PERSPECTIVE

Moving beyond panaceas in fisheries governance

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In fisheries management—as in environmental governance more generally—regulatory arrangements that are thought to be helpful in some contexts frequently become panaceas or, in other words, simple formulaic policy prescriptions believed to solve a given problem in a wide range of contexts, regardless of their actual consequences. When this happens, management is likely to fail, and negative side effects are common. We focus on the case of individual transferable quotas to explore the panacea mindset, a set of factors that promote the spread and persistence of panaceas. These include conceptual narratives that make easy answers like panaceas seem plausible, power disconnects that create vested interests in panaceas, and heuristics and biases that prevent people from accurately assessing panaceas. Analysts have suggested many approaches to avoiding panaceas, but most fail to conquer the underlying panacea mindset. Here, we suggest the codevelopment of an institutional diagnostics toolkit to distill the vast amount of information on fisheries governance into an easily accessible, open, on-line database of checklists, case studies, and related resources. Toolkits like this could be used in many governance settings to challenge users' understandings of a policy's impacts and help them develop solutions better tailored to their particular context. They would not replace the more comprehensive approaches found in the literature but would rather be an intermediate step away from the problem of panaceas.

governance | fisheries | panacea mindset | individual transferable quotas | institutional diagnostics

In environmental governance, many authors note the dangers of panaceas, or simple formulaic policy prescriptions that are believed to solve a given problem in a wide range of contexts, regardless of actual consequences (1). From this literature, we know that panaceas fail to solve problems and that long-term adherence to panaceas can increase fragility and undermine resilience in socioecological systems (2–6). Still, the influence of panaceas in the thinking of both practitioners and analysts persists.

In this paper, we hope to spark new research on the spread and persistence of panaceas, as well as strategies for avoiding them. We illustrate our points using the case of individual transferable quotas (ITQs; also

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individual fisheries quotas and individual transferable effort limits) as an example. Like many other types of fisheries management, ITQs start with an allowable harvest level or effort level set to achieve biological goals, such as maximum sustainable yield. Some portion of this quantity is then distributed to fishers (via individual quotas) who may trade their quotas in various types of markets. This transferability is the distinguishing characteristic of ITQs. Proponents expect that competitive quota markets will lead to outcomes that are economically efficient as well as sustainable in biophysical terms (7–9).

As with many other policies that become panaceas (e.g., carbon trading, microfinance, payments for ecosystem services, terrestrial and marine protected areas, and so forth), theory and practice diverge. There are many well-documented negative side effects and unintended consequences associated with ITQs. ITQs: caused cultural upheaval through the exclusion of indigenous and subsistence users in the United States, Canada, and New Zealand; resulted in quota oligopolies, inflexibility, and economic hardship in Iceland, Denmark, the United Kingdom, and the Faroe Islands; and failed to prevent stock declines or thwarted rebuilding efforts in several Greenlandic, Dutch, Canadian, Australian, and international fisheries (10–18). Even ITQ proponents agree that "getting the incentives right," as advocated by Lubchenco et al. (19), requires careful attention to the social, political, and behavioral attributes of specific cases, along with their bioeconomic features (20–22). Nevertheless, ITQs spread rapidly following their inception in the 1980s and they are often implemented without consideration of case-specific factors (14, 17, 23–25). Widely accepted and applied as a panacea in fisheries governance, ITQs constitute a fitting example for this study.

We start by describing the panacea mindset and explaining how it contributed to the institutionalization of ITQs as a panacea. A key insight from this analysis is that we need to consider cognitive and behavioral factors, as well as institutions and incentives, when trying to understand why panaceas spread and persist despite their shortcomings. This leads to some suggestions for moving beyond panaceas in fisheries governance through the use of institutional diagnostics toolkits. Continuing with our ITQ example, we show how toolkits would be user-friendly on-line resources that allow decision makers and stakeholders to explore the costs and benefits of various policy options as applied to a specific context. It would not replace the more comprehensive approaches found in the literature. But, by counteracting some of the components of the panacea mindset, diagnostic toolkits would promote movement away from reliance on panaceas.

