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# A Social Wellbeing in Fisheries Tool (SWIFT) to Help Improve Fisheries Performance

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**Abstract:** We report on a rapid and practical method to assess social dimensions of performance in small-scale and industrial fisheries globally (Social Wellbeing in Fisheries Tool (SWIFT)). SWIFT incorporates aspects of *security* (fairness and stability of earnings, benefits of employment to local fishing communities, worker protection, and personal safety and health in communities associated with fisheries); *flexibility* (including opportunity for economic advancement); and the fishery's social *viability* (including whether the fishery is recruiting new harvesters and diverse age classes of workers, whether women's participation and leadership in global production networks are on an upward trajectory.). We build on resilience research by conceptualizing wellbeing in terms of *security*, *flexibility*, and *viability*, and assessing wellbeing at individual, community, and system levels. SWIFT makes social performance measures more broadly accessible to global production networks, incorporates an everyday understanding of wellbeing for people involved in the seafood industry, and helps put social sustainability into measurable terms that are relevant for businesses.

**Keywords:** fisheries improvement; corporate social responsibility; social sustainability; seafood; supply-chain; well-being; global production networks

## 1. Introduction

As trends toward fair trade and corporate social responsibility (CSR) continue in many areas of food production, seafood consumers and organizations promoting ecological sustainability have shown growing interest in social wellbeing within global seafood production networks [1–4]. Interest in wellbeing mirrors a call for ecosystem stewardship that fosters social-ecological sustainability, and identifies strategies to maintain diverse options, enhance social learning, and adapt governance to implement potential solutions [5,6]. In the seafood industry, increasing attention has been paid to human rights frameworks in relation to global production networks in the academic literature [7,8], seafood trade conferences [9,10], and industry-led initiatives [2]. While it is critical to address egregious examples of fisheries worker mistreatment such as those exposed by the media, eradicating those problems is not enough. Seafood industry firms need tools to understand and help improve the everyday wellbeing of people working in their global production networks, and consider their future prospects. We make the case for a rapid tool to help organizations throughout seafood production networks begin the process of assessing social performance.

Social scientists have long studied the social structures, cultures, and dynamics of fishing communities and how they relate to physical environments, but the interest, specifically, to assess wellbeing began to emerge in the late 1990s through policies concerning social impact evaluations of fisheries [11]. Researchers also engaged in social assessment work as a way to understand how and why individual and community wellbeing was declining in historically-strong small-scale fishing regions [12,13], and to meet the needs of a wider movement toward ecosystem-based management approaches that integrate people into the fishery systems concept [14]. Wellbeing has been defined as the degree of individual or community health, happiness, and prosperousness [15], security, health, good social relations, freedoms, and choice [16,17], and in terms of resistance (politics and power), rootedness (sense of place), and resourcefulness (knowledge and learning) [18]. In the resilience literature, it is argued that social-ecological systems that effectively sustain human wellbeing are better prepared to adapt and transform in response to change [19].

### *1.1. Comparing Social Wellbeing Measures*

Our comparison of selected wellbeing measures shows the trade-offs between breadth and depth of information that can be used to assess social performance (Table 1). The need for social data that can only be obtained through detailed field research can drastically inhibit the use of performance measures at global levels by businesses. For example, the Association of Southeast Asian Nations (ASEAN) method has a high standard for evidence for worker fairness using compliance certificates from industry partners, and local research surveys detailing resource conflict. This is feasible for that specific context to the extent that ASEAN's industry-led consortium members are based in a single region and likely have the capacity to track compliance. However, the resource mapping proposed in field sites will be time consuming, expensive, and difficult to obtain globally [20]. NOAA's social scientists generated a way for US decision-makers to consider social impact assessments that incorporate social vulnerabilities and resilience in modeling the impact of fishery policy alternatives [21,22]. The NOAA group's [21] approach has the potential to be accurate in its ability to predict social outcomes related to policy changes at the community level, but it is best suited for the US context because it relies heavily on publically-available data, such as spatially-explicit census data, boating ramp databases, and other data types not applicable to many international fisheries [21,22]. Similarly, the strength of Fair Trade standards is their commitment to ensure updated information, using third party field visits annually to verify components of the production network [23]. However, data from these opportunities will likely not be available to most fisheries in the short term. On the other hand, the Anderson group [24] have created 68 metrics which can be ranked using key informants (rather than on-site field research) and, thus, potentially reduce the burden in uncovering suitable evidence. In this approach rankings are verified through further research if the evaluators find anomalies. Yet, the Anderson group's comprehensive, performance-focused, and carefully-constructed metrics are complex for non-academic audiences, who would likely find it difficult to locate evidence to back up those metrics. Importantly, the Anderson group includes some measures that recognize the basic differences between small-scale and industrial fisheries. This distinction is also explicit in the Food and Agricultural Organization of the United Nations' (FAO) ethical guidelines in small-scale fisheries, which provides a broad overview of human rights themes in the context of fisheries (rather than specific social performance measures) and emphasizes the importance of considering gender, tenure, and power relationships [25]. The rapid method we propose, Social Wellbeing in Fisheries Tool (SWIFT), uses criteria that are appropriate for both industrial and small-scale fisheries. Other key characteristics of SWIFT are that it aims to rely on data that are publically available, or readily-accessible data through desk-based research (reports or online sources), focuses on performance measures that the global production network can likely influence, applies aspects of resilience that likely resonate with both businesses and academics, and uses the fishery as a unit of performance measurement, in keeping with the way fisheries are generally managed.

