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Ghoti aims to serve as a forum for stimulating and pertinent ideas. Ghoti publishes succinct commentary and opinion that addresses important areas in fish and fisheries science. Ghoti contributions will be innovative and have a perspective that may lead to fresh and productive insight of concepts, issues and research agendas. All Ghoti contributions will be selected by the editors and peer reviewed.

**Etymology of Ghoti**

George Bernard Shaw (1856–1950), polymath, playwright, Nobel prize winner, and the most prolific letter writer in history, was an advocate of English spelling reform. He was reportedly fond of pointing out its absurdities by proving that 'fish' could be spelt 'ghoti'. That is: 'gh' as in 'rough', 'o' as in 'women' and 'ti' as in palatial.

Claiming seafood is 'sustainable' risks limiting improvements

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Abstract

Over the past decade, the sustainability of seafood production has improved and is cause for ocean optimism. In an attempt for recognition of ongoing efforts, many producers and food retailers now claim products are 'sustainable'. What exactly does this mean and could we limit further improvement using this claim? Here, we discuss the sustainable/sustainability dichotomy, and the problem of communicating continual improvement in terms of grand and absolute claims – that is 'We sell 100% sustainable product.' We believe a statement like this risks short selling the challenges at hand and removes necessary and ongoing incentives for learning, improving and innovating. We argue the best path for producers and retailers is to demonstrate and communicate the concrete actions and achievements being made towards a more resilient and healthy food system today and for the future. This requires moving away from the current practice of calling products sustainable, and to instead work towards continually improving the sustainability of the products. Focusing on measuring the impact of our actions generates a wealth of substance and establishes a direction of travel towards seafood of greater sustainability and we believe this will help educate, inform and inspire consumers to make good choices for their own and future generations benefit. In this study, 'seafood' will

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refer to both farmed and wild seafood products, and 'sustainability' refers to the behavior that drives economic, environmental and ethical progress towards ensuring seafood availability 'meet(s) the needs of the present without compromising the ability of future generations to meet their own needs'.

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Food production is a significant impact driver within the Anthropocene (Steffen *et al.* 2011) due to the sheer number of people on earth, as well as our increased reliance on resource-hungry protein sources. We are now at a state where humans require more resources than the Earth's ecosystem can provide indefinitely (Hoekstra and Wiedmann 2014). However, while protein consumption is increasing, not all proteins are equal in terms of ecosystem impacts (Tilman and Clark 2014). When compared to other primarily animal-derived farmed proteins, 'seafood' as a class of proteins is of relatively lower environmental impact (Hall *et al.* 2011; Heller and Keoleian 2015). Yet, within this framework and in response to the concerns of environmental impacts association with seafood production, a sustainability movement began in earnest in the late 1990s with the development of certification systems, ecolabels, improvement projects and corporate advisory programmes (Ward and Phillips 2008). The industry largely responded to these initiatives and now make declarative statements related to arrival at the destination, exemplified by major North American retailers committing to sourcing 'sustainable seafood' (Silver and Hawkins in press).

We posit that sustainability can never fully be conceptualized as an end destination, a set of standards or tickboxes. Instead, sustainability indicates a process-driven journey that has no agreed recipe book or a set path – it is instead a type of behavior (Tlusty *et al.* 2012). It is defined with every step we take and redefined as we learn more. Certification schemes have a role to play as markers of our progress on the journey towards greater sustainability (Tlusty 2012; Tlusty *et al.* in press). However, our responsibility to a 'sustainable' future is better understood through the 14th century Latin origins of the word – *sustinere* – which means 'to continue – to keep up'. Our challenge is simply put to keep up with progress, improvements and innovation that allow us to viably meet growing

demands while minimizing per capita impacts on the environment. Rather than 'sustainable' being the ultimate end to the sustainability journey, it is in fact a marker of the indefinite endurance of systems and processes.

