

# How Resilient Are Europe's Inshore Fishing Communities to Change? Differences Between the North and the South

Maria Hadjimichael, Alyne Delaney,  
Michel J. Kaiser, Gareth Edwards-Jones

**Abstract** One would hypothesize that the Common Fisheries Policy, as the umbrella framework for fisheries management in the EU would have the greatest impact on fishers' communities across Europe. There are, however, biological, economic, social, and political factors, which vary among fishing communities that can affect how these communities react to changes. This paper explores the links between institutional arrangements and ecological dynamics in two European inshore fisheries socio-ecological systems, using a resilience framework. The Mediterranean small-scale fishers do not seem to have been particularly affected by the Common Fisheries Policy regulations but appear affected by competition with the politically strong recreational fishers and the invasion of the rabbit fish population. The inshore fishers along the East coast of Scotland believe that their interests are not as sufficiently protected as the interests of their offshore counterpart. Decisions and initiatives at global, EU, and sometimes national level, tend to take into account those fisheries sectors which have a national economic importance. A socio-ecological analysis can shift the focus from biological and economic aspects to more sustainable long-term delivery of environmental benefits linked to human wellbeing.

**Keywords** Resilience · Artisanal fisheries · Socio-ecological systems · Governance · Cyprus · Scotland · Mediterranean

## INTRODUCTION

A common explanation for the past collapse of socio-ecological systems<sup>1</sup> (SESs) has been their “failure to adapt” to environmental, institutional, and other changes (Janssen

et al. 2003; Folke et al. 2005). Fisheries SESs are resource-dependent systems in which humans participate as resource users (or extractors). As such, humans often deal with declining resources and increasing controls, in addition to facing socio-demographic disadvantages (Pauly et al. 1998; Robards and Greenberg 2007). Institutional solutions to fisheries resource problems among European Union (EU) Member States are dealt with at different levels (EU and national), with the Common Fisheries Policy (CFP) providing the umbrella framework for top-down control of fisheries resources at the EU level. Thus, with the enlargement of the EU, fisheries management has had to adapt to the biophysical specificities of different seas and oceans, as well as their political, economic, and cultural differences of the adjacent Member States and non-EU states (Hadjimichael et al. 2010). Fishing communities absorb different levels of external shocks depending on their socioeconomic environment and attempts to improve their performance from outside can undermine their ability to cope with change and maintain their structure and function (Janssen et al. 2007). This paper explores the links between institutional arrangements and ecological dynamics in two European inshore fisheries SESs, using a resilience framework designed by Anderies et al. (2004). We hypothesized at the outset that the CFP has had the greatest impact on the small-scale inshore fisheries in the Northern (Northeast Atlantic) and the Southern waters (Mediterranean) of the EU due to the CFP being the institutional solution provided from the decision-making body that is at the highest level (the EU).

Generally, change is not considered to be an element in the definition of institutions but rather institutions are thought to be persistent, and consequently the study of

<sup>1</sup> Social-ecological systems are complex, integrated systems in which humans are part of nature (Berkes and Folke 1998).

institutional change is a weak spot in the study of institutions (Mahoney and Thelen 2010). Relating this to resilience theory, rather than focusing on what is required to sustain a system, it is important to use a resilience framework to explore how institutions and connecting structures respond to disturbance, and how one can prepare for those outcomes (Davidson 2010). Desirable outcomes are not necessarily for systems to remain unchanged, but rather to find ways to adapt or transform depending what the social, economic, and environmental impacts of change would be. In today's human dominated ecosystems, there is a critical need to understand the dynamics of SESs, especially as social and economic globalization has led to increased flows of goods, resources, people, and information and ideas with interactions operating from local to global scales (Young et al. 2006).

As Harvey (1989) suggested, in a globalized SES world, the time–space compression suggests that actions that take place in a certain place can lead to a direct and immediate consequences elsewhere. With resource-dependent SESs such as fisheries, interactions, and dynamics amongst the resource (fish) and the resource users (fishers) can be affected by a number of institutional changes due to socio-political, economic, or environmental factors. The two case studies used in this paper are small-scale fisheries which had to implement top-down solutions to fisheries resources issues as instructed by the EU via its fisheries management umbrella framework, the CFP.

