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Improving or overturning the ITQ system? Views of stakeholders in Icelandic fisheries

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Abstract

Icelandic fisheries have gone through tremendous changes since the 1980s and the gradual implementation of individual transferable quotas. The paper investigates to what extent the power of different stakeholders in the fisheries management system has changed, and examines whether and in which fields enhanced participation is favoured by relevant stakeholder groups. Strengths and weaknesses of participation within the system are scrutinized and alternatives assessed. The analytical framework stems from the concept of adaptive co-management, whereas the empirical data derives from a survey on Icelandic fisheries management among important stakeholder groups. This survey showed that the critique of individual transferable quotas is not homogeneous. Regional differences are present regarding the evaluation of the current regime, but also of proposed alternative management instruments. Overall, more stakeholder participation, especially in data gathering and decision making, is demanded. This has in fact decreased over time. The authors suggest that the perceived shortcomings of the quota system in general and the lack of stakeholder participation in particular, can be addressed by adopting certain elements of adaptive co-management.

Keywords: Fisheries management; Adaptive co-management; ITQs; Stakeholder participation; Iceland

Introduction

Fisheries throughout the world are in a serious decline. Transition to a more sustainable situation needs a comprehensive approach that manages to include the partly conflicting disciplines of ecology, economics and social sciences. This is due to threats facing both the biomass and also the livelihood of coastal and fisheries dependent communities. It is therefore necessary to rethink fisheries management and policy instruments.

Fisheries management is a challenging task. Uncertainty and complexity, coupled with the opposite interests of various stakeholder groups, transform it into a veritable Gordian knot. In most cases, fisheries management is the task of nation states or supranational institutions, including, for example, the European Union and its Common Fisheries Policy. The generally rigid top-down approaches of these institutions show several shortcomings, mainly but not exclusively regarding social aspects (Berkes 2009; Grafton 2005; Jentoft 2007; Olson 2011). An assessment of alternatives is therefore advisable. Statements affirming that essential changes cannot take place without enhanced stakeholder consultation have become more prominent over the past

decades. That participatory approaches are not only theoretical constructs of social scientists can be illustrated with examples from various fisheries management regimes throughout the world. Changes, however, require not only political will, but, following the maxim of co-management, also stakeholders' commitment (Berkes 2007, 2010). Thus the impetus for enhanced stakeholder involvement in bottom-up strategies has to come from the the stakeholders themselves. Increased stakeholder involvement in numerous fields of fisheries management, such as data gathering, knowledge utilisation, and stock assessment, is advocated by academia (Jentoft and Mikalsen 2014; Rettig et al. 1989; Soliman 2014a; St Martin et al. 2007) as well as stakeholders themselves (Folke et al. 2005).

Iceland has been looked upon as a laboratory for fisheries management. Particularly in the field of quota-based management, Iceland was a pioneer, introducing a system of vessel-based quotas in 1984 and later adding transferability. Until 1984, a mixture of methods was used, including the quota management of certain species (e.g. herring) and effort restrictions in the demersal fisheries (Matthiasson and Agnarsson 2009; Pálsson and Helgason 1995). However, problems of overcapacity became more and more apparent. Following some years of steadily decreasing catches that did not even reach the recommended Total Allowable Catch (TAC) by the Marine Research Institute (Matthiasson 2003), individual vessel quotas were implemented in the demersal fisheries. Based on the catch history for the previous 3 years, each vessel was allocated a share of the annually set TAC. In this transitional phase, fishermen had the choice between the quota system and the former system based on restricting effort (Eythórsson 2000).

The switch to the current individual transferable quota (ITQ) system took place in 1990. Transferability of quotas turned a former common pool resource de facto into a collection of important tradable assets (Benediktsson 2014; Benediktsson and Karlsdóttir 2011). This was thus a market-based solution that was meant to contribute to a decrease in fleet size and hence both the conservation of fish stocks and improved economics of the fishing sector. Just to what extent these goals have been achieved is fiercely debated, as was the case with the earlier management regimes also. The ITQ system, however, did not grapple at all with the question of social equity (Carothers and Chambers 2012; Holm et al. 2015; Soliman 2014b).

Nonetheless, the latest amendments of the Fisheries Management Act show that questions concerning regional development have been taken seriously to some extent. Two instruments have been introduced to support the small-scale sector and/or assist regions that were negatively affected by the introduction of ITQs. Community quotas (Icel. byggðakvótar) were introduced in 2002/03. The main purpose was to mitigate the impacts of quota transfers from small and vulnerable communities. Coastal fisheries (Icel. strandveiðar) were added in 2009. This scheme aims to enable small-scale operators access to the fisheries without having to buy quotas. Also, catch fees (Icel. veiðigjöld) have been gradually taken up, in response to concerns about the lack of resource rent payments from the industry to society at large (see: (Matthiasson 2008; Matthiasson and Agnarsson 2009).

The Icelandic system has been promoted worldwide as an example of an economically efficient and ecologically sustainable fisheries management system (Árnason 2012; Christensen et al. 2009a; Leal 2005). Yet, despite the fact that Icelandic fisheries have been analysed rather thoroughly, participatory aspects have not been prominent in the

discussion, neither on a scientific nor on a policy level. Whereas many other fisheries management systems have placed considerable emphasis on implementing bottom-up and participatory methods (Aranda and Christensen 2009; Evans et al. 2011; Trimble and Berkes 2013), such mechanisms are still absent in Iceland. Various instruments of fisheries management have been utilised during the past 40–50 years. However, those who have had to apply these instruments and adjust their work routines were barely involved in the decision and policy making process during the implementation of the most significant reforms. In fact, stakeholder involvement seems to have decreased over time (Christensen et al. 2009b; Eythórsson 2000).

An important question that arises is how far enhanced participation is favoured by the most affected stakeholder groups in Iceland – those whose livelihood depends directly on the fisheries. This is the basic question of this paper. Having gained popularity in literature and practice during the past few decades, the concept of adaptive co-management (ACM) provides the theoretical framework. After the introduction, a general discussion of adaptive co-management in resource management is presented, followed by an analysis of the power structure in the Icelandic fisheries policy making. This is a necessary and preparatory step for a thorough discussion of the stakeholders' statements. The paper concludes with some reflections about the possibilities for introducing adaptive co-management to Icelandic fisheries.

Based on empirical data from a comprehensive survey conducted within a European research project on 'results-based management' (EcoFishMan), the article examines relevant questions about stakeholder involvement, knowledge utilisation and the overall assessment of the recent management regime. Data from the survey will be analysed in the light of regional and occupational differences. The analysis and discussion is intended to contribute to an ongoing national and international debate about appropriate fisheries management systems.

Adaptive co-management and fisheries

One possible avenue for the rethinking of fisheries management is enhanced stakeholder participation (Berkes 2010; Wilson et al. 2009). International examples show that stakeholder involvement is not bound to a particular political system, place or development trajectory, but applicable in each and every resource management system (Berkes 2010; Wilson et al. 2003). Certain components of co-management occur at least in 130 fisheries worldwide (Gutiérrez et al. 2011).

Participatory methods echo the call of Basurto and Nenadovic (2012), who aim for a fisheries management system that recognises fisheries as 'complex adaptive systems' and considers all disciplines involved as equal. Several methods are available for the management of a given natural resource. One of the most prominent approaches, when it comes to the reduction of conflicts through participatory methods, is adaptive co-management (Armitage et al. 2007a; Berkes 2010). It encompasses four compatible elements: learning-by-doing, multiple knowledge systems, flexible management structures, and advanced collaboration through power sharing (Folke et al. 2005; Plummer and FitzGibbon 2007).

A strong argument for the growing popularity of adaptive co-management is the demonstrated potential to mitigate the negative consequences of two characteristics of conventional top-down resource management: non-linearity and unpredictability

(Armitage et al. 2007b). These are features that lead to increased complexity in natural resource management (Berkes 2007; Folke et al. 2005).

The approach itself combines two elements, namely the participatory emphasis of co-management and the importance of learning-by-doing within the adaptive management framework (Armitage et al. 2007b). In addition, ACM includes and enhances tasks such as data gathering and both logistical and allocative decision making, and generally leads to a more inclusive decision making process. Based on dialogue, interaction, and collaboration, this process is embedded in an interdisciplinary setting (Armitage et al. 2007a). This interdisciplinary aspiration becomes apparent when aspects of knowledge formation are discussed.

Knowledge is therefore an essential component, yet often defined in different terms. It is sometimes referred to either as indigenous knowledge (Berkes 2009), local knowledge (Armitage et al. 2008), traditional ecological knowledge (Berkes et al. 2000), fishers' ecological knowledge (Johnsen et al. 2014), or with reference to Iceland, as practical knowledge (Pálsson 1998a). Apart from the variation of these terms, there is a general consensus that the multiple epistemologies found within fisheries need to be included and considered (Berkes 2009; Carlsson and Berkes 2005; Pálsson 1998a). Symes and Phillipson (2009: 2) also highlight the importance of a more inclusive kind of knowledge gathering, defining fishery communities as "reservoirs of knowledge, experience and understanding of local fisheries that cannot be replicated in any other form."