The Panacea Mindset

If panaceas create so many problems, why do they spread and persist in so many areas of governance? To answer this question, we develop the concept of a panacea mindset, or suite of factors that predispose many decision-makers to accept panaceas. We have identified three main clusters of factors in the mindset: conceptual narratives, power disconnects, and heuristics and biases. This list is neither exhaustive nor mutually exclusive, but it combines two common themes in the fisheries literature (institutions and interests) with ideas from behavioral psychology (cognition), which are generally understudied in this context. Each cluster involves distinct causal mechanisms, although they often interact with one another. In this formulation, we follow Hanna (26), who notes that, "It is the interaction between the institutional environment, property rights and individual behaviors that contribute to the [governance] outcome." Other factors may be important, and we hope this analysis will initiate a broader investigation into the panacea mindset.

Conceptual Narratives

People rely on narratives to understand problems and devise solutions. Narratives may be detailed and complex descriptions or they may be simple metaphors or "just-so stories" that are intuitively appealing. Conceptual narratives are developed and spread by academics (27–30). When a conceptual narrative describes a complex problem like fisheries governance in overly simple ways, it paves the way for overly simple "solutions" or panaceas. Degnbol et al. (23) show how conceptual narratives contribute to the use of several different panaceas in fisheries governance, including ITQs. We build on their work by describing two major panacea-supporting conceptual narratives, although others may also be important: the neoliberal economic paradigm and the mainstream fisheries economics paradigm, which in turn comprises several subnarratives, as described below. Although both contain the term "economics," the first is a political construct, while the second occurs when fisheries economists produce policy prescriptions.

The neoliberal economic paradigm prescribes the use of incentive-based policy tools like ITQs as solutions in all types of environmental governance. Widely recognized in political science, this paradigm is a political translation—some would say corruption—of neoclassical economic theory (31–33). It emphasizes market forces as alternatives to government, while ignoring market failures, transaction costs, and most types of externalities. By seeking to remove government from the equation (in ITQs, mainly by letting allocation issues be handled by markets rather than governments), the neoliberal economic paradigm ignores the social, political, and economic realities that shape public policy in fisheries (15, 34–36). It is a common factor in many other market-based panaceas, including carbon trading, payments for ecosystem services, and irrigation rights (37–39), as well as corporate social responsibility and privatization of government services like education or prisons (40–42).

The mainstream fisheries economics paradigm is partially embedded in the neoliberal economic paradigm, but it draws on a number of other subnarratives, each of which simplifies different aspects of the fisheries governance problem (15, 36). First, like many renewable resources, ITQ fisheries are usually managed using a single-stock approach, with few if any modifications for habitat or species interactions (43, 44). There is an extensive literature critiquing single-stock management; experts recommend alternatives, like multispecies, ecosystem based, and space-based management (45–49). Nevertheless, single-stock management is the norm in large-scale commercial fisheries, and it is a fundamental conceptual narrative supporting ITQs (25, 44, 50).

This narrative oversimplifies fisheries economics in two main ways. First, as in neoclassical economics more broadly, when mainstream fisheries economists prescribe policy, there is a tendency toward Whitehead's "fallacy of misplaced concreteness" (51, 52). In other words, while fisheries economists tend to recognize the many limitations of their models in scholarly work, these caveats are often missing or downplayed in their policy prescriptions (see, for example, refs. 7 and 53). Second, mainstream fisheries economists focus on open access to the exclusion of other market failures. This is due in part to treatment of the tragedy of the commons (54) as a problem of market failure arising from a lack of private property rights (55–58). Ironically, these authors then go on to ignore or downplay the market failures associated with ITQs,

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including reduced competition and increased inefficiencies from the consolidation of quota ownership (more below) (17, 59–61).