Creating a static end-state definition of sustainable will not allow the designation to continue and keep up in an ever-changing world. Ultimately, it will limit our overall progress. Claiming seafood, or any food for that matter, is sustainable will shift the emphasis from a dynamic journey of improvement and innovation, to a state, or a destination (Tlusty *et al.* 2012). In a similar vein, Steffen *et al.* (2011) argue that the constellation of challenges clustered within the moniker 'climate change' will by definition prevent us from reaching a sustainable end state. From a natural resource perspective, management that assures constant harvest levels will result in a lesser future *per capita* availability (accounting for increasing population). Perhaps the concept of the 'sustainable end state' is as illusive and misguided as Fukuyama's declaration of 'The End of History' with the triumph of Western style liberal democracy after the end of the Cold War (Fukuyama 2006). This analysis failed to see the emerging threat of terrorism to the new global order. Similarly, defining anything as 'sustainable' assumes no further work is necessary, no more challenges unforeseen or otherwise, all problems are solved and our journey has indeed ended. Calling seafood sustainable fails to see the emerging threat of slavery and climate change induced disease to the new global order. When it comes to securing enough food for our growing global population, nothing could be more dangerous than this kind of false security. We posit that declaring seafood is sustainable will limit further improvement for the simple reason that *if our sustainability journey is complete and seafood is sustainable, is there any need or purpose to continue to improve or innovate solutions?* We believe that while significant steps have

been taken to increase the sustainability of seafood over the past decade, and this is a cause of ocean optimism, there is still a significant amount of work that is required to optimize the potential for nutritious seafood to be produced in a manner that does not irretrievably harm the oceans and coastal ecosystems.

To illustrate our argument, the term 'sustainable' needs further examination and we will explore this from two different perspectives. First is to address why it is difficult to have a singular definition of a 'sustainable' end state, whereas the second is the consideration of who is to measure our success. The first issue of why a singular definition for 'sustainable seafood' is difficult to create is phenomenological (Smith 2011), or the way in which conscious experience shapes how we give meaning to the world around us. Consider young children whom often exclaim an object is 'big' or 'huge' in a way that more experienced adults consider incorrect and humorous. A similar situation occurs within the study of the sustainability of food systems where there is no impartial bar to indicate the true characteristic of particular achievements. Subjective and personal experience currently indicate where the bar is placed, meaning the bar will change with additional experience and increased knowledge. As we derive more sophisticated tools to understand our interactions with the environment, our conceptual definition of sustainability will incorporate a broader swath of variables. We have seen this occur in the seafood industry in response to acknowledgement of risk where initial sustainability metrics within US management plans focused on control of fishing mortality (the fishery), where later metrics included protection of spawning biomass (the resource, Quinn and Collie 2005) and eventual evolution to ecosystem-based management where the health of the entire aquatic ecosystem is considered (Charles 2001). To the point of this essay, Quinn and Collie (2005) discussed that the rigour of US fishery management increases on a decadal cycle. Even though we are in the age of ecosystem-based fisheries management, few fisheries are managed as such (Skern-Mauritzen *et al.* 2016), and management has yet to incorporate global-scale environmental impacts as determined through life cycle assessment (Ziegler *et al.* in press). Similarly, there Within certifications and ecolabels, sustainability is often narrowly defined (Bush *et al.* 2013), or the scheme's interpretation of sustainable seafood

can change as outside advisory groups add additional criteria and values to existing standards (Bush and Oosterveer 2015). A declarative approach to sustainability – illustrated by the claim to sell 'sustainable seafood' – undermines the need and willingness to continuously increase management and standards as we learn more. Realistically, if a fishery or farm achieves a marker of being sustainable, will it truly work to increase the rigour of the definition by which it is judged? If the bar was to be raised, this fishery or farm may find itself no longer sustainable and then faced with additional work to regain the designation.

Fisheries scientists acknowledge the multiple lenses through which sustainability can be addressed. Hilborn (2005) discussed three definitions (long-term constant yield, preserving intergenerational equity and maintaining a biological social and economic system), while Charles (2001) discussed four components (ecological, socio-economic, community and institutional). Personal perspective on the relative importance of these different frameworks will create a multitude of definitions based on a phenomenological perspective. We maintain that regardless of individual starting point, a commitment to always improving and keeping up the quality and resilience of the seafood supply through ever-changing goals will allow the industry to strive to continue to be better.