Apart from the knowledge-generating pillar, ACM is based on three additional elements: delegation, devolution and/or decentralisation. Delegation can be understood as the handing over of management responsibilities and authority across the institutional or policy levels (Jentoft et al. 1998; Pomeroy 2000). Devolution also an essential part of ACM (Plummer et al. 2013). It can be considered "as a kind of governance reform, a mechanism to bring citizens, local groups and organizations into the policy and decision-making process" (Berkes 2010: 491). Devolution should not be interpreted as merely an increase of participants without effectively sharing power. This will not result in an improved policy-making process, and can work as a placebo rather than a real remedy for the perceived flaws of the management system. In addition, the number of participants is not so much of importance as is the quality of methods applied and a clearly formulated objective (Reed 2008). Besides, the more participants and stakeholder groups involved, the harder will efficient consensual decision making become (Pomeroy et al. 2001; Symes 1997). Thus a balance between efficiency, accountability and legitimacy has to be found (Jentoft and McCay 1995; Yandle 2007). Also devolution can result in a 'participation paradox': de Vivo et al. (2008) point out that including more stakeholders eventually decreases the importance of the single actor. Thus, "greater devolution does not necessarily result in greater participation" (de Vivo et al. 2008: 320). Decentralisation is tied to the two previous elements and can vary in form and intensity. A suitable definition that is useful for the further discussion of the Icelandic case is provided by Pomeroy (2000: 135): "Decentralization refers to the systematic and rational dispersal of power, authority and responsibility from the central government to lower or local level institutions [...] and then further down to regional and local governments, or even to community associations." However it is important to find the right balance in the decentralization process. Too much decentralization can have counterproductive

effects, such as the consolidation of power amongst local elites (Berkes 2009; Folke et al. 2005).

The misuse of power locally is just one example of the possible criticisms levelled against co-management regimes. Others that are mentioned frequently concern the costly and time-consuming processes that co-management can entail (Aranda and Christensen 2009) and also that inclusiveness may not be as comprehensive as originally intended (Yandle 2003). The latter is a complex problem, but largely a semantic one, concerning how to define precisely the term 'stakeholder' (Eythórsson 2003; Mikalsen and Jentoft 2001; Soliman 2014b). This semantic problem will be discussed in detail later. Regarding the aforementioned issue of complexity, it is essential to bear in mind that there is no 'one-size-fits-all solution' for resource management, or a guaranteed blueprint emerging from the scientific laboratory. Hence, failure is always a possible outcome (Berkes 2009). It should be kept in mind that ACM is a long-term scheme, and not a short term crisis remedy (Armitage et al. 2007b).

Stakeholder involvement in Icelandic fisheries

Much has been published on Icelandic fisheries management and ITQs. However, no comprehensive analysis of stakeholder involvement over the entire period of ITQ management has been done, and in general the focus has not been on participatory concepts. This is somewhat surprising, given that the development in the Icelandic fisheries shifted from a broad consensus in the 1970s to the "most-dividing and conflict-laden issue of Icelandic politics" in the 1990s (Eythórsson 2000: 484). For McCay and Acheson (1987), the early stages of quota management were not only shaped by consensus but even defined as co-management, fulfilling the attributes of openness and flexibility alongside a trusted state. However, they relativized this conclusion in a way which has since been verified, stating that the acceptance of the system and the trust in state authorities can only be granted as long as the "continuation of the ideology of equal, or equitable, access" is enabled (McCay and Acheson 1987: 33). Whether these conditions have been met is questionable, since the subsequent financialisation of fishing rights soon led to a substantial concentration of power (Benediktsson and Karlsdóttir 2011).

For a better understanding of the development of the Icelandic system, different stakeholder groups will be identified in this section and the influence or power of those groups in policy making will be assessed through a review of the relevant literature. For the sake of simplification, the choice of stakeholders follows the general criteria of Mitchell et al. (1997). According to these authors, three main variables define a stakeholder: power, legitimacy and urgency. Stakeholders are then subcategorized as definitive, expectant or latent. Based on this, Mikalsen and Jentoft's (2001) identification of groups of relevant stakeholders in Norwegian fisheries management will now be modified and applied to the Icelandic case. While the latent stakeholders are excluded in the following, the definitive and expectant groups will now be more closely defined and their degree of power further discussed.

Definitive stakeholders are those that reach medium or high degrees in power, legitimacy and urgency. According to Mikalsen and Jentoft (2001), this applies for fishers, fish processors, bureaucrats, enforcement agencies, scientists and fish workers. As a category, 'fishers' is too vague considering the Icelandic circumstances. A division into

quota holders and crew members is more appropriate. Expectant stakeholders are those who possess medium or high degrees in at least two of the three variables or have received increased recognition. This applies to indigenous people, environmental groups and local communities. Since 'indigenous' groups have a certain stake in Norwegian fisheries, but are not present in Iceland, this group can be left aside. Also environmental groups have not really participated in the fisheries management discourse. Of the expectant stakeholders therefore, only local communities will be discussed in the description that follows. We identify eight groups of stakeholders. It should be pointed out that these groups are not mutually exclusive: a single person can belong to two or more groups, e.g. 'quota holders' and 'local community' members.

Quota holders arguably constitute the most powerful group, since the quotas are attached to vessels, and thus to their owners. This group is now represented by the association Fisheries Iceland (Samtök fyrirtækja í sjávarútvegi, or SFS), established in 2014 by the merger of the Federation of Icelandic Fishing Vessel Owners (Landssamband íslenskra útvegsmanna, or LÍÚ) with the Federation of Icelandic Fish Processing Plants (Samtök fiskvinnslustöðva, or SF) (<http://www.sfs.is>). The LÍÚ, de facto an association of quota holders, was for a long time a highly influential interest group. Their influence has been frequently and fiercely debated. Among scientists there is a broad consensus that this stakeholder group has been very influential, even the leading one (Eythórsson 2000, 2003; Karlsdóttir 2008). The crucial support of LÍÚ during the policy making process prior to the introduction of quota management underlines this theory (Gissurarson 2005; Matthiasson 2003). Matthiasson (2003) considers Icelandic fisheries management as a 'closed-shop policy' with the governmental institutions remaining in a passive role, leaving the field to LÍÚ. Their power reaches into political decision making. LÍÚ has at times wielded its influence so as to thwart proposals for changes to the system (Thorhallsson and Kattel 2013; Benediktsson and Karlsdóttir 2011).

Crew members belong to a group that is considerably less powerful, and which has lost influence significantly since the introduction of the ITQ system (Eythórsson 1996). The division between crew members and vessel owners defines one of the main conflict lines among stakeholder groups that have "dominated the ITQ-debate in Iceland for many years" (Eythórsson 2000: 489). Instead of a unified lobbying group such as LÍÚ has been, crew members are represented by several different unions. Their representatives do not have the same influence in the policy-making process as quota holders have traditionally had. Crew members have been labelled as disenfranchised and dependent (Carothers and Chambers 2012; Eythórsson 1996, 2000). This group has had to accept changes initiated by more powerful institutions, since the only alternative in most cases is to leave the sector. In other terms, the crew has a weakened bargaining position under ITQs, but has to carry the burden of negative impacts within the system (Carothers and Chambers 2012; Olson 2011).

Fish processors: This stakeholder group consists of the owners of fish processing companies, whereas their employees are subcategorised as fish workers. Speaking of Norway, Mikalsen and Jentoft (2001) think that plant owners are very powerful within the fisheries production chain. The reason for this is the development of the sector, characterised by centralisation and integration. This can also be said about Iceland. With regard to power, integration is of importance since most of the processing is owned by vertically integrated companies that include fishing, fish processing and

exporting. This secures those companies a strong representation in the political system, increased market power, and improved bargaining positions (Eythórsson 2000; Knútsson et al. 2008; Pálsson 1998b).

The power imbalance, especially between the vertically integrated companies and fish workers, can have momentous consequences. Recent examples include the decision of a company to close three out of four processing plants in remote areas, concentrating the operations at its home base in the southwest of Iceland. This is just one recent example of the general trend from community-attached firms to a footloose industry (Eythórsson 1996, 2000; Karlsdóttir 2008). In general this trend has “contributed to a polarization in terms of affluence and survival favouring the new global businessman above the locally oriented processor” (Karlsdóttir 2008: 9).

Fish workers are a stakeholder group consisting of employees in onshore processing plants. They occupy the lowest rung in the fisheries’ power hierarchy, not only since this group “has been least involved in decision making and policy design in the fisheries” (Eythórsson 2000: 485), but also because of their often uncertain employment. Their power is mainly dependent on the responsible union. But even strong unions cannot prevent the permanent threat to those workplaces. This is not only due to centralisation processes in the sector, but also technological changes. After 1984 the fleet of factory trawlers grew steadily (Eythórsson 2000), making parts of the land-based processing redundant. This had noticeable consequences on the distribution of processing plants. While 50 municipalities had such plants in 1992, only 35 did in 2005 (Karlsdóttir 2008). This number has decreased even more since. This case illustrates quite well that those working in the processing plants are pawns in the hands of the powerful, facing the choice of staying and looking for other work in their home region or to follow the company south-westwards.

