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Searching for market-based sustainability pathways: Challenges and opportunities for seafood certification programs in Japan

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ABSTRACT

Over the past two decades, there has been a proliferation of consumer-facing, market-based initiatives for marine conservation—most notably in seafood eco-labels and sustainability certifications. Yet, despite the growing recognition of these initiatives by consumers and retailers in North America and Europe and the (subsequent) acceptance of their role in seafood distribution by fisheries and fish marketing industries around the world, seafood certification programs have thus far made little progress in Japan. Here, the evolution of the three seafood eco-label and certification programs in Japan is examined and insights into the ongoing challenges they face in terms of the domestic supply chain network, consumer preference and their social-cultural attitude toward sustainability are provided. Despite an initial lack of success, seafood certification programs in Japan can be useful in enhancing consumer awareness for fisheries resource conservation and identifying Japanese domestic small-scale fisheries that are already engaged in sustainable fishing practices. A possible pathway for developing an eco-certification program suitable for the Japanese seafood market is provided through integration of environmental and cultural sustainability under the existing certification framework.

1. Introduction

Eco-certifications are consumer facing, privately designated seals of approval given to products that are deemed to have met a certain set of conditions for environmental sustainability [1]. They serve as means of differentiating products based on one or more attributes that are otherwise invisible to consumers; most often, the environmental footprint associated with the use or consumption of a product. Thus, these labels enable producers to reach consumers whose purchasing decisions are reliant on this factor.

Since their introduction in the late 1990s, fishery sustainability certification and eco-label programs have become a global, ubiquitous feature in the realm of marine conservation strategies. While some programs were industry-driven, many of these programs emerged largely from increased concerns within civil society that current stock management measures have been inadequate in ensuring the sustainability of fisheries [2].

In theory, the key function of these programs is to differentiate fisheries engaged in sustainable fishing practices by establishing a voluntary set of standards, beyond the minimum requirements of government or international regulatory bodies that assess stock status, management practices, and ecosystem impacts (i.e., bycatch and habitat destruction). Products from fisheries that are deemed to have met such standards bear the program's label, which suggests they are more ecologically sustainable options than other similar products. Furthermore, sustainability certification also generates financial incentives for fisheries, through preferential market access or price premiums, and encourages others to invest and follow suit in order to keep pace with their competitors [2–4].

Given its scale of seafood consumption, Japan has been viewed as a key country that is currently missing from global sustainability certification programs following their success in capturing the markets of North America and Europe [5–7]. Globally, Japan accounts for 5% of total seafood consumption, with per-capita fish consumption also ranking amongst the highest of the developed countries [8]. Historically, Japan was the largest fishing nation in the world with fleets operating across many of the world's productive fishing grounds [9]. Following the decline of its distant water fisheries and the collapse of some key domestic stocks (e.g., Pacific pilchards [10]) Japanese seafood market has since become increasingly reliant on imports; as of 2013, it was the primary destination for seafood caught around the world [8].

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Coupled with rising global coastal populations [11], surging per capita seafood consumption rates [12], the overfished or at-capacity status of many of the world's assessed stocks [8,13] and the threat of climate change [14,15], there is an emerging scientific consensus that calls into question the future productivity of many of the world's fisheries. As such, market competition in the global seafood sector is already intensifying. Therefore, ensuring the sustainable exploitation of domestic fisheries resources and creating seafood supply chains that can shield consumers from potential shocks in the availability of foreign product supply is of paramount importance for any country hoping to maintain national seafood sovereignty and security. While all countries will feel the pressures imposed by this set of circumstances in the years to come, the national importance of seafood consumption at a social level in Japan, as well as the country's current reliance on imports, suggests the issue of the sustainability of domestic fisheries resources will become even more critical if Japan is to maintain seafood sovereignty and security,

In this paper, therefore, we will discuss how voluntary certification programs can become an effective tool for attaining sustainability in Japanese domestic fisheries in the context of both long-term ecological stability for the marine environment, and economic stability for the multitude of coastal fisheries around the country. The current landscape for the three nationwide seafood certification and eco-label programs available in Japan will be examined, and the suitability of these programs in a socio-cultural context through an examination of fisheries, the distribution and retail sectors, and consumer attitude will be described. In the final section we will propose an alternate approach featuring sustainability recommendation guidelines and highlighting the positive practices of local fisheries that incur minimal impacts on the marine environment.