SESs integrate a number of important dimensions of social structure that are ruled by stability dynamics that emerge from three complementary attributes: resilience, adaptability, and transformability (Walker et al. 2004). A resilient system has the capacity to absorb disturbance and reorganize while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004; Janssen and Ostrom 2006). An adaptable system has the capacity to influence resilience without changing the dynamics of a system (Walker et al. 2004, 2006). However, if a system is highly adapted to a range of variability through specialized institutions it can be more vulnerable to new unknown changes (Nelson et al. 2007). In order to sustain such systems, it is important to understand these dynamics as they not only face predictable and well-understood variations, but also unpredictable temporal variations in social and natural variables (Folke et al. 2005; Janssen et al. 2007; Robards and Greenberg 2007).

The fish catching sector has learned to continuously adapt to changes such as fluctuations of the resource biomass, changes in operating costs, and regulatory changes in order to remain profitable. Such adaptive strategies include: (i) transformability, where fishers shift to a different metier when ecological, economic, or social (including political)

conditions make the existing system untenable (Walker et al. 2006), (ii) diversification, which involves the broadening of alternatives, both within fishing and between fishing alternative livelihoods (McCay 1978), and (iii) intensification, which refers to an increased commitment to an investment in one or another mode of resource procurement (McCay 1978). EU solutions have in some cases transformed social–ecological systems rather than help them adapt to the current situation (Folke 2006). For example, decommissioning schemes and Individual Transferable Quotas (ITQs) in Denmark have caused a shift in the capacity of fishing fleets. In contrast, subsidies have been used to help communities adapt to new regulatory measures by acting as shock absorbers.<sup>2</sup> However, the subsidies given by the EU and the way these subsidies are distributed distort the economic landscape of fisheries without addressing the underlying issues such as the overcapacity of the sector (Robards and Greenberg 2007).

Upon the publication of the Green Paper on the reform of the CFP in 2009 (European Commission 2009), a flow of different opinions and arguments as to how regionalization would become a new policy element in the new reformed CFP commenced (Hegland et al. 2012). The Commission's proposals that followed the Green Paper failed to follow on the expectations from the Green Paper and would not commit Member States to cooperation at the regional sea level (Raakjær et al. 2012).

Nevertheless, regionalization of the CFP is a work in progress (Symes 2012) and therefore understanding the data and governance needs are as vital as ever. It is important that the historical, biological, and geopolitical differences of the Atlantic and the Mediterranean fisheries SESs are integrated in the governance of the new framework of the CFP taking into account all relevant social, economic, and biological characteristics of each region whilst allowing for regional flexibility (Hadjimichael et al. 2010).

Within this context, the primary aim of this paper is to understand how the different agents in the resilience framework interact (resource, resource users, public infrastructure, and public infrastructure providers) in two different fisheries SESs in the EU. Thus, the systems' resilience is explored in terms of institutional arrangement and ecological dynamics. Specific objectives of this paper are to analyze the robustness of SESs from an institutional perspective using the framework designed by Anderies et al. (2004) incorporating primary field data and other relevant literature. The SESs examined are the Mediterranean inshore fleet and the East Coast Licensed Small Boat association on the Scottish East coast (ECLSBA). The two fleets were chosen for this study due to the similarities of

<sup>2</sup> For example, fuel subsidies to fishers aim to assist fishers in times when fuel prices are too high.

the fleets (boat size, gear used) on the one hand, and the regulatory and the bio-ecological differences on the other.

## Background

The Cypriot inshore fleet is composed primarily of small fishing vessels (less than 12 m) that use seasonally deployed passive gear. This is the most important fleet in terms of vessel numbers (93 % of the overall active fleet), employment (74 % of the total employment of the Cypriot fleet), and its contribution to national fleet production (44 % of the total national volume of landings and 58 % of the total value of landings)<sup>3</sup> (Anderson and Guillen 2009). Landings are mainly composed of *Spicara* spp. (mostly *Spicara smaris*), *Boops boops*, *Mullus barbatus*, *Mullus surmuletus*, *Pagellus erythrinus*, and cephalopods (*Octopus vulgaris*, *Eledone moschata*, *Loligo vulgaris*, and *Sepia officinalis*). The fleet also lands relatively large quantities of *Diplodus* spp., *Sparisoma cretense*, and *Siganus* spp. The Scottish inshore fleet is represented in this study by the ECLSBA, a small self-organized fishers' association which includes small-scale fishers operating from various harbors along the East coast of Scotland. These harbors include Peterhead and Fraserburgh, but also smaller ones such as Banff, Macduff, Sandhaven, and Portsoy. Fishers in ECLSBA are owners of boats less than 10 m in length and operate with handlines or pots/creels, depending on the season. Handlines are used during the summer months to catch mackerel (*Scomber scombrus*). However, potting for species such as Norway lobster, or *Nephrops norvegicus* but also brown crabs (*Cancer pagurus*) and lobsters (*Homarus gammarus*) is essential for full-time fishers due to their small mackerel quota allowance. For both case studies, only professional fishers were interviewed.

