International Journal of the Commons
Vol. 5, no 2 August 2011, pp. 233–258
Publisher: Igitur publishing
URL:http://www.thecommonsjournal.org
URN:NBN:NL:UI:10-1-101632

ISSN: 1875-0281

Power, knowledge, and conflict in the shaping of commons governance. The case of EU Baltic fisheries

Tom R. Burns
Department of Sociology, University of Uppsala, Uppsala, Sweden,
tomburns@stanford.edu

Christian Stöhr
Department of Applied Information Technology, Chalmers University of Technology, Gothenburg, Sweden,
christian.stohr@chalmers.se

Abstract: This article aims at contributing to governance conceptualization and its application to case study analyses. Two of the challenges which the theoretical and empirical work in the article addresses concern the facilitation of comparability of diverse governance cases and a specification of several key mechanisms of governance formation and reform. A proposed model of the *architecture of governance systems* – their major components and inter-linkages – contributes, as argued and illustrated here, to greater comparability among cases and with the possibility of improved accumulation of knowledge about governance systems. These tools are applied to empirical cases of governance structure and their functioning and reformation. Baltic fisheries, a complex, multi-level case of commons governance, is considered in some detail in order to illustrate and elaborate the key factors of power, knowledge, and conflict in the functioning and transformation of governance systems. In addition to the Baltic fisheries case, we consider briefly for comparative purposes chemicals and gender relations as additional areas of EU governance. The paper is divided into four sections. Section I introduces the basic conceptualization and tools of analysis. Section II presents the case of Baltic fisheries. Section III elaborates the key concepts and tools presented in Section I, in particular considering additional cases of the functioning of governance systems. Section IV is a brief conclusion.

Keywords: Baltic fisheries, commons, conflict, governance, governance architecture, knowledge, power

Acknowledgements: We are grateful two anonymous reviewers and to Elinor Ostrom, Dolores Gomez Calvo, Marcus Carson, Peter Hall, Ilan Kelman, Nora Machado, Alberto Martinelli, and Mikael Roman for reading and suggesting

changes in earlier versions of this paper. We want to particularly thank Helena Flam for analyzing and commenting in great detail on a couple of versions of this paper. Thanks also to the Baltic 2020 foundation, the Swedish Board of Fisheries and the European Fisheries Fund for their financial support for the case study of Baltic Sea fisheries. During the preparations of this article, Burns has been a Visiting Scholar at the Woods Institute for the Environment, Stanford University; he has also been partially funded by CERES21 at the Center for Development and Environment (SUM), University of Oslo.

1. Introduction

Students of governance require tools to allow systematic analysis and comparability of diverse governance systems. In spite of a great deal of excellent research on governance, in particular commons governance,[1] and numerous excellent case studies, there remain gaps and challenges. One of these gaps, which our theoretical and empirical research tries to address, concern the facilitation of comparability of governance cases. In this article, we suggest a framework for the analysis of the architecture of governance systems – their major components and interlinkages. This conceptual tool contributes to greater comparability among cases and better accumulation of knowledge about commons governance systems and their functioning. The article presents the tools (Section I) and applies them to the empirical case of fisheries governance in the Baltic Sea (Section II), bringing out selected features of social organizational and the cognitive-normative components characterizing the case. In our comparative analysis (Section III), we focus in addition to the Baltic fisheries [a classic common pool resource (CPR)], on chemicals and gender relations as additional areas of EU commons governance.[2]

2. Basic concepts

2.1. Governance

Governance refers to a system of public and/or private coordinating, steering and regulatory processes established and conducted for social (or collective) purposes

[1] The term "commons" describes goods that are shared among a well or ill-defined group of actors and provide some kind of yield. Commons can, but by no means have to, be open access resources. Ostrom and others distinguish public goods and common pool resources (CPRs) depending on whether or not the yield is subtractable (Ostrom 2005, 24). As other environmental resources such as water, air or grazing land, the fisheries case in this paper is a classic example of a CPR. Ostrom has also expanded the CPR concept to cover, for example, knowledge and information (Hess and Ostrom 2006).

[2] Chemistry and gender do not fall within the CPR conception but can be considered public goods. The governance of chemicals concerns protecting the global commons of human health and ecosystems. The governance of gender concerns obviously multiple values. It relates to the realization of a just and democratic society. While the human population is more than a "public good" or a "valued natural resource," its protection and sustainability are worthy of public policy: and women in particular, their conditions in education systems, on labor markets, and in health care systems as well as their empowerment in general – are essential to the global commons of humanity and a worthy focus of governance.

where powers are distributed among multiple agents, according to formal and informal rules (Burns and Flam 1987; Ostrom et al. 1994).[3] Governance systems are developed and applied to a vast array of objects in modern society, for purposes of shaping, governing, and regulating such objects.

Governance systems are the basis on which to make as well as reform, interpret, implement, and enforce rules and policies with respect to domains of policy and regulation in social life. The agents – both directing governance systems as well as subject to them – may be diverse: "political actors" (parties, states, international government organs), economic interests (private companies, business alliances and associations), non-profit organizations, NGOs, groups and associations of scientists and other experts, local communities, networks, or any social entity that conducts activities of deciding, governing, coordinating, regulating, allocating resources, etc.

Given the contrasting objects of regulation systems (and the diversity of human behaviour and the material and socio-cultural contexts related to the objects of governance), it is not surprising that *the governance arrangements exhibit great variability, in particular in their specific relation(s) to the objects of regulation.*[4] In governance processes, operations are carried out not only on the objects to be regulated but also on the actors in the governance structure who are to perform the functions of governing, regulating, and developing. Regulation typically extends also to those who receive or use the objects (e.g. goods and services) of governance systems.

2.2. Toward a conceptualization of the architecture and functioning of governance systems

2.2.1. The architecture of governance systems

Governance systems – and their policy goals and tools – are institutional and cultural arrangements characterized by (see Table 1) (Carson et al. 2009):[5]

[3] The concept of governance (Ostrom 1990; Campbell et al. 1991; Kooiman 1993; Marks et al. 1996; Glasbergen et al. 2007; Jordan et al. 2010; McGinnis 2010 among others*)* has been articulated since the 1980s necessitated by the emergence of many private and hybrid forms of coordination and regulation in contemporary society.

[4] Governance design and functioning take into account or reflect characteristics of the governance objects and their environmental context. Thus, a governance institution combines ("composes" if you will) social structural "facts" with material "facts" (human biology, environment, time and space, "natural" conditions) – with their different types of causality and "logics". This is apparent in the case of socio-technical systems; for example, in the case of a hydro-power system, diverse but more or less integrated governance arrangements deal with water reservoirs and flows, land, people, electricity production and distribution – the different governance sub-systems have varying social organization, expertise, and problem-solving models.

[5] The approach outlined in this paper relates to Ostrom and associates' Institutional Analysis and Development framework (Ostrom 2005; McGinnis 2010) [and variants of it, e.g. the design principles for sustainable management of common-pool resources (Ostrom 1990)]. See Kooiman et al. (2005) who also applies institutional analysis to fisheries governance.