2. Seafood certification programs in Japan

Currently, Japan's seafood certification landscape consists of three programs, all of which were launched in the last decade: the Marine Stewardship Council (MSC), Marine Eco-label Japan (MEL-J), and Pride Fish. Strictly speaking, Pride Fish is not an eco-label, as it does not explicitly apply environmental or ecological standards (see Section 2.3); however, we included it in our assessment of seafood certification programs to capture the broader context of sustainability, both environmental and socioeconomic. While these three certification programs share some overlapping objectives, background, market positions, and industry partners, each represents a distinct system in terms of scale and scope, application of objectives, and in their acceptance by both fisheries and consumers (Table 1).

Specifically, MSC characterizes an internationally established third-party program with well-defined certification standards that balances both environmental and management considerations; MEL-J represents an industry-driven scheme that uses management implementation as the key driver behind in its certification; Pride Fish embodies an amalgamation of community-based initiatives and, therefore, has garnered strong participation from coastal fisheries. These programs are not, however, sufficient to elevate the seafood sustainability of Japan because of their limited capacity to expand across the country, and ambiguous terms of certificate criteria. We will review the historical details of those programs in the following section.

2.1. Marine Stewardship Council in Japan

A decade after its original establishment, this UK-based program entered the Japanese seafood market in 2006 through the introduction of MSC-certified Alaskan salmon and sablefish. Shortly after, three of Japan's major national food retailers (Aeon, Seiyu, and Japan Consumer's Coops) began carrying MSC-certified products. Since 2010, Aeon, the largest retail chain in Japan representing 30% of the total market [16], has been integrating MSC into its house label and seafood procurement policy and they have committed to sourcing 10% of their seafood from MSC and ASC (the aquaculture equivalent) certified operations by 2020 [17]. To date, however, the growth in the market share of MSC products in Japan has been limited. Despite nearly a decade of promotion, MSC and ASC products currently account for just 3% of seafood stocked by Aeon [17]. When contrasted with similar commitments made by the retailers in North America and Europe (e.g. Wal-Mart's commitment to source 100% of its seafood from MSC and other third-party certification programs), this failure to infiltrate the market is even more evident.

As for fisheries participation, the number of domestic applications for MSC certification has been limited to six, and only two fisheries have been MSC-certified as of 2015: Kyoto's seine fishery for flathead flounder (in 2008; the first fishery from Asia to be MSC-certified), and the hanging fishery for Japanese scallops in Hokkaido (in 2013 [18],). This lack of progress, it can be argued, is due to the fact that the financial benefits of certification have not been assured. For example, although certification enabled Kyoto's seine fishery to access new markets—most notably Aeon—the cost and maintenance of certification has been a substantial burden on this small fishery (i.e., 220 mt landed in 2009 [19]). Eco-labels can incur price premiums for certified products [20] if a market that recognize the label and value sustainability sufficiently develop; yet a lack of buyers for certified fish beyond Aeon and the local branch of Japan Consumer's Co-Operative means this is not the case for Kyoto's seine fishery. Moreover, the royalty payment associated with the use of the MSC logo have prevented the fishery from using it for sales through other channels and further diminishes the fishery's opportunities to gain a price premium for its catch [21]. The costs associated with certification and annual audits are also proving to be barriers for participation.

2.2. Marine Eco-Label Japan

In response to the introduction of MSC into the domestic market, in 2007 the Japanese government partnered with the Japan Fisheries Association—an industry group with over 400 fishing company members—to form an independent national seafood eco-label, Marine Eco-label Japan. Clearly designed as a national alternative to MSC, the stated rationale for MEL-J's formation was to establish a certification program that was “most suitable to the situation of the Japanese fisheries” [22].