Despite the fact that both case studies are found in EU Member States, their activities take place within the respective country's 12 nautical miles limit which means that they fall under national jurisdiction rather than under the CFP. However, the catches of inshore fishers fishing in UK waters are controlled by the EU-wide measure of total allowable catches (TAC). According to this measure, each Member State is allocated a percentage share of catch (for certain species in certain areas), following an established allocation mechanism which gives each Member State a fixed percentage share each year. From then on, it is up to individual Member States to decide how the quotas will be allocated to individual fishers. In Scotland, the quotas are shared out in a way which relates to a vessels' previous fishing activity or "track record." This allows fish producer organizations (POs) to manage their allocations of

fish quota according to the needs of their members (vessels) and take appropriate action to ensure that quotas are not overfished. For the ECLSBA fishers particularly: "the quota allocation for the under-10 m vessels fishing for mackerel by handline in Area IVa will be subject to a minimum allocation of 300 ton. This allocation may be caught only in Area IVa and not in Areas IIIa, IVb or IVc. Fisheries administrations will endeavour to acquire sufficient quota to allow for the opening of an under-10 m handline mackerel fishery in area IVbc in accordance with seasonality."<sup>4</sup>

Mediterranean EU Member States on the other hand, are expected to implement Council Regulation (EC) No. 1967/2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea. The Regulation lays down technical measures and lowers the threshold for species other than highly migratory and small pelagic ones that have to be recorded in the logbook from 50 to 15 kg live-weight equivalent. The regulation also increases the mesh sizes and hook sizes for trawl nets, bottom-set nets, and longlines for certain species and makes the use of square-meshed nets mandatory. Finally, it determines the overall size of the main types of passive fishing gear and reserves part of the coastal area for selective gears used by small-scale fishermen.

