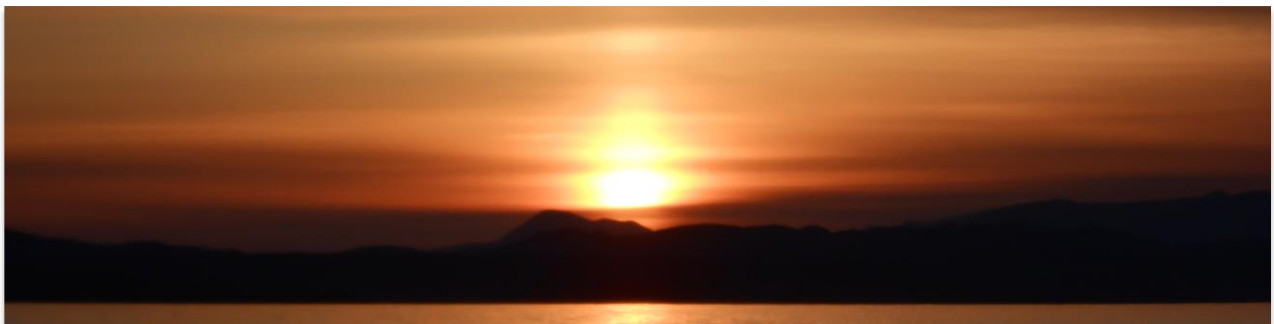


# Stakeholder Involvement in the Governance of Fisheries in Europe

*With perspectives of the result-based mangement*

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*A dissertation for the degree of Philosophiae Doctor – January 2016*





## Acknowledgements

I would like to convey my heartfelt thanks to my supervisors, Svein Jentoft, Petter Holm, Margrethe Aanesen and Kåre Nolde Nielsen for your indispensable advice, patience and encouragement; without which the compilation, writing and completion of this thesis would not have been a success. It is through your instillation and inculcation in me of your profound diverse knowledge and expertise that I can now proudly and confidently say I have acquired and mastered multidisciplinary and interdisciplinary research approaches. I now have proven expertise in both quantitative and qualitative research as exemplified in the publication of my articles in renowned scientific research journals (ref. Appendix 1, 2, 3, 4).

I would specifically like to thank Margrethe Aanesen for being my co-author and for teaching me how to use economic models for data analysis, particularly the principal–agent model. It has been a great pleasure working with you and learning so much from you.

I would also like to express my sincere gratitude to Svein Jentoft for being a great source of inspiration in the successful realisation of my PhD studies. You have been my unwavering guidance (*veiviser*) throughout; I really appreciate your close supervision and limitless support. I am very grateful for your advice, your assistance, your kindness, your patience, and for your strong confidence and trust in me.

Signe Annie Sønvisen, I cannot thank you enough. You have been both a true friend and my sister, but a very close colleague too. Thank you for always being there for me when I needed you most. I greatly appreciate your encouragement, which really assisted me in keeping my feet firmly on the ground and kept me going until I reached my destination.

Finally, this would not be enough without mentioning my family, especially my dear brother Patrick Geoffrey Msomphora and my dear nephew Kondwani Msomphora for providing me

with emotional support; you kept me smiling throughout. You stuck with me through thick and thin. Thank you. *Tusen takk til min kjære Øystein Kristian Bruvold for å være tålmodig med meg og støttende gjennom perioder med mitt harde arbeid, spesielt mot slutten.*

Thank you all for having faith in me and for believing that I could do it.

November, 2015 Mbachii Ruth Msomphora

## **Abstract**

The PhD project study is about ‘stakeholder participation’ in fisheries governance; a concept that has become acceptable in all areas of decision-making during the last few decades, partly due to dissatisfaction with the performance of fisheries management systems across the world. Among other issues, discarding, especially of marketable fish, is a serious and continuing problem despite the heavy emphasis on conservation policies. The absence of responsibility for industry and stakeholder groups is evidenced as the main reason for the problem. In this regard, authors in this field expect that a fisheries governance that entails sharing management responsibilities between the authorities and the resource users i.e. ‘co-management’ and more recently ‘results-based management’ (RBM) will result into developing a positive feedback loop.

The purpose of this study is therefore to establish a theoretical framework on how and to what extent the stakeholders can efficaciously be involved in the management of fisheries, within the perspectives of RBM. This central topic is explored through four papers: Paper 1 discusses how the proposed discard-reduction management mechanism, i.e. Catch Quota Management (CQM) strategy, may be formulated in order to attract fishers’ participation and to make it profitable for them to comply with the rules. Paper 2 explores the association between stakeholder levels of participation and satisfaction in the decision-making process for the development and implementation of the fisheries management plan (MP). This issue is also discussed in paper 3, but in light of exploring the important fisheries conditions for success in stakeholder participation. Lastly, paper 4 demonstrates what the stakeholder involvement in scientific knowledge-production of policy-making may imply for the fisheries science community, but also illustrating how science with the incorporation of all stakeholders may be practised to provide valuable knowledge for policy-making without compromising the ethos of science as an institution.



## **List of Papers**

The thesis is based on the following papers:

### **Paper 1**

Mbachi Ruth Msomphora, Margrethe Aanesen, (2015). Is the catch quota management (CQM) mechanism attractive to fishers? Preliminary analysis of the Danish 2011 CQM trial project. *Marine Policy* 58: 78 - 87

### **Paper 2**

Mbachi Ruth Msomphora, (2015). Stakeholder participation and satisfaction in the process of developing management plans: The case of Scottish Inshore Fisheries Groups. *Ocean & Coastal Management* 116: 491-503

### **Paper 3**

Mbachi Ruth Msomphora. Conflict resolution and the delegation of authority in fisheries management: The case of Outer Hebrides Inshore Fisheries Group in Scotland. *Marine Policy*, In press.

### **Paper 4**

Mbachi Ruth Msomphora. The role of science in fisheries management in Europe: From Mode 1 to Mode 2. *Maritime Studies* 15(1): 1-23





## List of Abbreviations

AC	Advisory committee
ACFM	Advisory Committee on Fisheries Management
ACs	Advisory Councils
ACE	Advisory Committee on Ecosystems
ACME	Advisory Committee on the Marine Environment
ACOM	Advisory Committee
CCTV	Closed-circuit television
CEC	Commission of the European Community
CFP	Common Fisheries Policy
CNES	Comhairle Nan Eilean Siar
CQM	Catch quota management
CUDOS	Communalism, Universalism, Disinterestedness, Originality and Scepticism
CULAVS	Communal, Universal, Local, Academic-freedom, Value for money and Scepticism
DEFRA	Department for Environment, Food and Rural Affairs
DCR	Data collection regulations
DG MARE	Director General for Maritime Affairs and Fisheries
DKK	Danish kroner
DTU	Technical University of Denmark
EAFM	Ecosystem Approach to Fisheries Management
EBM	Ecosystem-based management
EC	European Commission
EFF	European Fisheries Fund
EU	European Union

ExCom	Executive committee
FA	Fishermen's Association
FQA	Fish quotas
HELCOM	Helsinki Commission
HLOS	High-level objectives
IC	Incentive compatibility
ICES	International Council for the Exploration of the Sea
IFGMP	Inshore Fisheries Group Management plan
IFGs	Inshore Fisheries Groups
IMP	Integrated Maritime Policy
ITQs	Individual Transferable Quotas
LCC	Lewis Castle College
LQ	Landing quota
MCAP	Management Committee for the Advisory Programme
MLS	Minimum landing size
MP	Management plan
MPAs	Marine protected areas
MS	Marine Scotland
MSC	Marine Scotland Compliance
MSS	Marine Scotland scientists
MSY	Maximum sustainable yield
NASCO	North Atlantic Salmon Conservation Organization
NEAFC	North East Atlantic Fisheries Commission
NFIs	National fisheries institutes
NWIFG	North West Inshore Fishery Group

OHIFG	Outer Hebrides Inshore Fisheries Group
OR	Odds ratios
OSPAR	Oslo-Paris
OT	Outcome targets
PA	Precautionary approach
PLACE	Proprietary, Local, Authoritarian, Commissioned and dependent on Expert skills
PMSU	Prime Ministers' Strategy Unit
POs	Producer Organisations
RACs	Regional Management Councils
RBM	Results-based management
REM	Remote electronic monitoring
ROs	Regulation Orders
RSC	Regional Seas Conventions
SEPA	Scottish Environment Protection Agency
SFCs	Sea Fisheries Committees
SIFAG	Scottish Inshore Fisheries Advisory Group
SISP	Scottish Industry Science Partnership
SNH	Scottish Natural Heritage
SSB	Spawning stock biomass
F	Fishing mortality
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total allowable catch
ToRs	Terms of Reference
UK	United Kingdom
VMS	vessel monitoring system



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## **Introduction**

Many of the world's commercial fish stocks are in a state of crisis, especially due to the way in which fisheries are managed (Fernandes & Cook, 2013; Graham-Bryce, 2005; Jentoft et al., 1999; STECF, 2013; Van Vliet & Dubbink, 1999). While, on the one hand, Holden (1994) argues for a reinforcement of the command-and-control (top-down) approach, on the other, Symes and Phillipson (1999) put the blame on the top-down approach which is characteristic of the traditional (conventional) fisheries management systems.