Table 1: Elements comprising the architecture of a governance paradigm

Feature of the governance paradigm	Explanation
Social organizational configuration	
Authority and responsibility	Actors with formal or informal responsibility for addressing and/or resolving key issues and problems
Expertise and knowledge requirements	Actors that are legitimate knowledge sources and producers to explain sources and solutions of any particular issue
Other affected actors, stakeholders	Actors that are not directly part of the governance regime itself but are affected by it and/or try to influence it
Procedures for (legitimate) decision-making	Designation of persons with authority to make decisions or define who and how actors should be involved in a collective decision-making process Also includes deliberating, resolving or settling conflicts, and deciding the nature of the problem and the right strategy and solution
Cognitive-normative configuration	
Problem or issue	Framing and characterization of the key issues that the governance system is supposed to regulate
Goals and priorities	Definition of legitimate values and appropriate goals which are expected to be applied in the policy-making and governing processes
Conceptualization/model of the situation or issues	The applied model(s) of the social arrangements, the natural or technological system and the interaction between them (which may or may not be correct)
Solutions	Specification of form and range of acceptable methods to achieve the goals including the appropriate, available institutional practices, technologies and strategies

1. **Their social organizational features**: particular classes of designated agents, their roles and relations of power/authority, and procedures for making collective decisions.
2. **Their normative-cognitive features**: the definition of relevant or appropriate "problems" or "issues", the goals or priorities relating to the problems and to favourable states of the world, conceptualization or models of sources of the problems, the causal linkages, and strategies and methods to solve problems or deal with issues.

The paradigms define, frame problems or problem situations, the "objects" that are to be shaped, produced, governed, or transformed. The distinctions between the two basic building blocks of governance systems – the social organizational configuration and the cognitive-normative configuration – are not just analytical ones. The important point to note regarding the different categories is that they exert different kinds of influence. Organization exerts a direct pressure

influencing and regulating overt behaviour, while the influence that stems from the cognitive-normative configuration is conceptual and normative. In an instance where a policy paradigm is highly institutionalized, the two would be expected to mirror one another to a very large extent.[6] In instances where the level of institutionalization is much lower, such as in periods of transition or confrontation over paradigmatic elements, one would expect many gaps and inconsistencies, as a new policy paradigm is constructed, struggled over, and reconstructed over time and space.

2.2.2. Key factors in the functioning of governance systems

Governance systems are a type of social system. Social systems are characterized by institutional arrangements, organized forms of power, diverse knowledges and conflict/struggle within and over the systems (Burns 2006). Power, knowledge, and conflict are three key dimensions with which to explain a significant part of the functioning and transformation of governance systems. Briefly:

A. Power, different types of power including expert powers:
Power and control are central to governance systems – both in their functioning but also in establishing or changing them. In their functioning, relations of authority and responsibility already have been singled out in our characterization of the architecture of governance systems. In general, the power arrangements of governance systems may vary greatly: there are hierarchical forms including bureaucratic and patron-client types of hierarchy, horizontal (for instance, negotiating orders run by a committee, board, or a network), "markets-like", "democratic-like decision-making", and a great variety of hybrids. McGinnis (2010, 6) also stresses that, in general, governance need not be conceptualized as authoritative agents having "power over" subjects or citizens, but can entail various forms of agents jointly exercising "power with others" in joint efforts to solve common problems or realize shared goals. Power may be backed by substantial economic or political resources, but increasingly there are various forms of "soft powers" (Carson et al. 2009).

B. Knowledges:
Governance systems typically entail knowledge acquisition and production processes evolving in concrete, practical ways, particularly those dealing with

[6] For the application of the framework to describe the architecture of specific governance systems, one would usually reflect the institutionalized view of the most powerful actor (e.g. the EU in the cases in this paper). However, in governance systems with major cleavages or a low level of institutionalization, the cognitive-normative and social organizational framework might significantly differ among different agents or groups of agents. One of the applications of the framework is to compare the different conceptions of an appropriate governance paradigm among different actors in order to identify and explicate sources of conflict that might lead to dysfunctioning and ultimately transformations of the governance system (Carson et al. 2009).

objects or phenomena about which specialized (scientific and other) knowledge is believed to be essential to regulatory effectiveness.

Because most governance arrangements consist of multiple regulatory mechanisms, diverse bodies of knowledge are required (for example, different scientific disciplines plus diverse stakeholders with their local or tacit knowledge). Together these increase the likelihood of effective policy-making and regulation. One of the aims of many governance arrangements is through the design of organizational forms and procedures to enable the systematic application of relevant knowledges to governance problems, for instance, local practical knowledge, scientific knowledge, knowledge of law (and, thus, sustainable in any challenge "according to the law") etc. Indeed, one of the challenges in contemporary governance design is to effectivize legitimate procedures incorporating the increasing diversity of expertise as well as an increasing engagement of a variety of "relevant or appropriate stakeholders". The results are complex governance arrangements as illustrated in the Baltic fisheries case presented later. By complexity we understand that the governance system is characterized by a high number of actors, relations and dependencies between them, regulatory processes, forms of knowledge and interests that are difficult to understand and coordinate, create non-linear dynamics and may therefore lead to unforeseen developments and outcomes of the governance system as such.

C. Contestation/conflict:
Governance systems typically entail multiple forms of power and regulatory processes, multiple agents (including different stakeholders), diverse forms of knowledge and interests among those involved and affected by such systems. This provides a context for contradiction and conflict. Since agents involved in government systems typically have differing roles as well as knowledge and interest bases and even varying conceptualizations of governance aims and arrangements – in short a differing cognitive-normative configuration, struggles take place about the social organizational elements including the proper architecture, functioning, and reform of governance. Those directly involved as well as those affected in one way or another are likely to be concerned about issues such as what are defined as problems, goals, preferred governance forms and procedures (public, private, hybrid, etc.), procedures for deciding what are "problems" or "solutions", or what are strategies and methods to use in finding solutions. One of the challenges of modern governance systems is to coordinate and integrate the different regulatory mechanisms, diverse agents, and their differing material and ideal interests as well as differences in their governance conceptions.

In sum, the paper proposed above a model of the *architecture of governance systems* – their major components and inter-linkages – which will be applied to selected cases in Parts II and III. The model contributes, as illustrated later, to increase comparability among cases and with the possibility of improved accumulation of knowledge about governance systems.

3. Multi-level, complex case of commons governance: Baltic fisheries

The Baltic Sea fisheries governance discussed in this section is an example of a complex, multi-level commons governance case that is still in a difficult "take off" phase, but where institutional analysis sheds some light on the problems and the direction reforms might take to increase effectiveness. Although fisheries belongs to the areas that Ostrom has also investigated, the degree of complexity goes beyond her classic work and thus points to her later contributions on polycentric and multi-level governance, that is more complex forms of governance (e.g. Ostrom 2009, 2010a,b).

3.1. Background

The Baltic Sea is a comparatively small semi-enclosed sea of about 415,000 km^2. It is bordered by nine countries[7] with together about 16 million people living on the coast. With the exception of Russia, all bordering states are members of the European Union, with Poland, Estonia, Latvia and Lithuania joining quite recently in 2004. The brackish water of the Baltic supports both marine and freshwater species. The most important commercially harvested fish species are cod, herring and sprat (herring-like fish used for, among other things, "sardines") that make up about 90% of the total catches. Other economically relevant species are among others salmon and eel. Catches have increased over the past 50 years from 100,000 tons to over a million resulting in a value of catches of about 540 million EUR each year. The intensity and kind of fisheries vary between the different bordering states, as one can see in Table 2.

