

Overview

Sustainable Fisheries: Addressing a Global Problem

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Importance of Fisheries

Currently, of the world's assessed stocks, only 20% are estimated to be moderately exploited or underexploited, 52% are fully exploited, 1% are recovering from depletion, 8% are depleted, and about 19% are considered overexploited (Cochrane et al. 2011, this volume). Fisheries are vitally important renewable resources if they are governed sustainably with responsible harvest from healthy populations, which allows for future use. While the case for sustainable fisheries has been made effectively to most fisheries professionals, it has not been an apparent priority for the majority of policy makers and the public. This book is designed to draw media and policymaker attention to key global fisheries problems that are not adequately addressed by existing governance structures and to serve as a key directive for convening a global conference on sustainable fisheries. The chapters underscore the urgency of the ecological, economic, and social aspects of the sustainable fisheries issue; highlight inadequacies of current institutional mechanisms to deal with this global tragedy; and identify areas for change. The following provides an overview of the key points from *Sustainable Fisheries: Multi-Level Approaches to a Global Problem* (see Table 1).

Ecological

There is an undeniable link between sustainable fisheries and the ecological health of marine and aquatic systems. While it is true that a sustainable fishery does not necessarily signify overall ecosystem health, truly healthy ecosystems characteristically have long-term stability and resilience, which enable the production of sustainable fisheries (Dobiesz and Hecky 2011, this volume). In essence, the health of an aquatic ecosystem reflects the state of fisheries therein (Dobiesz and Hecky 2011). Many of the same stressors that lead to ecosystem impairments can also damage fisheries sustainability, including anthropogenic impacts such as pollution and contaminant loading, invasive species, harmful land-use practices, overexploitation, habitat degradation, climate change, and other pressures linked to increasing human population growth (Dobiesz and Hecky 2011).

Similarly, although aquaculture currently provides almost 50% of the world's fisheries product needs, it does not necessarily lessen the pressure on wild populations. Currently, most of the industry is additive to wild caught fisheries (not substitutional), with high demands for fish meal produced from capture fisheries (Hughes and Rose 2011, this volume). Other strains on wild fish stocks stem from aquaculture facilities' pollution of surrounding environments, the possible escape-ment of farmed fish that can contaminate the natural genetic diversity of wild fish stocks and spread

Table 1. Key points from *Sustainable Fisheries: Multi-Level Approaches to a Global Problem*.

Importance of fisheries	<ul style="list-style-type: none"> • Healthy ecosystems, with long-term stability and resilience to external stressors, support sustainable fisheries. • 8% of the world's population is dependent upon fisheries industries for their livelihoods. • More than 40% of the world's population consumes at least 15% of their animal protein directly from fish.
Fisheries failings	<ul style="list-style-type: none"> • If global marine fish stocks were restored and sustainably governed, potential annual profits could reach US\$45 billion, compared to their current net annual loss of \$5 billion. • Science is not well integrated into fisheries decision making. • Fishing subsidies and misplaced incentives support unsustainable fishing practices. • Global fishing fleets may be capable of catching up to 250% more than the oceans can sustainably produce. • Absent or unenforceable fishing regulations (i.e., without meaningful penalties) are not effective.
Future of fisheries	<ul style="list-style-type: none"> • Aquaculture, if conducted with environmentally sustainable methods, has the potential to alleviate pressure from wild fish populations, generate income, and address nutritional needs. • Interdisciplinary approaches to fisheries governance will produce ecologically, economically, and socially sustainable targets. • Ecosystem-based management will ensure targets are resilient to a range of stressors to the fisheries system. • Community-rights based approaches will instill a sense of stewardship for fisheries resources in the stakeholders involved in the decision-making process. • Reducing fishing capacity, coupled with providing viable alternative livelihoods, will allow for greater ecological resilience, economic profitability, and social stability. • Codifying fisheries laws and treaties in an enforceable way will hold nations and fishers accountable for the consequences of unsustainable fishing practices. • A global conference will elevate the issue of sustainable fisheries as a priority on the world stage.

disease, and the increased potential for the spread of antibiotic resistance to aquatic environments as a result of the prevalence of antibiotic use in fish farms (Hughes and Rose 2011). Additionally, given that more than half of aquaculture production occurs in freshwater inland environments, the related water allocation needs can further strain already scarce resources (i.e., water quality and quantity; for references, see Hughes and Rose 2011).