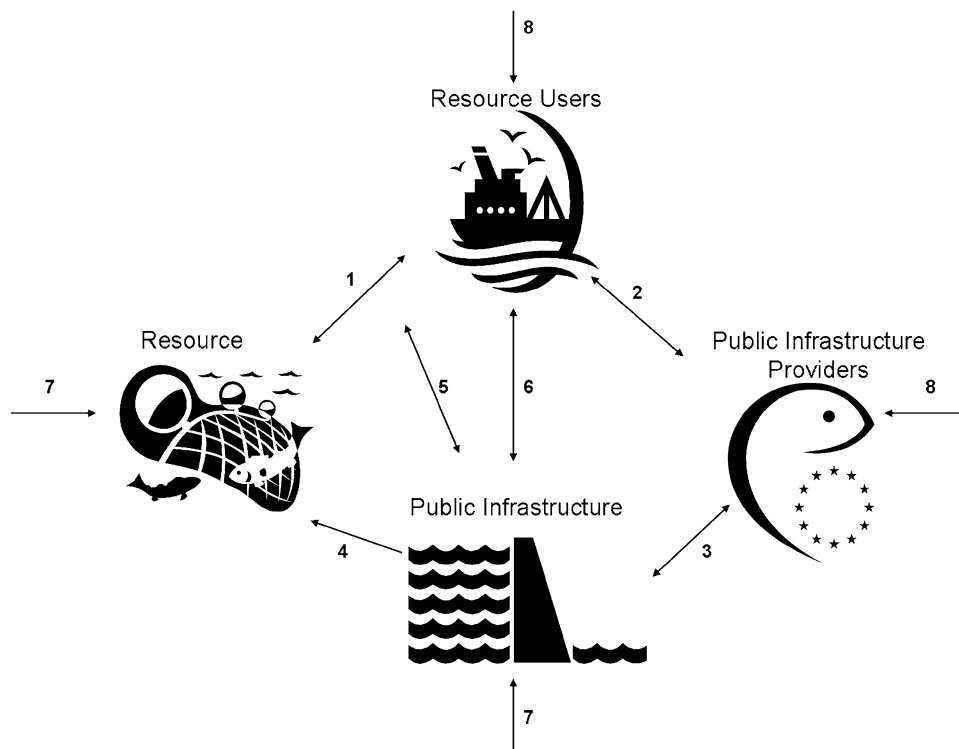
## MATERIALS AND METHODS

This paper explores the resilience of two inshore fisheries SESs in the EU using a modified version of the framework proposed by Anderies et al. (2004) (hereafter: framework). The framework was designed to be used by researchers from diverse disciplines as a method to analyze internal dynamics among four components of SESs, two human components, (i) resource users and (ii) public infrastructure providers, (iii) the resource, and (iv) public infrastructure. By studying the resilience of a resource-dependent SES, one can explore how the resource users interact with the other three components of the system and how they react to a change that be an environmental problem, i.e., stock collapse, change in the biology of the natural system, or a change in the management regime, etc.

The framework consists of a set of definitions and a list of attributes that are of key importance to understanding the robustness of SESs. Specifically, it looks at how institutional arrangements affect the robustness of SESs and for this study in particular which if any disruptions impacted the robustness of either of the case studies. To achieve this, disturbances which occurred over time were isolated, the processes triggered and problems caused were

<sup>3</sup> The Cypriot inshore fleet had a value of around € 1.1 million in 2007, approximately \$1 469 050 (Anderson and Guillen 2009).

<sup>4</sup> <http://www.defra.gov.uk/foodfarm/fisheries/documents/fisheries/rules.pdf>.



**Fig. 1** A conceptual model of a social–ecological system with the *numbered links* involved between the four agents (the *numbered links* are described in Table 1) (adapted from Anderies et al. 2004)

described along with the reactions in response to these problems (Ternström 2004). A conceptual framework of a SES with the different components and the different links between them is presented in Fig. 1. The resource is a form of natural capital transformed for use by resource users. The public infrastructure providers intervene to control its use through regulatory measures (public infrastructure). The resource users and the public infrastructure providers are two actors with “different specialized tasks” leading to more complex SES (Janssen and Ostrom 2006). However, there are times where there is a substantial overlap or they may be entirely different individuals depending on the structure of the social system governing and managing the SES. The term public infrastructure depends upon the SES context and can represent either physical or social capital, where physical capital includes engineered works such as dams, and social capital represents the rules used by those governing, managing, and using the system (Janssen 2006). Public infrastructure providers are national or EU wide policy/decision-makers. The links between components were identified and numbered and are presented (Table 1).

### Nature of the Data

Empirical data for this study include survey data collected for a different study which used a conjoint analysis method to

**Table 1** Links involved in social–ecological systems (adapted from Anderies et al. 2004)

Number	Link
(*)	Between different users
(1)	Between resource and resource users
(2)	Between users and public infrastructure providers
(3)	Between public infrastructure providers and public infrastructure
(4)	Between public infrastructure and resource
(5)	Between public infrastructure and resource dynamics
(6)	Between resource users and public infrastructure
(7)	External forces on resource and infrastructure (biophysical disruptions)
(8)	External forces on social actors (socioeconomic changes)

identify fishers’ opinions with respect to their most and least preferred regulatory obligations in terms of the regulations impact on their income (results from this study are published in Hadjimichael et al. 2013). Problems and challenges faced by fishers which repeatedly came up during conversation were further explored using secondary data such as past research literature, national reports, relevant national, and European regulations as well as follow-up interviews with governmental fisheries experts. Consequently, the data

gathered pertained to the most important issues for each case study but were not designed with ease of comparability in mind. However, using the adapted framework, key interactions (links) were analyzed for two SESs.

For Case Study 1, the Cypriot inshore fleet, empirical data were collected in seven ports along the Southern coast of Cyprus,<sup>5</sup> and 47 fishers were interviewed during June 2009. Data from ports in Palamos and the island of Mallorca (Spanish Mediterranean) were also collected in July 2009 but were limited due to time restrictions and language barriers. There were 23 interviews conducted with inshore fishers in the Spanish Mediterranean. In Cyprus, representatives of the Department of Fisheries and Marine Research (hereafter: DFMR) were interviewed in addition to fishers. The empirical data for Case Study 2, the ECLSBA, were collected during interviews with the president of the association and a number of members of the association (9 interviews were conducted) during May 2009 in Fraserburgh.