**Table 1.** Comparison of six approaches to operationalizing wellbeing for fisheries in terms of the evidence, units of analysis, and context.

| Approach | Purpose | Main Focus | Audience | Evidence/Source | Unit of Analysis/Scale |
|---|---|---|---|---|---|
| *ASEAN* [20] *(Industry)* | Measure social performance | Worker fairness and avoiding resource-use conflict | Industry investors, philanthropists | Self-reporting of compliance certificates; mapping community resources on site | Small and large fisheries (Asian Region) |
| *Jepson et al.* [21] *and Himes-Cornell* [22] *derived from Pollnac* [15] | Assess social impact | Assess management alternatives' effect on vulnerability, community wellbeing, social disruption | State agencies, fishers | Spatially-explicit census and other datasets | Fishing community (section of a county) (US States) |
| *Fair Trade USA* [23] | Set Fair Trade certification standards | Governance structure, empowerment, human rights, wages, working conditions and services | Consumers, fishers, industry | Third-party verifies supply network through fieldwork | Certificate holder/fishery organization (Global/Local data) |
| *Anderson and colleagues* [24] | Measure performance of fishery management systems | Ecology, economy, community in harvest and post-harvest sectors | Governments, industry, researchers | Sixty-eight metrics ranked by experts using key informants | Fishery management rather than fish stock (Global) |
| *FAO/United Nations* [25] | Provide ethical guidance relevant to small-scale fisheries | Secure tenure, decent work, power relationships, gender equality | Governments, industry, fishers | Document summarizes rights issues in small-scale fisheries) | Small-scale fisheries communities (Local) |
| *Sustainable Fisheries Partnership (SWIFT method proposed here)* | Measure social wellbeing performance | Flexibility, security, and viability | Industry, investors, philanthropists | Third parties synthesize public data; performance rankings can be challenged and rebutted with evidence | Small and large fisheries (Global-Fishsource data) |

### *1.2. State of the Art and Contribution to Work in the Area of Wellbeing*

SWIFT incorporates resilience-oriented concepts of wellbeing (*security*, *flexibility*, and *viability)* [26–28] because these are relevant across disciplinary boundaries to social scientists, ecologists, and those working in the private sector and government. *Security* is the dependability of a continued livelihood. Secure systems are able to maintain themselves and are also well positioned to adapt to change. The profile of a secure fishery would be that workers earn fair wages, are protected, and have a strong, accessible healthcare system. *Flexibility* is freedom of choice, degree of options, and potential mobility within the fishery system. Flexible social systems, often those characterized by diverse economic and livelihood options, are more likely to recover from shocks [28]. The profile of an ideal flexible fishery would be that fishers can sell their catch to whomever they wish, fishery wealth remains local, and young people in the community have a strong educational system that opens up new options. *Viability* refers to whether the fishery and associated global production network is likely to persist from a social perspective, as long as the fishery is well-managed, ecologically. Viability addresses the link between individual wellbeing and the wellbeing of a fishery system as a whole, looking at demographic features and trends in fisheries, rather than their individual participants or communities. A viable fishery demonstrates signs of persistence through demographic patterns that show the new generation and women have attractive opportunities for engagement. Viability helps us grasp the current social and ecological state of the fishery and likelihood the system can persist or transform [29].