Mainstream fisheries narratives also oversimplify fisheries governance by removing politics and institutions from the equation. There is a vast literature on the management of the commons documenting alternatives to property rights that ensure sustainable use of fisheries and other natural resources (62–69). Conversely, ITQs often create interest groups that use the system for their own ends (see next section). This is why some authors advocate incorporating human rights in the concept of rights-based management, moving from the overly simple option of ITQs to a wider range of solutions that could be tailored to fit the needs and interests of local communities (70, 71) and society at large (72).

Power Disconnects

Like most other forms of management, ITQs create winners and losers. In the process, they can widen power disconnects, which arise when those who benefit from a governance system have greater political and economic power than those who are harmed by it (73). Power disconnects contribute to the panacea mindset by providing beneficiaries with the influence to ensure that such measures are adopted and remain in place. In fisheries, this allows influential fishers to limit competition via governance systems (26, 74). It is a direct contravention of the theoretical logic of ITQs and ensures that any potential benefits in the form of increased efficiency through competition may be lost due to a combination of monopsony power in the market for quota and capture of political rents from the ITQ system (75–81). Furthermore, by "locking-in" overly simple ITQs via regulatory capture, power disconnects reduce flexibility in the long-run, thereby increasing systemic vulnerability (44, 82, 83).

As noted by Lasswell (84) and others, government capture like that associated with ITQs is common; in the context of fisheries governance it can cause serious ecological, financial, and political instabilities. There are two sides to this issue. With high capital reserves and interests in multiple fisheries (or other industries), elites who monopolize quota are insulated from both economic and ecological costs in any given fishery. This encourages them to downplay risks faced by local fishing communities, and it may negate expected benefits from ITQs, such as longer time horizons, greater stewardship of the resource, and improved efficiency through competition (14, 79, 85).

Conversely, when inhabitants of fishing communities who experience the costs of overly simple ITQs have little political power, decision-makers will have few incentives to respond to their concerns. This is not just an issue of social justice. Because of their dependence on local resources, these communities have greater incentives to protect the local ecosystem (18, 62, 83, 86–89). This does not guarantee that fishing communities will not embrace panaceas, including ITQs, but they will experience the costs of the panacea sooner and more extensively, giving them incentives to find policy options with fewer negative side effects. The combined effects of these factors are apparent in the Icelandic fishery described below, but have also been documented in the Faroe Islands, Greenland, Denmark, Norway, the United Kingdom, Peru, and other fisheries where quota consolidation is permitted or where coastal communities are otherwise excluded (50, 72, 86, 90).

Evidence for the social costs of power disconnects associated with ITQs is extensive, but bioeconomic benefits have also been diluted as powerful quota-holders lobby to raise catch limits above scientifically recommended levels to maintain the "value" of their quota (18, 91–93). Ecologically, locked-in ITQs are ill-suited to handling the nonlinearities and interconnections occurring in dynamic marine systems. It is always easier to raise the total allowable harvests in good years and harder to lower them in bad years. But when powerful groups of "owners" treat shares as assets, it can be nearly impossible to achieve the needed flexibility (77, 90, 92, 94, 95). Macroeconomic instabilities also have been observed in cases where fisheries rights are used as financial instruments in fisheries-dependent countries. In Iceland, for example, the creation of financial instruments based to a considerable extent on catch shares played a role in the collapse of the country's major financial institutions in 2008, producing a deep crisis with significant negative impacts on the welfare of the entire Icelandic public (11, 96, 97). Here again, if those with power felt the effects of their actions sooner and more clearly, modifications might have been made to prevent these types of risks. This is another way power disconnects reinforce panaceas and other suboptimal policy choices.