## RESULTS

The interactions (links) between the four components differed between the two case studies and these differences related to different disruptions either on the resource users or on the resource itself by the other two components of the SES, namely the public infrastructure and the public infrastructure providers. Table 2 summarizes the issues that arose from the interactions of the different SES components in the two case studies.

### Case Study 1: Cypriot Inshore Fleet (with References from the Spanish Mediterranean)

Mediterranean inshore fishers agreed that their catches have been decreasing; the fish they catch is less, and also smaller in size. Fishers also pointed out that the narrowness of the continental shelf means that a substantial part of the fishing activities are carried out close to the coast. In Cyprus specifically, according to the fishers and a DFMR officer, there used to be a lot of competition between the small-scale fishers and the few trawlers that were in operation in Cyprus, specifically due to the fact that the trawlers would operate around the same areas with the small-scale fleet because of the narrowness of the continental shelf.

According to the Cypriot small-scale fishers, the inshore trawling fleet used to destroy both the inshore fishing

grounds by damaging the seabed with the bottom trawl gear but it would also sometimes damage passive gear deployed in the same fishing grounds. Cyprus' accession in the EU and access to the European Fisheries Fund (EFF), assisted in the decommissioning of the inshore trawlers that operated in the Cyprus EEZ.

The impact of recreational fisheries on small-scale fishers was raised on many occasions during the interviews with fishers from both Cyprus and the Spanish Mediterranean. Small-scale fishermen criticized the activities of the recreational fishermen in their areas and suggested that in many ways they are their biggest threat. The main reason for this concern is that recreational and small-scale fishermen in the Mediterranean compete for the same resources: (i) boats are of same size and power (sometimes wealthy recreational fishers own boats that are more powerful than the small-scale, professional fishers), (ii) there is a lack of control in the catches and activity of the recreational fishers, and (iii) recreational fishers sometimes illegally sell their catch to restaurants<sup>6</sup> for a lower price than that of professional fishers. Fishers also felt that there is a lack of control on the activities of recreational fishers for a number of reasons. Recreational fishing takes place during out-of-office hours and recreational fishers, unlike professional fishers in Cyprus, are not required to have vessel monitoring systems (VMS) on their vessels.

For fishers in Cyprus, the growing population of an invasive species, referred to by the locals as lagocephalos (rabbit fish), or commonly known as silverstripe blassop (*Lagocephalus scleratus*) has been their number one problem. The silverstripe blassop is widespread in the Indo-Pacific and migrated from the Red Sea into the Mediterranean through the Suez Canal and is thus a “lessepsian migrant”<sup>7</sup> (DFMR 2008). According to DFMR, *Lagocephalos* was first reported in Cyprus in 2000, although it has become more common in catches since 2004. Measuring up to 100 cm in length and 7 kg in weight, *Lagocephalos* can cause serious damage to the catch and fishing gear of fishermen, using its powerful jaws. Additionally, it has no commercial value due to the presence of tetrodotoxin in its tissues, a neurotoxin that can be a source of poisoning with high fatality risk.

There appears to be a rather dysfunctional relationship between fishers and the Cypriot authorities, which challenges any attempts at a collaborative relationship between the industry and the authorities. During the interviews, it was apparent that fishers distrust local authorities, both the DFMR and the decision-makers (Cypriot Ministers of

<sup>5</sup> Visits along the North coast were not possible due the political situation in Cyprus: the island was partitioned in 1974 during the Turkish Invasion and the Northern part of the island has been under Turkish occupation since.

<sup>6</sup> This accusation was also made by small-scale fishers in the UK.

<sup>7</sup> Also known as the Erythrean invasion: the on-going migration of marine species across the Suez Canal, usually from the Red Sea to the Mediterranean Sea, or more rarely in the opposite direction.



**Table 2** The different entities involved in each component of the two EU fisheries social–ecological systems and the issues that arise from their interaction

Component	Social–ecological system		Issues
	Inshore Fleet, Cyprus	East Coast Licensed Boat Association, UK	
Resource	Fishery	Fishery	Complexity Lack of data on the resource/ ecosystem Uncertainty
Resource users	<i>Professional</i> Fishers; passive fleet, polyvalent fleet, trawlers <i>Recreational</i> fishers	<i>Professional</i> Fishers Inshore: ECLSBA Offshore: Scottish, Spanish, French	Overharvesting
Public infrastructure providers	Local and national representatives Department of Fisheries and Marine Research National decision-makers EU	Inshore Fisheries Groups (IFGs) Scottish fisheries protection agency (beyond 12 miles) National POs National decision-makers EU	Conflicts among national and EU decision-makers Different priorities (environmental, social, economic)
Public infrastructure	National Fisheries Act CFP Aswan dam Suez canal	National Fisheries Act CFP Marine Stewardship Council certification	Failure of policy goals (resource depletion, socioeconomic consequences) Non-compliance Invasive species