Ecosystems not only supply an assortment of harvested resources and services (i.e., fisheries and tourism), but also maintain high levels of biodiversity. The ecosystem services and resources provided by coral reefs, for example, have an estimated global value of about US\$375 billion per year, and these reefs are also home for one-third of all marine fishes during some part of their lives

(for references, see Bruckner et al. 2011, this volume). Declines in ecosystem health, in addition to harming this biodiversity, impact the vitality of local communities that depend on these systems for food and income, particularly in economically less developed countries (Bruckner et al. 2011).

Economic

These ecological implications highlight the importance of fisheries in both a local and global context and emphasize the need to integrate their ecology with economic and social systems (Cochrane et al. 2011). Marine fisheries generate an estimated gross annual revenue of \$80 billion from annual harvests of 85 million tons (for references, see Martens et al. 2011, this volume) and support 34.8 million fishers and 8.7 million fish farmers world-wide (Valdimarsson and Metzner 2011, this volume). Altogether, an estimated 8% of the world's population is considered dependent upon the fisheries industry (for reference, see Cochrane et al. 2011). According to figures from 2007, 114 million metric tons of food fish were provided by global capture fisheries or produced by aquaculture operations (for reference, see Cochrane et al. 2011). Fish destined for consumption is clearly a valued commodity, being traded throughout the world more than any other food, with many economically less developed countries having fish as their highest valued export (Valdimarsson and Metzner 2011, this volume). In fact, 2006 totals showed a movement of US\$85.9 billion of globally exported products related to fisheries, with 50% of that originating from economically less developed countries, where it has significantly eclipsed other agricultural commodities (i.e., coffee, rubber, cocoa, bananas, meat, tea, sugar, rice, and tobacco) in net value of exports (for reference, see Cochrane et al. 2011; Valdimarsson and Metzner 2011).

Despite, or further enhanced by, these estimates, it is important to note the integral role of the small-scale sector in economically less developed countries for income and subsistence (Valdimarsson and Metzner 2011). While in some communities, these small-scale fisheries are a last resort after agriculture or other means to generate income fails, small-scale fishers in economically less developed countries still make up the vast majority (90%) of the total global continuously operating population of fishers, and small-scale fisheries directly or indirectly support 200 million livelihoods in economically less developed nations worldwide (for references, see Hori et al. 2011, this volume).

Social

As populations grow in regions with a high proportion of economically less developed countries, the need for fisheries to supply food has also increased (for references, see Cochrane et al. 2011; Hori et al. 2011). Fish made up "15% of the average per capita animal protein intake" for more than 2.9 billion people in 2006 (for reference, see Cochrane et al. 2011). Other estimates show that 500 million livelihoods in economically less developed countries are dependant on wild and farmed fisheries and 400 million people from these countries use fish to obtain more than 50% of animal protein and minerals in their diets (for reference, see Martens et al. 2011).

The socioeconomic implications of this dependency are paramount for the health, livelihoods, and cultures of those who would be most directly impacted by the inability to access adequate amounts of this resource in the future, as well as the communities and nations in which these people reside. Fishers need to provide income for themselves and their families in the present and also ensure that sustainable fisheries are available as a resource for their families in future generations

(Valdimarsson and Metzner 2011). In areas capable of supporting productive tourism industries, some traditional fishers are shifting to these more profitable livelihoods and are being replaced by foreign fishers, who lack traditional knowledge of the local ecosystem and resources and are implementing more destructive fishing methods, destroying habitat and altering the local fish community ecology (Bruckner et al. 2011). Coastal development coupled with nutritional and economic needs associated with continued human population growth in already impoverished regions further stresses fisheries and fish habitats in countries that may not have governments with adequate financial or institutional capacity to support sufficient protection and management of natural resources (Dobiesz and Hecky 2011). Short-term poverty-induced desperation can further drive deleterious fishing practices, such as illegal harvest and use of gear that is damaging to aquatic habitat (Bruckner et al. 2011; Dobiesz and Hecky 2011). Alleviating such poverty is necessary to enhance the possibility of sustainable development (for reference, see Cochrane et al. 2011).