Heuristics and Biases

Human cognition and behavior contribute to the appeal of panaceas. People tend to rely on heuristics when faced with complex problems involving high costs of information or other transaction costs. Often, these mental shortcuts make decisions easier, but they can also create biases that degrade decision making (98–102). Biases may also arise as people try to rationalize bad behavior and reduce cognitive dissonance or defend prejudicial social norms (103–105). These factors are largely ignored in the literature on ITQs and, more generally, in the neoliberal problem narrative, because people are assumed to be perfectly rational. Indeed, implementation of ITQs is often referred to as the "rationalization" of a fishery. However, psychologists have demonstrated that humans are predictably irrational. This is not to say that all individuals always behave irrationally, but rather that for a given choice point, a percentage of the population will use simplifying heuristics and biases that skew their choices in predictable ways (106–110).

Many well-known heuristics and biases contribute to the institutionalization of ITQs and other panaceas. We do not have space for a full review here but provide a few examples to show the rich potential for future study in this area. Several heuristics encourage the spread of panaceas by biasing decision-makers toward policies that appear to work in one set of circumstances, even if both the context and the actual content of the regulatory regime differ substantially. For example, the representativeness heuristic is based on the assumption that a small sample is representative of the entire population and, furthermore, that the population resembles the most salient aspects of the sample (111). Based on a handful of perceived successes in places like Iceland in the 1980s, decision-makers who rely on the representativeness heuristic would assume that ITQs could work in many other contexts, regardless of actual fit. Similarly, the halo effect occurs when the perceived "goodness" or "badness" of a person or thing biases judgment in its favor. The implication here is that, if people believe that ITQs are "good," they will judge the effects much more positively than if they believe that ITQs are "bad," dismissing negative side effects caused by a poor fit (112).

Other cognitive factors well-studied in psychology but not in environmental governance can obscure the potential costs and benefits of using panaceas like ITQs. People are not good at assessing risk in complex systems. Even when presented with detailed estimates of objective environmental risk, many people assess risks based on other information, like the ease with which they can recall an event happening before (i.e., the availability

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heuristic) or their gut response to the event (i.e., the affect heuristic) (113–116). Difficulties assessing risk also arise from innumeracy, or people's inability to internalize the numerical representations of risk most commonly used in science (117–119). There is little research on the perception of risk in fisheries governance. But in Alaska and elsewhere, the risk of fishery collapse or failure in the absence of ITQs is often overstated, leading to a false dichotomy; the only two options considered are collapse (due to the tragedy of the commons) or rebuilding and return to profitability through ITQs (120, 121). The many other policy options available are ignored.

Some heuristics also reinforce other components of the panacea mindset. The halo effect can amplify the influence of conceptual narratives, as people who already believe that ITQs will work are more likely to judge them as effective (122). Confirmation bias works in a similar way, ensuring that people accept information that confirms their prior beliefs while disregarding information that contradicts those beliefs, regardless of its veracity in either case. This bias can also contribute to the persistence of panaceas despite evidence regarding ineffectiveness or negative side effects, as is well-documented in the literature (123, 124). Groupthink and group polarization are also important. Groupthink occurs when social networks reinforce prior beliefs, often by allowing group members to discard any information that contradicts preferred conceptual narratives (125–127). Similarly, as people with moderate positions on a given topic talk to each other, their positions often become more extreme. This is known as group polarization (128, 129). As seen in recent studies, these processes can reinforce prejudices and power disconnects as well (130–132).

Other cognitive biases can reinforce power disconnects in the panacea mindset. Experimental and observational evidence shows that people with power over others are more likely than the average person to forget facts or events that make their goals seem less worthy or less achievable and to reject evidence disconfirming the effectiveness of their preferred policies (133–136). They screen out knowledge of competing goals, negative impacts, and other information that would make panaceas less palatable. In addition, those in power frequently rationalize the external costs of panaceas by blaming scapegoats. Abstract concepts like "complexity" or nonhuman agents (e.g., bats, mice, and so forth) may be implicated, but when groups of people are targeted, power disconnects widen considerably (137–139). Marginalized groups may be dehumanized based on social biases that are either explicit (stereotyping, prejudice) or implicit (in-group bias, out-group attribution error). As problems and related costs increase, the resulting network effects and cycles of rationalization can lead to high levels of environmental injustice that increase the fragility of the system (140–143).