Parliament). Additionally, the majority of the fishers believed that the country's accession to the EU would have a positive impact on their profession. Even though the country's accession in the EU led to an increase in regulatory obligations for its fishers, it is perceived as a positive step for two main reasons: (i) fishers felt there was a higher body where they could object decisions taken by the national decision-makers, and (ii) the EFF meant additional support for exit from the industry, improvement of fishing harbors (also known as fishing shelters), etc.

A concrete example that kept coming up during the interviews with Cypriot fishers was the introduction of a 2007 legislation measure which gave recreational fishers professional status (Category C status). According to this new regulation (Number 132(I) of 2007), Category C holders are allowed to use nets of restricted mesh and of maximum 600 m but only during weekends. This legislation was introduced after the introduction of EC Regulation 1967/2006<sup>8</sup> which prohibited recreational fishers from using fishing nets and thus catching large amounts and species of fish.

For many, the introduction of Category C status was a mechanism used by decision-makers (members of parliament) to benefit influential and rich recreational fishers prior

<sup>8</sup> Council Regulation (EC) No 1967/2006 of December 21, 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea.

to elections. According to the president of the Association of Professional Fishermen, in Cyprus mail<sup>9</sup> “instead of the Cyprus Parliament approving the regulation (EC No. 1967/2006) so that it can become law, after pressure from the masses of amateurs and in an attempt to attract votes, not only did it not approve it, but instead bypassed it and with a special legal amendment created a category C of fishermen.” According to fishers, Category C holders were sometimes upgraded by the DFMR to a Category A or B status<sup>10</sup> (and sometimes Category A or B fishers were downgraded to Category C). Since the creation of Category C licenses, license holders are perceived as an even greater threat to the professional fishers as they are now allowed to sell their catch.

### Case Study 2: East Coast Licensed Small Boat Association, Scotland, UK

The fishers interviewed were members of ECLSBA, and suggested that restrictions in the form of TACs and particularly, the way the quotas are distributed, have left inshore fishers with, “the crumbs of the quota cake” as one of the fishers described it with larger boats being part of

<sup>9</sup> <http://www.cyprus-mail.com/cyprus/parliament-accused-passing-fishing-laws-attract-votes>.

<sup>10</sup> Categories A and B are for professional fishers for whom fishing is their main (Category A) or part-time (Category B) occupation.

politically stronger and better represented fishers' associations' acquire the majority of the quotas. The ECLSBA, just like the majority of fishers interviewed in Scotland (Hadjimichael et al. 2013), were critical of the EU and the regulations of the CFP. This view is supported by other studies in the area which suggest that fishers attribute the contemporary crisis in the fishing industry to the CFP (Nuttall 2000; Rossiter and Stead 2003). The regulatory tool of the TAC is regarded by fishers as the measure having the greatest impact on fishers' income.

The creation of Inshore Fisheries Groups (IFGs) in order to "improve the management of Scotland's inshore fisheries and to give commercial inshore fishermen a strong voice in wider marine management developments" (Scottish Government 2008) appears to be a step to the right direction. Even though at the time of the interviews, fishers expressed their satisfaction for this development, time was required to evaluate its success or failure. Members of ECLSBA believe that the relevant authorities do not provide enough advice and information regarding new and existing regulatory measures, changes in the regulations and regimes, and even on how different measures needed to be implemented from them. Fishers feel that due to their size and the relatively small economic input to the national economy, the authorities do not show an interest in ensuring the livelihood and in securing the existence of the sector.

During the interviews, fishers from ECLSBA also pointed out that even though they are using more environmentally friendly fishing practices than their more industrial fishing counterparts, they cannot afford to get MSC accreditation. This makes it harder for them to sell their fish or it obliges them to sell at a lower price. Establishment of voluntary standards, labels, and codes of conduct such as the Marine Stewardship Council (MSC) accreditation scheme are intended to reward sustainable use of marine natural resources and also producers from unjust trade relations.