## 2. Methods

Drawing on the concepts of *flexibility*, *security*, and *viability*, we identified seven social performance dimensions that best met the criteria of being essential, applicable at the fishery level, having publically-available data, and likely to have at least one stakeholder group in the supply network associated with it that has a degree of control to improve performance on the dimension. For each dimension we identified the focus, rationale, operationalization, data sources, and availability. We then ranked two fishery cases to test the method. A fishery was ranked for each of the seven dimensions, often using qualitative data, such as project reports or websites. Each dimension had two or three factors. We used a three-level ordinal scoring system for each dimension: a fishery is ranked 1 if less than half of the factors were present, 2 if at least half of the factors were present, and 3 if all of the factors were present (Table 2). These ordinal variables are not to be totaled together among multiple dimensions to try to obtain a single sum rank. This rule is a characteristic of ordinal variables. The difference between each rank cannot be assessed as they are interval and ratio variables and, therefore, mathematical operations in such cases make little sense. Instead, each dimension should be evaluated by itself to get a sense of where a fishery stands. We did not penalize rankings for missing data, though that would certainly put pressure on those responsible for fisheries performance to seek out information on social wellbeing. To determine ease of finding data, we looked for evidence for the dimensions in five fisheries in as many countries. We categorized the data search difficulty as easy, average, challenging, and very challenging.

**Table 2.** Social Wellbeing in Fisheries Tool (SWIFT) method for determining social performance in fisheries.

| Wellbeing Dimension | Suggested Measures & Rank Ranges | | |
|---|---|---|---|
| | For Each Measure, Determine Which Factor(s) Apply and Note the Appropriate Ranking. | | |
| | 1 | 2 | 3 |
| | Less than half of factors are present | At least half of factors are present | All factors are present |
| 1. Earnings are fair and stable. | 1.1 For *wage-based earnings*, harvesting wages are higher than the standard (national minimum wage), OR if *landings-based earnings*, price/weight paid to harvesters is stable or increasing over a five year period of most recently available data.<br>1.2 Processing sector wages are higher than the standard. | | |
| 2. Jobs benefit the communities. | 2.1 The majority of the harvesting workforce is comprised of local people.<br>2.2 The majority of primary processing workforce is comprised of local people. | | |
| 3. Workers are protected. | 3.1 There is a national level protection of right to strike in place or it is in the nation's constitution.<br>3.2 There is a national level protection of freedom of collective bargaining, or it is in the nation's constitution.<br>3.3 Structure is in place to address worker grievances at local level or the global production network uses labor contracts and the terms are transparent/public. | | |
| 4. Communities have improving healthcare. | 4.1 Made improvement in under-five mortality rate at the relevant fishery level or meets global standard.<br>4.2 Seafood company has implemented programs to improve healthcare. | | |
| 5. Communities have improving education. | 5.1 Less than 10% of primary and secondary school age children are out of school.<br>5.2 Seafood company has implemented programs to improve education. | | |
| 6. Fishery will be viable for future generations. | 6.1 Harvesters from a range of age classes are represented.<br>6.2 New fishers are being recruited into the fishery.<br>6.3 Women are increasingly taking leadership roles in the production network and fishing communities. | | |
| 7. Harvesters have economic flexibility. | 7.1 Harvesters are free to sell to whomever they wish without retribution.<br>7.2 Harvesters can access loans from at least two types of lenders at interest rates not exceeding the government rate.<br>7.3 Formalized training is provided to harvesters concerning how to add value to their landings. | | |

### *2.1. The Test Cases*

Our two test cases were selected because they represented a small-scale fishery and an industrial fishery that should exhibit wide-ranging rankings (we have anonymized the fisheries for use in this comparison). Industrial work crews are often paid in wages, have large labor unions, and are locked in to one target species, area, fishing gear, and harvest time. In contrast, small-scale fisheries with independent fishers are often paid per catch, local cooperatives and middlemen often provide economic safety nets, and fishers are more readily able to switch gear, species, and harvest time and location. In addition, a global comparison of how trade influences the social-ecological outcomes in small-scale fisheries has shown that strong governance institutions at various levels were a necessary condition for fisheries that ranked high on both social and environmental indicators of success; therefore, a fishery operating in a country with weaker institutions likely would rank lower [30]. Profiles of the two cases are:

- *Small-scale fishery test case:* a fishery with relatively weak fishery management, governance, and labor institutions. Very large number of fishers in the fishery, and the resource is reported to be over-exploited. Small boats operated by individual fishers sell product to local middlemen. The product has a relatively high value per kilo and processed in country for export and sale

under several brands. There is a small domestic market for the product. Women are employed in processing.

- *Industrial fishery test case*: a fishery context with relatively strong institutions and legal framework protecting citizens. A large number of fishers are employed in the fishery, with the resource reported to be fairly well managed. Industrial vessels employ workers under a contract. The product has a lower value per kilo and is processed overseas, for sale in a highly-competitive commodity market.