The stakeholder group identified as *bureaucrats* mainly consists of employees of governmental bodies, such as state authorities (differing from enforcement agencies) and ministries. Classified in general as “principal authors of management laws and rules”, this group was powerful before 1990 and during the initial stage of the quota implementation (Mikalsen and Jentoft 2001: 285).

Since ITQs are a form of privatization, it is to be expected that the influence of the central government decreases over time. However, the fisheries minister still “has the power to make ITQs worthless by the stroke of a pen without compensating the ITQ holders” (Matthiasson 2003: 16). Also the state makes decisions about TACs for the various species, which in itself is a source of considerable power.

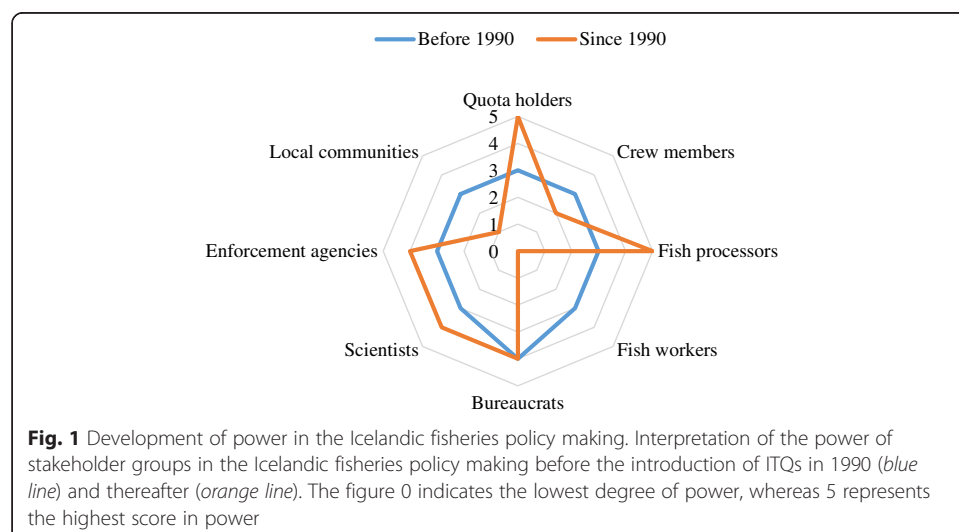
Scientists: The assessment of power is difficult for this group and varies between the scientific branches. On the one hand, the group of scientists appears in a consultative capacity to the bureaucrats (Mikalsen and Jentoft 2001) and fisheries management has to comply with best scientific advice (Holm et al. 2015). On the other hand, the scientific community is not represented equally. Most important is the state run Marine Research Institute (Hafrannsóknastofnun, or Hafró) that provides recommendations and advice to the government bases on stock assessment and stock projections. The advisory function includes also possible closures of fishing grounds and catch restrictions, including the TAC. Hence, this scientific actor has, theoretically, a very high degree of power with far reaching consequences. In practice, the recommendations from Hafró have not always been followed (Woods et al. 2015).

Hafró, and the general scientific discourse, has been dominated by economists and marine biologists (Benediktsson 2014; Eythórsson 2000; Karlsdóttir 2008; Matthiasson 1997; Pálsson 1998a). Social scientists other than economists are largely excluded from this stakeholder group, which has been criticised.

Enforcement agencies: This group is represented mainly by the Directorate of Fisheries (Fiskistofa). The role of this agency is surveillance, monitoring and the delivery of data on landings that are considered when the TAC is determined. The TAC itself is allotted by Fiskistofa. Furthermore, all commercial fishing operations are subject to a permit from the agency. With the surveillance, monitoring and possible sanctioning, Fiskistofa has mainly executive power.

Just as with the governmental bureaucrats, the influence of *local communities* is challenged in a privatised quota market. Historically, municipalities were quite influential stakeholders, sometimes even the owners or shareholders, of vessels, plants and cooperatives (Matthiasson 1997). Over time, their influence has been decreasing, which is partly self-imposed. Municipalities had and still have the chance to buy back quotas that were or are about to be transferred out of the municipality. However, this option was not often exercised during the first years of quota management, as it left the municipality with significant financial burdens (Eythórsson 1996; Matthiasson 1997). On the whole, the fisheries sector has become 'deterritorialized' as most fishing villages have lost influence on the decision-making about even those fish that are found in local waters (Benediktsson and Skaptadóttir 2002).

Figure 1 illustrates schematically the development of power in Icelandic fisheries policy making before and after 1990, based on the preceding identification of eight stakeholder groups. The figure 0 marks no power at all, whereas 5 indicates the maximum power possible. As stated at the beginning of this section, before the quota management was initiated, the fisheries sector was characterised by a consensus-based policy making process much more than later became the case. Therefore an equal rating of moderate power for all stakeholder groups is assumed, with one exception: the bureaucrats stand out due to the governmental power in the final decision. The development



after 1990 provides a different picture. Four groups have gained significant power, leaving another three groups in an inferior position while one group remained unchanged.

Analysing the trajectories of power (im)balances in the Icelandic fisheries management, a paradoxical observation can be made: the more complex fisheries management has got, the less stakeholder involvement has been granted from the policy makers. Formulating and executing the fisheries management policy soon became the endeavour of a chosen few and of the political class (Eythórsson 2000, 2003; Matthiasson 2003; Pálsson 1998a). This may be understandable from an efficiency-seeking perspective that is based on the assumption that the fewer the stakeholders, the less complicated the policy making is. This runs the risk, however, of overlooking some valuable knowledge that is found within the various stakeholder groups.

The overall trend outlined in this section echoes in particular the diagnoses of the rapid implementation of neoliberal politics in Iceland offered by Benediktsson (2014). These politics that were enabled by sectoral corporatism that generally defines Icelandic governmental decision making (Thorhallsson and Kattel 2013). In addition, the democratic system has been described as adverse, conflictual, and non-consensual, not seeking compromise or consultation (Jónsson 2014; Thorhallsson 2013). This is rather atypical in the Nordic context (Thorhallsson and Kattel 2013; Jónsson 2014). Sectoral corporatism in the context of Icelandic democracy has been heavily influenced by the fishing industry (Kristjánsson 2004; Thorhallsson 2013; Thorhallsson and Kattel 2013). This has been enabled by informal and flexible decision making, with close personal connections and strong ties between politics and economics that eventually weakened the system of checks and balances (Vaiman et al. 2011). Thereby “substantial emphasis on political favouritism rather than general policy-making” (Thorhallsson and Kattel 2013: 10) can be identified. We might recall the remark of Hersoug et al. (2000: 328) on ITQs in general, that “the political reality is that a closing of a commons is not only an economic transaction, it is even more a transfer of political power.”

The survey

The empirical results for this paper stem from a survey that was conducted between March and June 2014. The survey was part of the EU FP7 project EcoFishMan (<http://www.ecofishman.com>), that analysed results-based management in European fisheries with the view of contributing to reforms of the Common Fisheries Policy of the European Commission (Nielsen et al. 2015). A central concern of the project was the assessment of stakeholder views on fisheries policy and aspects of participation in the policy making process. For this, a survey was designed jointly by the University of Iceland and the research company Mátis. The survey was intended to reach a balanced group of participants. It did not, however, attempt to include all the groups identified as stakeholders above (Fig. 1), but was aiming mainly for those stakeholders that are directly involved in fisheries and whose daily livelihood is dependent on this resource.

The questionnaire was distributed in two phases. Field trips to selected municipalities with fisheries and fisheries-related industries were the foundation of the first phase. The communities themselves were located all around the country, including remote regions, such as the Northeast. The idea behind these field trips was not only to distribute the survey, but also to gain a sense of the atmosphere, problems and concerns of

the respondents. Therefore dozens of informal interviews were conducted before the survey was distributed.

Two difficulties were faced during these field trips. First, a language barrier was evident in the processing plants, where many workers were not of Icelandic origin. Even though some were familiar with Icelandic, many technical terms were unfamiliar and the necessary background information was not always provided. Second, certain localities were relatively underrepresented, especially in the East. Following the fieldtrips, a second phase was initiated with the generation of an unaltered online version of the survey. This was distributed to many stakeholders in the fisheries, including companies and institutions that had valid email addresses, with a request to participate and to further distribute the link (snowball sampling) to colleagues.

