Chapter 3
Concerns and Problems in Fisheries and Aquaculture – Exploring Governability

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Abstract Concerns, problems and issues in fisheries and aquaculture are, in many instances, undermined by the lack of a thorough examination of their nature and of the characteristics of the associated systems. Their persistence creates governability challenges, which have restricted effective policy interventions. In order to improve governability, we submit that there is a need to first recognize the complexity of the problems, and then conceptualize them in a way that points towards solutions. In so doing, it may reveal not only limits to governance but also the opportunities and possibilities that exist to enhance governability, i.e., the overall quality for governance.

Keywords Governability assessment • Interactive governance • Wicked problems • Fisheries • Aquaculture

Introduction

The second chapter of the book explains the key elements of the interactive governance theory, linking it to the overall issue of the governability of the system-to-be-governed, the governing system and the various governance orders and modes. The challenges of applying this theory and the governability concept are the focus of this third chapter.

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Here we explain a way to operationalize and apply it to examine concerns, problems and issues related to fisheries and aquaculture. First and foremost, the complex set of concerns related to fisheries and aquaculture governance needs to be recognized in order to enable an understanding of the nature of the problems that are to be solved. Only when this happens can we move into identifying the structural and functional aspects of fisheries and aquaculture governance determined by the characteristics of the systems-to-be-governed, the governing system, and their interactions. The chapter serves as an introduction to the following chapters in this section of the book, each of which elaborates on the relation of the basic concerns facing fisheries governance outlined in the *Fish for Life* volume, i.e., social justice, livelihoods, food security and ecosystem health (Kooiman et al. 2005), to governability. These concerns are value-laden, sometimes irreconcilably so, and therefore require a comprehensive and holistic governance approach. The conceptualization of the relationship between these concerns and the problems that must be solved, as well as the exploration of limitations and possibilities that may exist, are the first steps in improving governability.

The persisting and re-occurring problems in fisheries and aquaculture suggest that there may be some features related to these resource systems and the governing mechanisms that make governance particularly challenging. In their discussion of planning, Rittel and Webber (1973) conceptualize these problems as "wicked." By this, they mean that the problem is neither simple nor easy to define, but requires a deliberative process, an aspect that is also suggested in the interactive governance theory (Kooiman 2003). As is commonly perceived as ideal in fisheries management, the planning process starts by defining the problem, setting the goal, seeking and analysing information, outlining the available alternative solutions, calculating their relative merits, making and implementing a decision, and, finally, evaluating outcomes and, if needed, making modifications (cf. Gilmore and Camilius 1996). This systematic methodology is typical of engineering or scientific inquiry, and, according to Rittel and Webber (1973), may work for what they call "tame" (or benign) problems. It does not, however, apply to societal problems in real life situations. These are messy and uncertain, and therefore require a process that allows for interactive communication and learning.

In the following sections, we draw on Rittel and Webber (1973) to examine how fisheries and aquaculture concerns and problems can be conceptualized and how they can give rise to governance challenges. We then present the underlying hypotheses for assessing governability and provide an explanation of the ways in which key attributes may cause fisheries and aquaculture systems to be more or less governable.

Conceptualization of Concerns and Problems

Concerns are 'meta-order' governance issues that are deeply situated in social values, norms and principles about things we care for and consider important (Kooiman and Jentoft 2009). Thus, ecosystem health, social justice, livelihoods and food security are aspects that require governance attention, most likely all at once, and addressing one of them alone in any instance may result in the worsening of

others. This is why fisheries and aquaculture governance must transcend academic disciplines and discourse, which tend to emphasize a particular concern while ignoring others. For instance, conservation biology may be more interested in the health of the marine ecosystem, but not of the people depending on it for their livelihoods. The latter belongs to social science discourse. Consequently, marine protected areas are promoted primarily by biologists as an ecosystem conservation tool, while their social impacts are often ignored (Christie et al. 2003).