### 2.2. Social Wellbeing and Fisheries Tool (SWIFT) Dimensions

(1) *Earnings are fair and stable.* This focuses on harvesters and processors at the fishery level; these data are of average difficulty to obtain. Wages are a standard economic measure of wellbeing [15]. If either the harvesting (1.1) or processing (1.2) sectors earn less than the standard wage, then social inequality is being perpetuated in the fishery. *Waged-based earning* by country and minimum wages for the fisheries sector are tracked [31]. Local variation in earnings for harvesters or between fisheries in a country is not represented and must be found elsewhere. If both harvesting and processing sectors have average earnings lower than the standard, then the fishery is not providing an acceptable living. The standard is for fishers to obtain higher than the national minimum wage except in countries where wage standards are set by collective bargaining (i.e., Scandinavian countries) or if no minimum wage is available. In these cases, estimates can be made using respected publically-available sources. In *landings-based earnings*, such as small-scale fisheries where fishers work independently or in small groups, landings-based data on stability or increase in price/unit actually paid to fishers for catches over a five-year period is a direct, accessible measure, that can be substituted as a minimum wage (1.1). This information is often collected for fisheries whose products are sold on global markets, and is often collected for fisheries improvement projects (FIPs) seeking to improve marketing opportunities, or implement new policies or practices that may benefit fishers economically [32].

(2) *Jobs benefit the communities.* This focuses on harvesters and processors at the fishery level and the data is challenging to find. A reasonable measure for jobs benefiting the community is whether more than half of the harvesting (2.1) and primary processor (2.2) workforce is based in the fishery region (vs. outsourced or migrant labor). An underlying assumption is that a local workforce implies that greater fishery wealth and other benefits remain in a fishing community. Reducing local employment by processing fish in another country may affect local wellbeing indirectly as well as directly, by reducing the tax base and, therefore, reducing political leverage for needed social services. Anderson et al.'s measures of nonresident employment follow a similar rationale [24]. We found no common data source for outsourced or migrant labor for fisheries (2.1 and 2.2). Instead, data on workforce composition is possible to find for fisheries with in-depth reports on trade dynamics. Reporting of non-local fleets is likely more common than reports of local ones, and some fisheries may have no public data.

(3) *Workers are protected.* This focuses on institutions at the fisher and national level. These data are average to challenging to obtain. The most direct measures of basic worker protection are the presence of legitimate legal frameworks at the national level that include rights to strike (3.1) and freedom of collective action (3.2) which, for many countries, can be found in online databases, such as wageindicator.org [31]. As Fair Trade USA's first requirement makes clear, if there is no organizational structure for workers, then worker protections are less likely to be a concern [23]. The presence of grievance structures (3.3) can be verified through either active fisher organizations that are common in small-scale fisheries and are often FIP participants or stakeholders (see fishsource.com for specific fisheries) [33]. Another source (3.3) of evidence is a formal structure with employers or local regulations that explain grievance mechanisms. Ideally, we would assess how well fisheries are *actually upholding these rights*, but standardized data would be scarce under the evidence constraints we are working with.

(4) *Communities have improving healthcare.* The focus is children at the level closest to the fishing community scale, and the fishing community. These data are easy to obtain. Children are the most vulnerable in a population. Goal #4 of the Millennium Development Goals of the United Nations calls to reduce the under-five mortality rate by two thirds, between 1990 and 2015 [34]. While few publically-available datasets are global in scope and can be used as a shared standard for fisheries, child mortality under five years old (4.1) is one of these virtually universal measures regularly collected at the national level, and sometimes at regional and finer resolution (preferred). The Demographic and Health Surveys (DHS) Program's Spatial Data Repository funded by USAID provides spatially-explicit health and demographic data [35]. Since the under-five mortality rate may vary across areas of large fisheries that encompass multiple geographic regions, the assessor must take the highest under-five mortality rate of all regions associated with the fishery. We set global standard for under-five mortality as higher than 10, which is in line with many developed countries. Faced with the challenge of this performance measure, global production networks may be encouraged to create new partnerships with public health and other agencies. CSR reports can be used to cite legitimate programs to improve local health that are initiated or supported by the seafood industry (4.2).

(5) *Communities have improving education.* The focus is children at the level closest to the fishing community level, and the fishing community. These data are easy to obtain. As with the health dimension, focusing on children and the community (rather than education levels among the workforce) is likely to be more available through desktop research and more indicative of changes. The first component of this builds on the Millennium Development Goal #2 to achieve universal primary education [34], but these alone do not capture enough variation across countries. Instead we focus on whether less than 10% of the children are not enrolled in primary or secondary school (5.1) using UNESCO's global trend on numbers of out-of-school children [36,37]. If data are available at finer resolution they should be used. For 5.2, evidence of legitimate industry-led education-related programs for fishers, as well as others in the community, could be obtained from CSR reports.