While more research is needed, there is some evidence that elites with vested interests in ITQs rationalize negative side effects imposed on others (e.g., keeping them out of the fishery or forcing them to accept low prices for their catch in exchange for access to shares) so that they can continue to enjoy asymmetric benefits (15, 86, 144, 145). Of particular concern here is the tendency for ITQs to exclude indigenous peoples or those who are otherwise marginalized politically and economically due to structural factors, such as racism. There is clear evidence of this occurring in fisheries in New Zealand, Alaska, and several other countries (146, 147). ITQ proponents rationalize such effects by emphasizing efficiency and expected improvements in the health of fish stocks that will "lift all boats," reducing social justice problems by providing alternative sources of livelihood (12, 13, 21). As in other domains, this logic ignores the loss of cultural practices and traditional ecological knowledge, as well as the ways in which power disconnects can prevent the "trickle down" of benefits to marginalized groups. There is ample evidence that ITQs can destroy cultural values and exacerbate economic inequalities, particularly when power disconnects are reinforced by social-psychological rationalizations (14, 44, 148–150).

An Institutional Diagnostics Toolkit

Although the elements of the panacea mindset are widespread, there are many experts who embrace the complexities of environmental governance. They have designed more comprehensive approaches meant to guide decision-makers as they fit policies to dynamic environmental, political, and economic conditions. Ecosystem-based management, space-based management, adaptive management, comanagement, and various combinations of these approaches are much discussed and have substantially improved environmental governance in areas including forestry, water, climate change, biodiversity and, of course, fisheries (6, 151–155). Unfortunately, where the panacea mindset is affecting governance choices, these more comprehensive and seemingly more complex approaches are not likely to be selected or, if they are put in place, implementation will be incomplete. In addition, there is the possibility that stakeholder engagement, polycentricity, and other key elements of adaptive comanagement are now being treated as panaceas, with highly appealing just-so stories taking the place of nuanced empirical analyses (156, 157).

Combating conceptual narratives, reducing power disconnects, and minimizing the influence of simple heuristics and biases is a difficult task. We cannot vanquish the panacea mindset in a few paragraphs. In any case, this is not a task for a small group, but rather for society as a whole. Nevertheless, as a practical midrange approach, we suggest the use of institutional diagnostic toolkits that could help people avoid panaceas in different issue areas. Based in the literature on institutional diagnostics (2, 4, 158, 159), toolkits would not replace existing comprehensive approaches, but would be complementary and could be used in situations where the panacea mindset is limiting governance options. A well-designed toolkit may even guide users to more comprehensive methods.

For any given management challenge, the creation of a toolkit would start with transdisciplinary working groups that bring together academics, decision-makers, and stakeholders to develop a set of institutional diagnostic checklists that capitalize on the wealth of knowledge on environmental governance to make it easier to determine the fit of a set of policies to a specific context. These groups would also develop corresponding case narratives that go beyond just-so stories to highlight the importance of considering context. Hopefully, this process itself would ameliorate the conceptual narrative portion of the panacea mindset by breaking through groupthink, although this will depend on the willingness of participants to step out of their ideological boxes.

Table 1 provides an example of the types of items that could go into a diagnostic checklist for ITQs, which in turn would be part of a larger fisheries governance toolkit. It is organized around five key governance goals identified in the literature. Because of space limitations we can only include one or two rows per goal, each drawn from our description of the panacea mindset discussed above, but this should show how such a checklist might work. Associated system properties or diagnostic conditions under each goal are listed in column 1, with indications of the fit of ITQs to that property in column 2, followed by methods to improve fit or select alternatives that would be a better fit in column 3. The purpose here is to expand the users' conception of the problem (preferably beyond their own conceptual narratives), help them think about how

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the policy might fit their context (e.g., whether fit is conditional on the use of additional policies or requires the prevention/removal of the property associated with the diagnostic condition), and provide ideas about potential solutions.