As argued in the last two reforms of the CFP (in 2002 and 2013), the lack of stakeholder participation in fisheries governance has contributed to the crisis of commercial fish stocks. Discards are among the best examples for causing such shortcomings of the hierarchical mode of governance (European Commission, 2014). The absence of responsibility for industry and other stakeholder groups is seen as the main reason for the serious and continuing problem of discarding, despite the heavy emphasis on conservation policies in fishery (Fernandes & Cook, 2013; STECF, 2013). In this esteem and consistent with research literature, it is repeatedly reported that stakeholder participation plays a very crucial role in sustainable fisheries.

Critics of the hierarchical mode of governance, according to Gray (2005, p. 1), claim/say “that only a suitably managed market system can deliver a sustainable fishing industry” and the opinion of the majority seem to favour the participatory mode of governance – that is a governance strategy that requires designing an effective and innovative fisheries administrative framework that engages scientists, policy-makers and the public, so as to achieve shared understanding and informed decision-making based on both sound scientific and traditional knowledge. As such, there is a demand for a management structure that allows for more and successful stakeholders' participation in the fisheries management. In this regard, the proponents of the “participatory mode of governance” expect a fisheries governance that entails sharing management responsibilities between the authorities and the resource users, i.e. ‘co-

management' and more recently 'results-based management' (RBM), will result into developing a positive feedback loop (Gray, 2005; Jentoft, 1989; Jentoft et al., 1999; Nielsen et al., 2015; STECF, 2013; Symes & Phillipson, 1999). This is because "governing knowledge becomes more adequate, resulting in more satisfactory governing measures, which in turn lead to higher management legitimacy and compliance, "accepting the regulations as appropriate and consistent with [...] persisting values and world views"" (Kooiman & Bavinck, 2013, p. 23).

According to Jentoft (1989) the crucial question for the success of stakeholder participation in any management scheme could be: what are the measures needed to get stakeholders voluntarily to advance their collective interests at the expense of their private interests? In other words, what could motivate stakeholders to adhere loyally to the regulations, which are there to benefit all? The key elements here include 'legitimacy' and issues that entail the sustainability of social, economic and environmental aspects: how can regulations be made efficiently appropriate and consistent in order for stakeholders to willingly accept them with their persisting values, while at the same time allowing environmental conservation measures for sustainability of the resources? This is because if stakeholders find the regulatory conditions or circumstances adequate for preventing depletion of the resource base and dissipation of the potential resource rent, while securing a fair distribution of fishing opportunities and incomes among participating groups, there is more reason to believe that they will comply with the management rules. How to balance all such relevant concerns is an important governance challenge. The question therefore is, how could governance be improved in order to secure the efficient platform or mechanism that works in a participatory fisheries governance system? It is in this light that this PhD project study explores the practical ways of how to achieve increased stakeholder participation in fisheries governance, with the central topic of the study being to investigate



how and to what extent the stakeholders can practically be involved in the governance of fisheries in Europe.

Using the umbrella concept of ‘governance’ in fisheries, the study specifically explores the project’s topic through four papers: Paper 1 explores how the so called ‘catch quota management’ (CQM) mechanism may be formulated in order to ensure continuous stakeholder participation. This is conducted by exploring whether and how the properties of CQM mechanism attract fisher stakeholder’s participation and how to make the mechanism profitable for them to comply with the rules. Paper 2 explores the association between stakeholder levels of participation and satisfaction in the decision-making process for the development and implementation of the fisheries MP. Paper 3 investigates the fisheries conditions that are important to ensure a conducive institutional framework for increasing stakeholders’ satisfaction in order to increase their participation. Lastly, paper 4 explores what the transition from traditional academic science (top-down approach, i.e. Mode 1) to modern post-academic science (participatory approach, i.e. Mode 2) may imply for the fisheries science community; specifically, what consequences it might have for the way science is practiced and converted into policy, and whether it is time to rethink if this is a move that should be supported.

The structure of the project study is as follows: 1) Introduction. 2) ‘Governance’: gives a review of ‘Governance’ as a key concept used for exploring the objectives of the research project. The concept is described using three categorical terms, namely: Hierarchical governance; Market governance; and Participatory governance, respectively. 3) ‘Co-management’: denoted as the key concept in participatory fisheries governance (de Vivero et al., 2008; Gray, 2005; Jentoft, 2003). ‘Co-management’ is the focus of interest in this study. 4) ‘From Co-management to Interactive Governance’: describes the recent developments in co-management, i.e. beyond the concept of co-management. 5) ‘Results-Based Management’: an overview of the results-based management (RBM) concept as a version of participatory governance reflecting the

developments in co-managing the fisheries with reference to the recent EU's CFP. 6) 'Overall Study Objective' Section: describes the research objective that motivates the investigations in this project study. 7) 'Summary of Main Findings and Discussion Points'. Based on the overall study objective, this section summarises the main findings with respect to the four papers, as listed in the 'List of Papers' Section. 8) Conclusion: an attempt to bring the findings from the present work into an immediate practical application. It provides conclusive remarks reflecting the disclosure and interpretation of the main findings of the research project.

## **Governance**

Governance has been used mostly as an umbrella concept and the term has no agreed definition (Gray, 2005). As Tortajada (2010, p. 298) notices, governance is not a synonym for government, but "a complex process that considers multi-level participation beyond the state, where decision making includes not only public institutions, but also the private sector, civil society and society in general". According to the European commission, "Governance" means rules, processes and behaviour that affect the way in which powers are exercised, particularly as regards openness, participation, accountability, effectiveness and coherence", (Gray & Hatchard, 2003, p. 546).

According to Gray (2005) fisheries governance refers to three categorised modes (structures): 1) Hierarchical governance; 2) Market governance; and 3) Participatory governance. While participatory governance is this study project's primary focus of interest, the study also briefly describes the other two modes.

## **Hierarchical Governance**

Hierarchical governance used to be the most common style of governing, but this is about to change because its dominance is being challenged by the other two alternative modes. Apart from the top-down structure, the hierarchical mode of governance is characterised by “its emphasis on legality, political legitimacy, centralisation, bureaucracy, interventionism, command-and-control, scientific elitism and exclusivity, and sense of public responsibility” (Gray, 2005, p. 3). In the hierarchical governance, fisheries resources are considered as a public resource (Gray, 2005). Thus as a public resource, fisheries resources like other common pool resources such as ‘air space’ are a prime responsibility of the state (Symes & Phillipson, 1999). Dryzek (2005) calls the ideology of Hierarchical governance as ‘administrative rationalism’, where the decision-makers are the few experts, and not the majority public. In this respect, the psychological basis of hierarchical governance, is Hobbesian (Gray, 2005); implying that:

“human nature is self-centred and egoistical, and that the only way to avoid “the tragedy of the commons” (Hardin 1968) is to institute strict measures of control, backed up by force. Typically, this requires fish quotas, days-at sea, decommissioning, satellite surveillance, and inspectors on boats and in ports to check that catches and landings do not break the rules. In other words, the stick rather than the carrot is necessary to discipline fishers’ behaviour that puts fish stocks at risk” (Gray, 2005, p. 3).

In Europe, as Symes and Phillipson (1999) point out, a good example of Hierarchical governance is the UK system where a central government department, such as the Department for Environment, Food and Rural Affairs (DEFRA), makes the most important decisions, and further up in the chain of command is the EU’s CFP. The national governments do not have much influence over the CFP decisions, and the fishing industry has even less (Gray, 2005).

According to Van Vliet and Dubbink (1999, p. 22), there are three main criticisms of hierarchical governance: 1), the national government does not have a monopoly of knowledge

about fisheries, 2), the national government does not have a monopoly of judgement about the right measures to introduce to deal with fisheries problems, and 3), the national government does not have a monopoly of power to enforce its measures. This is to such an extent that it is hardly possible to prevent individuals and groups from undermining government policies, if these policies are unpopular. In addition, the British Prime Ministers' Strategy Unit (PMSU, 2004) reports that due to the top-down structure as evidenced through the CFP, simple command-and-control policies such as the 'conventional' cuts in quotas (total allowable catch (TAC) system) will not work in complex, multijurisdictional, mixed fisheries. Moreover as Gray (2005) notices, the assumption of the TAC system that the "Member States can enforce the rules and that fishermen will obey them, [...] is for the large part flawed and does not reflect the reality of fisheries management in the EU" (Gray, 2005, p. 4).

Despite the weaknesses of the hierarchical governance, other authors have asserted that the national authorities cannot be absent from fisheries governance (Gray, 2005; Jentoft, 2004; Kooiman, 1999; Pierre & Peters, 2000). In this regards, there will always be a need for at least some element of hierarchy in fisheries governance. As Jentoft (2004, p. 34) points out, "there is obviously a public interest in fisheries management, which sector participants and NGOs, with their various agendas, cannot and will not always consider". As representatives for the public interests, this means, says Jentoft (2004), the national authorities have a role to play in fisheries management, and, for this reason, should not be exempted from the decision-making process of the fisheries organisation and management. The authority supplies several vital functions necessary for fisheries management, such as, "democratic accountability", "exclusive legal status in negotiations with third countries", and "legislative and revenue raising powers" (Symes, 1999, p. 32), including coercive power, i.e. power to enforce the rules (Gray, 2005).