The second issue is who should judge us as being sustainable? Sustainable development was defined by the Brundtland Commission (World Commission On Environment and Development, 1987) which proposed it in terms of that which 'meets the needs of the present without compromising the ability of future generations to meet their own needs.' Huetting and Reijnders (2004) indicate prior work (see IUCN/UNEP/WWF, 1980) also had a formative role in the definition and framed it as a means to balance human activities and the physical environment to assure long-term productivity of natural resource (fisheries and forestry) products. This progressive and forward-looking definition implies that it is future generations – our children and grandchildren who will be the ultimate graders of the success of our actions, investments and strategies (preserving intergenerational equity as discussed in Hilborn 2005). However, fisheries are managed on a medium time return, as that is the time that can be effectively

measured by fisheries managers. And thus the time conundrum, fisheries and aquaculture managers require a shorter time frame to base decisions compared to the more ethereal discussion of sustainable production that is measured by our children's children. Yet, it is the next generation that will be able to evaluate whether our present day actions do in fact allow them to meet their needs. If we were today to judge our past actions for sustainable development, would we deem those actions to have met the goal? In 1991, the IUCN/UNEP/WWF seafood relevant goal was that by '2000, all depleted fisheries should be recovering and no fishery should be overexploited' (IUCN/UNEP/WWF, 1991, pg 184). This goal, set less than a generation ago, was not achieved. While we did not meet it, we have learned through our efforts and have made great strides in the right direction (Worm *et al.* 2009). But meeting a sustainability goal is not the end. Once met, we need to continue to improve and innovate (Thlusty 2012) to increase the resiliency and security of our food systems. We acknowledge future-based assessments are perhaps difficult to use as a roadmap for guiding immediate actions. To better align current and future needs, current goals could be stated in terms of positive trajectories helping to keep us on a journey of improvements and innovation. This is a second reason we propose avoiding declaring any piece of seafood as fully 'sustainable'. We should put our collective efforts into measuring and documenting the impact and benefits our actions have on people, animals, the environment and our economy. Furthermore, we believe companies can deliver more powerful and inspiring stakeholder communications based around actual and measurable impact and achievements rather than simply stating a product is 'sustainable' – whatever that may mean.

Finally, the declarative statement of sustainable seafood can create an additional level of obfuscation within our understanding of protein provisioning. When it is declared 'we sell sustainable seafood', are we comparing it to an equivalent portion of the same species produced the same way by a different producer, the same species produced a different way, a different species or perhaps a different type of animal protein altogether? Farmed Atlantic salmon has long been on many 'do not buy' lists, indicating some believe it to not be sustainable. Yet, for all the messages of avoid, over the past decade, farmed salmon has been the

third most consumed seafood in North America, until recently when it vaulted to second place behind shrimp and ahead of tuna (NFI 2013). What is farmed salmon's true sustainability message? Research indicates that the environmental impacts of farming salmon can vary with feed (Pelletier and Tyedmers 2007), production system (Ayer and Tyedmers 2009) and country (Pelletier *et al.* 2009). In terms of one measure of sustainability – greenhouse gas (CO₂ equivalent) emissions – production of farmed salmon has a similar footprint to that of poultry, 65% that of pork and 14% that of beef (Pelletier and Tyedmers 2007). Using phosphorus and nitrogen emissions, it is less impactful than the terrestrial proteins (Hall *et al.* 2011). However, as an aquaculture product, salmon has greater impacts (eutrophication, acidification, climate change, land occupation, cumulative energy demand) than bivalves, gastropods and seaweeds (Hall *et al.* 2011). Thus, asking consumers to avoid eating farmed salmon to reduce said impacts could be warranted if the alternate option was to switch to a lesser impactful protein such as mussels and seaweed (Thlusty 2013), but not if the result was to switch to terrestrial proteins – such as pork or beef. The fact that every food item has some degree of impact upon which improvements can be made demonstrates why declaring the journey as ended – either as 'sustainable' or 'unsustainable' – is unfortunate. Instead, companies would be wise to focus on ensuring – through better measures – that their actions contribute directionally towards sustainability. At the end of the day, it is our actions that matter, not our commitments. This requires stepping out of a limited linear strategy that deems the 'mission accomplished' when particular objectives are met and instead have truly visionary goals that motivate us to always improve. This will enable us to raise the bar every time objectives are reached (see Fig. 1). A tickbox approach to goal setting can still be maintained, but in this circular case, checking a box does not indicate the job is done, but rather a goal is met. Goals could be simple and constant, such as having an increasing per cent of product that meets specific certification criteria each year, or more complex as in switching sources that continually meet more rigorous demands (Bush and Oosterveer 2015; Thlusty *et al.* in press).