(6) *Fishery will be viable for future generations.* The focus is the fishery system as a whole, including fishers, women, and newcomers. These data are challenging to very challenging to obtain, as local reports are required. If fishery employment is seen as a viable source of livelihood, women and men value the fisheries. Conversely, fisheries can, and do, extinguish from attrition when the value is seen as low and when resources are overharvested. Women play a critical role in many fisheries and are often the majority of workers in seafood processing [38]. Such work is often poorly paid and low status. Evidence of women in leadership roles (6.1) in workers' organizations that represent seafood worker interests or seafood companies are shown in FIP, CSR, or other reports. Whether a mix of age groups is represented (6.2) can likely be found in demographic information that are regularly collected at fisheries levels for socio-economic assessments or national statistics of employment by FAO country profiles [39]. Evidence of training of fishers (6.3) can be found in CSR, fisher association, industry association, or government reports.

(7) *Harvesters have economic flexibility.* This focuses on harvesters at the fishery level. These data are challenging to very challenging to obtain. Evidence of fishers' freedom to sell to whomever they choose (7.1) is the absence of information indicating that harvesters are locked into one buyer or loan type (which may lead to unfair lending practices and other exploitation by intermediaries leaving them more vulnerable to cope with challenges [40]). Evidence (7.1) can also be the structural dynamics of the fishery, for example, if there are few processors, or fisheries are contracted to sell to a single processor, or if there are very few middlemen in a large fishery system, the harvesters' options and ability to negotiate fair terms are severely limited. Evidence of economic flexibility also includes whether harvesters access multiple loan types at good rates (not exceeding government rate) (7.2), which will need to be obtained through socio-economic reports. We also consider as evidence formalized training such as programs in how to add value

to fishers' landings (7.3) that can help harvesters earn more without increasing fishing effort or expenditures. This information can be found in fisher-organization, government, FIP, and CSR reports. We did not include economic fishery analyses, such as cost of entry for fishers, a metric being considered elsewhere [32].

## 3. Results and Discussion

*Small-scale fishery*: The small-scale fishery (with weaker institutional context) ranked lower than the industrial fishery (with stronger institutional context) in most dimensions (Table 3, Figure 1). In the small-scale fishery, the highest rank for any single dimension (3) was for jobs benefitting the communities, because >50% of the fishers and processors were local (community-based). The small-scale fishery ranked medium (2) for earnings and education, and ranked low (1) for worker protection, healthcare, fisheries viability, and economic flexibility. The medium ranking for earnings was assigned because while fishers earned a fair wage in the small-scale example, processors did not. Education ranked medium because less than 10% of primary and secondary school age children were out of school, but there were no company-led education programs. The low (1) rankings for worker protection were assigned because there were essentially no labor protections at the national level, nor any structures in place to address grievances at the fishery level. In the health dimension, the DHS survey data showed >85 deaths per 1000 births, higher than the standard of 10, and there were no records of company-led health initiatives in this area. Regarding fisheries viability, despite having all age-classes of fishers represented in the small-scale example, there was no evidence of either recruitment of new fishers nor of women in leadership positions, resulting in a low ranking. A low ranking for economic flexibility was assigned because loans were obtained mainly from middlemen, and no formal value-added programs were in place.

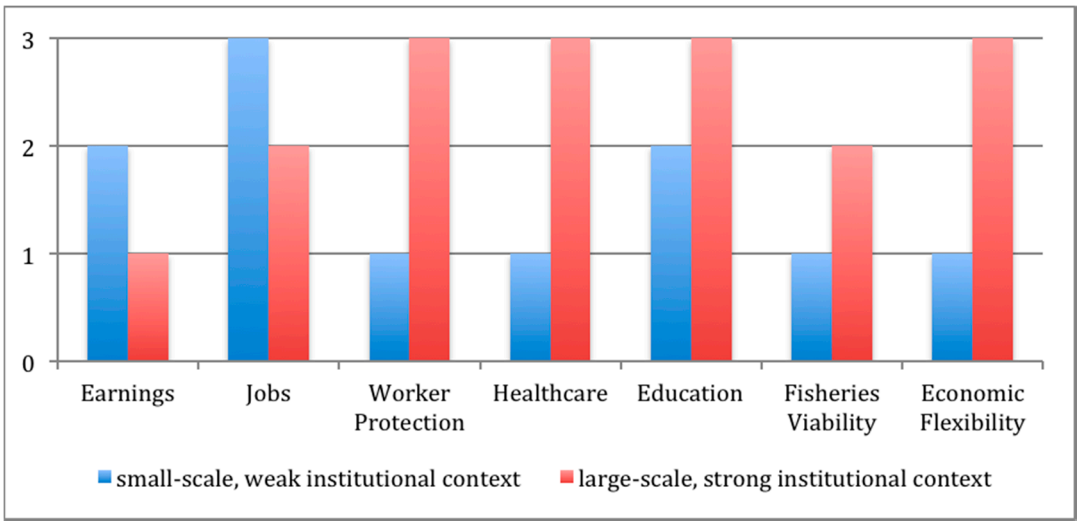


**Figure 1.** A comparison of SWIFT rankings of a small-scale fishery in a weaker institutional context and an industrial fishery in a stronger institutional context.