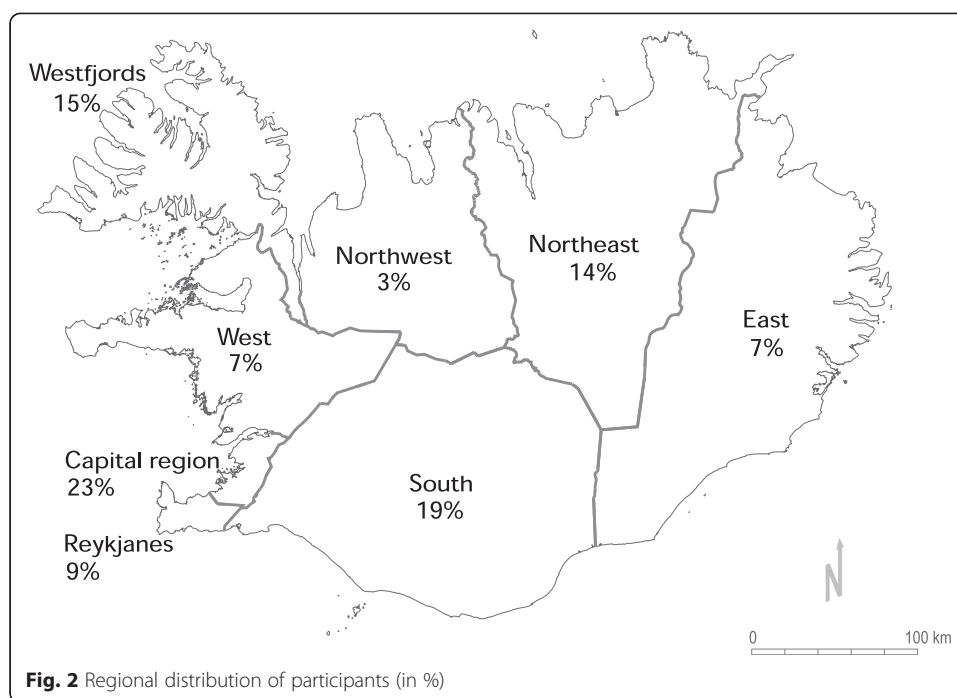
The survey itself consisted of 40 questions subdivided into four categories: The assessment of stakeholder participation; an evaluation of fisheries management; alternative management regimes; and aspects of trust and monitoring. In the following chapters the focus will be on analysing those questions that are related to participatory management approaches.

Overview of participants

The total number of respondents in the survey was 392 (153 from the first phase, 239 from the second phase). When asked about occupation, a total of 144 respondents identified themselves as 'fishers' and 80 as 'processing workers'. In addition, the survey included 81 people from various service industries that are directly fisheries-related, such as net-mending or repairs, and another 79 participants that selected 'other' as occupation (e.g. office workers at fisheries firms). Eight respondents did not answer this question. In addition to the broad occupational classes, the respondents were asked to identify whether they were quota holders or not. Some 55 (14 %) turned out to be quota holders. Thus five out of the eight categories of stakeholders identified above (Fig. 1) are represented in the survey. Those not represented are scientists, bureaucrats and enforcement agency staff – people who relate more indirectly to the fisheries sector per se. The age and gender distribution is rather skewed. Almost 50 % of the participants were aged over 50, with the cohorts of 15–30 years old contributing only 10 % of the total number. The questions were thus answered mostly by respondents with considerable experience of the fisheries sector. An overwhelming majority of the respondents were male, or 85 %.

The map (Fig. 2) shows the distribution of the respondents. Most answers were obtained in the Capital Region, which is not surprising since approximately 60 % of the population of Iceland reside in this region. The field trips to the South and Northeast led to relatively high numbers of participants from these regions. Also the online version of the survey invited the opportunity to increase the number of answers from the remote Westfjords and the East. Reykjanes and the West have a fair number of respondents, whereas the Northwest is underrepresented and thus not included in the analysis of regional differences. However, this region is not much of a fisheries-dependent region anymore. Four per cent of the respondents did not indicate their residence.

In the discussion of the results, the respondents were divided into subgroups by three variables. Given the concerns with geographically uneven impacts of the ITQ system,



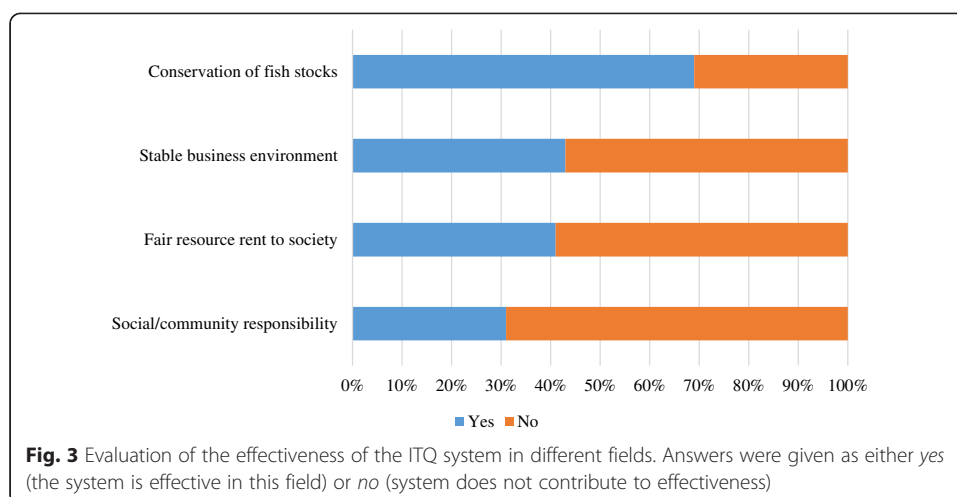
the initial focus was on the region of residence. Differences relating to occupational background and the variable of quota holding were then also examined.

General perceptions of ITQs and alternative fisheries management systems

The survey results indicate that, after some 25 years in place, opinions about the Icelandic ITQ system are still quite divergent among stakeholders. Moreover, possible alternatives or modifications that were presented in the survey receive different levels of support.

Figure 3 shows how specific fields of effectiveness related to the current management regime were rated. The participants were asked to state in simple yes/no terms whether they saw the ITQ system as being effective in achieving ecological, economic and social/societal goals. Clear differences can be detected. Some 69 % see the current management system as having been effective when it comes to the conservation of fish stocks. Achievement of other goals is much more sceptically evaluated. A little more than half the respondents think the ITQ system does not contribute to a stable business environment. Almost three-fifths answer negatively the question about whether a fair resource rent accrues to society at large, and more than two-thirds think that the regime is ineffective concerning the fulfilment of social/community responsibility. A sharp difference in judgements of ecological vis-a-vis social effectiveness can thus be detected.

Certain regional differences in the assessment of ITQ effectiveness are evident. Respondents from the Westfjords especially show a high degree of scepticism about the system. Just over one third thinks that resource rent accruing to society at large is fair (interestingly enough, the Capital Region has even stronger negative opinion about this) and only 13 % feel that goals of social responsibility are achieved by the management



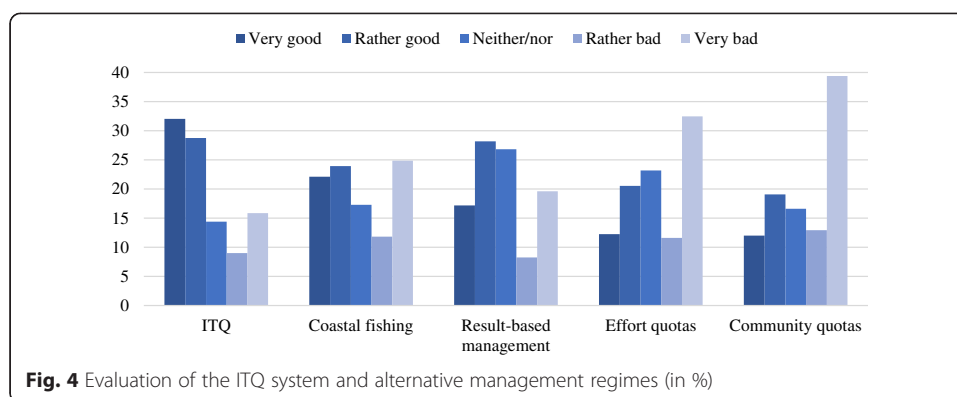
system. Quite different results come from Reykjanes, the region showing the highest rate of approval. Even the generally negative appraisals elsewhere of the system's performance regarding resource rent and social responsibility are not backed up in this region.

Analysing the results of these questions while differentiating between quota holders and non-holders reveals two findings worth mentioning. While the general critique of a lack of social responsibility is shared by the majority of quota holders (69 %: equal to average), this group regards the resource rent to society criterion as achieved according to 55 %.

Differing views are also present when it comes to opinions about other management regimes and possible alternatives or amendments to the ITQ-system. Respondents were asked to state their opinions about several management regimes on a five-item Likert-scale (Fig. 4). Despite the fact that overall the ITQ system is rated critically with respect to many of the goals which a fisheries management system is intended to fulfil, this system receives the best rating, with a broad majority rating the recent regime either good or very good. It is the only system that elicits a positive response from over 50 % of the respondents. This applies to every region except the Westfjords and the Northeast. These two regions are the only ones to choose a system other than the ITQ system as the most preferable, namely coastal fisheries. Both regions have indeed lost a great deal of quotas since the 1990s. The East and Reykjanes are the regions that rate ITQs best. The former has fared rather well under the quota system in terms of processing, while Reykjanes has some expanding fishing companies, most notably in the town of Grindavík.