Currently 23 fisheries have been certified by MEL-J. These operations range from a mixed fishery set net operations owned by private fishing firms (e.g. Nagasaki sardine purse seine), to various Fisheries Cooperative fleets (e.g. Kochi fisheries cooperatives for horse mackerel; Table 1), to distant water skipjack pole-and-line fisheries. Additionally, 52 firms and cooperatives have attained MEL-J chain-of-custody certification. While local interest appears substantial, the program lacks the support of major retail partners that MSC has obtained. As of 2012, retail availability of MEL-J certified seafood was limited to 400 retail outlets, many of which were speciality and local gift shops [22]. This certification body places a high emphasis on fisheries management measures, making active use of co-management of the fishery between fishermen, scientists and broader national management bodies. The MEL-J certification cost is considerably less than that for MSC, “around JYP 500,000 to 3,000,000” (USD 4,000–25,000 [22],).

Despite the emphasis on good management, MEL-J recommendations do not consider key ecological and biological aspects of the fishery, including stock status (i.e., abundance, current biomass) and fishing pressure on the exploited species. In fact, given its current standards, most coastal fisheries operating within the government's regulatory framework would qualify for certification. As Oosterveer [23] noted, the program is effectively a “verification scheme to assure that management systems are in place.” Furthermore, MEL-J's assertion that its fishery appraisals are conducted by an independent third-party should be called into question given that the sole appraisal body

Table 1
Key features of three seafood certification programs (Marine Stewardship Council, Marine Eco-Label Japan, and Pride Fish) in Japan.

	MSC	MEL-J	Pride Fish
Organization	Independent	Japan Fisheries Association	Fisheries Cooperatives
Scale	Global	National	Community
Certified Japanese Fisheries	2	23	110
Species	Flathead flounder, scallops	Skipjack tuna, albacore, alfonsino, clams, whitebait etc.	Horse mackerel, monkfish, oyster, nori etc.
Chain of Custody Members	568	52	n/a
Key retail outlets	AEON, Consumers Coops	Local restaurants and gift shops	Fisheries Cooperatives shops, local restaurants and gift shops
Independent Assessment	Yes	Yes	No
Certification Bodies	24 independent agents accredited by Accreditation Service International	Japan Fisheries Resource Conservation Association	n/a
Assessment Criteria			
Stock status	No overfishing or depletion of the exploited stock; demonstrable recovery	Scientific survey conducted	None
Management	Effective management system through harvest control rules; compliance with law and regulations	Fisheries licenced and management framework present	Supported by local Fisheries Cooperatives
Environmental impact	Maintenance of ecosystem diversity, including habitat	Compliance with marine pollution regulations	None
Monitoring	Monitoring and enforcement requirement; management performance evaluation	Landings monitored	Locally landed
Community impact	None	None	Supported by local Fisheries Cooperatives

currently licenced to conduct assessments is the Japan Fisheries Resource Conservation Association (JFRCA). JFRCA is a semi-public organization (Public Interest Corporation) established to conserve Japan's fisheries resources and sustainable fisheries production [22]. Yet, both JFRCA and Japan Fisheries Association include as their members a similar list of industry bodies, which suggests a considerable conflict of interest.

2.3. Pride Fish

Pride Fish makes no explicit considerations for resource sustainability and, therefore, does not qualify as an eco-label under the FAO's Guideline for the Eco-labeling of Fish and Fishery Products from Marine Capture Fisheries [24]. The main objective of the program is to support local small-scale fisheries by promoting increased consumption of hyper-local, seasonal seafood by highlighting products that are popular at the regional level but may not be available nationally. Currently, 96 fisheries and 22 aquaculture operations have been certified, covering a diverse range of products from farmed algae and invertebrates to line-caught skipjack tuna (Table 1).

The National Federation of Japan Fisheries Cooperatives developed Pride Fish in 2014 as a certification applicable to both capture fisheries and aquaculture operations. The selection criteria for Pride Fish products are: (1) it comes with a high recommendation from local fishers; (2) it is landed locally; (3) it is seasonal; and (4) it meets the standards (e.g. minimum size and caught in the appropriate fishing grounds) that have been individually set by each member of the Fisheries Cooperative. Fisheries Cooperatives from 34 coastal prefectures each select up to four seafood products annually, to represent the four seasons. Although Pride Fish does not assess for biological or ecological sustainability, almost all of the farmed bivalves (e.g. Pacific oysters and cockles) as well as algae (*nori* and *wakame*), which represents 16 out of 22 Pride Fish-certified aquaculture products, are produced through small-scale, low intensity aquaculture; the U.S.-based Seafood Watch program recommends Japanese seaweed farming and oyster productions as “Best Choice” options (i.e., among the most sustainable products available). As for its certified capture fisheries, fishing gears used in small-scale fisheries include passive gears (e.g. setnets and traps) or gears that pose little threat to the surrounding environment (e.g. trolls and poles-and-lines). These fisheries are managed under the local Fisheries Cooperatives’ licensing scheme that, in many cases, has been shown to be effective in regulating the fishing effort [25]. Yet, gears such as setnets are mixed fisheries and catch an array of species at once. As such, comprehensive and accurate assessment of the impacts that these fisheries have on all the species and stocks impacted is essential before they can be declared ecologically sustainable.