**Table 3.** SWIFT rankings for a small-scale fishery in a weaker institutional context and an industrial fishery in a stronger institutional context, according to criteria in Table 1.

| Wellbeing Dimension | Suggested Measures & Rank Ranges | Small-Scale | Rank | Industrial | Rank |
|---|---|---|---|---|---|
| 1. Earnings are fair and stable. | Harvesting wages are higher than the standard (national minimum wage) OR if no wages price/weight paid to harvesters is stable or increasing over time over a five year period. | Yes<br>>10% national average. | 2 | No<br>Harvesters earn below national average. | 1 |
| | Processing sector wages are higher than the standard. | No<br>Less than average daily wage in region. | | No<br>Outsourced to cheaper labor markets abroad. | |
| 2. Jobs benefit the communities. | Harvesting workforce comprised of >50% local people. | Yes<br>>50% local harvesting crew. | 3 | Yes<br>National fishing companies own fishing quotas. Strong labor organizations/difficult to employ unregulated workers. | 2 |
| | Primary processing workforce is comprised of >50% local people. | Yes<br>>50% local processing workers. | | No<br>Processing outsourced to other countries. | |
| 3. Workers are protected. | National level protection: multiple national level protections for right to strike. | No<br>Only provisions in the labor code, not in trade union/collective action. | 1 | Yes<br>Insufficient data on wage.indicator.org, but public strikes suggests strikes allowed. | 3 |
| | National Level Protection. | No<br>only in the labor code. | | Yes<br>Insufficient data on wageindicator.org but salaries are collectively bargained for 80% of workforce. | |
| | Structure is in place to address worker grievances at local level, or the global production network uses labor contracts and the terms are transparent/public. | No<br>No evidence of fisheries associations to address grievances, & mainly informal contracts. | | Yes<br>National fisherman's association addresses grievances, and strong labor protections present. | |
| 4. Communities have improving healthcare. | Made significant improvement in under-five mortality rate at the relevant fishery level or meets global standard (set at 10 deaths per 1000 births). | No<br>DHS Survey data show >85 deaths per 1000 births. | 1 | Yes<br>⩽10 deaths per 1000 births or less. | 3 |
| | Seafood company has implemented programs to improve healthcare at the relevant fishery level. | No<br>none known to be implemented. | | Yes<br>CSR program by industry to deliver services such as support for physiotherapist, safe equipment and sponsored sports activities for employees. | |

**Table 3.** *Cont.*

| Wellbeing Dimension | Suggested Measures & Rank Ranges | Small-Scale | Rank | Industrial | Rank |
|---|---|---|---|---|---|
| 5. Communities have improving education. | Less than 10% of primary and secondary school age children are out of school. | Yes | 2 | Yes | 3 |
| | Seafood company has implemented programs to improve education. | No<br>Industry does not invest in education initiatives. | | Yes<br>CSR program by industry to deliver education programs in finance, information technology (IT), mathematics, and languages for employees. | |
| 6. Fishery will be viable for future generations. | Harvesters from a range of age classes are represented. | Yes<br>All working ages are well represented. | 1 | Yes<br>All working ages are represented, although. average age for fishers is >40. | 2 |
| | New fishers are being recruited into the fishery. | No<br>No evidence of new fishery recruits. | | Yes<br>Active recruitment of new members. | |
| | Women are increasingly taking leadership roles in the global production network and fishing communities. | No<br>No evidence of women in leadership. | | No<br>No women on management team of large processor or in the board of fishermen's union. | |
| 7. Harvesters have economic flexibility. | Harvesters are free to sell to whomever they wish without retribution. | No<br>Evidence that fishers are not free to sell to whomever they choose. | 1 | Yes<br>No evidence to counter that fishers are free to sell to whomever they choose. | 3 |
| | Harvesters can access loans from at least two types of lenders at interest rates not exceeding the government rate. | No<br>Harvesters only obtain loans from middlemen. | | Yes<br>Loans from government and banks. | |
| | Formalized training is provided to harvesters in how to add value to their landings. | No<br>No evidence of value-added training programs. | | Yes<br>Formalized trainings include two years basic education to become a fishermen and training in fish processing and quality. Further education offered in fishing techniques, radio communications and money management. | |