The management of fishing activities in a sustainable manner has been one of the major governance challenges worldwide. Until recently, while the Baltic herring and sprat stocks have generally been in good condition, the two cod stocks ("Eastern" and "Western") have decreased considerably and the situation has been especially dramatic for the Eastern cod stock.

Table 2: Reported landings in tons by country in the Baltic Sea region 2006 (data taken from http://www.seaaroundus.org/sponsor/baltic.aspx)

	Denmark	Poland	Sweden	Germany	Finland	Latvia	Estonia	Russia	Lithuania	Total
Cod	32,300	70,084	17,643	14,920	989	9139	1303	6583	7347	160,306
Herring	9482	52,482	79,400	30,667	97,932	27,198	29,114	11,456	1413	339,144
Sprat	51,051	65,257	79,349	35,938	23,334	63,795	56,072	33,071	12,626	420,483
Other species	40,395	20,334	8210	8033	14,587	2920	3338	7447	833	106,108
Total	133,228	208,157	184,602	89,558	136,842	103,052	89,827	58,557	22,219	1,026,041

[7] EU member states of Germany, Sweden, Finland, Denmark, Poland, Estonia, Latvia and Lithuania and the non-EU Russia.

3.2. The EU fisheries governance system[8]

3.2.1. Regulation and authority

The EU countries agreed in 1983 on the Common Fisheries Policy (CFP). With about 2000 rules, it is one of the most comprehensive fisheries governance agreements world-wide regulating all aspects of fishing.[9] In this governance system, the EU Council of Ministers is the highest decision-maker determining broad policy measures that are to be implemented by the member-state Fishing Ministries. The most important determination is the annual total allowable catches (TACs), which are distributed among the member states according to the "principle of relative stability".[10] The European Commission (more precisely, DG Maritime Affairs and Fisheries, DG MARE) prepares and proposes the regulations for the Council. The Council together with the EU Parliament are the main co-deciders of legislation and policy (Carson et al. 2009).[11]

3.2.2. Expertise and knowledge requirements

Although the regulatory power is concentrated at the EU level, the decisions are informed by several knowledge sources. Among the four most significant advisory groups two groups consist of scientists and two of stakeholders. Most importantly are scientific studies and measurements about the status and the future development of the fish stocks. However, unlike in forestry or agriculture, fish resources are moving targets and difficult to observe under water.[12] The interactions of different species with each other and other components of the eco-system are still not fully understood. In addition, the regional conditions vary tremendously. Thus scientific knowledge acquisition and production processes about the object of governance – the fish stocks – are costly, often provide uncertain information and are confronted with ecological conditions that change over time. The most important knowledge source for EU fisheries policy is arguably the International

[8] This case study is using data that have been generated through a project with the Baltic Sea Regional Advisory Council (BS RAC). Besides the reviewed literature, we rely on data gathered through more than 30 qualitative interviews with different BS RAC members, scientists and the European Commission, observations of BS RAC meetings and numerous informal talks.
We only consider key parts of the regulation of the Baltic fisheries. There are numerous other regulatory processes taking place that affect the environmental and health of the fish (as well as humans) relating to control of waste disposals, effluents that are or might be dumped into the Baltic.

[9] It sets catch quotas of each type of fish each member state is allowed to catch. The CFP transferred substantial power from the member-state level to the EU level and member states have only limited leeway for national regulations, for example, coastal and inland fisheries. Enforcement is the responsibility of member states, but there is a community level inspection service to ensure that member states enforce the rules within their own country.

[10] Relative stability is the permanent share for each member states, usually defined through historic catch records.

[11] Thus far the European Parliament is only consulted but does not have any regulative power in the matter of fisheries. However, this is going to change to the co-decision modality engaging the Council and the Parliament after the next reform of the CFP 2012.

[12] See e.g. Schlager et al. (1994) on fish as mobile CPR units and its effects on harvesters.

Council for the Exploration of the Sea (ICES), an umbrella organization for the national research institutes, where the data collected on status and prognosis of fish stocks are organized and interpreted. Based on the data obtained and the application of the precautionary principle,[13] ICES provides recommendations for policy measures of which the annual Total Allowable Catch (TAC) is the most important (Commission 2007; Karagiannakos 1996). In addition, the Commission established the Scientific, Technical and Economic Committee for Fisheries (STECF) in 1993 and renewed it in 2005. The Committee consists of scientists that provide advice on the current status of fisheries resources, their development and any consequent economic implications.

The second source of information comes from stakeholders that, especially in the recent years, have gained greater opportunities to provide advice to the European Commission. One stakeholder-based advisory group is the Advisory Committee on Fisheries and Aquaculture (ACFA) that consists of members of the fishing industry and since 2000 also of scientists and NGOs. The Commission typically asks the Committee for advice concerning certain issues related to the CFP, but ACFA can also issue its own opinions. In addition, after continuous pressure from the fishing industry and with the general shift of the EU governance paradigm towards greater inclusiveness with increased stakeholder involvement, the Council decided in the CFP reform 2002 to set up Regional Advisory Councils (RACs) that consist of representatives of the fishing sector and so called "other interest" groups that among others include environmental Non-Government Organizations (ENGOs). Similarly to ACFA, the RACs provide – preferably consensus based – advice to the Commission on behalf of their region, but do not have any formal regulatory power.

3.2.3. Other affected actors, stakeholders

At the grassroots level, two main groups of stakeholders have an interest in fisheries governance – the fishing industry (e.g. fishers, ship owners, processing industry) and ENGOs. The fishing industry tries to realize economic gains from fishing. The scope and size of fisheries are highly diverse; different national legal and norm systems apply in the fishing communities; and responsible authorities and configurations of actors vary among the countries (see later).

ENGOs promote nature conservation and obtain their influence mainly through private campaigns to mobilize public opinion, consumer behaviour, and even electoral results. The power and size of ENGOs vary among countries as well. In Sweden for example, ENGOs were able to block the entire Baltic cod market after practices of unsustainable harvesting were disclosed. In Poland, on the other hand, ENGOs still play a marginal role in Baltic Sea policy-making processes.

[13] The Precautionary Approach states that "The absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures" (FAO 1995, 12).

Figure 1 summarizes the governance system described above. Although it can be classified as a hierarchical paradigm it consists of multiple levels (EU, regional, national, local) and a large number of different actors with a wide spectrum of interests, diverse powers, and different organizational arrangements.

3.3. The architecture of Baltic Sea fisheries governance

Using the analytic scheme presented in the first part of this paper, the different elements comprising the architecture of the Baltic fisheries governance system can be specified (Table 3). Such an approach allows, as we suggest later, comparisons with other governance cases but also enables one to analyze and identify shifts in the current governance systems leading to institutional change (Carson et al. 2009).