Addressing these multifaceted concerns in fisheries and aquaculture is a major challenge and creates problems for governance. These problems are partly related to how they are defined and what solutions are possible. The conceptualization of these problems is socially constructed, meaning that social processes that "set" a problem must come before it can be solved (Schön 1983). Fisheries stakeholders are numerous and they have competing and, more often than not, conflicting interests, values and worldviews. Thus, in practice it is close to impossible to achieve full consensus about what the problems are and where the solutions lie. Even when they share similar interests, different stakeholders tend to frame the problem differently. Moreover, scientists' perspectives of the 'fisherman's problem' (McEvoy 1990) and what it takes to solve it varies among disciplines. So too, the solutions they prescribe may be different (Brady and Waldo 2009). Where fisheries biologists see fish, social scientists see people. Where governments see sectors, economists see markets, and sociologists see communities and social groups. This is also reflected in the concerns that each group would consider most important, thus differentiating what they want the governing system to concentrate on.

Many of the problems in fisheries and aquaculture tend to reappear and are not solved once and for all (Jentoft and Chuenpagdee 2009). Instead, they need to be attended to on a continuous basis. For example, protecting ecosystem health, sustaining adequate resource availability, and securing food and livelihood activities for communities and consumers require long and committed governance efforts (see Chap. 7 by Pascual-Fernandez and Chuenpagdee, Chap. 5 by Johnson, and Chap. 6 by Pullin, this volume). This implies that the governing system must perform its tasks and evaluate the outcomes on a regular basis. The difficulty observed worldwide with the implementation of fisheries and aquaculture regulations suggests that effective governance is an on-going struggle that requires adaptation and innovation. In particular, it calls for creative interactions along the lines suggested by the interactive governance perspective.

Yet, interactive governance is no panacea. It does not guarantee success. Rather, it requires rigorous assessment of what makes a system more or less governable in order to help improve governance in certain contexts and to provide general insights and lessons that may be broadly applicable. Since fisheries and aquaculture governance is largely about hard choices (Kooiman et al. 2005), one challenge and concern may be addressed in ways that may help or hinder the resolution of other problems. For instance, as governors deal with resource conservation issues, they may complicate another problem, like that of alleviating poverty (Chap. 9 by Onyango and Jentoft, this volume). As shown around the world, it is difficult to both conserve and utilize resources at the same time and in a socially just manner (see Chap. 4 by Jentoft, this

volume). Even when a decision could be made either to conserve or to utilize, the question of who benefits and who loses from such decision remains. It goes without saying that winners and losers would tend to frame the problem differently and have very different ideas of whether the problem is actually solved. Thus, equity and justice, as far as benefit and burden sharing is concerned, are among the criteria on which to make judgements with regard to determining whether a problem has been addressed. However, what constitutes equity and justice is equally difficult to determine and agree on. The sharing of burdens and benefits in ways that stakeholders would accept as fair and just is not only an ethical and moral issue, it also has practical implications. This is largely because it will determine what stakeholders are willing to abide by and accept. At the end of the day, they determine the degree to which a governance system will work or not (Jentoft and McCay 1995).

One of the main features of fisheries and aquaculture is embeddedness (Hanna and Jentoft 1996). Their problems are situated in particular ecological, social and political contexts and are often symptoms of larger issues or problems within other problems. In other words, they may operate at various scales. Thus the level at which the problem should be addressed or dealt with first – at the producing or receiving end – is a key question. For example, from the ecosystem perspective, the 'fishing down the food web' phenomenon (Pauly et al. 1998) indicates the accumulating effects of continued fishing pressure and the shift of target species from large pelagic fish on top of the food chain to invertebrates. Rebuilding fisheries would require measures that not only address problems at the lower food chain, but also at the top. However, fishing also links to the alteration of natural ecosystems, and, in cases where destructive bottom-tending gears such as trawls and dredges are employed, the degradation of seafloor habitats (Chuenpagdee et al. 2003). This implies that the restoration and protection of habitats would need to be considered as part of the ecosystem management. From the social and policy perspective, modernization in fisheries has resulted in distributional issues between small- and large-scale fisheries (Butcher 2004), which have consequences on broader concerns like poverty, food security, social justice, gender bias and human rights. The effects of the decline in fisheries catches are more palpable on small-scale fishing sector and their communities than on the industrialized sector. Small-scale fishers are highly dependent on the resources and have limited financial assets and capacity that would enable them to explore other livelihood options. The remoteness of their location, the lack of capital, and the weak bargaining power in the market and in the policy realm ensure that small-scale fishers are highly vulnerable to changes that occur in the fish production chain (Chuenpagdee 2011). Addressing the problems within small-scale fisheries sector would thus require measures and interventions implemented at all scales.