Of course, the short descriptions given in the third column are insufficient to guide decision-makers fully. In the real version of the checklist, this information would be more extensive. But we also envision that the full toolkit would augment each checklist by

Table 1. Diagnostic considerations relevant to ITQs in industrialized fisheries

Diagnostic condition	ITQs fit?	Design elements to improve fit/alternative solutions
Ecological		
Overfishing of a single stock	Conditional	Binding, science-based total allowable catch (TAC), sufficient monitoring and enforcement; size limits and other measures may be needed as well Case studies (primary sources): Pacific halibut (refs. 162–164), Peruvian anchoveta (refs. 165–167)
Ecological interactions	Conditional	TACs established using ecosystem-based (EBM) or multispecies management (MSM); marine protected areas (MPAs), space-based management (SBM) used to protect critical habitats; multispecies quotas (see also Governance, System-level Resilience) Case studies (primary sources): Icelandic herring (refs. 168–170), Norwegian cod (refs. 72, 171, 172)
Economic		
Overcapitalization	Conditional	Binding, science-based TAC, sufficient monitoring and enforcement (see also Sociocultural). Alternatives: individual quotas (IQs), community based management (CBM), traditional use rights fisheries (TURFs; a list of other options can be found here) Case studies (primary sources): Pacific halibut (refs. 162–164), Alaska salmon (refs. 145, 173, 174)
Oligopolistic control of quota	No, unless oligopoly is eliminated	Remove/prevent oligopoly via: limits on quota holdings, and programs to provide access to specific groups (e.g., young fishers, community members) Alternatives: IQs, CBM, TURFs Case Studies (primary sources): Icelandic herring (refs. 168–170), Faroe Islands mixed fishery (refs. 50, 175, 176)
Sociocultural		
Structural injustice	No, unless rights are protected	Establish management rights to give voice to groups most affected, institute comanagement and/or stakeholder engagement Alternatives: IQs, CBM, TURFs Case studies (primary sources): Alaska salmon (refs. 173, 174, 177), New Zealand ITQs (refs. 145, 149, 150)
Coastal communities' livelihoods	No, unless livelihoods are protected	Protect livelihoods by establishing management rights to give voice to groups most affected, institute comanagement and/or stakeholder engagement Alternatives: IQs, CBM, TURFs Case studies (primary sources): Icelandic groundfish (refs. 97, 178, 179), Alaska salmon (refs. 145, 173, 174), New Zealand ITQs (refs. 149, 150, 177)
Governance		
Power disconnects	No, because of potential for lock-in	Reduce disconnects by establishing management rights to give voice to groups most affected, institute comanagement and/or stakeholder engagement Alternatives: IQs, CBM, TURFs Case studies (primary sources): Faroe Islands mixed fishery (refs. 50, 175, 176), Alaska salmon (refs. 145, 173, 174)
Corruption/government capture	No, because of power disconnects and lock-in	To minimize political rents: Allocation via auction, limits on portion of quota owned by an individual or corporation, temporary rights rather than property rights; To reduce government capture: incorporate management rights for all stakeholders, institute comanagement and/or stakeholder engagement Alternatives: IQs, CBM, TURFs Case studies (primary sources): Faroe Islands mixed fishery (refs. 50, 175, 176), Peruvian anchoveta (refs. 165–167), Icelandic groundfish (refs. 97, 178, 179)
System-level resilience*		
Sudden or surprising changes	No, because of lock-in	To avoid lock-in: see advice in this checklist on Oligopoly, Power Disconnects, and Corruption Alternatives: adaptive management, EBM, SBM, CBM, TURFs Case studies (primary sources): Icelandic groundfish (refs. 97, 178, 179), Peruvian anchoveta (refs. 165–167), Norwegian cod (refs. 72, 171, 172)

Underlined text indicates where hyperlinks will be incorporated in the online version of the checklist so that users can easily navigate to other items in the toolkit.
*These may be ecological, financial, political, social, and so forth.