Concurrently however, there are limits to what the national authorities can do. As the economist, Lindblom (1977) said, the State has no fingers, but only thumbs; implying that

fisheries governance must also involve the local community, because the ecological and social diversity, complexity and dynamics of fisheries are such that the central authorities cannot possibly be on top of every local situation. “The closer one is to the source of the problem, the greater is one’s ability to influence it, and the problem-solving ability to complex systems depends not on the hierarchical control but on maximizing discretion at the point where the problem is most immediate” (Pressman & Wildavsky, 1984, p. 208). Therefore, the principles of governance must involve all those that have interests at stake in fisheries, and this strategic concept is what is called participatory fisheries governance. However, before turning to participatory fisheries governance, I will, as already stated above, describe in short, the second of the three modes of fisheries governance, namely, market governance.

### **Market Governance**

There has been a shift from hierarchical governance to market governance in fisheries during the last three decades, following the neo-liberal trend towards deregulation and privatisation (Kooiman, 1999). On this neo-liberal theory, the basis of market governance is supply and demand, unrestricted by the national authority interference, yet supported by the fundamental values of private property rights (Gray, 2005). Premised on von Hayek (1944), Dryzek (2005) characterises market governance as ‘economic rationalism’ or ‘leave it to the market’, since no one can possibly know how to run the market mechanism due to its complicatedness. As such, the market mechanisms should largely run by themselves. Moreover, in theory the ethical assumption of market governance is that each person knows best what is in his or her own interest (utilitarianism or philosophical radicalism), and psychologically, the assumption implies that people are rational in making their choices (Gray, 2005). However, in applying this theory of rational choice to fisheries, as a substitute to free supply and demand theory, “governments should adjust market carrots and sticks to reward self-interested behaviour that protects public resources, and punish self-interested behaviour that damages them, and then

leave the forces of supply and demand to get on with it”, (Van Vliet & Dubbink, 1999, pp. 19-20).

This mode of market governance, in the case of fisheries, could mean a system of Individual Transferable Quotas (ITQs) (Van Vliet & Dubbink, 1999). ITQs are catch-quota share that give individuals a privilege to a dedicated portion of the total allowable catch of fish or shellfish in a given year. ITQs can typically be bought, sold and leased; a feature called transferability (Buck, 1995). The governments use ITQs as a means of regulating fishing. They were introduced in tandem with the privatisation of the commons. The ITQs regulatory measure was implemented in fisheries due to the assumption that people are likely to take good care of the resources that they themselves own (Gray, 2005). As such, based on the doctrine of natural resource economics, ITQs were introduced in fisheries market governance, with an idea that the measure will give property rights to the fishers, and thereby incentivising the stakeholders (in this case fishers) to participate in managing the resources.

New Zealand, Canada and Australia are the ITQs world leaders, based on number of species under ITQ management (Chu, 2009). In Europe, ITQs are currently in operation in countries like Norway, Iceland, Denmark, Portugal, Italy and the Netherland, but also in other parts of the world such as Chile, Argentina, Namibia, Mozambique, South Africa and the USA (Chu, 2009). Nevertheless, despite the trend of deregulation in other fisheries policy areas, in the marketing mode of governance, the trend in the EU’s CFP governance has been in the opposite direction, i.e. “towards greater regulation” (Gray, 2005, p. 6). The British PMSU report (2004) argues against this. It is recommended in this report to move away from command-and control management structure to a “central role for market-driven incentive and mechanisms whereby information can be used to influence decision-making by individual businesses” (PMSU, 2004, p. 98).

Kooiman (1999, p. 143), criticises the market mode of fisheries governance in that it rests much upon many simplified-assumptions that are based on views of human motivation, “*a one-dimensional homo economicus*”. But, fisheries, in fact rest on more than environmental or economical risks. For instance, for some fishers it is at least a way of life, it enables self-expression and identification, but also as a form of self-determination (Gray, 2005). In addition, Jentoft and McCay (2003) report that market governance excludes social and cultural influences on fishers’ behaviour, e.g. concern for the marine environment and their community. Moreover, just as pointed out above, market governance cannot eliminate the involvement of the national authorities for several reasons, including the function of developing the terms of the market, while ensuring that the health of the marine ecosystem is not damaged.

Despite the criticisms of market governance, this mode of governance has one important value, “it serves as an important corrective to the hierarchical mode” in that it demonstrates that fishing regulations must be economically literate to motivate fishers’ compliance, “because rules that prevent fishers from making a living will be ignored” (Gray, 2005, p. 7). In fact, market issues of governance are required to give incentives for motivating the coordination and cooperation of the stakeholders participating in a co-regulated governance (Sverdrup-Jensen & Nielsen, 1998). Lindblom (2001) notices that the market can be considered as a system of society-wide coordination with mutual interactions in the form of transactions. The competition does not coordinate the market, but is instead coordinated by a blending of competition and social cooperation (Taylor, 2015).

## **Participatory Fisheries Governance**

The participatory mode of governance is a key interest of this PhD project study. In contrast to the hierarchical governance with administrative rationalism of ‘leave it to the experts’, and the market governance with economic rationalism of ‘leave it to the forces of supply and demand’, participatory governance is depicted by Dryzek (2005) as “democratic pragmatism”, i.e. “leave it to the people” (cf. Kooiman, 1999, p. 142). Generally, the participatory concept is about citizens and stakeholders. It has the roots in: 1) post-materialism (people are more concerned with quality of life than accumulation of material goods); 2) loss of faith in experts, where the value of experimental knowledge is becoming increasingly recognised and that the value of public judgements prevails over the experts’ value of judgements; 3) the spirit of devolution (a need to devolve decision-making to its lowest possible levels); 4) communicative rationality, “denoting the contemporary aspiration of civil society to engage in dialogue on the important political issues of the day in order to reach more reasoned decisions”; and finally, 5) participatory governance has the roots in the failure of the other two modes of fisheries governance (Gray, 2005, pp. 8-9).

Participatory mode of governance can be divided into four different sub-types (Gray, 2005): 1) industry self-regulation, 2) co-management, 3) community partnership, and 4) environmental stewardship. However, due to new developments in the concept of participatory governance, there is now a new additional sub-type which Gray (2005) did not consider – that is the move beyond co-management (Armitage et al., 2007), as we shall see below.

Although the main focus of this study is ‘co-management’, certain aspects of the other types of the participatory mode of governance will also be given due consideration. The concentration/emphasis is on co-management because of its distinctive prime feature of sharing management responsibilities between the authorities and stakeholders. Co-management has indeed been depicted by several authors as very important and central to sustainable fisheries



governance (de Vivo et al., 2008; Gray, 2005; Jentoft, 2003; Kooiman, 1999; Ostrom, 1990; STECF, 2013).

### **Co-management**

Fisheries co-management, the joint management of the fisheries, is often formulated in terms of some arrangement of power sharing between the government and a community of resource users (Carlsson & Berkes, 2005; Sen & Nielsen, 1996). Co-management is denoted as the key concept in the recent developments of theories and customs in fisheries governance (de Vivo et al., 2008; Gray, 2005; Jentoft, 2003). The way the concept has evolved from the 80's to the present day is an indication of the direction of the common point of view concerning sustainable fisheries management (Jentoft, 1985, 1989; Pinkerton, 1989). Noteworthy, however, is the fact that despite the concept of co-management development being relatively recent, its regimes have for centuries existed in some parts of the world (Jentoft, 2003).

Presently, there are many examples on co-management globally: Sverdrup-Jensen and Nielsen (1998) have noted co-management in Southern and West Africa, while Nsiku (2001) focuses on Malawi; Pomeroy and Viswanathan (2003) and Loucks et al. (2003) among others have described co-management in Asia and America respectively. The concept has also been described in Australia and New Zealand (Metzner et al., 2003) and in Norway (Hernes et al., 2005). But, in Europe, even if there are certain examples where co-management exist at national level, and the purest form being Norway, Gray (2005) argues that co-management does not exist at the intergovernmental level of the EU's CFP. At national level, however, Gray (2005, p. 11) notices that the Netherlands has the strongest co-management system in the EU, "while the UK has some features of a co-management system in its sectoral quota management by the Producer Organisations (POs) (Symes & Ridgway, 2003, p. 126) and in its regulation of inshore fisheries in England and Wales (the Sea Fisheries Committees (SFCs))," and in Scotland (Inshore fisheries groups (IFGs)).

There are currently some developments in the EU: the establishment of the Regional Advisory Councils (RACs) that are now called Advisory Councils (ACs) on the regional level (Gray, 2005; Linke & Jentoft, 2014; Wilson, 2010) being one example. Only time will tell if this is a genuine step towards co-management. Just as the RACs, ACs are established to prepare and provide advice on the management of the fisheries on behalf of stakeholders in order to promote the objectives of the CFP, but also to facilitate a more direct knowledge-exchange between scientists and stakeholders within the ACs (Msomphora, In press). Thus, as Linke and Bruckmeier (2015, p. 173) observe, the ACs “describe changes of co-management perspectives from formal power relations to more encompassing knowledge practices”. However, before ACs would reach co-management their problems regarding representation, deliberation, decision-making authority and delegation of power need to be addressed (Linke & Bruckmeier, 2015; Linke & Jentoft, 2014).