Fisheries and aquaculture problems may have features that are known, but they occur in different situations and contexts. Hence, potential solutions cannot be the same across the board. For instance, a fisheries crisis, such as a resource in peril, observed in one country may well resemble a similar crisis in another country. However, when looking at the details, there are always some features of the crisis in each country that make them ecologically, socially, culturally and politically

unique. This is why governability assessments must pay attention to contextual variables. This is also one of the arguments for the 'subsidiarity' principle in fisheries governance, which states that problems should be addressed (and responsibilities to solve them vested) at the lowest possible organizational level (Jentoft and Eide 2011). However, it does not suggest that the decentralization of authority from high to low levels is always necessary or wise. In fact, there are issues which the local community is not the appropriate entity to deal with. The construction of infrastructure for post-harvest activities and overall legislative frameworks, which requires active involvement and financial backing of governments, serves as a case in point.

On the whole, fisheries and aquaculture problems have a number of properties that governors would recognize as being wicked (Jentoft and Chuenpagdee 2009). One of them is that "[t]he formulation of a wicked problem *is* the problem!" (Rittel and Webber 1973, 61). In other word, a problem may be felt but people may disagree in how to interpret it. For instance, explanations for low fishery yield are not always clear and consensus about the nature of the problem is hard to find. There is often a "blame game" of who causes it and who is responsible for solving it. In most cases, there is no single natural or social variable that explains outcomes. Even with the best of science, it is still difficult to provide clear answers with regard to problem definitions and solutions. The objective of sustaining a particular resource base, for instance, leaves us with a number of questions. At which level should the resource be sustained? How large should this stock biomass be? If a recovery plan is needed, how fast should it proceed? How big should a protected area be? Should the state of the ecosystem be the only concern, or are there other concerns that are also important, and if yes, how should they be prioritized? Which concerns should be given the greatest attention and resources? These are questions where science falls short. Science may help raise critical questions, but on its own it may not provide answers that lead to decisions. Other concerns may play a role, different rules may apply, and conflict may be a major driver. On political issues, stakeholders tend to have different views and priorities, many of which are not based on knowledge as much as they are on values, beliefs and interests. Here, the problem definitions and the solutions that one may support may not only reflect a political stance, but such a stance will also determine which questions are asked and which concerns are given priority (Turnbull 2006).

Operationalizing Governability Assessment

The governability concept recognizes that there are limits to how systematic and effective a governing system can be in addressing challenges and concerns that occur within the system-to-be-governed. With limits of governability, one must assume that governance does not always go according to plan, and that governors often have to accept solutions that are less than ideal. However, the limits of governability are not necessarily structural. They can sometimes be related to how the systems function. As the case may be, there is a potential for either marginal or radical governability enhancement, through governance interventions aiming at changing the

way the systems are structured and working. What these limits are and how they can be influenced is a governance research issue.