Community quotas (*byggðakvótar*), introduced in the fishing year 2002/03 in order to increase the "social robustness" of suffering smaller coastal communities (Christensen et al. 2009b), are considered the worst of the alternative systems. In all regions, negative evaluations surpass the positive range, which does not happen with any other alternative system. The West is most sceptical with 72 % in the negative range, followed by Reykjanes (60 %). The Westfjords are the only region where the positive range (42 %) is about to reach the negative evaluation (47 %).

Some hopes regarding new employment opportunities and the revitalization of coastal communities rose during the introduction in 2009 of a separate coastal fishing



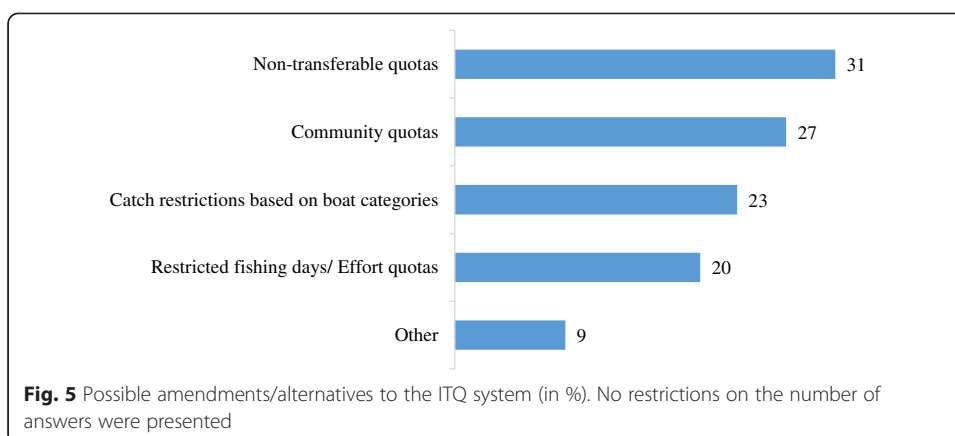
scheme for small boats (Carothers and Chambers 2012). It is seen as the second best option to ITQs. However, there are clear regional differences in the interpretation. Whereas the Westfjords, Northeast, East, and Capital Region have a majority on the positive side, Reykjanes and the South evaluate it rather negatively.

The alternative called here ‘results-based management’ was one of the core concepts of the EcoFishMan project. In the context of the survey, it was defined and presented with an example, since the concept has not been used much in discussions of Icelandic fisheries. Results-based management was defined as shaped by cooperation and stakeholder involvement; management plans that are mutually agreed upon by various stakeholder groups; and new defined indicators to measure the success of those management plans. These elements are in line with basic ideas of adaptive co-management. Therefore the results from this question are of special interest with regard to the theoretical issues discussed in the previous section, as well as for further discussion.

Overall this management idea received moderate ratings. Together with the ITQs, this is the option which is least often evaluated negatively. Since the concept of results-based management has hardly been articulated in Iceland, it is not surprising that 27 % choose the neither/nor option. From a regional perspective, it is only the West and the East that have a majority on the negative side. The largest shares of proponents are found in the Capital region and Reykjanes.

It is evident that the main point of criticism of the ITQ system concerns the transferability of quotas, which is in line with the general debate around ITQs (Carothers and Chambers 2012; Copes 1996; Pinkerton and Edwards 2009). When asked about possible alternatives, non-transferable quotas scored highest (Fig. 5). However, it is somewhat striking that even though there was no restriction on answers, none of the opportunities listed got the approval of more than a third of the respondents. According to the survey, it is mainly people in the Capital Region and the Westfjords who want to curtail transferability, whereas the East shows the lowest support for the idea of non-transferability (only 4 %).

Community quotas receive different approval among localities. While once again the Capital Region and the Westfjords show the highest support, it is a very unpopular idea in Reykjanes. When it comes to effort quotas, only the Westfjords show support significantly above the average, whereas the South is very unlikely to support the idea. Catch restrictions based on boat categories are most favoured alternative management option in the East, while being opposed most strongly in the South.



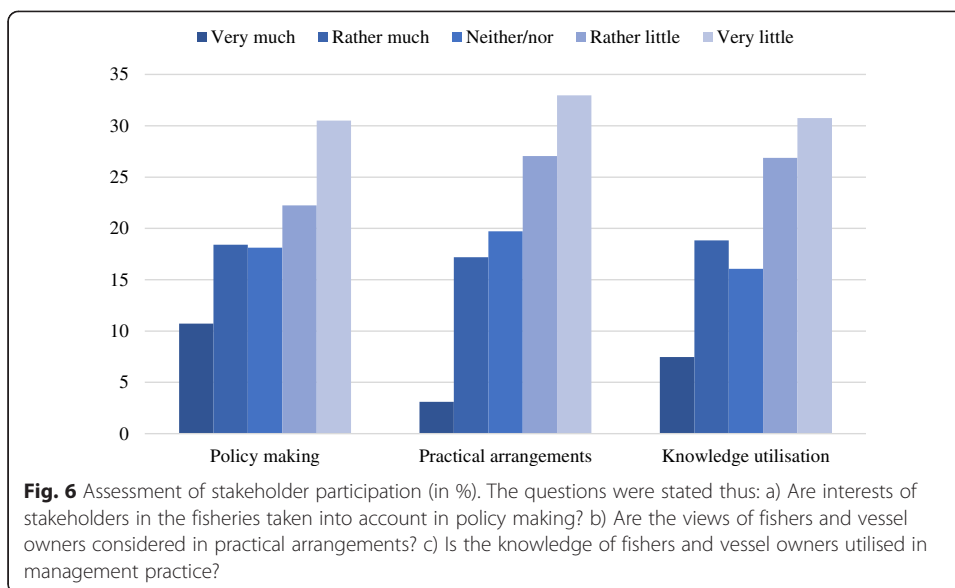
Stakeholder involvement and collaboration

As explained before, one part of the survey dealt with the assessment of stakeholder participation, which is also a key element in the discussion of co-management. Before the functions of co-management can be discussed it is essential to highlight that, according to the survey, a majority of 79 % considers more involvement of fishers and vessel owners in the implementation of fisheries management as a necessary step. Against prior expectations, it was the workers from fish processing (70 %), the group that was declared least powerful in section “Stakeholder involvement in Icelandic fisheries” above, who are least likely to demand more involvement. Stating this in basic yes/no terms, the subsequent questions offered more differentiated response options: Three questions dealt with the consideration of certain interests of stakeholders and the knowledge utilisation, whereas another open question aimed for a fuller investigation of the particular fields in which enhanced stakeholder involvement was thought to be necessary.

Three questions with a Likert-scale answer range aimed for an assessment of stakeholder participation (Fig. 6). The general impression is that a lack of stakeholder representation is sensed by the participants. Some 52 % feel that the interests of stakeholders in fisheries are taken rather little or very little into account in the policy making. The question whether the views of fishers and vessel owners are considered in practical arrangements, such as gear restrictions, certain closures or boat sizes was not only answered more negative, it was also the question that got the least answers in the positive range. Most negative were the views on the (non-)utilisation of the fishers and vessel-owners knowledge in management practices.

All three questions received significantly different answers by respondents considering occupational backgrounds and the question of quota-holding. In all aspects of stakeholder participation, it is the fishers who are most negative about the current state, peaking in the consideration of practical arrangements (72 %). Enhanced participation in the policy making is least demanded by employees from the service industries (35 %). This is the only group that shows a slightly higher rate of agreement than disagreement. When it comes to the utilisation of knowledge, the workers from processing plants are less negative (47 %) than the other occupations.

Strong differences can also be detected between quota-holders and non-quota holders. In all three questions it is the holders being more negative and show much

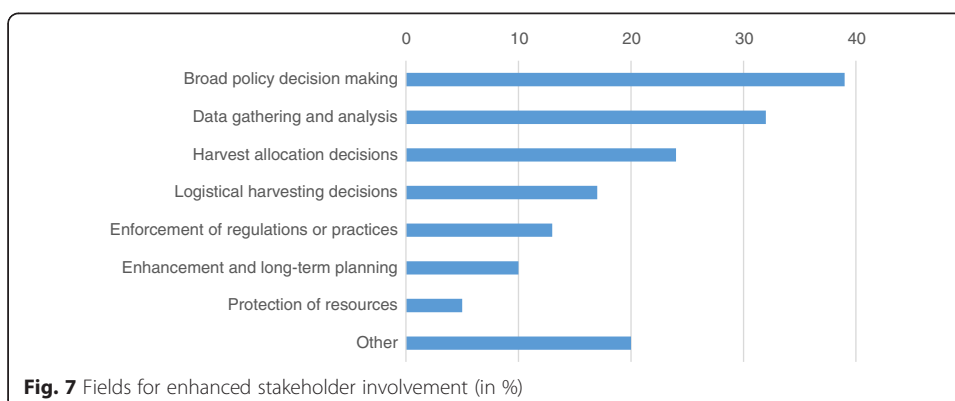


more tendency to select the “very little” option with the strongest results on practical arrangements (56 %). The differences between these groups are striking and show a gap up to 19 percentage points.