This governance configuration is the conception from the perspective of, and favoured by, the European Union. The EU is by far the most powerful formal agent (actually a group of agents) articulated through the DG Maritime Affairs and Fisheries at the Commission. However, other actors, both subjects and third parties such as the ENGOs prefer other governance paradigms based on different

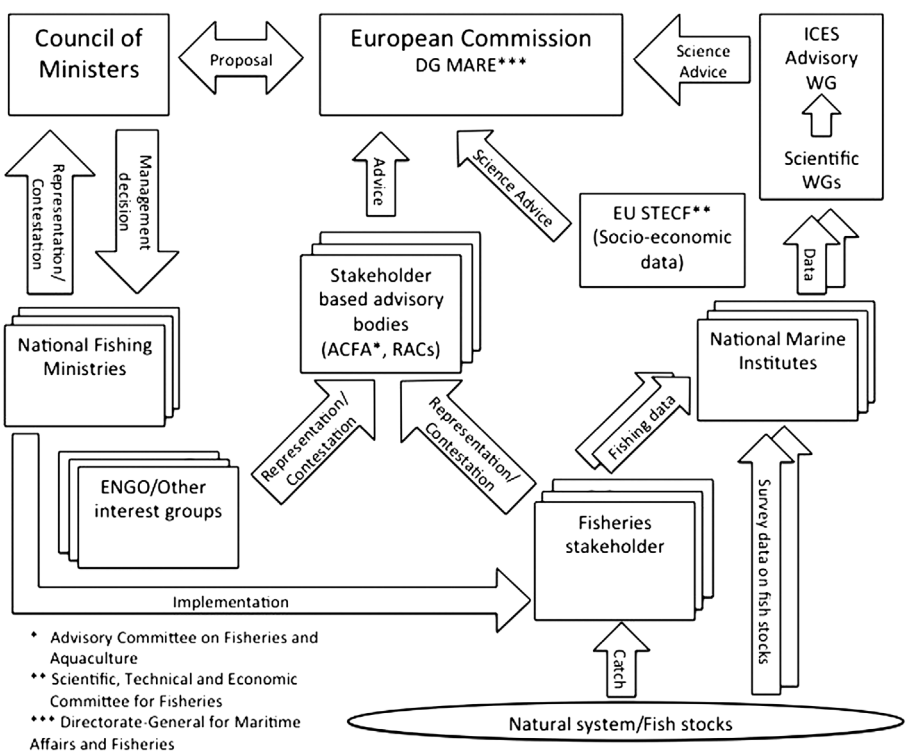

Figure 1: *The EU fisheries governance process.*

Table 3: Governance paradigm for Baltic Sea fisheries

EU Baltic fisheries governance system	
Social organizational configuration	
Authority and responsibility	Authority in the Council of Ministers on the basis of proposals from EU commission's DG Maritime Affairs and Fisheries which monitors and regulates member-state governments compliance with policies
Expertise and knowledge requirements	• ICES (umbrella group for the national fisheries research institutes): Status and prognosis about the fish stocks • STECF: socio-economic experts: • Impact assessments (of e.g. new regulations) • Fishers: fishing data, regional particularities
Other affected actors, stakeholders	Fishers, fishing industry National and local governments
Procedures for (legitimate) decision-making	• Council of Ministers, European Commission, National governments engaged • Pressures for multi-stakeholder participation: fishing industry and NGOs
Cognitive-normative configuration	
Problem or issue	Declining fish stocks in the Baltic, some at risk of collapsing
Goals and priorities	• Keep fishing pressure on Baltic Sea fish stocks within sustainable limits • Substantial reduction of fishing effort • Maintaining a healthy fishing industry
Conceptualization/model of the situation or issues	Models of fishing and the risks to the ecosystem/model of physical causality: • High fishing pressure is the main cause for declining fish stocks Model of socio-economic causality and regulation: • Anthropogenic • A case of "the Tragedy of the Commons" (Hardin 1968)
Solutions	• Catch quotas (TACs) based on precautionary principle, technical measures* • Monitoring (catches, boat positions, etc.) • Diverse solutions on national and local level

* Technical measures is the term used to refer to all rules that define how and where fishers are allowed to fish (as opposed to how much). Examples are minimum landing sizes of fish, minimum mesh sizes for nets, areas and seasons that are closed for fishing etc.

organizational forms and different goals, and with different conceptualizations and models of problems and solutions as well as proper knowledge sources. The framework can be used to identify these differences in both the preferred organizational as well as the cognitive normative configuration as sources of potential conflicts and instabilities:

A. Social organization configuration

Authority and Responsibility:

Besides some fishermen that argue that there should be no regulation or only self-regulation it is generally accepted that there is a need for international regulative body. However, the level of power of the council is challenged both by fishers and ENGOs (see procedures for decision-making).

Expertise and knowledge requirements:

Many actors from the industry also challenge the designated expertise and knowledge requirements in the current governance system. Instead of marine biologists as the dominating provider of scientific knowledge they promote a greater inclusion of socio-economic expertise as well as fishers' knowledge into the decision-making process. While many ENGOs do not deny the need for fisher's knowledge in general, they tend to strongly argue for scientific data as the decisive element.

Procedures for decision-making:

The fishing industry has an interest in gaining substantial influence over regulatory decisions and, in general, promotes greater inclusion of fisheries stakeholders into the governance process. Instead of the EU conception of a top-level decision-making body and the big influence of scientists, the fishing industry promotes the idea of a system of stronger self-regulation for the fishing industry. Also, NGOs appear to be against the Council as highest decision-making body (see later) and would prefer to give more decision-making power to the Commission level and/or scientists.

Many of these differences in views about how the social organization of fisheries governance should be structured relate to the agents' particular cognitive-normative configurations:

B. Cognitive-normative configuration:

Goals and priorities:

Fishers and the fishing industry consider the protection of the fish stock as less an issue and a goal than the maintenance of a healthy fishing industry; both of these goals are important to the EU, but pose a greater dilemma for them than for fishers and the fishing industry. For ENGOs on the other hand the primary goal would appear to be fish population sustainability and a reduction of the fishing pressure; the goal of maintaining a healthy fishing industry appears as less relevant from their perspective.

Conceptualization/model of the situation or issues:
Some fishers also have a different causality model than the EU and would argue that the interaction between the different (natural) factors within the ecosystem (such as multi-species interactions) as well as external natural factors (such as climate change and the change in water temperature) have a much greater influence on fish stocks than fishing activity as such. ENGOs usually support the causal models of the EU.

Solutions:
As a consequence of differing goals and conceptualizations, fisheries stakeholders also tend to contest the catch quotas in the form of TACs – both in terms of the concrete quotas as well as the TAC system as an appropriate solution itself. While generally accepting the applied solutions of the EU, ENGOs tend to perceive the current system as too supportive of the fishing industry and not attentive enough to their environmental concerns.

The differing goals (socio-economic rationality versus environmental concerns) in this configuration of agents reflect the fundamental conflict that the CFP governance system is faced with, while trying to realize both goals. However, such conflicts are rather common in other environmental governance arenas and do not necessary lead to a collapse or non-functioning of the governance system. Nevertheless, some of those engaged in the system might try to mobilize powers to either achieve a shift of the current governance system or to fully sabotage it. Depending on the powers that these actors are able to mobilize, such efforts can be successful in such a way that a shift in governance arrangements is achieved or that the governance system fails altogether. In the case of Baltic Sea governance both scenarios can be seen developing. As we will outline in the next sub-section, the essential top-down regulatory system has not succeeded in achieving compliance by those most affected – the fishers.