*Large-scale fishery*: The large-scale fishery had high rankings (3) in worker protection, healthcare, education, and economic flexibility (Table 3; Figure 1). It ranked medium (2) for jobs benefitting the community and for fisheries viability, and low (1) in earnings. A basic explanation for the high rankings in the industrial fishery case is that the fishery is located in a country with measures in place for human rights and labor protection, and public health and education is strong, overall. Specifically regarding worker protection, strikes were allowed, salaries were collectively bargained, and there was a national fisher's organization where grievances can be addressed. For health, there were <10 deaths per 1000 births and the fishery had documented company-led healthcare initiatives. For education, less than 10% of primary and secondary school age children were out of school where the fishery is based, and at the harvester level there are documented company-led education initiatives. Regarding economic flexibility, harvesters could obtain government and bank loans at market rates and there were formalized training programs to increase the value of the harvest. For viability, while new fishers were being recruited and all age-classes were represented in the fishery, there were no women leaders in relevant worker or fisher organizations, or board members, resulting in a medium ranking (2).

The industrial fishery ranked higher than the small-scale fishery overall (Table 3), but it ranked somewhat lower than might be expected in some dimensions considering the country's institutional context in which workers have very strong protections in place (e.g., labor contracts, unions, social security, pension, unemployment funds). Specifically, the industrial fishery ranked lower than the small-scale fishery for "earnings are fair and stable" and "jobs benefit communities". In the industrial example, harvesters earned less than the national standard (which was a high standard). Earnings in the small-scale fishery case were higher compared to their national standard. In addition, the business model of the industrial fishery example is to outsource the vast majority of fish processing jobs overseas where labor is cheaper. Thus, despite employing mostly local harvesters, it ranked low (1) because processing jobs did not benefit the fishing communities.

Of the seven variables, the easiest to obtain were those regarding earnings, and community-level education and healthcare. The most challenging were data on viability and flexibility. The local workforce characteristics and worker protection were in the middle. This was not surprising, since concepts such as viability and flexibility were more complex measures of wellbeing and were not yet measured in a standardized way, as opposed to regularly-collected education and health metrics, and economic information on wages.

### *3.1. Areas for Future Work*

Testing SWIFT on two fisheries gave insights on data collection process and availability in order to obtain rankings. The next step is to expand testing to a wider range of fisheries in terms of geography, socio-cultural context, and scale to better understand potential issues of validity. This will provide additional information on how fisheries rank relative to each other and how to improve the methodology. If common challenges are encountered in the data collection or scoring, or if biases are detected across the fisheries tested, adjustments can be made. Another key consideration is how these dimensions resonate with key stakeholders in small-scale and large-scale source fisheries. The results of the tests should be shared with the stakeholders involved in the fisheries that are included. Their understanding of, and response to, SWIFT will inform adjustments to the method.

SWIFT highlights that it is possible for a fishery to meet certain criteria in practice, but to be unable to demonstrate that through publically-available data at the time of assessment. For example, some countries (like Scandinavian countries) may have no legally-set minimum wage but pay rates are agreed through collective bargaining agreements between the industry and the union. In our industrial fishery example 85% of workers in the country were automatically protected through labor unions' agreements, and fishers have their own separate association and contract. It is also possible that evidence used to justify ranks may be outdated by the time it becomes available to the public. Political regimes change, fisheries collapse, but such events will also be public so the public can request that this information be corrected if evidence is supplied, as is the case with other ranks on fishsource.com.

Once additional test cases are analyzed and further improvements are made to SWIFT, opportunities for better understanding the interaction between social and ecological issues in fisheries will be explored. Changes or trends in social performance ranks can be overlaid with ecological ranks to look for insights into causality or indirect effects. For example, if a fishery's rank for dimension 1 (Earnings are fair and stable) drops over the course of a period of a few years and illegal fishing increases over the same timeframe, we can begin to ask questions and design improvement solutions that consider both areas, if a link can be shown.

Ideally, wellbeing should be examined at all levels in the global production network, and across all populations and locations where the product is processed, but for now we focused mainly at the origin of the seafood supply network. A contribution of SWIFT to social performance measures is that it includes, but is not limited to, assessing wellbeing at individual and community levels. Community resilience has been found to be important in disaster preparedness and in social sustainability [41,42]. Wellbeing applies to various levels and sectors in fishery systems (e.g., fishers, seafood processors, women, children, institutions related to fishing, and processing labor, more generally) and they are interrelated. If fishers have a secure livable income, but children in the community do not complete basic education, then fisheries may not be able to capitalize on new opportunities or respond to future change or crises, because the system, as a whole, is not well.