The results of the open question were interpreted and grouped with an analytic tool designed by Pinkerton (Pinkerton 1989), which was slightly modified. Pinkerton identifies seven fields in which enhanced involvement finds application (Fig. 7).

The most desired field of increased stakeholder involvement is broad policy- and decision making. This can be linked to a remark by Berkes (2010) about devolution and basic democratic principles. He argues that those who are affected in their well-being should have a say in the decision-making process. Even though more inclusive decision making scores highest, it is seen quite differently by the various groups of respondents. Only some 27 % of employees from the service industries emphasise this, with 52 % of those stakeholders defined as ‘other’ being most positive about it. The numbers for the fishers and processing workers are 44 % and 29 % respectively. The average is 39 %.

That data gathering is considered as a field that needs enhanced stakeholder involvement is not surprising, since a certain mistrust towards the responsible institutions was sensed during the interviews that were conducted. Also, strong statements in response



to the open question indicate a severe disbelief in official figures regarding fish stocks. It is mainly fishers (33 %) and the employees from the service sector (38 %) who demand a say in this regard.

Harvest allocation decisions focus on quantitative regulations, for example the annual TAC. Logistical harvesting decisions differ as they focus on who can fish, when to fish and where to fish. Despite the discussion around initial allocations and the unequal distributions of quotas, concluding from the answers given here, the question who can fish is not as prominent as quantitative concerns. With regard to the before mentioned mistrust in official figures that are crucial for the TAC, this result is a logical consequence.

An interesting result is the very low demand for involvement in the protection of resources. On the one hand, it can be interpreted as just another positive evaluation of the overall effectiveness regarding ecological concerns. On the other hand it is surprising that, considering the mistrust in official data and the demand for enhanced participation in quantitative regulations, this field scores the lowest. This leads to the assumption that the stakeholders want to get involved in the delivery of data, but not in its interpretation.

Discussion

Results regarding ITQs

As stated in the previous section, the critique of the ITQ system itself is not homogeneous. Rather the system is criticised on many fronts and from different angles. In this survey we have identified four categories of critique (Fig. 3), but excluding one trenchantly criticised aspect: The initial quota allocation process. This was due to the fact that the categories were not asking about particular shortcomings but, in this case, social/societal concerns in general.

Throughout the survey it became apparent that ecological concerns were the least controversial. These results reflect the assumptions of ITQ proponents regarding the ecological success of such a system (Árnason 2005). Conversely, this aspect is the only one related to effectiveness that is answered positively among the majority of respondents. The feeling that the current management regime does not contribute effectively to the stability of the business environment according to the majority, is astonishing in a country that is not only dependent on fisheries but where the fisheries seem to be in a reasonably healthy state. This is perhaps just another sign of the profound uncertainty that prevails in the sector, but might also be the result of the recent financial crisis (see discussion below; see also (Durrenberger and Pálsson 2014). For the sake of fairness it is important to underline that the stability of fisheries businesses depends on at least two major variables (or complicating factors) in addition to the political setting: sustainable and stable fish stocks, and a stable economy. Economic stability is partly a domestic issue, but also dependent on international conditions. While the domestic issue is characterised by debates about instruments such as resource fees, international concerns are shaped by severe currency fluctuations that affect this important export sector.

It is not surprising that the question of whether fair resource rent accrues to society at large is a central point of criticism (Christensen et al. 2009b; Gissurarson 2005; Hannesson 2003). Árnason (2005: 255) postulates that “estimates of the actual

economic rents generated by the system as well as analysis of quota values strongly indicate that very substantial economic benefits are already being generated by this management system.” Whether or not this statement is correct, one question should be raised at this point: Exactly to whom do those benefits accrue, since the majority of stakeholders feel that the distribution of benefits is lacking in fairness? The palpable tension surrounding this discussion is a central theme among scientists (Copes 1996; Hannesson 2003; Holm et al. 2015; Matthiasson and Agnarsson 2009; Soliman 2014b). A conflict-reducing economic measure that has been discussed alongside quotas was the introduction of resource fees. However, there is no evidence that the introduction of a catch fee in 2002, which was “an effort aimed at reducing the tension caused by free allotment of quotas” (Matthiasson and Agnarsson 2009: 303), has lowered the existing discontent.

That a stable majority of respondents senses a lack of social responsibility and fair resource rent to the society at large substantiates the observations of several scientists. For Pálsson (1998b: 280) this is the consequence of the prerogative of economic efficiency that dominates the discourse: “social issues are pushed to the periphery, perceived as mere distractions from the objective and essentially technical undertaking of promoting efficient production.” Overall the quota system has thus “instituted a new level of social inequality” (Pálsson 1998b: 285). This statement from the late 1990s is still valid. Benediktsson and Karlsdóttir (2011) state that the question of social equity has been sidestepped entirely. Holm et al. (2015) even argue that the ‘social contract’ has been violated, due to a lack of emphasis on the coastal livelihood. For Matthiasson and Agnarsson (2009), the social shortcomings within the current regime can be connected to discussions about the initial allocation that enabled the generation of windfall profits for a few quota-holders, while former fisheries communities saw quotas transferred away. Even though most critiques addressed moral and ethical issues regarding the allocation process, there were critical, albeit unheard, voices that saw Iceland falling into a generational conflict such as the transitional gains trap (Copes 1996; Olson 2011; Tullock 1975). Receiving quotas, and thus a marketable asset, for free, gives the first generation of quota holders an economic advantage that the following generations have to compensate.

Building on this critique, Eythórsson (2000: 489) goes even further when he speaks of marginalised communities that “are left without many options for coping with the situation [the quota loss]”. This is of special concern since a number of these communities, referred to as ‘single-enterprise communities’ (Eythórsson 2000) or ‘one-company towns’ (Karlsdóttir 2008), were heavily dependent on fisheries and related industries. Hence it is not surprising that respondents from those communities and regions which have shown negative tendencies since the 1990s in terms of overall socioeconomic development and fisheries in particular, evaluated the current regime worst with regard to effectiveness.

Discussions about a stable business environment, social responsibility or a fair resource rent cannot be concluded without considering the financial crisis that hit Iceland in 2008. The extent to which this crisis can be linked to the introduction of ITQs has already been discussed by several authors (Maguire 2014; Benediktsson 2014; Benediktsson and Karlsdóttir 2011). Quotas were used extensively as collateral and mortgageable for speculative investment strategies. How far the crisis has influenced

responses in this survey cannot be conclusively assessed. The devaluation of the Icelandic currency that accompanied the crisis led to a great increase in the value of exported marine products (Maguire 2014; Statistic Iceland 2014). Most fisheries-dependent regions have proven more resistant to the shocks that the crisis entailed, but then it should be kept in mind that they never benefitted from the economic boom that preceded it to the same extent as the capital region (Benediktsson and Karlsdóttir 2011).

Aspects of participation

As discussed in section “Adaptive co-management and fisheries”, knowledge acquisition is a central theme in fisheries (co)management. As the subsequent discussion has shown, however, there is no clear agenda within the Icelandic management system on how to integrate different forms of knowledge. This current sentiment recalls the view of Pálsson (1998a: 50) who contended that “the inclusion of fishermen’s knowledge was ‘gradually subdued’ since ITQs got introduced.” Or, with reference to Carlsson and Berkes (2005), there is no ‘epistemic community’ based on the close cooperation of fishermen, scientists and the administration. Hence, the aspect of representation and collaboration needs to be taken up for discussion again. In general not much seems to have changed since the assertion by Eythórsson (2000: 490), that “the practice of working out the fisheries management policy by broad debates and consensus in the Fisheries Assembly and by preparing new legislation by task forces with broad representation from different stakeholder groups is now abandoned”.

That the fishers are demanding more inclusiveness is not surprising. Almost two decades ago, Pálsson (1998a) considered that more inclusiveness could help to overcome the conflict-laden discourse between scientists and fishermen. This discourse is long-lasting and still ongoing, despite the fact that Iceland has experimented with an instrument to join the partly opposing types of knowledge. In the year 1985 the *togararall* (trawling rally) was introduced to the Icelandic fisheries. Some skippers therefore collected data in collaboration with biologists on previously defined paths. This was a “diplomatic endeavour” with the aspiration to lower the gap between scientific and practical knowledge while collecting ecological data collaboratively at sea (Pálsson 1998a). However, judging from the feelings of fishermen uttered in the open questions and the atmosphere during informal interviews during the fieldtrips, this endeavour has failed to solve knowledge-based conflicts, 30 years after its implementation. This conclusion is supported by the survey.