3.4. Key struggles and their explanation

The Baltic Sea governance system has not prevented the overexploitation of fish stocks in recent years, as indicated earlier. The non-compliance by many fishers reflected in large part the weak legitimacy and enforcement of CFP regulations. ICES has estimated that the illegal, unregulated or unreported (IUU) fishing consists of 30–40% of the total landings. According to a recent study by Rossing et al. (2010) the greatest offenders are Poland, Sweden and Denmark that are also the countries with the largest share of TACs. Poland represents a whole 36% of the total IUU, while Sweden and Denmark represent 13% and 14%. The estimated IUU for cod in Poland reaches in some years 300% of the reported cod landings. Although these data have to be treated with caution due to the difficult conditions of collecting them, they suggest the likely ineffectiveness of the present governance system as a whole. Cod stocks remain a major issue

of discussion and conflict, although recent indications suggest some signs of recovery.

Below we identify several key issues and conflicts which challenge the governance system. The discussion follows the focus of this paper on the role of power, knowledge and conflict in governance systems.

A. Problems related to power and enforcement in multi-level governance in a complex political context

1. Decisions about regulations for the Baltic Sea in the EU Council are negotiated among the ministers of all EU members – even from non-coastal states. This creates a situation, where outsiders and "amateurs" may be involved in deciding about basic fisheries issues including very technical questions such as appropriate mesh sizes, a case of misused power.[14]
2. The national systems around the Baltic differ significantly in their national legislation and political cultures. Although the influence of the national states is becoming weaker due to power shifts to the transnational as well as increasingly to sub-national levels (Symes 2007), they still play an important role in the allocation of TACs. Countries like Sweden can be described as a neo-corporatist and inclusive society, which is reflected in fisheries policies (e.g. the Swedish co-management initiative) and strong fisher associations.[15] Four of the EU countries bordering the Baltic belong to the former communist Eastern block and joined the EU only recently (2004). This process led to a severe destabilization of the fishing industry in these countries. In Poland, for example, local and regional fisher organizations hardly exist. A unifying voice in policy formation is therefore missing. The so-called "mazonerias" that managed fisheries as local, co-operative organizations in the command economy before 1991 have almost completely disappeared. Along with these institutions, the cultural norms of localized collaboration and mutual help vanished as well. In their place emerged an ideology of pure self-interested behaviour on the part of individual fishers and minimal legitimacy attributed to coordinating, regulating institutions (Marciniak and Jentoft 1997, 84).
3. Standardized regulations collide sometimes with particularities in a region. The rule to discard "good fish" and return them to the sea in mixed

[14] In general, electoral politics in the Baltic member-states lead to trade offs in the negotiation process that have little to do with the problems of fisheries as such. Final regulations therefore are often delayed, only partially implemented or deviate both from the Commission's proposals as well as scientific guidelines (Daw and Gray 2005). For example, Council decisions on TACs in 2006 were on the average 45% higher than the catches recommended by ICES (Aps et al. 2007).

[15] Denmark adheres also to corporatist fisheries governance with a strong fisher association as an umbrella for various smaller associations.

fishery situations provides a much discussed example. While discards are generally considered as undesirable, in some Baltic regions, cod, for example, has appeared in traditional areas of herring or sprat. The boats that are fishing there do not have allotted cod quotas. Therefore, the fishers are supposed to discard the cod that they catch together with the sprat or herring, but do not always do so contributing to the high level of IUU catches.

B. Problems relating to the knowledge bases for fisheries management:

1. There are high levels of uncertainty in the ICES assessments due, for example, to random fluctuations in the fish stock characteristics or the poor understanding of the interactions within the eco-system that influence fish population behaviour and development. In addition, the scope of scientific assessments is very limited, since it mostly relies on single-species assessments, ignoring (or ignorant of) multi-species and eco-system conditions (Daw and Gray 2005).
2. At the same time, the European Commission relies almost exclusively on scientific knowledge, in particular the ICES. In general, the EU has not been able to incorporate effectively fishers' knowledge into the scientific or regulatory process (including data about IUU). For example, in the 2008 advice on sprat, ICES had a problem with the survey area since the stock had moved. In the discussions in the Baltic Sea Regional Advisory Council between fishers and scientists, it turned out that the sprat fishers knew already three months earlier that the distribution area had changed (Stöhr and Chabay 2010).

   Problems of incorporating fishers knowledge into the scientific advisory process can be traced to: (a) the difficulties of integrating the tacit and qualitative information of fishers into the quantitative scientific models; (b) the institutional multi-level structure of the scientific advisory process itself (since the data are collected by the national research institutes and have to be aggregated, organized and turned into political advice on an international level); and (c) the mutual strong skepticism and distrust between scientists and fishers.
3. The legislative and bureaucratic mandates for science in a regulatory environment tend to constrain and distort science and scientific recommendations. The need to translate scientific data into policy recommendations leads to "creative tensions" (Wilson 2009) within ICES and pressures to achieve an artificial consensus among the scientists. In addition, there is an incentive for scientists to provide overly conservative recommendations in order to try to pre-empt political compromise (Daw and Gray 2005; Stöhr and Chabay 2010).

C. Stakeholder and challenger issues and contestations

1. Participatory mechanisms such as the RAC are restricted to purely advisory functions while decisions about formal regulations – even in questions of micromanagement – are made by the EU. The members of the Baltic Sea RAC have repeatedly pointed at the poor recognition and incorporation of the stakeholder advice into the policy process. One of many examples is the Commission's consultation process about a new regulation on "Technical Measures", where the chairmen of the RACs expressed their dissatisfaction in a joint letter (Johansson et al. 2009).
2. Different value systems and problem definitions applied by different stakeholders lead to conflicts (especially fishers and NGOs but also between different nationalities) and make consensus in the RAC deliberations in critical matters unlikely. The most prominent example is the annual Baltic Sea RAC advice on TACs to the European Commission, where the discussions regularly heat up. ENGOs tend to follow the TACs recommended by the scientists of ICES as "the best available information" applied following the precautionary principle.[16] Fishers, on the other hand, tend to see the ICES recommendations as a point of departure that have to be put in perspective according to uncertainties in the data and socio-economic considerations.
3. The dialogue and consensus making processes within the regulative system (RACs) are undermined by external activities and measures of the stakeholders (e.g. campaigns, lobbying). The success of Swedish ENGOs with their public campaign against cod consumption (see above) led repeatedly to very heated discussions in the RAC meetings. Fishers argued that such campaigns are irresponsible courses of action that threaten a whole industry and the livelihood of many fishers.

These points illustrate, among other things, the difficulties that attempts to increase stakeholder engagement in the Baltic fisheries have faced. For the European Commission, greater inclusion of stakeholders and stakeholder knowledge is connected with the hope for more legitimacy and acceptance of policy decisions and higher compliance among fishers.