While market forces and government agreements play a role in an individual's fishing practices, the sharing of knowledge regarding technology and harvest techniques between networks of community members also exerts an influence on where and how fishers capture fish as they learn of locations and fishing methods that produce potentially higher yields (Frank et al. 2011, this volume). Their views on compliance with regulations are also reinforced or altered through local social norms within their respective networks (Frank et al. 2011). Additionally, as individuals prioritize the time and resources they dedicate to work versus leisure in response to market trends in fish products, their social interactions can motivate related decisions and use of associated fishing practices (Frank et al. 2011).

Culture is also important. For example, the North American Pacific salmon fishery is significant to aboriginal communities as a traditional economic and nutritional resource, as well as for ceremonial purposes (Noakes and Beamish 2011, this volume). Nongovernmental organizations (NGOs) can play an important role in educating the general public about an issue, garnering support from non-users (Lynch et al. 2011, this volume). Contemplating these cultural and social aspects of the fishing industry and the effect of societal norms further emphasizes the different ways communities may both benefit from and impact the future sustainability of fisheries, therefore highlighting how governance may need to adjust accordingly (Frank et al. 2011).

Fisheries Failings

The problems surrounding overexploitation of fisheries and fish habitat destruction are an indication of the failure of fishers, fisheries managers, and governments to manage the pressures from political and economic interests on resource use and related markets (Valdimarsson and Metzner 2011). Common discrepancies between long-term conservation objectives and socioeconomic short-term objectives (Cochrane et al. 2011) enable overexploitation, which reduces potential economic benefits in the long run (Martens et al. 2011). Despite beliefs to the contrary, it is possible to operate at maximum sustainable yield and still yield an economic loss (Martens et al. 2011). Assuming that global marine fish stocks were restored and sustainably managed, potential annual profits could reach about \$45 billion, as opposed to the current net annual loss in marine capture fisheries of roughly \$5 billion, according to recent conservative estimates, which do not include potential losses from the recreational fishing sector, related marine tourism, or values associated with biodiversity

loss and illegal catch (for references, see Martens et al. 2011). Some of the primary reasons for these economic losses also include the overcapacity of fishing fleets leading to expensive operating costs and “redundant investments,” the increased effort required to find and capture declining fish stocks, and overexploitation of higher value species, forcing a redirection of effort towards less-valuable species (for references, see Martens et al. 2011).

Science

Despite calls for a greater integration of science in the decision-making process to alleviate these problems (Schechter and Blue 2011, this volume), the level of interaction between science advisors, fishery managers, and policymakers has been unsatisfactory and ineffective towards catalyzing measures towards fisheries sustainability (Oh 2011, this volume). Scientists have been unable to adequately communicate their results with the public and policymakers in a transparent, impactful, and culturally sensitive manner, so their advice is often not heeded while decisions are made according to economic, social, and political forces (Oh 2011).

Part of the problem is that some of the existing research lacks sufficient certainty and detail and has spatial and temporal gaps. In some cases, this problem could be alleviated through the use of rapid assessments to set a baseline to evaluate management progress and determine what additional data are needed (Bruckner et al. 2011). Such gaps in data availability and information on the biology of the fished species lead to uncertainties that complicate related stock assessments (Bruckner et al. 2011). This subsequent ecological and biological uncertainty (i.e., lack of trust in the data and scientists) can lead to poor management decisions (Cochrane et al. 2011), and the perceived lack of certainty in fisheries assessments may invalidate related recommendations for decreased effort and catch, especially when there is a lack of sufficient alternatives to supplement society’s need for food and fisheries-related livelihoods.