The advocates of co-management (Gray, 2005; Jentoft, 2004; Pomeroy et al., 2011; Symes & Phillipson, 1999; Van Vliet & Dubbink, 1999) stipulate that there are several benefits to this concept: equity; increased transparency; accountability; a wider source of knowledge; regulations that are more rational and legitimate; which supposedly would lead to more compliance and reduced costs of surveillance. For instance, ‘a wider source of knowledge’ due to the involvement of both the government and user groups in co-management, is an important component of resolving conflicts, since it allows knowledge integration under the conceptual umbrella of knowledge exchange, and thereby enhancement of solution(s) to the conflicting interests or values (Fazey et al., 2013; Leys & Vanclay, 2011; Stepanova, 2015). Co-management is therefore viewed as essential for tackling fisheries diversity (Kooiman, 1999). Moreover, as de Vivero et al. (2008) note, co-management stresses the need for strengthening local perspectives. They perceive co-management as “a political system which steers clear of the cognitive exclusiveness of science and incorporates forms of “folk” knowledge; and all the

aspects that this entails” (de Vivero et al., 2008, p. 322). As such, it is hardly surprising that co-management is the promising candidate to get to grips with such theoretical thinking.

Co-management emphasises the need for engaging and empowering the fishing industry, including the local community, in the management decision-making process. In fact, the form of governance in co-management builds on public-private partnership, where management is generally shared between government regulators and representatives from the fishing industry (van der Schans, 1999). “Power sharing is a must” (Jentoft, 2003, p. 4); implying that there is genuine partnership in decision-making between the parties, than just a mere consultation of the industry by the government (Kooiman, 1999). This does not mean that co-management comes naturally to either side: the respective sides must have some incentive for reaching the common good in co-operation (Langstraat, 1999).

Co-management cannot be forced upon an unwilling industry and/or national authority (Symes & Phillipson, 1999). The industry side may lack the professional skills or the financial resources (capacity) to mobilise the important issues in managing the fisheries, while the government may be reluctant or unable to share power with the industry. The major problem lies in building trust between the two sides, and to ensure stakeholder satisfaction with their participation in fisheries management.

Amongst the several definitions of co-management expounded by various authors (Nielsen et al., 2004; Noble, 2000; Sen & Nielsen, 1996), Jentoft (1989, pp. 423-424) defines co-management as “the collaborative and participatory process of regulatory decision-making among representatives of user-groups, government agencies and research institutions”. This definition focuses on the establishment of a democratic and inclusive management system: a system that involves the relationship between the government and the associations that principally represent fishers as user-groups for sharing responsibility of management task,

while ensuring that the government remains primarily as an arbiter in a complex assemblage rather than one of the cornerstones of the system occupying the highest position in the hierarchy (de Vivo et al., 2008). Co-management's prime form of argument is the need for political effectiveness and legitimacy that lacks in the conventional top-down management systems, and this is how it has persistently been perceived even in the subsequent traditions. Therefore, as Kooiman (1999, p. 260) notices, "this model is more than an option: it is a necessity." Stakeholders are most likely to abide with decisions/policies, which they strongly identify with and feel a part of.

Despite all the potentialities of co-management as pointed out above, the practical experience and observation evidence for the efficiency and workability of co-management solutions in fisheries management is still scarce (Castrejón & Defeo, 2015; Symes, 2007). Questions still remain over how to successfully attain stakeholder participation from the fisheries organisations dedicated to this purpose. Co-management, as argued by Gray (2005, p. 12), "is easier to establish at local levels, where it may resemble community partnership, but it is more difficult to organise on a larger scale, because of the greater diversity of fisheries interests." Nevertheless, its advocates insist that it is at the higher levels where co-management strategy is needed most (Gray, 2005). In this regard, (as noted in the Introduction Section of this thesis), the EU's CFP has suggested a fisheries governance that entails sharing management responsibilities between the authorities and all those interested in the resources – that is 'co-management' but with characteristics that pertain to two sub-types or versions of participatory governance: 'industry self-regulation' and 'environmental stewardship'.

'Industry self-regulation' assumes that the stakeholders have the sole responsibility for running the fishery (Sutinen & Soboi, 2001; Symes & Phillipson, 1999). However, this does not imply that industry self-regulation is entirely independent from the authorities, but autonomous only within certain limits. For instance, the fisheries industry, e.g. a fisheries organisation, cannot

set aside safety rules laid down at national or international level (Gray, 2005). This depicts a strong resemblance between industry self-regulation and co-management, where “power sharing is a must” in managing the commons (Jentoft, 2003, p. 4). Notably, this is also one of the prime characteristic in results-based management (RBM).

‘Environmental stewardship’ reflects the growing power of environmental concerns. As Gray (2005) notices, integrating environmental issues in fisheries is considered essential in the new version of participatory fisheries governance. This requirement is often characterised using the concept of the ecosystem-based approach (EBM), which encompasses fisheries as part of the marine ecosystem management (Frid, 2005). Thus, environmental stewardship involves inclusion of environmentalists as stakeholders in co-managing the fisheries, in collaboration with the government and user groups themselves. Hence, the environmental stewardship has certain implications of co-management as a type of participatory mode of fisheries governance, but beyond the concept. In this regard, environmental stewardship has aspects in common with the EU’s newly suggested management mechanism for ensuring fully documented fisheries (the CQM). The purpose of the CQM mechanism is to manage the fisheries at an integrative approach, where environmental concerns are of prime importance for the potential to account for all catches, reduce discards, provide better scientific data and encourage fishers to fish more selectively through catch-quotas using sensor and camera technology (Dalskov et al., 2012). And more so to induce industry self-regulation.

The new concept of co-management as suggested in the EU’s CFP also has the characteristics pertaining to the third type of participatory fisheries governance: community partnership. It (community partnership) requires sharing management responsibilities with the whole range of local stakeholders who have the interest in marine resources (excluding the government). While the newly suggested fisheries governance devolves more of the management responsibilities from state to stakeholders, the central government continues to exercise a good deal of control

(directing overall policy) because of its basic obligation to take care of the commons on behalf of its citizens' common interests (Symes, 2007).

The recent developments in the concept of participatory governance suggest a changing discourse, from co-management, where fisheries management policy is driven to a large extent by four primary sets of actors: users (fishers), scientists, government administrators and elected officials (Jentoft et al., 1998), towards a system that involves more than these four groups. Therefore, the recently advocated governing marine system within which fisheries is situated involves the entire interested public, which in addition to the four primary sets of actors also includes consumers, local community, and other stakeholder groups such as environmental interests, as well as international bodies. Such a move towards a more interactive, more 'democratic' and broader participatory governance is beyond the traditional concept of co-management; called hereafter as the '*Interactive governance*' approach (Kooiman & Bavinck, 2005).

### **From Co-management to Interactive Governance**

Whereas the literature previously talked about co-management, it now tends to talk about the same issues under the label of interactive governance. What is the difference between 'co-management' and 'interactive governance'? The shift from 'co-management' to 'interactive governance' points to a change in two dimensions. The first is the shift in relevant participants, from users (particularly fishers) to a whole array of stakeholders, and the other is the shift from 'management' to 'governance'. What does this shift imply?

Co-management used to be preoccupied with fishers as a principal user group and oriented to resource management as the primary management problem (Armitage et al., 2007). 'Interactive governance' includes a much wider range of stakeholder groups and concerns. As an extension to the concept of co-management, 'interactive governance' can be described as a management

system approach that recognises the full array of stakeholder interactions, and entails managing a fishery as part of the marine ecosystem within which it is situated; rather than considering a limited stakeholder participation, with the resource management as the primary management problem, or ecosystem services in isolation. This implies that the shift from co-management to interactive governance involves a change from fisheries ‘management’ to ‘governance’. In other words interactive governance incorporates the idea that the managers should not be confined to the goal of maximising sustainable yield of targeted resources as in co-management, but be expanded to the goal of protecting the health of the whole ecosystem, with all its species e.g. fish, sea mammals and benthic organisms, and together with their natural habitats (William, 2005). Human issues like social, economic and environmental aspects (social-ecological issues) are also included in the management list, since without their inclusion, some natural phenomena in managing the marine resources may be impossible to manage (Galaz et al., 2008). Interactive governance therefore advocates wide participation in governance from a normative as well as from a practical point of view, but more so, the shift induces changes in procedures for making and implementing decisions. Its purpose is meant to serve more than just the sustainability of fisheries resources. The whole interactions are considered in order to “solve societal problems and to create societal opportunities, including the formulation and application of principles guiding those interactions and care for institutions that enable them” (Kooiman & Bavinck, 2005, p. 17).