3.5. Discussion

Several of the factors identified in section I appear prominently in the Baltic fisheries case: (1) there is the central role of power and contradictory power arrangements: the "state power" of the EU Commission, the powers in a multi-level system of member states, grassroots powers (and the power mobilization of groups of ENGOs),

[16] In ICES giving advice on TACs, it reduces TAC levels to take into account the scientific uncertainty in the data, in accordance with the precautionary principle (see footnote 14).

and the power of experts. In our case study the Commission enjoyed substantial power in setting up and managing the institutional arrangement of the fisheries governance system but lacked sufficient power over key member states and their fishing interests to regulate effectively fishing behaviour.[17] (2) While expertise is central in the fisheries case, there have been substantial problems in mobilizing and integrating different kinds of knowledge and applying them coherently in the policy process – a result of the limitations of the current social organization of the system. (3) Contestation and non-compliance characterize the governance system.[18]

There have been – and continue to be – efforts to improve the effectiveness of the EU Baltic fisheries governance system, a process of groping ahead, which is likely to continue for some time (this slow, piecemeal process is typical in the formation of complex governance systems). The next CFP reform proposal is soon due. The Green paper "Reform of the Common Fisheries Policy" acknowledges that the existing top-down structure of the fisheries governance process provides few incentives for the fishers to behave responsibly (Commission 2009). It also raises the question of how to incorporate stakeholder knowledge in the research-based advice and policy-making. It even promotes the idea of "industry self-management". This suggests a possible paradigm shift in governance towards regionalization and stakeholder involvement.

Ostrom and others argue strongly for such a shift. The design principles in her classic work "Governing the Commons" (Ostrom 1990) outline the conditions under which, localized CPR self-management is likely to be successful. Her later work on polycentric systems takes this approach and applies it to larger governance regimes with multiple levels (Ostrom 2005, 2010b). The two main advantages of smaller, rather autonomous systems are that firstly, they are less complex and thus easier to manipulate and adapt than the overall system with a centralized authority. Secondly, the dissonances in the cognitive-normative configurations between the authorities and the fishers (see Table 3) are likely to be reduced, which is both conditioned by and resulting in the evolution of local norms, compliance and trust. Or, as Ostrom puts it:

> *"Polycentric systems tend to enhance innovation, learning, adaptation, trustworthiness, levels of cooperation of participants, and the achievement of more effective, equitable, and sustainable outcomes at multiple scales."* (Ostrom 2010b, 552)

[17] While member-states ministries, the fishing industry and a number of stakeholders, particularly ENGOs, possessed some countervailing powers, they were not sufficient to overthrow the established hierarchy and to set up an entirely new paradigm of governance, for instance, a "negotiating order", a polycentric system of governance with overlapping jurisdictions (or centers of authority) (Ostrom 2009; McGinnis 2010:6), or a polyarchy with very local units having authority and responsibility to run their own operations (that is a self-regulation regime).

[18] The legitimacy of both the scientific expertise as well as the governance system itself on the grass-root level have been major issues reinforcing contestation and non-cooperative behavior, generally.

However, greater empowerment of stakeholders may not provide the ultimate solution per se. It can also amplify conflicts. Fishers and ENGOs look back on a history of conflicts. Stöhr and Chabay (2010) show, for example, that fishers in the Baltic Sea use the platform of the Baltic Sea RAC to attack scientific knowledge claims and to carry this conflict into the governance process. Similar results are indicated for the North Sea fisheries (Griffin 2009).

The anticipated changes in the CFP towards more participation can be seen as a shift from the earlier pure top-down governance paradigm towards more inclusion, a development that has been pushed by the fishing industry. While the ongoing reforms in the governance system have been more or less marginal, indications are that the CFP reform 2012 is likely to move much further in this direction.

4. Elaboration: comparative analysis of governance systems

After crafting an analytical framework and applying it to the Baltic fisheries multi-level governance case through which one could illustrate that the framework facilitates an understanding of several relevant governance phenomena, we present in this section a few elaborations which suggest the usefulness of this particular institutional approach.

Going beyond the accumulation of numerous case studies, we draw on other governance cases we have investigated in the EU, in particular chemicals and gender, and show how their architectures can each be specified and made comparable to the Baltic fisheries case on the finite set of dimensions. The following table (Table 4) applies these key dimensions to all three cases. This approach enables comparisons of the social organization of governance, those agents having responsibility and exercising authority, the expert groups and networks serving the governance system, the problem or issue motivating regulation, the key goals of the system and the models and methods used in monitoring and regulating.

Briefly about the two additional EU governance areas[19] (see Carson et al. 2009 for more details):

First, EU chemical governance entailed a radical regime of regulation passed in 2006: Registration, evaluation, authorization, and restriction of chemicals (REACH). It has been designed to cover a major part of all chemicals (substances of either high concern or manufactured or imported over 1000 tonnes). The law replaced about 40 legislative instruments in force at the time. The European Chemical Agency (ECHA) was established in 2007. Thousands of substances (approx. 30,000 expected) already on the market are being assessed and will be subject to authorization. The burden of proof of chemical safety lies now with the producers, not with consumers or with the regulator. Chemicals can be banned – or if their value to society is judged to be very high they can be allowed but under very tight controls. REACH – in effect since June, 2007 – was one of the most

[19] The establishments of these systems are instances of the exercise of meta- or structural power in agent-driven innovation and transformation of governance (Carson et al. 2009).

Table 4: *Selected EU governance systems in a comparative framework*

	Fisheries governance	Chemicals governance	Gender governance
Social organizational configuration			
Authority and responsibility	• Authority in the Council of Ministers on the basis of proposals from EU Commission's DG Maritime Affairs and Fisheries which monitors and regulates member-state governments compliance with policies	• Authority for implementing law and policy located in the EU Commission's DG environment which sees that member states enforce EU chemicals legislation such as REACH	• Dispersed authority located in a multi-sectorial policy model • Expanded Commission role, and the European Parliament and the Council to be involved in gender issues
Expertise and knowledge requirements	• ICES (umbrella group for the national fisheries research institutes): status and prognosis about the fish stocks • STECF: socio-economic experts • Impact assessments (of e.g. new regulations) • Fishers: fishing data, regional particularities	• Single Autonomous Agency, ECHA, for protection of human health and the environment in the chemicals domain • Collects data on the safety and socio-economic aspects of the use of chemicals • Recommends chemicals to be subject to obligatory authorization (also possibly banned)	• Wide Spectrum of EU, national, and NGOs with sector specific expertise. Social scientists including criminologists
Other affected actors, stakeholders	• Fishers, fishing industry • National and local governments	• Consumers, chemical industry, health care, environmental interests	• Women, gender relations, society
Procedures for (legitimate) decision-making	• Council of Ministers, European Commission, National governments engaged • Pressures for multi-stakeholder participation: Fishing industry and NGOs	• Multi-stakeholder participation: multiple EU and national as well as NGOs organizations	• Multi-stakeholder participation, typically specialized in multiple sectors
Cognitive-normative configuration			
Problem or issue	• Declining fish stocks in the Baltic, some at risk of collapsing	• Chemical threats to human health and environment	• Gender gaps and normative issues of equality ignored or neglected nationally and at EU level

Table 4: (Continued)