Addressing these analytical uncertainties, and therefore confidence in the scientific advice, requires attention to sources of error within data related to habitat utilization, catch-per-unit-effort (CPUE) standardization, stock assessments models, life-history characteristics, and catch-data availability; accuracy; and reporting consistency for large-scale, recreational, and commercial fisheries, especially for highly migratory species (Lynch et al. 2011). Additionally, small-scale fisheries also present a problem for assessment estimations, as well as associated monitoring and regulation, due to the fact that they often include multiple species, stocks, fishing methods, and a lack of recorded data because most products are used for subsistence and local commerce purposes (Hori et al. 2011).

Governance

Although taking an ecosystem-based approach is heralded as an ideal conservation strategy, traditional fisheries management tools rarely succeed in doing so because the ecological relationships are not well understood, the tools are not adequately implemented by management, and the system is continually confounded by environmental degradation (Bruckner et al. 2011). Additionally, failing to heed the recommendations of the fisheries research community is further complicated by existing institutional limitations to fisheries governance and lack of codified laws to promote enforcement of nonbinding fisheries agreements and codes (Schechter and Blue 2011). Despite a variety of innovations and definite steps towards progress, fisheries management strategies implemented

are failing to achieve sustainability in the face of demands on fish populations and the world's protein needs (Schechter and Blue 2011). Governments further advanced the likelihood of overfishing and unbalanced dispersal of capital through the use of license fees, which allow fleets from distant foreign countries access to domestic fisheries (for references, see Schechter and Blue 2011). Most of these governance problems originate from the lack of a long-term vision to guide well-focused decisions in the face of socioeconomically driven short-term objectives (for reference, see Cochrane et al. 2011). These issues are further exacerbated by insufficient institutional capacity to implement existing policy instruments, which subsequently encourages open access to resources as well as limits stakeholder education, communication, and involvement in management decisions and planning (Cochrane et al. 2011).

This overcapitalization results from open-access fishing practices, where too many fishers are trying to catch too few fish (Schechter and Blue 2011). Global fishing fleets may, in fact, be up to 250% greater than what is needed to catch what the ocean can sustainably produce (for reference, see Schechter and Blue 2011). Furthermore, government subsidies that promoted ship production and technological innovations allowed for the development of unsustainable fishing practices and habitat loss, when combined with illegal, unreported, and unregulated (IUU) fishing, further exacerbated overexploitation (Martens et al. 2011; Schechter and Blue 2011).

Additionally, as more desirable and economically valuable species are depleted as a result of the increased ability to capture fish, there is greater pressure to harvest other previously untargeted fishes (Bruckner et al. 2011). While certain fisheries are at maximum sustainable yield, nontarget species may also be overfished due to species life histories differences and overlapping distributions (Lynch et al. 2011). While protection of marine mammals from incidental catch has driven advocacy and regulations, alleviation of nontarget and less charismatic fish bycatch has not had the same level of public support in fisheries for highly migratory species; rehabilitation of some species, as a result, may not be possible under the current management regimes (for example, see Lynch et al. 2011).

Beyond the strains directly imposed through capture fisheries, inadequate governance of the aquaculture sector in some countries can result in negative impacts on human security, such as ecosystem degradation, water pollution, water scarcity, and contamination of food, and can pose genetic and health risks to wild fisheries (Hughes and Rose 2011). While many countries require site assessments prior to approval of new facilities in order to address some of these potential negative effects to environmental and human health, applying these advances on a broader scale is difficult due to the high variability of these domestic aquaculture regulations (Hughes and Rose 2011).

Enforcement

While several limitations in the policy and governance sectors may be highlighted, many would argue that the major failing lies in enforcement of existing regulations. The problem may not be misinformed laws or lack of laws, but rather that insufficient effort is being devoted to making the existing laws and institutions effective (Serdy 2011, this volume). What is truly missing from fisheries law is any sense of repercussion that arises from the breach of a government's obligation to uphold a regulation (Serdy 2011). Thus, a major challenge to addressing illegal activities that can lead to overfishing is actually the lack of associated penalties and lack of government willingness to enforce the laws (Serdy 2011).