When assessing the limitations and opportunities for enhancing governability, one might expect to encounter the following five hypotheses: (1) the systems-to-be-governed may be too diverse to be handled from top-down mode of governance. (2) Diversity suggests that no 'one size fits all' situation exists. Problems are essentially unique and governance solutions can therefore not be generalized. Instead, solutions must be built on local knowledge and decision making involving "those who know." As mentioned, local level management and devolution of authority and power may not work in all instances, such as in communities with weak leadership, low capacity and high heterogeneity and fragmentation (Archeson 2006). (3) The more complex the system is, the more governance would need to emphasize the structures of relationships and the ways in which they may hinder or facilitate constructive interaction and collective problem solving. Similarly, (4) the dynamics of the system requires knowledge of the internal interactions within the natural and social systems-to-be-governed, and the governing system; understanding the ways in which they affect the ability to govern and the overall quality of governance. Finally, (5) scale issues draw attention to boundary setting in addition to the spatial and temporal distribution of the system components, especially at the border or in overlapping areas where the majority of interactions take place.

Diversity, complexity, dynamics and scales are traits that may complicate the governability of fisheries and aquaculture, sometimes to the extent that the goals of governance are hard to achieve. They make systems less controllable and predictable. Their developments are often non-linear and information is never complete, making governance outcomes inherently uncertain (Degnbol and McCay 2007). As a consequence, they require a governance approach that is flexible and adaptive rather than one that emphasizes control and stability (Mahon et al. 2008). Conflicts within and between systems tend to persist over time and are therefore energy consuming. The same is true when goals are [re]negotiated among participants in the governing process. Governability assessments must therefore recognize that goals are not given *ex ante*, but are themselves governance outcomes. Under such circumstances, governance is not so much about exercising authority from the top-down as it is about political brokerage, where operating goals are at best imperfect compromises (cf. Jentoft et al. 2011).

At a general level, governability is an outcome of the structure that defines and the processes that occur within and between the governing system and the system-to-be-governed. Interactive governance theory broadens the perspective of governability to something that is not solely an issue and a responsibility of the governing system, such as a government agency. Rather, governability depends on the ability of these systems to deliver – individually and in concert – on the challenges and demands resulting from their diversity, complexity, dynamics and scale. Hence, in order to enhance governability, a wide range of instruments and mechanisms would be drawn from and applied within all systems. Since both structural and functional governability can be influenced by acts of governance, governance is basically about promoting governability.

Structural Governability

From the interactive governance perspective, governability is explored as a measure of how governable fisheries and coastal systems are given the particular features of the natural and social systems-to-be-governed, the governing system(s), and the interaction between them. For the system-to-be-governed, we distinguish between two sub-systems, the natural ecosystem and the socio-economic system. From a governability perspective, we focus on their separate qualities as well as the relationship and interaction between them. While the marine environment has intrinsic value on its own, it also provides a wide range of ecological goods and services to organisms within the system, not least humans. The social system affects change in this natural system, but it is also dependent and therefore impacted by these changes, which set limits to resource users' potential. The governing system aims to influence the interaction between the natural system and the socio-economic systems that it governs.

The natural system-to-be-governed in the fisheries context refers to the marine environment (including the geological, physical, and chemical properties), the flora, fauna and other organisms contained within the ecosystem, the habitats within which they live (including the water column), and oceanographic currents such as upwelling and storm surges. Natural ecosystems are related to the biophysical and geo-morphological environment, living and non-living organisms, vegetated and non-vegetated habitats. The external influences that may alter the natural system come from open oceans, coastal zones, as well as from upland areas.

The socio-economic system-to-be-governed comprises of direct and indirect resource users (e.g., commercial and recreational fishers fish farmers, shellfish gathers, divers, tourists, developers, oil and gas explorers, etc.), the social relations that they form, and interactions that occur among them. These various users may share common values, but more often than not their interests vary to the point that their activities cause competition, conflicts and resource degradation. In the simplest form, some of their use areas may overlap, and tension arising from this may be lessened through proper zoning. Some activities may, however, completely displace others. For example, areas used for mariculture are no longer accessible for small-scale fishing. Likewise, the development of an exclusive beach resort often prohibits others from enjoying the area. Additionally, there are issues like externalities such as those caused by the use of destructive fishing gears by a group of fishers, which degrade ecosystems and create loss of income and livelihoods for others. The social relations and interactions among various groups may be more or less structured, institutionalized and exposed to interference by governing bodies through, for instance, numerous regulations and rules. The social system-to-be-governed can also form governing systems themselves, as is the case with user organizations or communities.