The implication, of the literature review as described above, is that interactive governance is a combination of multi-stakeholder participation and ecosystem-based approach (EBM) (Frid, 2005). Compared to co-management, such an approach in managing the fisheries has more potential to make the management of the marine systems more efficient and democratic (Linke & Jentoft, 2014; Stringer et al., 2006). As with co-management, interactive governance approach strongly recommends that management planners (authorities) need to engage

stakeholders earlier, more often, more meaningfully, and through an open and transparent process (Dougill et al., 2006; Gopnik et al., 2012). This encourages the flexibility and success of stakeholder participation in the decision-making processes for the management of the sustainable fisheries in a holistic approach (Gopnik et al., 2012). Equally important, both approaches, co-management and interactive governance in managing marine systems affirms the value of bringing unlike parties together at the earliest opportunity to learn, talk, and listen to others with whom they rarely engage (Gopnik et al., 2012). Just as in co-management, stakeholders in an interactive participatory-management approach have something to gain from each other (Gopnik et al., 2012; Gray & Hatchard, 2008). But, in contrast to co-management, which used to be preoccupied with resource management as the primary management problem, interactive governance approach enables the stakeholders to have the right to decide how the marine resources (within which fishers resources are situated) as a whole are used, and gives them (the stakeholders) a duty to do so responsibly (Gray & Hatchard, 2008).

Although it is true that with the wider range of stakeholder participation there is a greater chance of improving fisheries management, there is a danger of persuasive stakeholders in obstructing efficient management. A broad array of stakeholder participation is reported to inflict more conflicts and transaction costs (Gray & Hatchard, 2008). In support of this, Grafton et al. (2006) report that a wide range of stakeholder participation may allow special interests to block conservation. In their argument, it is pointed out that voluntary participation in the regulatory process leads to overrepresentation by industry members with extreme preferences or special interests, which can result in sacrificing long-run conservation for short-run economic considerations. It is also stated that the greater the number of stakeholders, the smaller the roles each stakeholder plays, and the lesser the importance of the traditional sectors (de Vivo et al., 2008). Besides, the cost of stakeholder participation in terms of time and logistical resources, is high, such that the funds that could have been best used in implementation of management



issues is misused (de Vivo et al., 2008). A broad array of stakeholder participation could also reduce decision-making forums, where the persuasive stakeholders take the place of deliberative dialogue about efficient management (Gray & Hatchard, 2008). Furthermore, not all stakeholders may have the skills to understand scientific discussions about the ecosystem and its interactive complexity, and not all scientists have the skills to understand how the social system works (Gray & Hatchard, 2008; Linke & Jentoft, 2014).

Conversely, the danger of excluding stakeholder participation altogether is also a threat to the success of sustainable fisheries management. Through the dialogue, exchange of knowledge and democratic vote among the stakeholders, it is likely that an interactive governance approach may help to ease the dangers of special interests (persuasive stakeholders) obstructing good management practices. As Pitcher (2001) and Livingston et al. (2005) infer, it is not wise, for example, that the managers (national- authorities) develop the management plan(s) based on biological or environmental indicators without the reference to the stakeholder engagement. The use of different perspectives from a wide range of stakeholders (sources) gives a more complete overview of required knowledge, and thereby creating a more robust factual base and reducing management uncertainty (Berkes, 1999; Olsson et al., 2004; Woodhill & Röling, 1998). In addition, Daniels and Walker (1996) point out that incorporating the perspectives of all stakeholder groups minimises conflict, while allowing creation of ‘a common knowledge base’ about the main management issues, which then feeds into the decision making process, like with the production of a new management plan. In fact, as observed by Coser (1956), conflicts, in the context of interactive governance, can have a positive function as it brings stakeholders together, clarifying and communicating about their interest and values. In support of this, the work of Walters et al. (2000) on Glen Canyon Dam on the Colorado River also illustrates the efficiency of using the interactive governance approach. They show how changes

in such an approach led to the transfer of benefits from one stakeholder group to another, necessitating the development of a shared vision with input from all stakeholders.

Interactive governance therefore increasingly engages the stakeholders deeply into the management of the marine systems. Compared to co-management, which targets fisheries resource sustainability, going beyond co-management (interactive governance) brings mutual contribution to the sustainability of the targeted and untargeted marine resources. It serves as an important rhetoric function in managing the marine systems. However, the interactive governance compared to co-management in managing the marine and fisheries systems respectively is complex (Armitage et al., 2007; Gray & Hatchard, 2008; Hawkins, 2007), especially as we move away from top-down, centralised management approach to more developed and participatory approach. The so-called 'sectorial' approach to management, as was in co-management, involving information exchange with a limited number of stakeholder is relatively simple, whereas the new holistic interactive governance approach involving a broader range of stakeholders could become increasingly complicated.

Notwithstanding the limitations, the benefits in using interactive governance approach overpower the complexity (Gray & Hatchard, 2008). By encouraging a broader range of stakeholders to work in the framework of social-ecological system (cf. McGinnis & Ostrom, 2014), relationships can be transformed, changing people's perceptions of each other's views, and enabling them to identify new ways of working together, thereby strengthening the stakeholders' responsibilities in protecting the future of the target and non-target species and natural ecosystem-habitats as a whole. Thus, moving beyond the co-management approach could ultimately lead to better results and sustainability of the fisheries and marine ecosystems as a whole (Arheimer et al., 2004; Armitage et al., 2007).

The concept of interactive governance is currently being made popular in the research on EU policies (Denters et al., 2013). Such a governance version of co-managing the fishery can be reflected in what the EU's CFP recently refers to as 'results-based management' (RBM).

## **Results-Based Management**

Based on the European Commission's suggestions, RBM can be delineated as defining an acceptable impact and then leaving it to those concerned to identify the means to meet the requirements and to document the effectiveness of the means (Nielsen et al., 2015). RBM is a management strategy focusing on performance and achievement of results. But can RBM be considered as co-management?

RBM-based strategy can be viewed as a refined and more astute type of top-down management, applying co-management principles for low-level management functions (Fig. 1). It calls for a division of responsibility between the national authorities<sup>1</sup> and the stakeholders<sup>2</sup> as it delegates defined responsibilities from the former to the latter. It has the characteristics of co-management but yet beyond the concept. This is because with linkage between user-groups and national authorities, the users (fishers) participation in decision-making is the primary concern in co-management, while with RBM, it is essential that all stakeholders participate in decision-making but on condition that they comply with the rules as specified by the national authorities. It requires that there is a clear distinction between who decides upon the strategic and operational regulations. The role of the national authorities is to decide and follow up on a relatively small set of specified and enforceable outcome targets or results (objectives)<sup>3</sup>. How

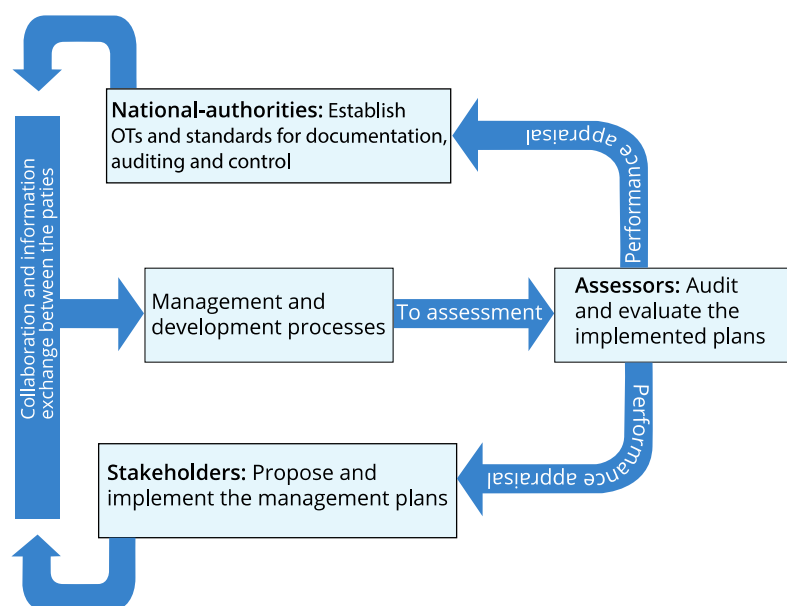
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<sup>1</sup> National authorities represents the public interests and have enacting authority in pursuit of the policy objectives decided for a fishery. In the EU context, national authorities may be comprised of agencies at a CFP level (i.e. the Council of Ministers, the European Parliament and the European Commission) as well as decision-making agencies at a member state level (i.e. national ministries). Their role is not to regulate actions in details (micromanagement) as in the conventional top-down hierarchical governance, but to facilitate, advice, and oversee self-management of industry stakeholders.

<sup>2</sup>The stakeholders acts as an organisational unit with delegated authority to develop management plans and oversee or conduct fishing operations within the standards decided by the national authorities. Stakeholders include all users groups and no longer being explicitly limited to the fishers. (All those that have interests at stake in fisheries, including the environmental interests).