However, there is still a great need for development of local laws and legislation that mirror international guidelines (e.g., the FAO [Food and Agriculture Organization of the United Nations] Code of Conduct for Responsible Fisheries) and subsequent effective local enforcement of the laws (Canonico Hyde 2011, this volume). Many countries lack adequate regulatory structures (Bruckner et al. 2011); as a result, inadequate law enforcement is a serious issue (Schechter and Blue 2011).

In addition to the difficulties in development of monitoring, regulatory, and legal frameworks, lack of funding often associated with the limited capacity of fisheries management institutions in developed, but more so in economically less developed countries, encourages increases in IUU fishing (Cochrane et al. 2011). While IUU fishing is largely blamed as a failure of the enforcement and regulatory sectors of fisheries management, it is also ambiguous and allows for passing of blame from policy makers to regulations, obscuring the policy responses required to treat distinct problems with individual solutions (Serdy 2011). For example, a legal offence is not being committed when a vessel engages in unregulated fishing; it is rather the government that is at fault for failing to have an applicable regulation or enforcement strategy in place (Serdy 2011).

Future of Fisheries

Sustainable fisheries are an important ecological, economic, and social component for a resilient future. Attempts to manage for this state have been difficult because of scientific, individual, social, political, economic, and enforcement-related complications. Sustainable management will not be easy. It will require an interdisciplinary approach to ecosystem and community-based management that alleviates poverty, reduces fishing capacity, produces viable alternatives to fund jobs and adequate quality of life, and increases personal and government accountability. A global conference dedicated to these issues associated with achieving sustainability could be integral to the development and implementation of workable fisheries policy.

Food and Livelihood Security

The importance of fisheries to the lives and livelihoods of millions is unquestionable, and fisheries capacity to alleviate poverty and hunger is substantial (Schechter and Blue 2011; Cochrane et al. 2011). Currently, more than 2.9 billion people rely upon fish for roughly 15% of their animal protein and approximately 8% of the world's population is dependent upon the fisheries industry (for reference, see Cochrane et al. 2011), with the demand for food fish tracking population increases in Asia, Africa, and Latin America (for reference, see Hori et al. 2011). Recognizing that these regions depend upon fish for sustenance and income, food security and the fiscal needs of economically less developed countries must direct fisheries policy so that it does not negatively impact livelihoods (Cochrane et al. 2011; Martens et al. 2011).

Aquaculture, in particular, has the potential to increase livelihood opportunities and fulfill global nutrition goals (Hughes and Rose 2011). Aquaculture is generally considered a sustainable substitution for wild caught fish stocks and a means to meet the demand for fish commodities if it is performed in an environmentally sound way (Canonico-Hyde 2011). While aquaculture conducted in this way has the potential to relieve fishing pressure from wild populations, if it is not conducted properly, aquaculture introduces a number of environmental issues, such as water security, invasive species, pollution, and the need for wild-caught fish meal (Canonico-Hyde 2011).

Farmed fish are now predominantly a luxury commodity export for developed countries, but human population growth will drive aquaculture to be an increasingly important source of dietary protein, specifically in economically less developed countries that lack access to other high protein foods (Hughes and Rose 2011). With aquaculture on the rise and capture fisheries production on the decline, it is estimated that by 2015–2030, aquaculture will contribute more than wild capture to global fisheries production (for reference, see Canonico-Hyde 2011). Currently aquaculture in some countries is overregulated while it is underregulated in other countries. Standardization of regulations (i.e., possibly through the FAO Code of Conduct for Responsible Fisheries) is necessary to ensure that aquaculture is consistent with sustainable development (Hughes and Rose 2011).

Interdisciplinary Approaches

Fisheries, both aquaculture and wild-caught, are fundamentally economic pursuits for resources of monetary, nutritional, or recreational value. A sustainable utilization of fish, then requires a balance between the ecological impacts on the resource and its ecosystem and the economic, cultural, and nutritional benefits of its exploitation (Bruckner et al. 2011; Hughes and Rose 2011). Economic gains in fisheries can be made only if fishing effort is reduced, stocks are rebuilt, and fishers are presented with meaningful alternative livelihoods. This requires interdisciplinary approaches, political will, and a social consensus for fisheries stewardship, namely responsibility for the resource (Martens et al. 2011).