3. Barriers to seafood certification programs in Japan

Having reviewed those three programs, it is clear that seafood certification programs in Japan to date have been met with limited success, particularly in terms of consumer recognition and nationwide standard setting. Unquestionably, both of these conditions are vital for ensuring long-term fisheries sustainability and seafood availability in the country, particularly with regard to anticipated changes to stock productivity under climate change and the associated uncertainty in the global market. Using the framework of the market and business environment of Japan's seafood sectors, the program development strategies applied by these three programs should be viewed as the main reason for the relative lack of success of seafood sustainability eco-certifications in Japan.

3.1. Limited certification capacity at coastal fisheries

Japanese coastal fisheries are highly diversified in their management and operational structure. Under the country's fisheries management framework, which considers individual Fisheries Cooperatives as semi-independent regulatory units, over 70,000 fishing entities operate within Japanese coastal waters [26]. Fisheries management strategies are centered on input control measures such as licensing, gear restrictions, temporal and spatial closures, and size limits. These controls seem more appropriate for Japan's coastal fisheries (particularly with regard to passive gears such as set-nets and gillnets) than output control (catch limit) measures that require approximation on stock size, productivity and vulnerability to fishing. Moreover, a large proportion of these fisheries are mixed fisheries with multiple targets and differing bycatch species (retained and marketed) that vary throughout and across fishing seasons.

The fisheries assessment protocol currently employed by MSC, based on data-intensive assessment of stock biomass and biomass reference points for management is unsuitable for Japan's coastal fisheries in general. Large-scale stock assessments are regularly conducted for over 60 coastal stocks by Japan's Fisheries Agency [27] yet,

catch composition statistics necessary for the evaluation of bycatch impacts are generally not reported officially by the local cooperatives or port authorities, and not integrated in the national statistics. The lack of official reporting of local information such as management measures and catch statistics at the national level has resulted in an overall perception that these fisheries cannot be assessed. This lack of capacity within Fisheries Cooperatives for organizing necessary data, as well as the high costs associated with assessments, has prevented coastal fisheries from obtaining certifications.

3.2. Decentralized supply chain network

In expanding into Japan, MSC sought to pursue the same strategy that had been instrumental in gaining international prominence and recognition since the mid-1990s. Globally, this strategy focuses around the establishment of key partnerships with influential retailers (e.g., Unilever, Wal-Mart) and through this large market demand for sustainable seafood created by their retail partners, MSC has subsequently been able to secure steady participation and product supply [28]. Nonetheless, unlike many western systems dominated by large retail chains, the Japanese food distribution network has a high level of fragmentation, whereby product distribution occurs through a patchwork of mid-size regional grocers and companies.

With regard to chain-of-custody requirements, MSC failed to adapt to Japan's “complex and multilayered” [29] distribution network. MSC's requirement that all participants in the supply chain be certified proved to be extremely costly and restrictive in Japan's supply chain network that consists of a multitude of trading houses, wholesalers, and processors, many of which are small-scale operations limited investment nor capacity in information technology required to implement MSC requirements. In contrast, MEL-J has recently amended its chain-of-custody requirements by eliminating the need for the entire supply chain to be certified. While such an approach contributes to considerable reduction in the certification costs and enhances the distribution pathways for its certified seafood, the program's legitimacy is once again diminished, in terms of transparency.