The move toward seafood products that are certified as sustainable is being driven by environmentally sensitive consumers that are concerned about how a product is produced and prefers those derived from sustainably managed resources (Egestad 2001). It is thus a market-based, rather than a regulation-based mechanism aiming to promote sustainable fishing by encouraging consumers to choose to buy a sustainable fished resource rather than an unsustainable one. The MSC accreditation scheme has been criticized for a number of reasons including (Ponte 2008; Jacquet et al. 2010) having been driven by the largest commercial player in the industry (or at least at the beginning), not having consulted with fishers at the stage of the development of the standard, having a centralized and corporate structure, being biased in favor of industrial

fisheries, high costs of compliance and certification and not ensuring sustainability.

## DISCUSSION

Socio-political and biological regional differences show how the complex interactions among different agents in SESs force them to adapt to different conditions and how internal reactions to external disturbances vary amongst different fishing communities. National differences in social norms and culture form another problem as the institution of norms and culture changes at a slower rate than changing from one formal rule to another (Rova 2000). This paper identified a regional variability in the links among the different components in the two fisheries SESs. This validates that "one size does not fit all" as there are different regional factors which depend on regional socio-cultural, political, and biological contexts that influence the resilience of SESs. It is imperative to acknowledge and understand the various elements other than regulatory measures that can disturb a SES. As argued by Anderies et al. (2004) small-scale fisheries SESs can be robust over long periods but such systems may collapse rapidly, when large biophysical or socioeconomic disturbances occur. This study confirms that argument with the vulnerability of two EU cases increasing due to: (i) the invasion of the rabbit fish from the Red Sea and the activities of the recreational fishers that disrupted the Cypriot inshore fisheries SES, and (ii) the inequitable distribution of quotas and a challenging access to markets because of lacking MSC certification.

SES resilience theory has seen a limited application in EU fisheries. However, analysis of feedbacks in SES can help stimulate a debate and deepen our understanding of what needs to change to allow transformation of EU fisheries governance with the desirable ecological, social, and economic outcomes (Österblom et al. 2011). With the CFP reform negotiations heading toward the end, besides a resolution from the European Parliament stating that small-scale fisheries needed to be considered more in the CFP,<sup>11</sup> nothing concrete in legal terms is expected as the proposals for the reform of the CFP do not adequately address the problems faced by small-scale fishing. A SESs perspective can help integrate social and ecological aspects of a system shifting the focus from solely the biological and economic aspects bioeconomic models focused upon.

Inshore fishers, though in general subjected to fewer regulatory measures, face many challenges. For example,

<sup>11</sup> The adopted text can be found here: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2012-0460+0+DOC+XML+V0/EN>.

competition from large-scale offshore fishing and recreational fishers puts pressure on both resources and markets (van Ginkel and Steins 2001; Morales-Nin et al. 2005). Inshore fishers interviewed in this study from Cyprus and the Spanish Mediterranean argued that recreational fishing has a greater impact on them than any of the regulatory measures. According to a report on small-scale fisheries in Europe, recreational fishers put pressure on the resources and on access to fishing zones. They distort the market for legal fishers, who are themselves subjected to higher production costs due to taxation, social contributions, and compliance with licensing and other regulations (Ifremer 2007). Additionally, technological innovation, the development of marine transport, and the rise of tourism have all increased the level of human impact on coastal areas and resources along with long-term developments such as demographic growth, urbanization, expanding demand for food and natural resources, the integration of resources into markets interfering with inshore fisheries (van Ginkel and Steins 2001).

In the Mediterranean, unlike the UK, small-scale fishermen form the largest fisheries group with the highest contribution to the national economy. Consequently, unlike in the UK, regulatory measures tend to be introduced taking the fleet's specificities into account. The Mediterranean small-scale fishers do not seem to have been particularly affected by the CFP regulations. The reasons for this are (i) there are not many legally binding EU legislations for inshore waters (less than 12 nm from the coast), and (ii) the authorities are adjusting the EU regulations to the needs of their national fleet (this was found particularly true in the Cypriot case study). For both national fleets, a severe problem has been their inability to compete (spatially but also in terms of markets) with the illegal fishers and/or the politically strong recreational fishers. In Cyprus, this has amplified commercial fishers' mistrust of the national authorities. The greatest difficulty in Cyprus, however, has been the invasion of the rabbit fish population; a result of the creation of the Suez Canal assisted by an increase in sea temperatures. Fishers suggested that the impacts caused by the rabbit fish invasion far outweigh any impacts derived from national or CFP regulations.