<sup>3</sup>Outcome targets (objectives) are specific and measurable performance goals defined for a fishery on the basis of agreed and appropriately authorised general goals, standards and principles, as defined by the authorities based on the policy objectives. Outcome targets are found in policy documents, for instance the specific objectives for the future CFP listed in the Green Paper on the future of the common fisheries policy (CEC, 2009).

these objectives are going to be pursued and achieved is left to the stakeholders on the condition that the results are acceptable; implying that access to fisheries resources comes with certain obligations for stakeholders regarding proper management and care of marine environment. Those who exercise responsibility in a proper and effective manner are the ones who enjoy the stakes of the fisheries (CEC, 2009). Within EU, the catch quota management (CQM) mechanism provides a good example on this. The authorities have established the standards for documentation, audits and control (system of documentation) system, and those stakeholders, in this case the fishers, who comply, or loyally adhere to the system's regulations enjoy the access to fish stocks. They (the CQM fishers) are awarded incentives through the grant of more fishing days at sea and additional catch quota to their normal TAC (Msomphora & Aanesen, 2015).



**Figure 1:** Illustrating results-based management (RBM) system in fisheries management.

Based on the RBM definition above, the suggested management system (RBM) can be illustrated by Figure 1. The figure is generated to reflect the new form of co-management, RBM,

as suggested in the EU's CFP. It (Fig. 1) includes three key components i.e. national authorities, stakeholders and assessors<sup>4</sup>. As a representative for the public interest, the national authorities have the final responsibility for resource management. However it is the stakeholders that propose and implement the management plan (MP), which documents that the outcome targets (OTs) are achievable through a suggested set of management measures (Nielsen et al., 2015). The assessors review the documentation provided by the stakeholders. To enhance legitimacy, the assessors are preferably institutionally independent from both the authorities and the stakeholders (assessors do not have interests at stake in fisheries). The assessors carry out assessment on whether the OTs are achieved or not (or assesses the extent of achievement). The assessment provides stakeholders a basis for modification of the MP, and for the national authorities it may provide the basis for imposing sanctions (if OTs are not achieved), rewarding achievements, or revising OTs (Nielsen et al., 2015).

It is important to note however, that the RBM approach presents a quandary to the authorities: while on the one hand the national authorities would like the stakeholders to essentially self-regulate the fisheries, on the other, they (the authorities) are often nervous about granting too much autonomy to stakeholders. National authorities fear of losing control of a situation for which ultimately they will be judged accountable (Symes, 2007). That is why, in the EU fisheries, despite the fact that in RBM the means to meet OTs are supposed to be defined by the stakeholders, it is the authorities (the European Commission under a Directorate-General of DG MARE) and not directly the stakeholders, who decides upon technical measures i.e. total allowable catch (TAC)<sup>5</sup>, as the prime management means to meet the OTs. It should

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<sup>4</sup>Assessors acts as an organisational unit with a competence in evaluating the extent to which specific and measurable policy objectives, as pursued within management plans developed and implemented by stakeholders, are fulfilled. Preferably, assessors are recommended to be an independent body from both the national authorities and the stakeholders.

<sup>5</sup> TAC is calculated based on the stock status referred to as spawning stock biomass (SSB) and fishing mortality (F) values. The SSB and F values are considered in regards to the maximum sustainable yield (MSY) and the precautionary approach (PA) reference points in concern with stock assessments and advice provided by the International Council for Exploration of the Sea (ICES).

nonetheless, also be noted that TAC could also be an example of the OT depending on the context of the prevailing management approach. For instance, in the context of discard ban and landing obligations<sup>6</sup>, the authorities give the fishers TAC as the OT measure with the goal of reducing unregistered fishing mortality, thereby providing better scientific data, and to encourage fishers to fish more selectively, and thus reduce unnecessary fishing mortality (Msomphora & Aanesen, 2015).

It is not unusual in policy areas for governments to promote the advantages of decentralisation while in fact strengthening control from the centre (Phillipson, 2002). In inshore fisheries, there is therefore a proper concern to avoid creating a confused and potentially dysfunctional mosaic system of co-management, which could hamper their strategic management (Symes, 2007). For example, it is arguable whether stakeholder organisations, such as the Scottish IFGs which are central to this thesis, would welcome the transfer of more responsibility, without adequate management powers of implementing their MP (lack of legislative power) and supportive formal resolutions for gear conflicts (Msomphora, 2015) . In some cases, the worry is whether stakeholders will have the resources and capabilities (adequate fisheries conditions) to cope with the added burden (Msomphora, 2015; Phillipson, 2002). The need, therefore, is not necessarily “for ‘less state’, but for a more effective, accountable, and a responsive state” to stakeholders’ concerns, which was in the first place the reason for the establishment of the EU’s RACs/ACs (Anon., 2005). As such, the CFP reforms through ACs at least allow the stakeholders to indirectly provide advice on the management of the fisheries on behalf of all stakeholder groups (Msomphora, In press).

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<sup>6</sup> Landing obligation in the reform of the EU’s CFP represents a fundamental shift in the management approach to fisheries, i.e. switching the focus from the regulation of landings to catches as well as introducing regionalised decision-making into the management of the EU fisheries (STECF, 2014) .

Stakeholder participation in decision-making, from the initiation of the management plan to its implementation, has been recognised in Europe's recent CFP, as a key ingredient of good governance (STECF, 2013). However, with RBM strategy, an important dilemma concerns how the national authorities can trust the information documented by the stakeholders, since the authorities will not attempt to regulate the conduct of the industry in details. Instead the stakeholders are left considerable discretion with regards to how they conduct the fishing, as long as they achieve the targets specified for the fishery in question (Nielsen et al., 2015). Under such conditions self-interested stakeholders may actually document what the authorities want to hear (Collins & Evans, 2002; Kraak, 2011). Therefore if the stakeholders do not develop an MP with a system which is able to document that the OTs are achievable through suggested set of management measures, they always have the option to deceive the system (Kraak, 2011). Hence, the impact assessment report (D-G MARE, 2011) on the performance of the current CFP conducted by the Director-General for Maritime Affairs and Fisheries (D-G MARE) suggested a management mechanism that can fully document the fishery with active involvement of the resource users in fisheries management, within the perspectives of the RBM. Emanating from this suggestion, the Catch Quota Management (CQM) mechanism has currently been adopted as an integral part of the CFP (European Commission, 2014; STECF, 2013). Nevertheless, while RBM strategy attracts considerable support (Aanesen et al., 2014; Msomphora, In press; Nielsen et al., 2015; Pita et al., 2010), it must be ensured that knowledge produced for policy-making in fisheries management should remain reliable, have credibility and be trustworthy. This is so because with RBM-based fisheries, the production of scientific knowledge involves more than just scientists. Apparently, the 2002 and 2013 Reform of the CFP encourages incorporation of all stakeholders, and not just scientists, to provide knowledge for policy-making.

Likewise, as with co-management, the RBM arrangement gives the stakeholders greater influence over the fisheries management, but the shift in management responsibilities imposes various challenges and risks to stakeholders (Linke & Jentoft, 2013). The stakeholders, for instance, need necessary capacity to fulfil the management role so that in reality the burden of proof is shifted from the authorities to the stakeholders (Hoggarth et al., 1999). Several issues can influence the stakeholders to successfully take the responsibilities of management functions such as developing reliable MP proposals. As with democracy, co-managing the fisheries between the national authorities and stakeholders is no easy challenge. Enabling legislation and organisational reform are necessary, but not sufficient.

It is argued that stakeholder participation cannot work well in an RBM setting under less than ideal fisheries conditions (Msomphora, 2015). Capacity building and psychological empowerment is required. More so, it needs a supportive social and cultural environment. Co-managing the fisheries at the community level may not work if the individuals in the community do not do their tasks, and for the community individuals to manage doing their tasks, the stakeholders must be properly organised to be effective in co-regulating the management process (Jentoft, 2004). RBM may produce biased outcomes if some stakeholder groups are better organised than others. This can be exemplified through the authors' experience during the IFGs' interviews in Scotland (Msomphora, 2015). Compared to those who were less satisfied with their IFG organisation (IFG leadership), it was observed that those who were more satisfied perceived themselves to be more involved in the decision-making process for managing their fisheries. Organisational formation must thus take place prior to, or as an integral part of, co-management institution building (Jentoft, 2004).

Having come thus far, participatory governance and co-managing the fisheries between the national authorities and stakeholders seems evident enough to satisfy the notion of 'good governance' (Fig. A1). However, although it may satisfy notions of good governance, their



ability to deliver better policy, more effective management, and sustainable fisheries is still questionable. In the search to improve the efficacy of fisheries governance, it is in the interest of this PhD project study to explore how and to what extent the stakeholders can efficaciously be involved in the management of fisheries, within the perspectives of the results-based management.

### **Overall Study Objective**

The aim of the study is to explore how stakeholders can engage in and take responsibility for management functions. The focus is on the aspects of how stakeholders can be incentivised for motivating their coordinative and cooperative participation in co-managing the fisheries. It is also to demonstrate what stakeholder involvement in the production of scientific knowledge for policy-making may imply for the fisheries science community, while shedding light on how science, with the incorporation of all stakeholders, can be practised to provide valuable knowledge for policy-making without compromising the ethos of science as an institution.