Lastly, national level retail chains require four “constants” in their product procurement policy: constant volume, constant quality, constant price, and constant delivery time. Clearly, this type of procurement policy is ill suited to accommodate the diversity and highly fragmented nature of Japan's coastal fisheries [30]. Such a policy is also ill suited for programs like MEL-J and Pride Fish since they rely on supply from small-scale fisheries, with products that are rarely integrated into the national supply chain system.

3.3. Mismatch with consumer demand

A survey of consumer preference in Japan found strong preference for domestic products and for wild-caught seafood over farmed [7]. It should be noted that both labeling of country of origin and whether wild-caught or farmed, as well as whether a product is fresh or previously frozen is mandatory in Japan.

Hall [31] suggests that Japanese consumer preference for domestic products may be linked with concerns over food safety, in that it represents assurance that these products have passed higher safety standards set by the Japanese government. The author also suggests that many food product companies try to appeal to the nostalgia for rural agricultural and fishing communities among the urban Japanese population in their promotion of domestic products. Similarly, the Hometown Tax Payment System (*furusato nozei*), in which the government incentivized charitable giving by providing special tax deduction for donations made to local governments, is also leveraging people's affinity to their (often rural) hometowns.

Consumer awareness is another factor that influences the valuation of eco-labels. Onozaka and Mcfadden [32] found that many Japanese consumers were unaware of the issues of overfishing and resource depletion since they do not observe any sign of scarcity in the market; the highly globalized seafood distribution network has the effect of “drowning out” such signals [33]. Thus, for these Japanese consumers, sustainability standards set by the eco-labels may not be recognized as an attribute that differentiates these products from others. However, a series of consumer surveys by Uchida et al. [6,7] found that when informed of the perils of the world's fish stocks, consumers’ willingness to pay for sustainable seafood products increased.

Thus, these attributes result in a mismatch between what consumers demand and what MSC can supply. Given the lack of locally certified fisheries, the majority of MSC-certified products are imported from abroad, frozen or processed (e.g. pre-frozen salmon fillets, cod roe, *surimi*), which automatically makes them lower in value than fresh fish or seafood used for premium sashimi. Thus, it is highly unlikely for a price premium to develop for MSC-certified seafood. This lack of price premium, combined with the lack of an exclusively MSC market (as noted above, even Aeon's most progressive commitment to sourcing MSC seafood is only 10%), there is no financial incentives for Japanese fisheries to attain the certification.

3.4. Socio-cultural understanding of sustainability

In addition to market limitations, the success of marine eco-labels in Japan is further limited by a society that has differing perceptions of what “sustainable” seafood means. Understanding the attitudes of the general public, as well as those of Japanese fishers, can be challenging without contextualizing this concept by its connection to the resource. Martinez [34] suggests that Japanese fisheries are viewed as an essential part of the country's coastal cultural identity. For consumers, seafood is a link to this identity; many Japanese people perceive their support for fishing communities such that they can remain viable long-term is a *sustainable* practice. Meanwhile, Takahashi et al. [35] observed that the compliance of Japanese coastal fishers to management regulations is generally motivated by economic interests and, more importantly, as a conflict reduction mechanism and the preservation of the community *habitus*, rather than for conservation of the targeted fish stock. Hence, the unique manifestation of the linkage between *community* and *sustainability* drives fisheries and seafood consumption in Japan.

The community-centric approach to coastal fisheries management is captured in Japan's concept of Satoumi [36]. *Satoumi* can be interpreted as “human-influenced coastal seas” [37]: a system of a small-scale ecosystem-based coastal management that integrates customary marine spatial planning and traditional modes of biogeochemical engineering, such as habitat restoration or modification. Low-tech and low-cost projects led voluntarily and collectively by local fishing communities such as planting of sea grass and kelp to alter nutrient load of coastal waters or creation of artificial nursery grounds enable these communities to take greater responsibility in maintaining the local seascape [38]. Again, the preservation and sustainability of the coastal fishing communities form the driver in resource conservation.

