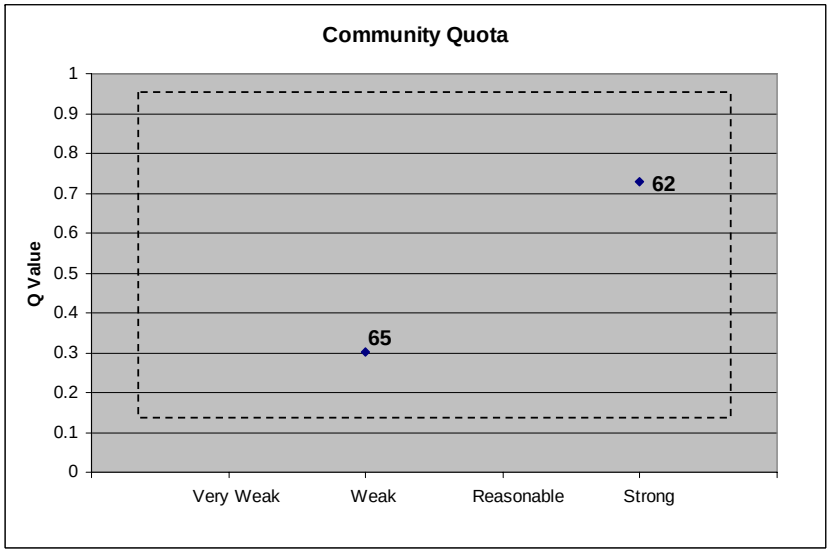
0.2
0.1
0
59
Very Weak
Weak
Reasonable
Strong


Community Quota
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
62
63
65
64
Over exploited
Overexploited but harvested sustainably
Unknown
Underfished


Community Quota
Q Value
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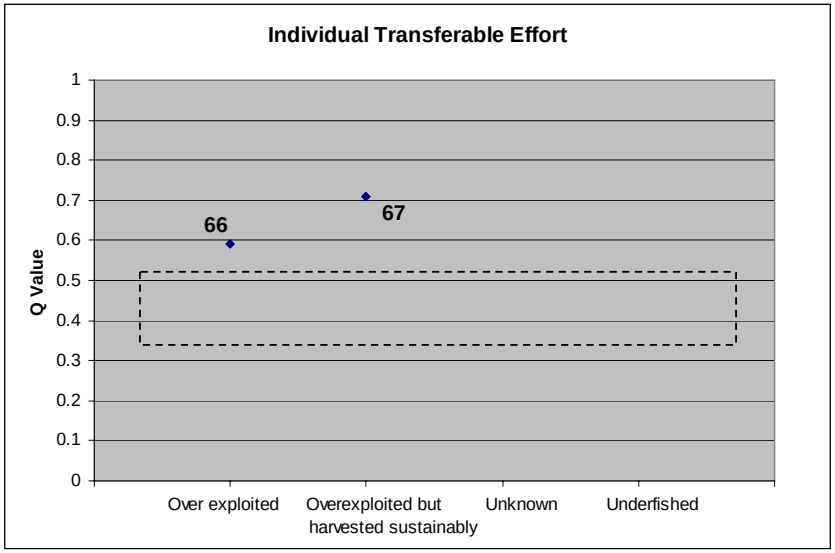
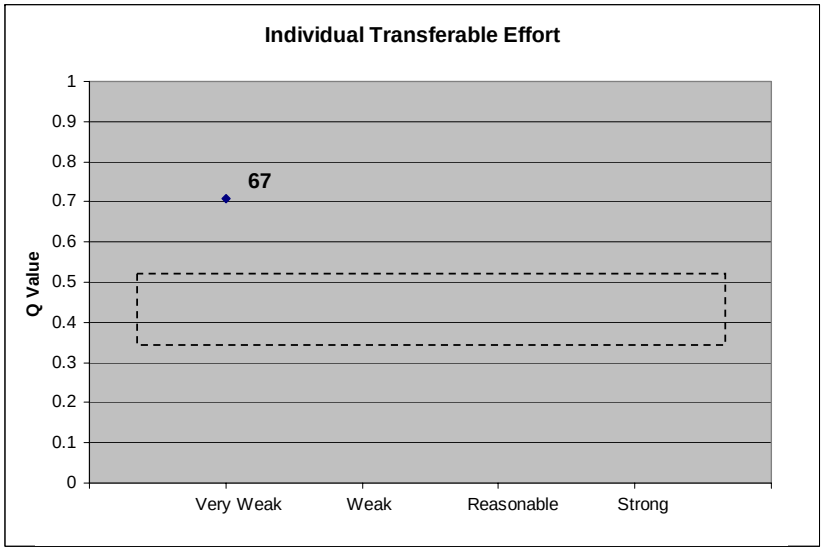
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
62
65
Very Weak
Weak
Reasonable
Strong