Using the concepts discussed in the previous sections, the project's research topic(s) cover different aspects of, or arenas for, stakeholder participation. They appear as follows:

Paper 1 explores the issue of stakeholder participation using the EU's newly proposed discard-reduction management mechanism called catch quota management (CQM). The CQM mechanism embraces both the hierarchical governance with 'a top-down approach', where the central authority sets and enforces all rules; and the participatory fisheries governance with 'an industry self-regulation approach', since the responsibility for the practical implementation of the management functions is left in the hands of the stakeholders. In addition, the CQM mechanism leaves to the stakeholders the responsibility of providing the authorities with the information about the fishing activities, so that it becomes possible to monitor performance and take corrective action. Such practicalities of CQM mechanism may enhance stakeholder

engagement in management processes and in the production of scientific knowledge, which could lead to better policy-making and management of the fisheries, while ensuring the industry's self-regulation. The setup of the CQM mechanism provides a prominent candidate to examine whether and how stakeholders can efficiently be engaged in fisheries management. Thus the main discussion in paper 1 is on how to formulate the CQM mechanism in order to attract stakeholders' participation (fishers' participation) and make it profitable for them to continuously comply with the rules. Through such an analytical discussion, the CQM mechanism could help to illuminate the question of stakeholder participation for good governance in fisheries management.

Paper 2 examines the association between stakeholder levels of participation and satisfaction in the decision-making process for the development and implementation of the fisheries management plan (MP). The paper specifically deals with the relationship between stakeholder participation and satisfaction perceptions regarding the decision-making process, in addition to assessing possible factors that may further explain the hypothesised relationship.

Paper 3 is an addendum to paper 2, but in light of exploring the important fisheries conditions for success in stakeholder participation. The paper aims to explore to what extent and under which conditions stakeholders can be engaged successfully in the development and implementation of management plans. It identifies conditions that may or may not be strictly necessary for making stakeholder participation work in fisheries management.

In this light, Papers 2 and 3 are complementary in that they both look at the issues of stakeholder participation based on the Scottish IFGs in the North West Coast of Scotland. Scottish IFGs aim at developing and implementing a transparent, accountable and flexible management structure that puts local stakeholders at the centre of decision-making processes for the management of their fisheries (Scottish Executive, 2005). The government, however, has to

complement it by providing enabling information, legislation and enforcement mechanisms, and other assistance required. The IFGs' strategic framework reflects a governance system beyond the concept of co-management. It tends to collectively incorporate biological, economic, environmental and social issues within the scope of 'interactive governance'. The strategy emphasises commitment to utilising the knowledge and experience of fishers in fisheries management, and recognises the importance of industry involvement in achieving compliance with regulations. But more so, it ensures the participation of all interested stakeholders including scientists and environmentalists in order to provide a structure, which is well placed to absorb or adapt to changes in approaches to managing of the marine environment (Scottish Executive, 2005). Thus, while the remit of IFGs primarily focuses on the management of commercial inshore fisheries, it does not prejudice the interests of other legitimate users of inshore resources and or marine environment as a whole. Following such a strategic framework, IFGs' stakeholders in Scotland are reported to have successfully finished developing their management plans (MPs), which are approved by the government and currently (by April 2014) in the implementation phase (Msomphora, 2015). In this context, the Scottish IFGs as case studies represent a relevant opportunity for providing pertinent chance in gaining lessons on how the incentives and social groundwork are developed on institutions managing fisheries activities such that it is enough to achieve a successful stakeholder participation in the decision-making process.

Paper 4 investigates the issue of stakeholder participation in scientific knowledge-production of policy-making in fisheries management. The paper provides insights into the consequences and dilemmas of the shift from 'top-down' towards 'participatory governance' mode of managing the fisheries. The idea is to explore what happens if we move from a science that is exclusive to stakeholder participation (Mode 1) to an open science (Mode 2) that enables more stakeholder participation. In this regard, the European fisheries management research, with

focus on the involvement of International Council for the Exploration of the Sea (ICES), as the major fisheries research and advisory institution in Europe, provides a relevant case study for illustrations.

The objective of the discussion in paper 4 is therefore to inquire into what the conceptualised transition from Mode 1 to Mode 2 science ideals may imply for the fisheries science community, i.e. what consequences it might have on the way science is perceived, practiced, legitimised, and converted into policy, and whether it is time to rethink if this is a move that should be supported. The paper demonstrates the predicaments that are involved in maintaining the reputation of science for policy-making while avoiding dilution of the values that are associated with Mode 1 science.

Below is the summary of the findings and discussion points with respect to the four papers.

## **Summary of Main Findings and Discussion Points**

### **Paper 1**

The average price per kg of the fish landed indicates that the CQM mechanism may work in order to reduce high grading. Generally, the results show that CQM fishers do have higher average gross income (DDK 2166480) compared to fishers harvesting according to the traditional landing quota mechanism, i.e. LQ rules (DDK 1961050). There is therefore an incentive for fishers to participate in the CQM trial and harvest according to the CQM rules. However, the findings also illustrate that with the possibility to cheat and mimic the harvesting behaviour of the LQ fishers, CQM fishers may achieve an even higher gross income. This means they may have an incentive to cheat and harvest according to the LQ rules. Nevertheless, the increase in their gross income decreases with increasing probability of getting caught, because it becomes expensive to cheat, as they have to pay the fine for cheating. Hence, the CQM fishers' expected gross income of the CQM fishers when fishing honestly is higher

compared to when they mimic LQ fishers. But, with more than 50% chance of not being caught cheating, the results indicate that the fishers will be better off if they do not comply with the rules of CQM mechanism. In this case, the CQM mechanism, as it materialised in the Skagerrak demersal trawl fisheries, indicates to be not incentive compatible (IC); the reason being CQM vessels may cheat and earn a higher gross income by mimicking LQ vessels.

The results therefore suggest that for the CQM mechanism to be IC, the CQM fishers must earn DKK 344590 (Alternative1), 234120 (Alternative2) or 294240 (Alternative 3) more than the LQ fishers, given no cost advantage for any of the groups of the fishers. Note that these amounts are too high if CQM fishers have a cost advantage when mimicking LQ fishers' behaviour. When CQM fishers do not cheat, they 'only' earn DKK 205430 (DKK 2166480 – 1961050) more per vessel per year compared to LQ fishers. This implies that the CQM fishers, although catching more cod and other valuable groundfish species as European plaice and haddock, will still be better off if they mimic the LQ vessels' harvest and landing patterns.

## **Paper 2**

The results indicate a positive relationship between stakeholders' perceptions of satisfaction and participation in fisheries management. Stakeholder satisfaction perception, fishing gear type and fisheries dependence significantly predict the degree of the stakeholder participation perception. Fisheries dependence had negative influence on participation perception.

Compared to NWIFG, the results generally show that the OHIFG stakeholders tend to be more agreeing to all investigation statements for satisfaction and participation perceptions. The OHIFG are more likely than NWIFG stakeholders to fall towards the high-end agreement scale-level of the stakeholder perceptions of participation and satisfaction. The results suggest that adjusting the model for age, education, dependency on fisheries, experience, fishing gear and the stakeholders' PO membership, decreases the difference in level of agreement between the

NWIFG and OHIFG to the response-statements of satisfaction and participation perceptions towards the decision-making process for the development of the MP. This means that demographic and business characteristics can influence stakeholders' participation in the decision making process, independent of their satisfaction perceptions towards the process.

In agreement to previous studies (Pita et al., 2010), the current study notices that there are numerous reasons contributing to lack of participation in the decision-making process. The study portrays that the less the stakeholders are listened to, the less happy they are with the process. The less the stakeholders are happy with the decision-making process in developing and implementing the MP, the less they are of the opinion that the MP will improve the fishery, hence reducing their satisfaction of their participation in the process. In addition, the results indicate that, with good leadership, it is possible to increase the level of stakeholder satisfaction in decision-making processes and hence the participation.

Seventy-four per cent of the involved OHIFG stakeholders, who happened to have already started implementing their MP by April 2014, were of the opinion that they have a good leadership, whilst only 26% of those from the NWIFG who reported not to have started implementing their MP, believe that their leadership is good. In this regard, the study results strongly suggest that good leadership may help to ensure stakeholder satisfaction of their participation in fisheries management. Good leadership is therefore fundamentally essential for improving stakeholder participation in decision-making processes for fisheries management.

### **Paper 3**

The outcome shows that all the essential conditions that enable stakeholder involvement in fisheries management, as pointed out by some eminent scholars (Hoggarth et al., 1999; Jentoft & McCay, 1995; Ostrom, 1990; Pinkerton, 1989; Pomeroy et al., 2011; Pomeroy & Williams, 1994), exist in OHIFG except for two: formal conflict resolution and the right to manage.

There are problems of conflicting interest between the stakeholders. For instance, there is a problem of conflicts between the static gear and trawler boats fishers. Resolving gear conflict is difficult and complicated at the moment, as no concrete formal system is in place.

There is also a problem of management power between the local stakeholders and the government-authority since the role of OHIFG up to now, as any other Scottish IFG, is to act as an ‘advisory’ body to the managing authorities (government officials) and not ‘management’ body as initially stated. The IFGs are not yet legislative schemes. Consequently, the OHIFGMP measures that require additional legislation to be introduced are a challenge to enforce compliance. This remains a challenge for MP implementation, and the tension between the government-authorities and the local stakeholders within the IFG remains.