The aspect of culture is also observed in the development of a complex supply chain and the construction of the coastal landscape. In seafood supply chain management, the value of seafood is amplified through practices that treat fish as a cultural motif. Bestor [39] examined the Tokyo Central Wholesale Market (i.e. Tsukiji Market), the hub of Japan's fish wholesale network, and concluded that the value of seafood is constructed through the communication between different parts of the supply chain, reinventing the fish as a cultural commodity. He observed that the professionalism in Tsukiji and throughout the supply chain, as exemplified in the careful treatment of fish, maintains the quality of the product while foreign retailers do not. Such practice of value addition through transition of fish into a cultural commodity represents the way in which the cultural relationship that fishers have with the fishery extends beyond fishers involved but collectively throughout supply chains from fishers to whole sellers and retailers

to consumers. These practices and ideology must be considered as the part of the Japanese principle towards seafood and, therefore, must be integrated with the notion of environmental sustainability in order for such notion to be incorporated into consumers' decisions on their consumption choices.

4. Pathways for a sustainable seafood program

In recent years, the idea of sustainability has been extended to the realm of culture. *Our Creative Diversity*[40] first raised the issues concerning the relationship between culture and development. Just as natural environment support the real economy, so also are cultural systems—the networks of cultural relationships and institutions that permeate societies—essential to sustain economic activities (Throsby 2008). Scholars such as Hawkes [41] and Soini and Birkeland [42] argue for the need to ensure that cultural capital is not eroded in the course of economic development and there is emerging recognition of the linkages between ecological and cultural sustainability (e.g [43]).

As noted, seafood in Japan is construed via a community-centered ideology, enabling fishers to undertake practices that avoid conflicts within fishing communities and supply chains to treat fish as cultural commodity. Thus, cultural capital exists in seafood production in Japan and it is recognized through the supply chains. Yet, the approaches adopted by both MSC and MEL-J, which consider the criteria of biological and ecological sustainability or compliance to management measures and governance as the sole principle of sustainability, fail to appreciate the role of culture in ensuring the sustainability of the fisheries (and seafood) that they assess. In contrast, Pride Fish focuses on the fishing community and their internal definition of sustainability. The shortcoming of the Pride Fish approach, however, is that cultural sustainability does not necessarily result in ecological sustainability. Its recommendations, therefore, cannot provide such assurance and may hinder the adoption of environmentally sustainable fishing practices.

Given this national perspective, ensuring that both social and environmental standards along the supply chain are met, requires stronger and more flexible interaction between all the actors involved. Given that the current models of seafood sustainability standards have yet to achieve integration in the national supply network, it is imperative that alternative approaches be explored (Fig. 1).

As highlighted above, such approaches must address the needs of the four key actors of the seafood supply chain: fish stocks and environment, coastal fisheries, distributors, and retailers and consumers. Most importantly, any eco-label must be sufficiently robust in terms of its environmental assessment to ensure biological and ecological sustainability of the fisheries, while at the same time resonating with the sense of *cultural* sustainability that is held by Japanese fisheries, supply chain actors and consumers to ensure grassroot support for the program. In order to mobilize Japanese consumer toward environmentally sustainable consumption, it may be necessary to leverage their cultural affinity to small-scale fisheries, similar to ways in which Carrier [44] suggested applying the consumers' "commodity fetishism" for environmental protection. In other words, a successful program must be rooted in and supported by Japanese coastal fisheries. A program such as Pride Fish, with its nationwide coverage and partnership with the local Fisheries Cooperatives, may be viewed as a community driven, 'bottom-up' model that has the greatest potential for national support. The fact that the Japan Fisheries Association, the organization behind MEL-Japan, is a supporting partner of Pride Fish may also contribute to reducing the administrative barriers between the two programs.

Eco-labels have various instruments at their disposal: recommendations, optional standards, and compulsory standards. Recommendations cannot be enforced by inspections and cannot assure consumers (and retailers) that the fisheries will comply with the recommended sustainability measures. The same argument applies to optional standards, where certification bodies provide a declaration that the fisheries have complied with the required measures, based on documentations presented by the fisheries to support their claim of compliance. Compulsory standards can provide the greatest assurance to the consumers of sustainability, yet at the cost of higher reporting and enforcement burden, not only for the producers (i.e., fisheries) but throughout the supply chain. In principle, the financial benefits of certification (i.e., price premium and market access) are to sufficiently compensate for such additional costs (as well as the additional costs associated with sustainable fishing practices). However, as exemplified by the Kyoto flathead flounder fishery, such benefits may only be realized in fisheries operating at a much higher scale [45–49]. Ultimately, sustainability certifications must find the right balance between the certification burden and assurance of standards. As the interest to be certified increases, the need for effective monitoring and enforcement of the certification standards to maintain a level of assurance to the consumer also increases.