Individual Transferable Effort
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
66
67
Over exploited
Overexploited but harvested sustainably
Unknown
Underfished


Individual Transferable Effort
Q Value
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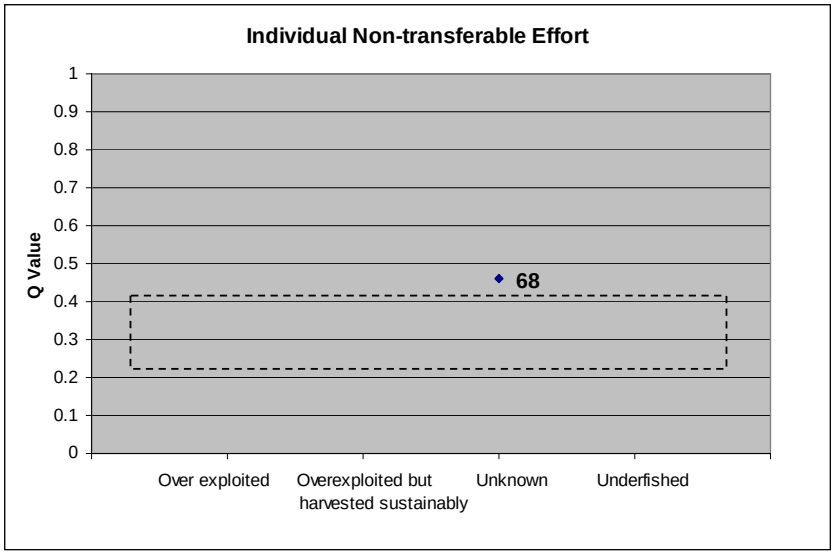
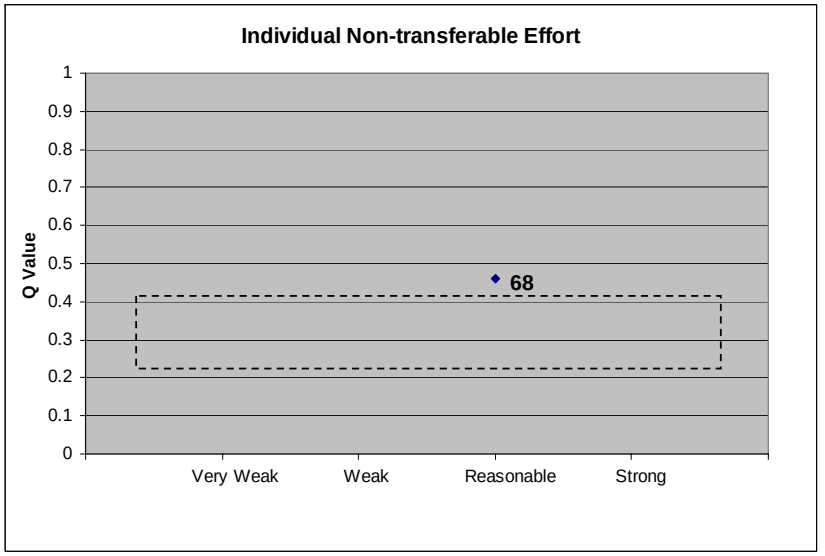
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
67
Very Weak
Weak
Reasonable
Strong


Individual Non-transferable Effort
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
68
Over exploited
Overexploited but harvested sustainably
Unknown
Underfished


Individual Non-transferable Effort
Q Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
68
Very Weak
Weak
Reasonable
Strong