From an adaptive co-management perspective, the results from the question on different fields of participation can be discussed from various angles. A general consensus about the need for a broader decision making process can be detected; however, this needs to be defined more precisely. That stakeholders are not aiming for the enhancement and long-term planning (only 10 % are in this category) is in this regard surprising. Being one of the unique characteristics that differentiate ACM strategies from conventional policy making processes, a clear call for more inclusiveness in the long-term planning cannot be detected. On the other hand, if this particular field of participation includes the question “where to concentrate management effort and what future is desired” (Pinkerton 1989: 6), it is easier to understand this low ranking: previous discussions in this section have shown that alternative systems or amendments to the ITQ

system are indeed requested but also debated. An optimal system for the future is not unanimously agreed upon. Furthermore, the fields of involvement vary between the stakeholder groups, and so this particular call for specific enhancement ranks much lower than the more general one for broad decision making.

Conclusion

Are the Icelandic fisheries at a crossroads? Seen as a whole, the country's fisheries sector is flourishing economically. However, continuing down the same path runs the risk of negative socioeconomic challenges – already visible in a number of former fishing communities around the country – becoming irresolvable. A return to an open-access regime can be regarded as untenable. It would not result in a sustainable fishery. Therefore the question arises whether an intermediate way might be found. Increased participation of certain stakeholder groups could play a part in developing the fisheries management system towards a more holistic approach.

The instruments of adaptive co-management could offer possibilities for a more inclusive policy. The stakeholders' will to introduce certain features of this approach is evident, as shown by the relevant survey questions discussed above. However, the will and commitment of the affected stakeholder groups is only one side of the story. Necessary policy changes have to come from governmental institutions as well. The political will for introducing more participatory processes is not present at this stage. One reason for that is the asymmetric power distribution among stakeholder groups. Furthermore, the socio-spatial disparities mentioned above tend to be overshadowed by the macro-economic benefits that have come with consolidation of quotas and economies of scale in the fisheries. The transferability of quotas is vehemently criticised and discussed, however. It is seen as not only dangerous for the coastal communities, but also contrary to prevailing ideas of fairness and justice. Despite the power imbalances and the numerous critiques that can be found within the survey, the ITQ system as such is not to be overturned but to be improved.

In addition to the policy and decision making level, ACM does have a potential to improve processes of knowledge generation and utilisation in Icelandic fisheries. Statements about a cleavage between scientific knowledge and the practical knowledge of fishers were abundant in the survey. ACM strategies can help to join these two (not necessarily opposing) strands of knowledge. Trust in the institutions, especially Hafró and its scientific assessment of fish stocks, is now lacking among the fishers and other stakeholders. The need for a change of methodologies towards more collaborative data gathering is clear.

Fisheries management is a complex task, but it is not impossible. ITQs are one management option, but one that is flawed in some fundamental respects. Iceland needs to learn from experiences elsewhere in order to adapt successfully to demands for a more inclusive and just arrangement. Inclusiveness, however, cannot only be about quantitative improvements, but has to be in compliance with an effective devolution of power. The devolution process has to consider aspects of efficiency, legitimacy and accountability. As mentioned at the beginning of this article, the Icelandic fisheries seem to be dealing with something of a Gordian knot – one tied together by its stakeholders, but one that can (only) be untangled through their effective collaboration.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MK Participated in field trips, conducted the survey, was in charge of the online version of the survey, and is the main author of the manuscript. AK Designed and conducted the survey and participated in field trips. KB Contributed to the manuscript. All authors approved the final manuscript.

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References

- Aranda, M, and AS Christensen. 2009. The New Zealand's Quota Management System (QMS) and its complementary mechanisms. In *Comparative evaluations of innovative fisheries management*, ed. K Hauge, 19–41. Springer Netherlands.
- Armitage, D, F Berkes, and N Doubleday. 2007a. Adaptive co-management: collaboration. *Learning and Multi-level Governance*: UBC Press.
- Armitage, D, F Berkes, and N Doubleday. 2007b. Introduction: moving beyond co-management. In *Adaptive co-management*, ed. D Armitage, F Berkes, and N Doubleday, 1–14. Vancouver, BC: UBC Press.
- Armitage, D, M Marschke, and R Plummer. 2008. Adaptive co-management and the paradox of learning. *Global Environmental Change* 18(1): 86–98.
- Árnason, R. 2005. Property rights in fisheries: Iceland's experience with ITQs. *Reviews in Fish Biology and Fisheries* 15(3): 243–264.
- Árnason, R. 2012. Property rights in fisheries: how much can individual transferable quotas accomplish? *Review of Environmental Economics and Policy* 6(2): 217–236.
- Basurto, X, and M Nenadovic. 2012. A systematic approach to studying fisheries governance. *Global Policy* 3(2): 222–230.
- Benediktsson, K. 2014. Nature in the 'neoliberal laboratory'. *Dialogues in Human Geography* 4(2): 141–146.
- Benediktsson, K, and A Karlsdóttir. 2011. Iceland crisis and regional development—thanks for all the fish? *European Urban and Regional Studies* 18(2): 228–235.
- Benediktsson, K, and UD Skaptadóttir. 2002. Coping strategies and regional policies – social capital in the nordic peripheries: country report Iceland, Nordregio Working Paper 2002:5. Stockholm: Nordregio.
- Berkes, F. 2007. Adaptive co-management and complexity: exploring the many faces of co-management. In *Adaptive co-management: collaboration, learning, and multi-level governance*, ed. D Armitage, F Berkes, and N Doubleday, 19–37. Vancouver, BC: UBC Press.
- Berkes, F. 2009. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90(5): 1692–1702.
- Berkes, F. 2010. Devolution of environment and resources governance: trends and future. *Environmental Conservation* 37(4): 489–500.
- Berkes, F, J Colding, and C Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10(5): 1251–1262.
- Carlsson, L, and F Berkes. 2005. Co-management: concepts and methodological implications. *Journal of Environmental Management* 75(1): 65–76.
- Carothers, C, and C Chambers. 2012. Fisheries privatization and the remaking of fishery systems. *Environment and Society: Advances in Research* 3(1): 39–59.
- Christensen, AS, M Aranda, B McCay, HA McLay, C Rova, AL da Silva, and F Wolff. 2009a. Understanding social robustness in selected european fisheries management systems. In *Comparative evaluations of innovative fisheries management*, ed. K Hauge, 163–190. Springer Netherlands.
- Christensen, AS, TJ Hegland, and G Oddsson. 2009b. The Icelandic ITQ system. In *Comparative evaluations of innovative fisheries management*, ed. K Hauge, 97–118. Springer Netherlands.
- Copes, P. 1996. Social impacts of fisheries management regimes based on individual quotas. In *Social implications of quotas systems in fisheries*, ed. G Pálsson and G Petursdóttir, 61–90. Copenhagen: Nordic Council of Ministers.
- de Vivo, JLS, JC Rodríguez Mateos, and D Florido del Corral. 2008. The paradox of public participation in fisheries governance. The rising number of actors and the devolution process. *Marine Policy* 32(3): 319–325.
- Durrenberger, EP, and G Pálsson. 2014. *Gambling debt: Iceland's rise and fall in the global economy*. Boulder: University Press of Colorado.
- Evans, L, N Cherrett, and D Pems. 2011. Assessing the impact of fisheries co-management interventions in developing countries: a meta-analysis. *Journal of Environmental Management* 92(8): 1938–1949.
- Eythórsson, E. 1996. Theory and practice of ITQs in Iceland. Privatization of common fishing rights. *Marine Policy* 20(3): 269–281.
- Eythórsson, E. 2000. A decade of ITQ-management in Icelandic fisheries: consolidation without consensus. *Marine Policy* 24(6): 483–492.
- Eythórsson, E. 2003. Stakeholders, courts, and communities: Individual transferable quotas in Icelandic fisheries, 1991–2001. In *The commons in the new millennium: challenges and adaptations*, ed. N Dolšák and E Ostrom, 129–167. Cambridge, MA: MIT Press.
- Folke, C, T Hahn, P Olsson, and J Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Reviews* 30: 441–473.
- Gissurarson, HH. 2005. Iceland's ITQ system and the problem of political acceptability. In *Evolving property rights in marine fisheries*, ed. D Leal, 171–193. Lanham, MD: Rowman & Littlefield.
- Grafton, RQ. 2005. Social capital and fisheries governance. *Ocean & Coastal Management* 48(9): 753–766.