In the case of Japanese seafood certification programs, it is important to re-examine the objectives of such a program. As noted above, goals of environmental certifications are generally to create financial incentives for fisheries to adopt sustainable fishing practices by enabling their products to be differentiated based on their environmental standards. Yet, in order for such a model to function, a consumer base that demands such products is required. At present, in Japan, where the concept of sustainability is driven from a community-based appreciation of sustainability, the demand for exclusively environmental sustainability in seafood is absent. As such, the objective for a Japanese seafood certification program should be to introduce the concept of environmental sustainability within the context of *cultural* sustainability, by identifying fisheries (among the small-scale, culturally sustainable, coastal fisheries) that meet the existing global standards of environmental sustainability, as implemented by programs such as MSC rather than to generate financial incentives. In other words, sustainability certification programs in Japan should be viewed as an information or traceability mechanism, rather than a market-based sustainability mechanism. In this sense, it may be that an optional standard approach may be more suited for the current Japanese seafood system.

This approach may also be appropriate for Japanese coastal fisheries since it could allow for greater flexibility in fisheries assessments, particularly in terms of management framework and effectiveness. It is imperative that any program maintains a robust set of standards for stock status and environmental impacts, in line with those of global programs. Nonetheless, management of fisheries can take many approaches, particularly at the local level and optional standards may enable greater capacity in engaging stakeholder throughout the supply chain and obtain information at a finer resolution.

Lastly, the greatest challenge for a certification program applied to small-scale coastal fisheries would be ensuring a consistent supply, at the volume required, for national distributors and retailers. One approach to meet the needs of national supply chains would be to enable the possible substitution of fisheries and sources through a tier-based system where, in the absence of sufficient supply of seafood meeting its standards, retailers can source from "good alternative" options. Such a tier-based system of seafood sustainability already exists (e.g. MBA Seafood Watch [50]), and some have suggested that such an approach be adopted by MSC to present graduated incentives for currently unqualified fisheries to improve their practices [51]. Again, the objective of the program proposed here is not to create financial incentives for improving fisheries practices but to identify those that are currently sustainable and to inform consumers.

In suggesting Pride Fish as a base model, it is important to consider three steps to integrate environmental sustainability. The first step would be to conduct data inventory at the local level. As noted above, the official national fisheries statistics lack the data resolution or capacity for detailed ecological impact assessment of most fisheries, particularly their impacts on bycatch species. Yet, some Japanese