Agreement on the biological, social, and economic aspects of sustainability is essential for effective fisheries policy (Cochrane et al. 2011; Noakes and Beamish 2011; Oh 2011). Often, scientific recommendations are brought forth to the management arena. While these are important, without consideration of social, economic, or policy disciplines, they are of little pragmatic use (Oh 2011). An interdisciplinary approach that promotes reproducible, transparent science and acknowledges economics, stakeholder values, and politics as part of the decision-making process will result in ecologically, economically, and socially sustainable targets (Schechter and Blue 2011; Bruckner et al. 2011; Dobiesz and Hecky 2011; Martens et al. 2011; Oh 2011).

Ecosystem-Based Management

Long-term ecosystem stability is an integral component of fisheries sustainability. An ecosystem-based management approach accomplishes this by integrating all the biotic, abiotic, and human components of an ecosystem (Lynch et al. 2011). Ecosystem-based management can include climate change, invasive species, habitat degradation, water pollution, availability of fresh water, economic opportunity, and cultural influence, among other factors, to ensure future sustainability of fish communities (Canonico-Hyde 2011; Dobiesz and Hecky 2011). Increasing food demands, for example, will lead to a progressively greater reliance upon aquaculture, which may be a particularly vulnerable pathway for introduction of invasive species. Ideally, fisheries policy should consider ecological health and encourage use of native species or species that are incapable of becoming established in case of escape (for references, see Canonico-Hyde 2011).

Overall, ecosystem-based management encourages direct management action to address localized stressors; spatial decision support tools can assist in this process by providing a systematic method for incorporating ecological responses to these stressors. These tools help to target species with key ecological roles, which promote ecosystem resilience (Bruckner et al. 2011). Though it in-

tensifies many challenges of fisheries management, the increased complexity and dimensionality of ecosystem approaches to management has potential to increase effectiveness through a more holistic method that addresses the entire system (Lynch et al. 2011). By taking the greater context into account, ecosystem-based management is more likely to be resilient to perturbations in the system, be they ecological, economic, or social.

Community-Based Management

A key element of holistic, ecosystem-based management is the people: the fishers, the consumers, the community members, and others who value the resource. An effective way to incorporate these stakeholders into sustainable fisheries management is to use a community rights-based approach because it instills a sense of stewardship for the resource (Martens et al. 2011; Valdimarsson and Metzner 2011). When stakeholders have some level of ownership within the policy planning process, policies reflect economic, social, and cultural frameworks and are more likely to be observed and enforced (Schechter and Blue 2011; Valdimarsson and Metzner 2011).

Economic incentives are often incorporated into community-based management. While biological sustainability is undoubtedly essential, it is important to note that it does not necessarily imply economic or social sustainability (Martens et al. 2011). Economic sustainability will only be possible when considering fisheries within the context of a business model. Fishers want to maximize their profit, minimize their expenditures, and ensure that they remain in business in the future. To encourage sustainability, economic incentives must be aligned with conservation (Martens et al. 2011; Orlic et al. 2011, this volume; Valdimarsson and Metzner 2011).

Reduced Capacity

If one thing has been learned from repeated fish stock collapses, free access to fisheries, often encouraged by government subsidies or misdirected incentives and exacerbated by a lack of knowledge, greed, and corruption, is not a suitable policy option. Subsidies are, in fact, a principal cause of the current levels of overcapacity linked to unsustainable fishing practices. Reducing and eliminating these detrimental subsidies is a basic first step to reducing capacity (Schechter and Blue 2011).

Rather than encouraging increased participation, fisheries need to be managed for balance of economic, social, and cultural benefits with ecosystem stability. This cannot be accomplished in an unlimited, open-access scenario (Valdimarsson and Metzner 2011). To reach sustainability, capacity of fleets, effort, and catch must be decreased to provide greater net economic benefits, ecological resilience, and social stability (Cochrane et al. 2011; Martens et al. 2011; Noakes and Beamish 2011).