	Fisheries governance	Chemicals governance	Gender governance
Goals and priorities	• Substantial reduction of fishing effort • Keep fishing pressures on Baltic Sea fish stocks within sustainable limits • Keeping a healthy fishing industry	• Effective control of chemicals identifying unknown or unacknowledged hazards, banning or limiting most high-risk chemicals • Also maintenance of a healthy chemical industry • Hence, precautionary as well as innovation principles apply	• Gender equality as core EU value to be accomplished in all policy areas
Conceptualization/model of the situation or issues	• High fishing pressure is the main cause for declining fish stocks • Anthropogenic • A case of "the Tragedy of the Commons" (Hardin 1968)	• Many chemicals are risky for humans, other species, and the environment and must be regulated by EU public policy • This is in the part the result of a long history of introducing chemicals into society without much attention to or control of side-effects and hazards to human health and environment	• Gender inequality and discrimination found in all sectors of society. Structural and hidden sources of inequality need to be identified and analyzed • Different models in different sectors
Solutions	• Catch quotas (TACs) based on precautionary principle, technical measures • Monitoring (catches, boat positions, etc.) • Diverse solutions on national and local level	• Control of chemicals from manufacturers, importers, and down-stream users, including powers to ban chemicals or to limit their applicability	• EU policy intervention necessary in all areas of public policy

radical and contentious policy initiatives of the EU, involving almost 10 years of debate, mobilization, struggle, and negotiations between the Commission, the Council of the European Union, the Parliament, and industry, labour unions, environmental, consumer and animal rights NGOs, among others. In addition, there were substantial cleavages and struggles within EU institutions: in Parliament (between, for instance, the Committee on Environment and Committees on Industry and Legal Affairs); in the Commission (between DG Environment and DG Enterprise), and in the Council itself between the countries (in particular Germany, France, UK) fighting to defend the old paradigm of a privileged position and limited regulation for the chemical industry and those states pushing for a new, much tougher regime of chemical regulation (for instance, Sweden, Austria, Finland, and Denmark). The US Government and US companies were key players in these struggles. Arguably, never has a public policy process in the EU involved so many players with such intensity over such a long period of time.

Second, the aim of EU gender governance was to "eliminate inequalities and to promote equality between men and women – and to do this in *all* EU policy sectors, a policy principle referred to as "mainstreaming" (established in 2000). The scope of the development is suggested by such sectors as "women in science," "their role in structural funds," "EU development aid, reconciliation between work and private life," "women in societal decision-making," "domestic violence," etc.

The EU came to make gender equality a core public policy goal during the 1990s. The EU approach evolved over three decades from, on the one hand, its previous approach that limited the issue to only the labour market to, on the other hand, an extensive approach that considers gender relations in a much broader public perspective (Hoskyns 2000, 3). The multiple "parallel tracks" concept in the evolution of EU gender equality policy has been driven from "below" and "above". National and international women activists and organizations have nudged EU policy along through periods of relative inactivity or painfully slow progress punctuated by occasional surges forward – a process of fits and starts that resembles the evolution of the EU itself. At the same time, it has been facilitated by contemporaneous developments within individual member states and at the international level – driven in large part by women's activism.

These developments were nurtured and driven forward by an array of local, national, and EU-level actors: women's organizations and other sympathetic NGOs, officials within the European Commission, members of the European Parliament, and civil servants and officials within several Member States. Moreover, international organizations such as the United Nations (UN), the International Labor Organization (ILO) and the World Health Organization (WHO) have been important sources of influence.

Several immediate observations from Table 4:

1. Contradictory goals characterize fisheries and chemicals: there is to be control over fishing and chemicals, respectively, but also these very industries are to

be maintained and developed as economically valuable. On the other hand, there are no conflicting goals concerning gender equality at the policy level; however, on a practical level, that is the level of implementation, there are of course other goals such as avoiding disruption of established practices that play a role and compete for priority with gender equality.

2. Fisheries and Chemicals are governed through specialized Commission directorates within the established EU institutional arrangements. Gender policy is not associated with a new and separate agency. However, special gender equality units and programs were set up in DG Research, DG Development, DG Europe AID, DG for Justice, Freedom and Security;[20] and an established unit DG Employment, Social Affairs and Equal Opportunities (DG-ESAEO) has been expanded for the purpose of coordination in the gender equality area.
3. New special EU agencies of expertise have been created for chemicals, ECHA, respectively. A partial "Europeanization" of expertise can also be seen in the case of the Baltic fisheries governance with the establishment of the ICES. On the other hand, no specialized unit of expertise was established for gender.[21]

   As might be expected in these EU cases, the types of expertise and knowledge requirements vary considerably. However, all have substantial involvement of scientists, but natural scientists predominate in chemicals, and to great extent fisheries, while social scientists including criminologists are engaged in the gender area. At the same time, non-expert types of knowledge brokers have become predominant in these EU governance settings. In fisheries governance, as we have seen, there have been conflicts, and the integration of the different knowledge agents has not been accomplished thus far. Fisheries governance is also weakest in terms of multi-stakeholder participation in deliberations and policy-making (although such participation is an established normative idea in the EU); nonetheless, there are currently initiatives to correct this.
4. The models of the problems and their mechanisms (or causes) differ accordingly. Baltic fishing is a classic commons problem (a potential "tragedy of the commons"). Chemicals had come to be identified as major problems as the result of a long history of introducing thousands of chemicals into society without adequate testing or knowledge about the human and environmental

[20] The DG for Justice, Freedom, and Security has been divided into two DGs in 2010: the DG for Home Affairs and the DG for Justice (the latter consisting of three directorates: Civil Justice, Criminal Justice, and Fundamental Rights and Citizenship).

[21] There is, of course, a unit in DG ESAEO and gender coordinators in the different DGs (most DGs do not have gender units but officers that act as gender coordinators). Some of these bodies are the Advisory Committee on equal opportunities for women and men (created in 1981), the Commission Inter-Service Group on Gender Mainstreaming (created in 1996), and the European Institute for Gender Equality (established in 2007). We are grateful to Dolores Gomez Calvo for these details (see also Carson et al. 2009).

health risks. Gender inequality and discrimination – in the context of expanding democratic norms and practices – called for new actions and policy responses. There were major differences among member-states in addressing gender issues, but some issues such as violence against women were shown through European research to be largely neglected everywhere. This and other policy considerations – in the context of feminist research and rhetoric about systematic structural discrimination in all societies – set the stage for the EU "mainstreaming initiative" (Carson et al. 2009).

5. The "solutions" in the different governance areas vary greatly. In some areas, "strong sanctions" are absent (or they are easily circumvented or subverted) as in the case of fisheries. In the area of chemicals, strong sanctions have been established: Heavy fines can be imposed; products can even be banned from EU markets. In the gender area, contrary to some prognoses about a "toothless policy", the EU found it had considerable leverage in areas such as science funding (DG Research) and structural funds (DG Regional Policy), where it became very unlikely for projects to obtain EU funding without demonstration of gender equalization among applicants. Even in the area of violence against women and children, the EU has supported widespread monitoring and financing of national efforts, which had a significant impact on public awareness and national and international policy during the course of the 1990s and 2000s.

In sum, the scheme of governance architecture provides a tool with which to comparatively describe and analyze governance systems on a few theoretically grounded dimensions. Different types of systems can be distinguished in these terms, for instance, the extent to which the goal structure is characterized by dilemmas, or the extent to which methods of regulation are characterized by single-sector or multi-sector operations, or by "hard" or "soft" methods of regulation. The cases in Table 4 have been presented as monolithic governance systems but major cleavages between involved groups (for example, the EU and the fishers or ENGOs) articulated in their perspectives or paradigms can be represented in the framework and similarities and differences with the formal system identified and analyzed (see footnote 6).