This adaptive programme raises particular challenges to companies that use standards and

ecolabels as a tickbox exercise to appease outside actors, rather than an innately meaningful process fundamental to the success of the company. A further concern for ecolabels is when their business model creates stronger incentives to increase membership rather than improving the standard. It is for this reason that advisory, ranking or eco-certification programme focused on declarative labels that call products 'sustainable' can result in greenwashing (Auld 2014). Certification has an important role in verifying the better methods of production that have fewer impacts and less risk, but its role should not be overstated. If the journey to sustainability is akin to crossing a river, then achieving certifications are the stepping stones marking progress across the river. What is required is alignment between how standards are differentiated and the claims made by a retailer. The Global Sustainable Seafood Initiative (www.ourgssi.org) is using the FAO codes (Wessells *et al.* 2001; FAO, 2011) to create the critical elements of a credible baseline. Using this, the certification programmes can elucidate their unique attributes for greater sustainability, and retailers can communicate their claims as they align to specific certification attributes. This baseline approach could open up opportunities for companies and programmes to differentiate themselves

(Bush and Oosterveer 2015). Ideally, this discussion of seafood sustainability should be broadened to include public health, nutrition, food safety, social concerns and animal welfare (Huetting and Reijnders 2004; Garnett *et al.* 2013). All these factors play into a more inclusive understanding of sustainability which the industry would be wise to adopt over time.

Our intent of this study is not to disparage the benefits of seafood nor the hard work done by so many committed people, companies and organizations the last decade and a half promoting seafood sustainability (Ward and Phillips 2008), increased fishery management (Charles 2001; Hilborn 2005; Quinn and Collie 2005) and creating ocean optimism. A number of aquatic species such as native seaweeds and shellfish (Tlusty 2013) create food while remediating anthropogenic environmental pollution — simultaneously providing for social and economic gains. But as the earth's burgeoning population races towards nine billion people, fisheries and aquaculture products need to be incentivized for resource efficiency, equity and environmental protection (Hall *et al.* 2011; Troell *et al.* 2014). We suggest a renewed focus on demonstrating fewer impacts and risk — on people, communities, animals and our environment — and to clearly communicate why our actions promote

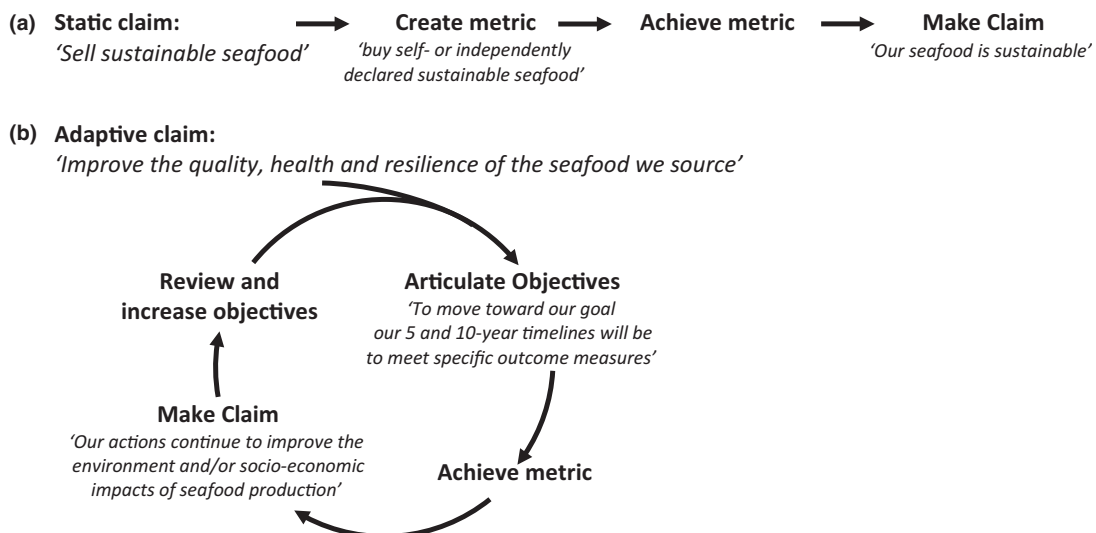


Figure 1 When a static or discrete goal is set such as 'source sustainable seafood' (a), then once the metric is achieved, the claim is made and further progress stops. In the case of the adaptive goal 'to increase seafood sustainability' (b), when the initial metric is met, the claim is then followed by a reformulation of the current metric or development of a new one. In the adaptive model, goals could range from 'increase sourcing of certified products by x% each year' to 'increase the breadth and/or depth (see Tlusty *et al.* in press) of sourcing requirements each year'.

a better, healthier and more secure food system for our customers and future generations is an exciting opportunity for managers, producers, retailers, NGOs, certification bodies and the media.

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