The governability of the social system-to-be-governed may be looked at as a three stage process. In the context of halting ecological degradation, for instance, the governing system must work with and through the socio-economic system by influencing user-behaviour such as fishing patterns. However, it is also a process

with a feedback loop, meaning the governing system is held accountable by the social system-to-be governed. In a democratic system, representatives of the social system-to-be governed are the ones with the power to interfere with the ways in which the governing system works. When resource crises hit, the governing system is questioned and governance reform may follow.

Governance theory argues that the system-to-be-governed and the governing system must be compatible in order to be mutually responsive. Thus, for instance, diversity within the system-to-be-governed would require that the governing system be contextually sensitive and therefore it also becomes structurally diverse. Similarly, governing mechanisms need to be tailored to the particularities of the targeted system-to-be-governed. The greater the variations between different system-to-be-governed, the more diverse the governing systems may need to be.

In the same vein, the system's complexities, dynamics and scales demand an adequate response requiring the governing system to mirror those traits (Chap. 10, Scholtens and Bavinck, this volume). Hence, governability will hinge upon the extent to which the governing system achieves this (cf. Jentoft 2007). This is not a matter of natural adaptation, but of deliberate planning and structural design by societal actors such as legislative bodies, planning agencies and civic organizations. This can happen alone or, preferably, in concert. We say preferably because governing capacity and interaction is enhanced through collaboration. Governing interactions are about the two-way mediation between the governing system and the systems-to-be-governed. These interactions identify the various ways in which the governing system is sensitive to the diversity, complexity, dynamics and scale within the systems-to-be-governed, and the ways in which the governing system responds accordingly. These connections structure the ways in which information is collected and communicated, representation is organized, and stakeholders participate, as well as the manner in which learning occurs among the actors involved in both systems. Furthermore, governing interactions can enable adaptation and capacity building and reveal the negotiation process of setting goals and objectives, resolving conflicts, and achieving compromise.

Functional Governability

Governability lies within the inherent and constructed traits of fisheries and aquaculture systems. The diversity, complexity, dynamics and scales of these systems present real challenges to governance, thus affecting their governability. Diversity, whether it regards resource units or relevant stakeholders, is about the heterogeneity of system's elements and its variability. A marine ecosystem in the tropics, especially those containing coral reefs, is much more diverse in terms of ecological biodiversity than one situated in a temperate zone. These areas tend also to be more heterogeneous. For example, they contain subsistence, commercial, small-scale and large-scale fishing sectors using different types of boats and gears and targeting multiple species. This kind of diversity calls for fine-tuned, particularistic governing approaches. For

instance, in order to fully comprehend, represent and control the issues at hand, governance must occur where the problems are felt or where the opportunities appears, and be conducted in cooperation with concerned stakeholders.

Complexity raises the issue of handling interrelationships and interdependencies. Any intervention into the system will have an effect on these linkages and may thus change the way the whole system works. Stakeholders sometimes interact predictably and with patterns that are easy to understand. For example, once landed, catches from large-scale fisheries are typically sold to the main wholesalers in accordance with prior arrangements. In this case, vessel owners have long and established relationships with certain buyers and negotiations between them are minimal. Sometimes these arrangements are institutionalized through vertical integration where transactions are internalized within one and the same enterprise. In small fishing villages where the majority of fishing is conducted by individual fishers, the marketing system can be very complicated. Fishers or their wives and children may sell their own catches to independent buyers or they may sell to certain buyers, often as part of the loan agreement. One governability issue is to anticipate and contain systemic, secondary effects. Another is that systems also have latent functions, which are often difficult to discern and account for. There is a risk of unforeseen consequences and feedbacks that interfere with the way the system works. For instance, when a common property is replaced by private property, it may leave community members to fend for themselves on an individual basis.