5. Conclusions

The work presented in this article can be understood as a contribution to the new institutionalism. This is a major feature of contemporary interdisciplinarity among the social sciences, to which Elinor Ostrom and her associates have made substantial contributions through the development of the IAD framework and its application, in particular, to governance phenomena (see footnotes 3 and 5). As illustrated here, a full-fledged institutional approach can address all levels of governance, including dealing with multi-level, complex governance systems.

Power, knowledge, values, and struggle are key factors in governance [and also in the transformation of governance systems (Carson et al. 2009)]; utilizing an institutional approach, we have investigated dimensions of power, knowledge, and conflict in governance systems. (1) The article considered powers *within* a governance system, for instance, the operative powers (and their limitations) over different agents and objects, as in the fisheries case but also the monitoring and sanctioning established in the chemicals and gender equality sectors. (2) While factors of information and knowledge are important in any institutional analysis, particular emphasis was put in this article on multiple *knowledges* of different groups of actors, for instance in the Baltic fisheries case the state agents that constituted the hegemonic governance paradigm in the first place, professional groups of experts, and the local, often tacit knowledge and models of "users" or subjects. (3) Given the multiple, diverse agents, with their differing knowledge perspectives and material and ideal interests with respect to governance, governance systems are characterized typically by internal and external contestation and conflict, which drive the exercise of power and, under some conditions, result in transformation of governance systems (Carson et al. 2009).

The process of conducting case studies on governance in diverse sectors and on multiple levels and assembling them, and using them as an empirical base for theoretical development is essential to cumulative science and to strengthening the inter-disciplinarity of an institutional approach. At the same time, this article has suggested that there is a need for the type of systematic comparative framework and analysis based on a few key dimensions (dimensions that nonetheless are highly context sensitive) which have been presented and applied here. The model of governance architecture facilitates the identification and analysis of similarities and differences among governance systems and promises to improve the accumulation of systematic knowledge about governance.

Literature cited

Aps, R., L. T. Kell, H. Lassen, and I. Liiv. 2007. Negotiation framework for Baltic fisheries management: striking the balance of interest. *ICES Journal of Marine Science* 64:858–861.

Burns, T. R. 2006. System Theories. In *The Blackwell Encyclopedia of Sociology*. Oxford: Blackwell Publishing.

Burns, T. R. and H. Flam. 1987. *The Shaping of Social Organization: Social Rule System Theory with Applications.* London: Sage Publications.

Campbell, J. L., J. R. Hollingsworth, and L. N. Lindberg. 1991. *Governance of the American economy*. New York: Cambridge University Press.

Carson, M., T. R. Burns, and D. Gomez Calvo. 2009. *Public Policy Paradigms: The Theory and Practice of Paradigm Shifts in the EU*. Frankfurt/Berlin/New York: Peter Lang Publishers.

Daw, T. and T. Gray. 2005. Fisheries science and sustainability in international policy: a study of failure in the European Union's Common Fisheries Policy. *Marine Policy* 29:189–197.

European Commission. 2007. Maximum sustainable yield: sustainable fishing is profitable fishing. *Fisheries and Aquaculture in Europe* 32.

European Commission. 2009. Green paper – Reform of the Common Fisheries Policy. *COM (2009) 163 final*.

FAO. 1995. *Code of conduct for responsible fisheries*. Rome: Food and Agriculture Organization of the United Nations.

Glasbergen, P., F. Biermann, and A. P. J. Mol, eds. 2007. *Partnerships, Governance and Sustainable Development.* Cheltenham: Edward Elgar.

Griffin, L. 2009. Scales of knowledge: North Sea fisheries governance, the local fisherman and the European scientist. *Environmental Politics* 18:557.

Hardin, G. 1968. The Tragedy of the Commons. *Science* 162:1243–1248.

Hess, C. and E. Ostrom, eds. 2006. *Understanding Knowledge as a Commons: From Theory to Practice.* Cambridge: MIT Press.

Hoskyns, C. 2000. *Integrating Gender: Women, Law and Politics in the European Union*. London: Verson

Johansson, R., H. Andersen, S. Lambourn, I. MacSween, and V. Badiola. 2009. *RACs' consultation on Technical Conservation Measures under the Common Fisheries Policy. Letter to the European Commission.* http://www.bsrac.org/archive/Dokumenter/Recommendations/2009/20091109%20RACs%20joint%20letter%20to%20EC%20on%20TCM%20consultation.pdf.

Jordan, N., T. R. Burns, and R. de Man. 2010. The promise and limitations of partnered governance: The case of sustainable palm oil. *Corporate Governance* 10:59–72.

Karagiannakos, A. 1996. Total Allowable Catch (TAC) and quota management system in the European Union. *Marine Policy* 20:235–248.

Kooiman, J., ed. 1993. *Modern Governance: New Government Society Interactions*. London: Sage.

Kooiman, J., S. Jentoft, R. Pullin, and M. Bavinck, eds. 2005. *Fish for Life: Interactive Governance for Fisheries.* Amsterdam: Amsterdam University Press.

Marciniak, B. and S. Jentoft. 1997. Fisheries management in post-Communist Poland: prospects of user-participation. *Ocean and Coastal Management* 34:73–89.

Marks, G., F. Scharpf, P. C. Schmitter, and W. Streeck, eds. 1996. *Governance in the European Union.* London: Sage.

McGinnis, M. D. 2010. *An Introduction to IAD and the Language of the Ostrom Workshop.* Bloomington: Indiana University. http://php.indiana.edu/~mcginnis/iad_guide.pdf.

Ostrom, E. 1990. *Governing the Commons*. Cambridge: Cambridge University Press.

Ostrom, E. 2005. *Understanding institutional diversity*. Princeton: Princeton University Press.

Ostrom, E. 2009. "A Polycentric Approach for Coping with Climate Change." Policy Research Working Paper No. 5095. Background paper to the 2010 World Development Report. Washington, DC: The World Bank.

Ostrom, E. 2010a. Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review* 100:641–672.

Ostrom, E. 2010b. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change* 20:550–557.

Ostrom, E., R. Gardner, and J. Walter. 1994. *Rules, Games, and Common-Pool Resources.* Ann Arbor: University of Michigan Press.

Rossing, P., S. Booth, and D. Zeller, eds. 2010. Total marine fisheries extractions by country in the Baltic Sea: 1950-present. *Fisheries Centre Research Report* 18.

Schlager, E., W. Blomquist, and Y. T. Shui. 1994. Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources. *Land Economics* 70: 294–317.

Stöhr, C. and I. Chabay. 2010. Science and participation in governance of the Baltic Sea fisheries. *Environmental Policy and Governance* 20:350–363.

Symes, D. 2007. Fisheries management and institutional reform: a European perspective. *ICES Journal of Marine Science* 64:779–785.

Wilson, D. C. 2009. *The Paradoxes of Transparency: Science and the Ecosystem Approach to Fisheries Management in Europe, MARE Publication Series No. 5.* Amsterdam: Amsterdam University Press.