The issue of units of analysis—whether a species, fish stock, fishing community, area defined by a regulatory system, or gear types—is problematic for all wellbeing approaches, including the one proposed. For example, the census-level data that the NOAA group relies on may be much broader than the scale appropriate to a fishery [21]. In some fisheries, information is so scarce that information from a single area and tens of fishers may be applied to a fishery that spans a whole country and many thousands of fishers and processing workers. Personal biases of key informants can also come into play in the Anderson group's approach [24] because it is unclear whether site-, region-, or country-level data has been used to arrive at a rank. Resolving this problem is beyond the scope of this paper, but this still is important to consider.

The difficulty of obtaining data specifically focused on resilience concepts—security and viability demonstrate opportunities to bring these concepts into the social responsibility mainstream, such as those that collect data on education, health, and wages.

While our desktop research approach cannot replace any "bottom-up" participatory method that uses local-level definitions and aspirations of wellbeing, it does help to open up the subject of human wellbeing as an important issue to more seafood industry actors and institutions, which is a much needed step. SWIFT can offer a snapshot of the wellbeing of a fishery, but this does not replace the function of conducting in-depth social research in fisheries, nor the use of comprehensive methods to assess social dimensions of fisheries.

### *3.2. How Can Global Production Networks Improve Social Performance?*

SWIFT may compel companies to look more closely at low-scoring aspects of their source fisheries, or make the effort to seek out legitimate evidence to improve a low ranking. Companies sourcing from high-scoring fisheries may see opportunities for communication and marketing about successful efforts to improve socio-economic aspects of fisheries. However, we recognize that actions of global production network actors are limited in certain ways by their context and the business models underlying them. Likewise, the motivation and potential reward for examining social performance will vary. Types of actions by seafood companies may depend, in part, on whether the production network in question produces a globalized commodity with low profit margins, or a product with higher margins that distinguishes itself by brand/more specialized markets. For example, global production networks (especially those harvesting or processing in countries with a high national wage as in our test case) may be less likely or able to overhaul their wage scales given the low-margin/high volume business model, and might be more likely to invest more heavily in other areas of performance that positively affect worker wellbeing.

The industry can also help foster existing fishing organizations or help develop new ones according to local desires and needs. These entities could co-create appropriate programs, such as more value-added training for fishers, more microfinance options, etc. which also could improve fishery performance ranks. Another example of how seafood companies can use resources and influence to improve social *and* ecological conditions in a fishery might be a landings data collection program that hires and trains interested women and men in the community, including students. Programs of this type that monitor performance can also help recruit individuals into the fishery workforce, creating a virtuous cycle in terms of viability of the fishery system. As this assessment method develops and patterns emerge within certain regions or fishery types, perhaps health and education programs might be designed with the common concerns of fishing communities or regions in mind at larger than local scales, and cooperation or networking among fisheries and across global production networks may be facilitated to address wellbeing issues.

Whatever actions may be available to global production network participants, it is clearly in the seafood industry's interest to be seriously concerned with the relationship between social and economic performance. A goal is for the seafood industry to be able to use some iteration of SWIFT to evaluate fisheries and create a publically-available snapshot of social performance in fisheries. A similar tool implemented by SFP has been successful in engaging industry to make changes to the environmental aspects of global production networks. This assessment methodology may also help seafood companies see the limits and consequences of certain fishery improvement strategies, such as drastic catch reductions and other constraints, and to improve chances of success. The economic hardship fishing communities often suffer when drastically new catch regimes are implemented harms wellbeing, and can doom efforts to failure by undermining fishers' abilities to comply. However, fishery improvement projects using social performance measures at the start have a foundation to design projects that activate the fishery's existing capacity to adapt, and take approaches that may be more step-wise and less risky from a harvester perspective [43], given the uncertain outcomes. We would expect that fishers who are less vulnerable, socially and economically, can better cope with the impacts of such efforts to improve fisheries ecological performance.

## 4. Conclusions

The SWIFT method offers a rapid, broad assessment of wellbeing and represents an accessible first step in understanding the situations of people working in global production networks. The proposed methodology provides a snapshot assessment of social wellbeing. The question of why a certain rank for a dimension is high or low will usually require a more detailed explanation or in-depth research. These "why" questions matter greatly for understanding fishery dynamics at the human-ecological system level. In the shorter term, however, SWIFT can help generate questions about causality and relationships between social performance measures for further research. The performance measures are meant to encourage current and future global production network participants, marine resource managers, and socially responsible investors to become more interested in the basic question of how social wellbeing and socio-economic sustainability relate to ecological sustainability.

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