However, despite the lack of formal ‘conflict resolution’ and ‘right to manage’ conditions, OHIFG stakeholders express satisfaction with their participation in fisheries management. They are highly satisfied with their participation in decision-making process for the development and implementation of their MP (cf. Msomphora, 2015), which they successfully developed (their MP is accepted and approved by the government-authorities for implementation). This is interesting because such findings mean that it may be unreasonable to require that local institutions must have the rights to manage, since such rights in the modern setting ‘by definition’ are invested in coastal states (UNCLOS, 1982). Those conditions that currently do not formally exist, at least suggest being not necessary conditions for stakeholder participation, although I am willing to speculate them only as *de facto*<sup>7</sup> essential conditions. This implies that, in the formal sense, ‘conflict resolution’ and ‘the right to manage’ are not strictly necessary fisheries conditions for successful stakeholder participation. As such, it can be concluded that the existence of formal ‘conflict resolutions’ and the right to manage’ are not that important as

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<sup>7</sup> Existing in actuality, especially when contrary to or not established by law (American Heritage®, 2011).

long as the fishery in question has a system or mechanism in place that can help to ease the situations between conflicting stakeholders such that at least they can come to a compromise that will satisfy them all.

In spite of tensions between the stakeholders, the collaborative spirit remains high. In collaboration, stakeholders are able to create methods that can provide a means of producing support and of sharing responsibilities for hard decisions that inevitably pose problems and challenges to their roles in managing the fisheries. In agreement with Coser (1956), such results portray that conflicts between stakeholders can be argued in terms of interactive process, and depicts conflict as ‘a form of socialisation’. A collaborative participatory management system does not have to be free of conflicts to succeed, because no group can be entirely harmonious, especially in a commons (Coser, 1956). As such, conflicts, in the context of sustainable fisheries management, must be regarded as necessary components of development: “they open possibilities to improve resource management and find ways towards sustainability through experimenting and collective learning (as in an ‘interactive governance’). Reframing conflict resolution as conflict transformation and embedding it into the frames of learning, knowledge use and integration,” can provide a solid groundwork for successful stakeholder participation while co-managing the fisheries sustainably under the strategy of RBM (Stepanova, 2015, p. 118).

#### **Paper 4**

The move from ‘traditional academic science’ (Mode 1 science) to ‘modern post-academic science’ (Mode 2 science) is controversial within the scientific community. According to Dankel et al. (2015); Hackett et al. (2008); Hessels and Van Lente (2008); Jasanoff (1996); Ziman (1996a, 1996b), Mode 1 science is changing to Mode 2. The transition is drawing the traditional science into a new sphere of activity (Ziman, 1996b), thus undergoing a cultural transformation, which involves radical change of many traditional practices and values. What



might be happening is that the transition of Mode 1 to Mode 2 is closing the gap between pure science and applied research.

Scientific developments are blurring the distinctions between fundamental and exploitable discovery. Such a merge not only raises practical issues of funding, intellectual property rights, disciplinary identity, criteria of excellence, career aspirations, and institutional management, just to mention a few; but it also seriously threatens the most central value of academic science (Mode 1), namely, its objectivity (Ziman, 1996a). Objectivity makes science valuable to society because it gives the public a guarantee of reliable disinterested knowledge.

With Mode 2 science, the assurance for quality justification of science using what Merton called ‘organised scepticism’ (Cole, 1992; Merton, 1973, 1996), i.e. peer review, will be lost. Even if peer review may be perceived as the only real mechanism for protection of science against the embodiment of serious errors in the knowledge that is produced, experts’ technical skills (extension of peer review) will eventually take its place for evaluation of ‘good scientific knowledge’. But, on the other hand, as Weingart (2011) points out, the blurring distinction between science and policy-making may encourage science to become aware of the public interest, which is good because it will make the produced knowledge useful, accepted and productive to society. It may influence the policy-makers to adapt their way of thinking to the produced scientific knowledge. Thus, while politicians will try to influence science for their own benefits, following the logic of the scientific knowledge for policy development may give an assurance that the developed policy are underpinned with solid and more democratic, scientific knowledge (Lidskog, 2008).

Due to the last two reforms of the CFP (in 2002 and 2013), where stakeholder participation has been recognised as a key ingredient of good governance (Coffey, 2005; Msomphora & Aanesen, 2015), a shift towards the new kind of more applied ‘Mode 2 science’ in fisheries

research has been noticed (Wilson, 2010). The reforms encourage incorporation of various stakeholder-interested groups, including Advisory councils (ACs) and scientists, to provide knowledge for policy-making. This may imply that the link for scientific advice from researchers to policy-makers is no longer in a direct linear relationship between them. The knowledge is constructed in accord with commercial, political or other social interests of the bodies that underwrite its production (Gibbons et al., 1994). The explanation of the research model is problem-solving oriented. Ideally, the model starts with a problem and then searches for solutions, which lead to policy action. But practically, the model often start with the solution e.g. discard reduction in EU fisheries, then the scientists are asked or consulted by the society (e.g. industry or policy-makers) to generate knowledge (commissioned research) for justification or development of the idea. Unlike with Mode 1, where scientist exercise their academic freedom, the production of knowledge in fisheries science with ICES-CFP context is based on Terms of Reference (ToRs), which dictate “the scientific investigations needed to generate the advice” (Wilson, 2010, p. 234). Policy-makers and planners often have a preconceived idea of the solution when they start the process, which directs the information search to support the arguments needed for framing/defining the problem (Jentoft & Chuenpagdee, 2009; Rittel & Webber, 1973). With such a new approach in fisheries management, there are dilemmas that accountability may be easily internalised, broadly based and self-organised to a degree of own-auditing.

Wilson (2010) also notices that quality control, in fisheries science with ICES-CFP context, seems to be focused on the procedural mechanisms, and the research process itself becomes the object of evaluation (cf. Guggenheim, 2006); hence the struggle with poor reliability, credibility and quality. So what does this imply for fisheries management policy-making?

Mode 1 science with no incorporation of various stakeholder-interested groups, except scientists themselves, is not perfect either. Despite the rule of data sharing in Mode 1 science,

withholding of data still happens (Committee on Science et al., 1995; Savage & Vickers, 2009). Data may be withheld for legitimate reasons like anonymity, and this can be the case in either Mode 1 or 2. In Mode 1 science it may also happen, that the status of the scientists involved may dictate the quality of knowledge produced, and this can be problematic. In fact, Sulkunen (2013) has argued that Mode 1 science is not accountable at all in practical terms, such as outcomes in welfare or impact on policy effectiveness. But, do we necessarily need to abandon all the values and principles of Mode 1 for Mode 2 science?

Maybe the solution to the shift, as suggested herein, could be something in-between the two ideal Modes, as a 'Mode 1.5 science' so to speak with the ethos of science acronym: CULAVS. This implies that science should be communal (C), universal (U) but also local (L); that there should be academic-freedom in research (A) and assurance of value for money (V); and that it (science) should allow for scepticism(S).

### **Concluding Remarks**

Stakeholder participation in decision-making, from the management plan to its implementation, as recognised in Europe's recent CFP (STECF, 2013), is a key ingredient of good governance. Increased stakeholder participation also applies when it comes to finding solutions for reducing practical problems such as discard of the EU fisheries. To achieve this, it requires designing and establishing a fisheries management structure that allows for more stakeholder participation with its inclination towards 'co-management', but with 'results-based management' (RBM) strategy, as suggested in the EU CFP reforms (CEC, 2009). Hence, the special interest of this PhD project study, i.e. to help design such an inclusive, encompassing and democratic management set-up in fisheries governance for all the interested parties.

In agreement with previous studies (Needle et al., 2015; Ruiz et al., 2015; van Helmond et al., 2015), the current study indicates that the CQM mechanism seems to be a promising candidate

that could reduce discard problems under RBM perspectives. The study generates knowledge that may generally be applicable in providing some insight into how CQM can sufficiently reduce discards within the perspectives of the RBM strategy and how the authorities can formulate the CQM mechanism in order to attract fishers' participation and make it profitable for them to comply with the rules (Paper 1). The study also spawns information on how stakeholder can successfully take on the responsibilities for management functions (Paper 2), and how to improve the chance of successful stakeholder participation (Paper 3). Lastly, the thesis provides insights into how we can secure the quality and value of scientific knowledge produced for policy-making in fisheries management; and how various interested stakeholder groups, apart from scientists themselves, could be incorporated in producing the knowledge (Paper 4).

My interpretation reflects the perspective of 'democratic pragmatism', believing that only if there is participation by stakeholders in decisions to safeguard fish stocks, will the measures of participatory fisheries governance be successful. Decisions and institutions are made more legitimate by the participation of user groups and all stakeholders, within the scope of interactive governance.

For details of the research findings of the study, including discussion points and recommendations, please refer to paper 1, 2, 3, and 4 in the Appendices, respectively.

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## Appendices

**See Figure A1 in Appendix A, and Paper 1 to 4 in Appendix B1 to B4 below respectively**



## Appendix A



**Figure A1:** Co-managing fisheries between national authorities and stakeholder groups including scientists: The future of fisheries management!