Unlike the Mediterranean fishers, the inshore fishers in East Scotland are affected by EU regulations, particularly by the TAC controls which due to the small amount of quota allocated to them, makes pursuit of the relevant fisheries (especially mackerel) not worthwhile. Such inshore fleets lack the power of their offshore counterparts due to their limited contribution to the economy. In a recent attempt, the UK government has tried to reallocate unused quota worth more than approximately US\$ 1 563 000 from big firms to small-scale fishermen. However, the UK

Association of Fish Producer Organizations whose members are mainly large-scale fishermen and that controls more than 90 % of the overall fishing quota for England and Wales has taken the government to court claiming that the government cannot reallocate quota without the consent of the association.<sup>12</sup> Their small-scale nature has also affected their lack of ability to enter into the MSC accreditation process which reduces their ability to compete with other products. However, since fieldwork was undertaken, the ECLSBA have become members of the Moray Firth IFG which is part of an initiative of the Scottish Government to "offer an innovative, partnership-led and locally specific approach to fisheries management" (The Scottish Government 2010). Though the association received "a warm welcome" from the IFG, it remains to be seen how their new-found partners may help improve their position (ECLSBA representative, pers. comm.).

Complex SESs in complex settings can rarely be prescribed with an optimal solution and those involved have to learn over time by experimenting with local ideas and past examples (Janssen and Ostrom 2006). Specifically, when new policies are devised by external authorities, these policies are rarely tailored to the local ecology and culture, and thus fail to take into account those socio-ecological and political specificities which can eventually lead to the success of those policies. Fisheries management has been used many times as a tool to react to resource crises (i.e., fishery closures after stock collapses or overcapitalized subsidies) rather than as a prevention tool hence in an attempt to remove a disturbance rather than help the system adapt to it. This created systems which are static and inelastic meaning that they are not robust as they do not have sufficient buffering capacity after a change (Rova 2000).

Just as specific biological data are required for each area and stock for decision-making, similarly specific social knowledge data should be collected for specific national fleets. With regards to future policies and decisions, even though the importance of a more regional management is appreciated in the Commission's Green Paper for the reform of the CFP, this paper demonstrates the importance of not solely a regional approach for inshore fisheries management, but rather one which is as close as possible to the fisheries community. In contrast to attempting to control natural resources for stable or maximum production and short-term economic gain, a resilience approach assumes an uncertain and complex natural-resource context and aims to achieve sustainable long-term delivery of environmental benefits linked to human wellbeing. Institutional diversity of well-functioning small-scale SESs also needs to be preserved as it provides a rich set of solutions for social systems' adaptation to ecological contexts (Folke and Berkes 1995;

<sup>12</sup> <http://www.bbc.co.uk/news/uk-22363873>.



Janssen et al. 2007). Finally, it is also important to acknowledge the needs and desires of the affected communities when considering ways to enhance their resilience or assist toward their adaption or transformation.

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## AUTHOR BIOGRAPHIES

**Maria Hadjimichael** (✉) is a Post-doctoral researcher at the Innovative Fisheries Management Institute at Aalborg University, Denmark, working on fisheries and marine governance. Her main research interests are political ecology and governance of common property resources, with a marine and fisheries focus.

*Address:* Department of Development and Planning, IFM Aalborg, Skibrogade 5, 9000 Aalborg, Denmark.  
e-mail: mmh@plan.aau.dk

**Alyne Delaney** is an Associate Professor at the Innovative Fisheries Management Institute at Aalborg University, Denmark. Her main research interests include social organisation, natural resource management, social sustainability, and maritime anthropology.

*Address:* Department of Development and Planning, IFM Aalborg, Skibrogade 5, 9000 Aalborg, Denmark.  
e-mail: ad@plan.aau.dk

**Michel J. Kaiser** is a Professor of Marine Conservation Ecology at Bangor University, Wales, UK. His main research is divided into four main themes: the ecosystem effects of fishing, sustainable aquaculture, disturbance ecology and socioeconomic and biological issues relevant to coastal systems management.

*Address:* School of Ocean Sciences, Bangor University, Menai Bridge, Anglesey LL59 5AB, UK.  
e-mail: michel.kaiser@bangor.ac.uk

**Gareth Edwards-Jones** was a Professor of Agriculture and Land Use Studies at Bangor University, Wales, UK. Prof. Edwards-Jones passed away in August 2011.

*Address:* Bangor University, Gwynedd, UK.