- Gutiérrez, NL, R Hilborn, and O Defeo. 2011. Leadership, social capital and incentives promote successful fisheries. *Nature* 470(7334): 386–389.
- Hannesson, R. 2003. The Icelandic fisheries and the future of the Icelandic economy. In *Competitiveness within the global fisheries*, ed. E Guðmundsson and HÞ Valtýsson. Akureyri, Iceland: University of Akureyri.
- Hersoug, B, P Holm, and S Rånes. 2000. The missing T. path dependency within an individual vessel quota system—the case of Norwegian cod fisheries. *Marine Policy* 24(4): 319–330.
- Holm, P, J Raakjær, RB Jacobsen, and E Henriksen. 2015. Contesting the social contracts underpinning fisheries—lessons from Norway, Iceland and Greenland. *Marine Policy* 55: 64–72.
- Jentoft, S. 2007. Limits of governability: institutional implications for fisheries and coastal governance. *Marine Policy* 31(4): 360–370.
- Jentoft, S, and B McCay. 1995. User participation in fisheries management: lessons drawn from international experiences. *Marine Policy* 19(3): 227–246.
- Jentoft, S, and K Mikalsen. 2014. Do national resources have to be centrally managed? Vested interests and institutional reform in Norwegian fisheries governance. *Maritime Studies* 13(1): 5.
- Jentoft, S, BJ McCay, and DC Wilson. 1998. Social theory and fisheries co-management. *Marine Policy* 22(4): 423–436.
- Johnsen, JP, B Hersoug, and A Solås. 2014. The creation of coastal space—how local ecological knowledge becomes relevant. *Maritime Studies* 13(1): 2.
- Jónsson, G. 2014. Iceland and the Nordic model of consensus democracy. *Scandinavian Journal of History* 39(4): 510–528.
- Karlsdóttir, A. 2008. Not sure about the shore! Transformation effects of individual transferable quotas on Iceland's fishing economy and communities. In *Enclosing the fisheries: people, places and power*, ed. ME Lowe and C Carothers, 99–107. Bethesda, Maryland: American Fisheries Society.
- Knútsson, Ö, Ó Klemensson, and H Gestsson. 2008. Structural changes in the Icelandic fisheries sector—a value chain analysis. In *14th Annual Biennial Conference of International Institutes of Fisheries and Economics and Trade*. Nha Trang, Vietnam: IIFET.
- Kristjánsson, S. 2004. Iceland: searching for democracy along three dimensions of citizen control. *Scandinavian Political Studies* 27(2): 153–174.
- Leal, DR. 2005. Fencing the fishery: a primer on rights-based fishing. In *Evolving property rights in marine fisheries*, ed. D Leal, 1–24. Lanham, MD: Rowman & Littlefield.
- Maguire, J. 2014. Virtual fish stink, too. In *Gambling debt: Iceland's rise and fall in the global economy*, ed. EP Durrenberger and G Pálsson. Boulder: University Press of Colorado.
- Matthiasson, T. 1997. Consequences of local government involvement in the Icelandic ITQ market. *Marine Resource Economics* 12: 107–126.
- Matthiasson, T. 2003. Closing the open sea: development of fishery management in four Icelandic fisheries. *Natural Resources Forum* 27(1): 1–18.
- Matthiasson, T. 2008. Rent collection, rent distribution, and cost recovery: an analysis of Iceland's ITQ catch fee experiment. *Marine Resource Economics* 23(1): 105–117.
- Matthiasson, T, and S Agnarsson. 2009. Property rights in Icelandic fisheries. In *Handbook of marine fisheries conservation and management*, ed. RQ Grafton, R Hilborn, D Squires, M Tait, and M Williams, 299–309. New York: Oxford University Press.
- McCay, BJ, and JM Acheson. 1987. Human ecology of the commons. In *The question of the commons: the culture and ecology of communal resources*, ed. BJ McCay and JM Acheson, 1–34. Tucson: The University of Arizona Press.
- Mikalsen, KH, and S Jentoft. 2001. From user-groups to stakeholders? The public interest in fisheries management. *Marine Policy* 25(4): 281–292.
- Mitchell, RK, BR Agle, and DJ Wood. 1997. Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. *Academy of Management Review* 22(4): 853–886.
- Nielsen, KN, P Holm, and M Aschan. 2015. Results based management in fisheries: delegating responsibility to resource users. *Marine Policy* 51: 442–451.
- Olson, J. 2011. Understanding and contextualizing social impacts from the privatization of fisheries: an overview. *Ocean & Coastal Management* 54(5): 353–363.
- Pálsson, G. 1998a. Learning by fishing: practical engagement and environmental concerns. In *Linking social and ecological systems: management practices and social mechanisms for building resilience*, ed. F Berkes, 48–66. Cambridge: Cambridge University Press.
- Pálsson, G. 1998b. The virtual aquarium: commodity fiction and cod fishing. *Ecological Economics* 24(2): 275–288.
- Pálsson, G, and A Helgason. 1995. Figuring fish and measuring men: the individual transferable quota system in the Icelandic cod fishery. *Ocean & Coastal Management* 28(1): 117–146.
- Pinkerton, E. 1989. Cooperative management of local fisheries, new directions for improved, management and community development. Vancouver: University of British Columbia Press.
- Pinkerton, E, and DN Edwards. 2009. The elephant in the room: the hidden costs of leasing individual transferable fishing quotas. *Marine Policy* 33(4): 707–713.
- Plummer, R, and J FitzGibbon. 2007. Connecting adaptive co-management, social learning and social capital through theory and practice. In *Adaptive co-management: collaboration, learning and multi-level governance*, ed. D Armitage, F Berkes, and N Doubleday, 38–61. Vancouver, BC: UBC Press.
- Plummer, R, DR Armitage, and RC De Loë. 2013. Adaptive comanagement and its relationship to environmental governance. *Ecology and Society* 18(1): 21.
- Pomeroy, RS. 2000. Devolution and fisheries co-management. In *Collective action, property rights and devolution of natural resource management—exchange of knowledge and implications for policy*, ed. RS Meinzen-Dick, A Knox, and M Di Gregorio, 111–146. Feldafing: Zentralstelle für Ernährung und Landwirtschaft.
- Pomeroy, RS, BM Katon, and I Harkes. 2001. Conditions affecting the success of fisheries co-management: lessons from Asia. *Marine Policy* 25(3): 197–208.

- Reed, MS. 2008. Stakeholder participation for environmental management: a literature review. *Biological Conservation* 141(10): 2417–2431.
- Rettig, RB, F Berkes, and E Pinkerton. 1989. The future of fisheries co-management: a multidisciplinary assessment. In *Co-operative management of local fisheries: new directions for improved community management and development*, ed. E Pinkerton, 273–289. Vancouver, BC: University of British Columbia.
- Soliman, A. 2014a. Duty of stewardship and fisheries governance: a proposed framework. *Maritime Studies* 13(1): 1–16.
- Soliman, A. 2014b. Using individual transferable quotas (ITQs) to achieve social policy objectives: a proposed intervention. *Marine Policy* 45: 76–81.
- St Martin, K, BJ McCay, GD Murray, and TR Johnson. 2007. Communities, knowledge and fisheries of the future. *International Journal of Global Environmental Issues* 7(2): 221–239.
- Statistic Iceland. 2014. Exported marine products by product categories 1979–2013. <http://statice.is/?PageID=1218&src=https://rannsokn.hagstofa.is/pxen/Dialog/varval.asp?ma=SJA04901%26ti=Exported+marine+products+by+product+categories+1979-2013%26path=../Database/sjavarutvegur/utf/%26lang=1%26units=Tonnes/million%20ISK>. Retrieved 27 February, 2015.
- Symes, D. 1997. Fisheries management: in search of good governance. *Fisheries Research* 32(2): 107–114.
- Symes, D, and J Phillipson. 2009. Whatever became of social objectives in fisheries policy? *Fisheries Research* 95(1): 1–5.
- Thorhallsson, B. 2013. The icelandic economic collapse: how to overcome constraints associated with smallness. *European Political Science* 12: 320–332.
- Thorhallsson, B, and R Kattel. 2013. Neo-liberal small states and economic crisis: lessons for democratic corporatism. *Journal of Baltic Studies* 44(1): 83–103.
- Trimble, M, and F Berkes. 2013. Participatory research towards co-management: lessons from artisanal fisheries in coastal Uruguay. *Journal of Environmental Management* 128: 768–778.
- Tullock, G. 1975. The transitional gains trap. *The Bell Journal of Economics* 6(2): 671–678.
- Vaiman, V, TO Sigurjonsson, and PA Davidsson. 2011. Weak business culture as an antecedent of economic crisis: the case of Iceland. *Journal of Business Ethics* 98(2): 259–272.
- Wilson, DC, JR Nielsen, and P Degnbol. 2003. *The fisheries co-management experience: accomplishments, challenges and prospects*. Springer Science & Business Media.
- Wilson, DC, KH Hauge, and M Aranda. 2009. Conclusion: the innovation evaluation framework. In *Comparative evaluations of innovative fisheries management*, ed. K Hauge, 247–269. Springer Netherlands.
- Woods, PJ, C Bouchard, DS Holland, AE Punt, and G Marteinsdóttir. 2015. Catch-quota balancing mechanisms in the Icelandic multi-species demersal fishery: are all species equal? *Marine Policy* 55: 1–10.
- Yandle, T. 2003. The challenge of building successful stakeholder organizations: New Zealand's experience in developing a fisheries co-management regime. *Marine Policy* 27(2): 179–192.
- Yandle, T. 2007. Understanding the consequences of property rights mismatches: a case study of New Zealand's marine resources. *Ecology and Society* 12(2): 27.

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