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providing hyperlinks to additional information (indicated by underlined text in the Table 1). Design elements are linked to detailed descriptions of best practices for suggested modifications of a basic ITQ policy. Alternatives provide links to checklists for policies that could be used instead of ITQs. Links to case studies give users concrete examples of the diversity of costs and benefits associated with implementing ITQs under each condition. Like the checklist, these cases would be compiled by a group of experts and would be written to provide accessible narratives that illustrate points in the checklist. We would also include links to the peer-reviewed journal articles that were used as sources for the cases. Here, we provide a few sources for each case (see reference list for details) but ultimately a larger library could be integrated into the toolkit. There is considerable overlap of conditions within cases, so most are used more than once. This demonstrates the complexity of fisheries governance and the need to pay attention to multiple factors.

To shift from an ITQ checklist to a fisheries governance toolkit, all of these elements would be connected via a relational database (or a set of linked data tables) that is searchable via a user-friendly interface. For ITQs, the database would allow a user who is interested in designing an ITQ system to search on any variation on the term ITQ and come up with the appropriate checklist. Alternatively, a user could enter a given policy goal and get a set of checklists associated with the various options that could be used to achieve that goal. Another possibility would be to search for case studies based on geography, time, or species, and then follow hyperlinks to the policies or checklists associated with those search results. In fact, a user could search on a component in any one of the data tables in the toolkit to find related information from any of the other tables. Hyperlinks, menus, and other tools would allow users to explore the database in an intuitive fashion.

Of course, a toolkit like this could be abused by decision-makers and vested interests seeking to justify panaceas that benefit them, just as any other policy approach can be. This is what makes the transparent and on-line nature of the system so important. Stakeholders and the public can use the toolkit to assess existing policies, to develop scientifically grounded options that better fit their interests and, ultimately, to hold decision-makers accountable.

As a public good, the most likely roadblock to the development and implementation of toolkits like this is lack of resources. However, there is precedent for such investment. In fisheries alone, there are several global-scale databases, most notably those managed by the UN Food and Agriculture Organization and the Fishbase system. Neither database covers governance factors beyond biophysical and economic data, but such information is included in the more general Social Ecological Systems Meta-Analysis Database (160) and the International Environmental Agreements Database (161). These successful efforts suggest that toolkits could be created for fisheries or other issue areas, although each would likely have to start small and be built over time, much like Wikipedia or other open-source, on-line mega-projects. We also note that crowd-sourcing information among experts is increasing and technological costs are declining, and so if the will exists, the way is already available.

Conclusion

We use ITQs as an example to show how the three components of the panacea mindset help institutionalize panaceas despite negative bioeconomic and sociocultural side effects. Conceptual narratives, like the neoliberal economic paradigm, popularize overly simple depictions of the governance problem, making it more plausible that solutions could come in a one-size-fits-all form. Power disconnects give vested interests the influence they need to create and maintain panaceas despite unequal costs and benefits. Heuristics and biases make it difficult for people to assess the effects of panaceas, increasing the likelihood that their lack of fit will favor adoption and prevent removal.

Overcoming panaceas in environmental governance is a challenge that extends well beyond the debate about the pros and cons of arrangements featuring ITQs. The same mindset that led to the spread and persistence of ITQs as a panacea can undermine other regulatory tools as well, creating major weaknesses at a time when ecosystems and communities are already highly stressed by multiple forces, including resource depletion, pollution, development, and climate change. As scientists, we need to enhance understanding of the factors that contribute to the spread and persistence of panaceas in order to combat them. This effort has its own intellectual merits and can also provide better governance, not just in fisheries but also in many other issue areas where panaceas are prevalent. In our view, "going beyond panaceas" will require grappling with the panacea mindset (2). This knowledge should then be used to develop midrange theories and intermediate resources, like institutional diagnostics toolkits, that make it easier to design context-appropriate institutions that are better than panaceas.

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