Reducing capacity must be conducted in a socially responsible way, with nations providing alternative livelihood options for displaced fishers (Schechter and Blue 2011; Cochrane et al. 2011). Opportunities in agriculture, tourism, or elsewhere to earn income may alleviate the intensity of small-scale fishing pressure, in particular (Hori et al. 2011). One consideration to note is that encouragement of alternative livelihoods to decrease small-scale fishing pressure may have additional negative impacts (e.g., water withdrawal for agricultural use) on other portions of the environment (Hori et al. 2011). But, in downsizing, the fishing industries themselves can create innovations; by investing in environmentally sustainable technology and focusing on preventative rather than responsive measures, fishers can improve profits and outperform regulatory standards (Orlic et al. 2011). These economically optimal fisheries usually imply a high degree of biological sustainability (Martens et al. 2011).

Accountability

Governments and individuals need to be held accountable for both their actions and their inactions. The dissuasive consequences for a nation must be beyond mere political embarrassment, which has had limited success, at best (Serdy 2011). This is particularly important for catch and fishing pressure estimates. Accurate reports are necessary for fish stock assessments and also for compensatory adjustments in which the nation that overcatches should bear the economic or access-related loss in excess of the given quota (Serdy 2011). Through domestic and interjurisdictional governance, fishers, consumers, and the public should be held accountable for environmental stewardship and corporate social responsibility. This will place less pressure on fisheries resources producing a more efficient, profitable, and sustainable product (Orlic et al. 2011).

The most direct way to ensure accountability on the international stage is to codify fisheries laws and treaties in an enforceable way (Schechter and Blue 2011). Excessive fishing capacity is a global concern for sustainable fisheries that must be addressed through the FAO Code of Conduct for Responsible Fisheries (Oh 2011). This code of conduct takes an integrated approach to managing fisheries. It should be enacted into a “court-enforceable law” and included in management plans of regional organizations as well as local regulations to integrate the precepts at all levels of governance and ensure long-term sustainable utilization of fisheries (Schechter and Blue 2011). Aquaculture governance can also be strengthened through the code of conduct by increasing coordination and implementation of standards across different scales, therefore facilitating a global set of sustainable aquaculture norms (Canonico-Hyde 2011; Hughes and Rose 2011).

Need for a Global Conference

Convening a global conference will reinvigorate global awareness, create social pressure on individuals, raise government concern, and accelerate treaty codification and other ratifications (Schechter and Blue 2011). It will promote the issue of sustainable fisheries as a priority on the global stage, adding authority to international management organizations and bringing media and NGO coverage (Schechter and Blue 2011). Considering the Convention on International Trade in Endangered Species of Wild Fauna and Flora, generally regarded as one of the most effective international conservation agreements, as an example, a global fisheries conference will be a valuable impetus to the social, economic, and political process. It will incite advocacy campaigns for sustainable fishing practices (for example, see Lynch et al. 2011), increase awareness, and drive political will for responsible harvest methods and effective governance structures (Cochrane et al. 2011; Schechter and Blue 2011).

A conference will help facilitate many of the necessary changes towards achieving global fisheries sustainability, including the setting of benchmarks and increasing the power of international governance by allowing for stakeholder involvement, formation of advocacy coalitions, and mobilization of agencies, NGOs, and the media to ensure adequate actions continue well after the conference has ended (Schechter and Blue 2011). In particular, a global conference on sustainable fisheries will increase the likelihood of the FAO Code of Conduct for Responsible Fishing being codified (Schechter and Blue 2011). By codifying the FAO Code of Conduct for Responsible Fishing, the world will acknowledge the importance of fisheries and the current failings of their governance and will look, optimistically, to a more sustainable future. This policy action is an extensive undertaking,

from recommendation to enforceable regulation, and a global conference is an important, and necessary, step to attaining it.

This book presents multi-level approaches to the global problem of sustainable fisheries. It discusses the importance of fisheries and current fisheries failings and provides recommendations for more sustainable practices (i.e., food and livelihood security, interdisciplinary approaches, ecosystem-based and community-based management, reduced capacity, and accountability; see Table 1). We believe that a global conference will be critical to ensuring that these recommendations are effectively implemented for healthy fish, healthy people, and a healthy world.

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