Dynamics refers to the fact that systems may be unstable and that they evolve over time. A major source of these dynamics is the interaction that occurs within and between systems, as actors respond to each other and to shifting circumstances. Governability here would then be expressed as the capacity and capability of systems to cope with internal demands and to mediate and accommodate external drivers. Internally we can think of conflicts between stakeholders giving rise to constructive or destructive interactions, either of which generates dynamics in the system. Another example is how a governing system may lag behind the development in the system-to-be-governed, causing low governability. A system-to-be-governed that is able to resist or evade governing actions may similarly be a sign of low governability. A governability assessment must therefore focus on how these systems function *in vivo*, as a living organism with uncertain and unpredictable outcomes.

Further, fisheries and aquaculture as natural systems, and the social and governance systems related to them, come in varying spatial and temporal scales. The matching of scale in the operation of these systems is therefore another important aspect that determines governability. Notably, a certain degree of overlap among natural, social, economic, and political boundaries is expected for the system to function. The extent to which this overlap occurs, particularly in the case of multiple jurisdictions, is a governability issue. The extent of the overlap is likely a determining factor to the governability problem. How it plays out at the end of the day, and how it may be addressed, is an empirical question.

The fisheries and aquaculture governing system is a decision-making machine that must relate to the diversity, complexity, dynamics and scale of the system-be-governed.

The diversity implies on-site presence. The complexity requires an eye for interaction, by-effects and latent functions. The dynamics do not afford the governing system a rest and are such that change does not necessarily converge towards equilibrium. Nor are they such that change is always cyclical. Instead, things often change in lasting ways. As a result, the idea of adaptive governance and corrective feedbacks with built-in learning does not always work well. Adaptive governance exists within limits, whereas transformative governance is about surpassing or stretching them. Adaptation also suggests marginal rather than fundamental, radical change and that a new solution is sought within proximity of old ones. Change does not occur automatically, as in the case of a natural evolutionally process, nor does it occur easily, as it would in the event of a re-adjustment of the governing mechanism. Instead, change often comes as a consequence of a decision-making process ridden with conflicts and political log-rolling, where winning outcomes are determined by power as much as an inherent collective rationality.

Conclusion

Governors, be they individuals or agencies, operate within systems that are inherently diverse, complex and dynamic, restricting what they can possibly achieve. Their ability to govern is limited, and falling short of expectations is part of the norm. Yet, these limitations are also opportunities; they are not necessarily given once and for all, but may be subject to governance initiatives and reforms such as institutional redesign, organizational innovation and the development of new management tools. Sometimes these marginal adjustments of routines, which Kooiman (2003) labels "first" order governance, will suffice. Other times they require a more thorough overhaul ("second-order" governance), such as institutional reform. In some instances, however, governors must start over again by rethinking the basic principles, images and values that underpin governance in the first place and the ways in which they provide guidance for institutional design and operation ("meta-order" governance). Such is the case when governance failure becomes critical. A governability assessment must include a systematic search for possible malfunctions among the diversity of the system components and their complex connections. Governors must be prepared for the fact that things will take time; governance is often a slow process, because it involves multiple stakeholders who need to be convinced that there is a problem and that there is a need for change. If they are not convinced they will tend to resist the call for change.

The beginning of the governability assessment described in this chapter enables the governor(s), including researchers, to identify what the problem is, how the system works, and what might possibly explain why it does not work. The goals of governance are assumed to be negotiated internally as part of interactions; they are not predetermined as something that the system necessarily tries to achieve. As we anticipate that goals are themselves the outcomes of the interactions structured by the particular systems under scrutiny, they should be assessed empirically. In these

interactions, power is expected to play an important role. In the first place, power influences what goals are to be established and who sets them. This implies that the governing system is designed to correspond with the properties of the systems-to-be-governed, the structural features of the governing system, both issues of governance in and of themselves, and the ways these systems interact. It is precisely for this reason that addressing governability must recognize the limits and opportunities of particular systems rather than expecting them to perform beyond what they can actually and potentially do.

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