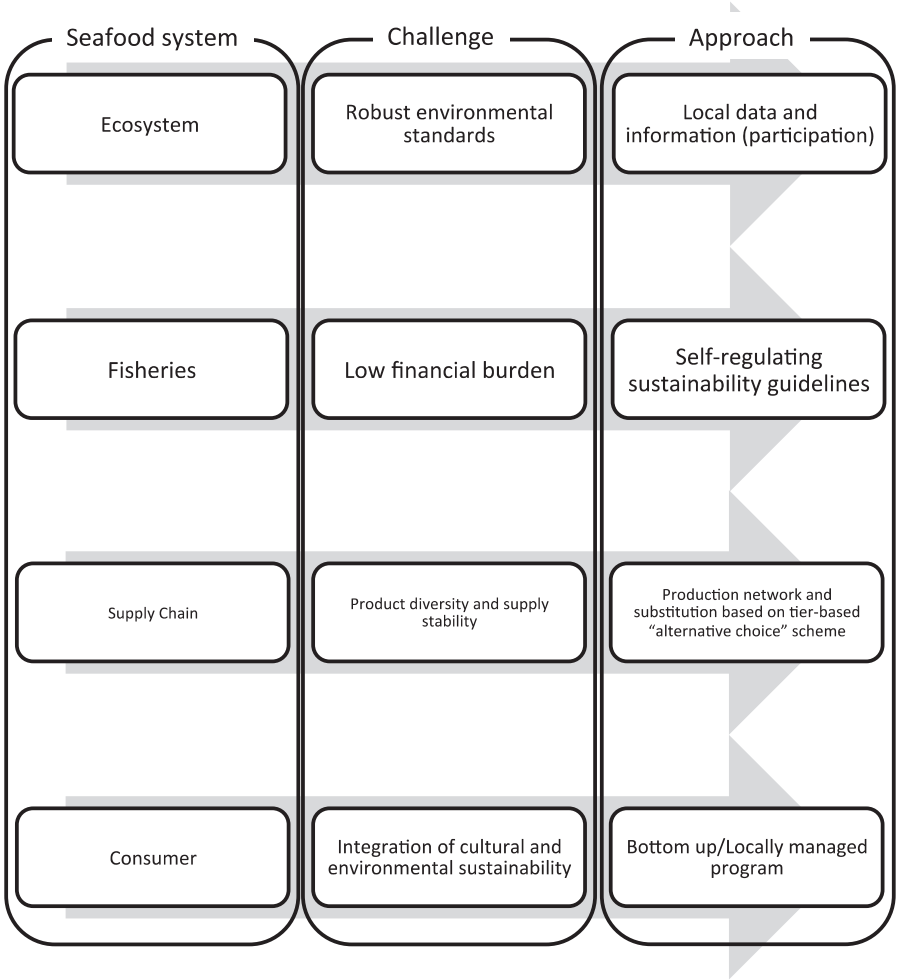

Fig. 1. Pathways for nationally integrated and supported seafood certification programs in Japan.

small-scale fisheries that have been successfully in maintaining detailed records of fishing efforts and landings by all its members, including fishing locations. According to local government officials, such records could provide sufficient data to allow assessment of bycatch impacts. Data inventory exercises would also contribute to showcasing the value of voluntary and community-based data to members. The second step would be to create an assessment methodology that would allow full utilization of the diverse range of available datasets. Fisheries scientists and local experts, familiar with both the ecological and socio-cultural context of the fishery should be involved in designing such methodology and considerations for assessment costs should be included to ensure that they don't become barriers to participation. The third step would then be to create a network of fisheries, thus enabling greater integration into the national supply chain. The existing network of Fisheries Cooperatives that form the basis for Pride Fish, for example, could be integrated for this step.

5. Conclusion

For consumer-facing private certification programs to gain legitimacy, it is critical that they capture the consumers' existing notions of sustainability. The lack of market development of MSC, the most successful global seafood certification program, and MEL-J, the domestic counterpart to MSC, in Japan over the past decade should, therefore, be attributed to its inability to identity and deliver products that appeal to the Japanese supply chain network. MSC, with its dependence on foreign seafood sources, and MEL-J, exclusively on regulatory compliance, failed to capitalize on Japanese consumer's almost nostalgic attitude toward sustainability as a culturally embedded and community-centric concept. Pride Fish, through still in its infancy, has the potential to capture the consumer support; yet in its current form, the absence of explicit environmental standards prevents the program from becoming an effective tool in attaining fisheries sustainability.

The advantage of self-regulatory instruments that rely on data collection, assessments and reporting by participating fisheries, such as those proposed here, includes flexibility and responsiveness to local environmental, economic, and management conditions, and the fisheries' willingness to comply through such responsiveness. At the same time, self-regulation is often criticized for its potential to be deceptive [52] and may be inadequate in addressing complex and multi-faceted problems of environmental sustainability. This balancing of the program participation from fisheries, supply chain and consumers with the reliability of its environmental standards and recommendation remains the central challenge for voluntary instruments such as eco-label.

It is important to recognize that sustainability certification signal just one of many attributes possessed by a product. Consumers can base their purchasing decisions on various product characteristics from physical features (e.g. freshness, colour or size), price, cultural preferences, and possibly their production origin (e.g. source country, farmed or wild caught). Consumers effectively trade off these different attributes, based on their individual preference, and decisions on whether to purchase products bearing certifications, and the sustainability standard they represent, are made not in isolation but in conjunction with these other attributes. Thus, seafood certification

programs in Japan has the potential to be a means of developing new sustainability standards that merge the concept of environmental sustainability, with the current concepts of cultural sustainability desired by the producers, supply chains, and consumers of Japan.

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