



Flexibility through bundles of capital: The capabilities of Indonesian small-scale handline tuna fishers under voluntary sustainability certification

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ABSTRACT

As key tuna producers and exporters globally, developing countries are exposed to voluntary sustainability certification to respond to market and consumer demands. Only recently, small-scale fisheries have received attention in this respect. Despite small volumes traded, fishing activities are essential for maintaining the livelihoods of small-scale fishers. Their environmental footprint is lower than large-scale fisheries, yet lack of capital, capabilities, and conflicting interests along the value chain have hindered their participation in certification schemes. This study employs Sen's capability approach to understand the extent to which a voluntary standard develops the capabilities of small-scale tuna fishers. We use a case study of the Fair Trade USA Capture Fisheries Standard (CFS) in the province of Maluku, Indonesia, established in collaboration with an Indonesian non-governmental organization, Yayasan Masyarakat dan Perikanan Indonesia. We show that fishers use a bundle of different kinds of capitals to develop their capabilities for compliance with the certification standard. This bundle of capitals consists of a combination of prescribed capitals (the capitals necessary to comply with the certification standard) and alternative capitals that fishers use to develop their abilities for their compliance. Instead of using human capital as emphasized by the certification standard, in this study, we found that fishers use social capital as their main capital to comply with the standard, which makes it the primary source for improving their capabilities. In conclusion, we found support for the need to strengthen flexibility in the implementation of sustainability standards to increase their effectiveness as a sustainability governance mechanism.

1. Introduction

The high volume and value of seafood traded in the global market originating from developing countries have created serious concerns about sustainability. Voluntary certification is a popular way to govern the sustainability of fisheries, because it is not mandatory or enforced by any government authority, and any actor along the value chain can apply for and commit to following the standard [1]. Voluntary certification schemes usually establish a set of standards, convey information about product attributes to consumers, initiate awareness campaigns, generate market incentives for fishers, and influence retailers to invest [2–6]. Certification schemes are part of market-based approaches to support and ensure sustainable fishing practices by influencing consumer preferences to increase market demand and price of sustainable seafood [7].

In response to global market dynamics, voluntary seafood certification schemes have increasingly expanded in developing countries over the last decades [8]. Different certification schemes have developed different criteria to address a range of sustainability concerns. Criteria relate not only to environmental but also to economic and social issues [9,10]. In the seafood industry, consumer concerns relate to safe and environmentally friendly seafood as well as to the livelihood of small-scale fishers [11,12].

Small-scale fisheries (SSF) play essential roles in developing countries [13,14]. Their total production is higher compared to large-scale fisheries [14,15]. Also, most of their catch is used for local and domestic trade, thereby contributing to food and nutrition security [15]. Fishing activities are vital for their livelihood, especially for securing income and employment [16]. However, as with other smallholders, lack of capabilities, insufficient access to infrastructure, inadequate

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market access, and conflicting interests along the value chain are challenges for small-scale fishers [10,17,18]. Furthermore, small-scale fishers are often marginalized in national and global fisheries policies, their working conditions disadvantaged and their contributions under-reported, while the price they receive does not reflect the price consumers pay, leading to poverty and food insecurity [19–23].

Like other smallholders, small-scale fishers have difficulties benefitting from voluntary certification programs. Most voluntary certification schemes prescribe a set of standards for particular practices [24]. In order to encourage producers' compliance, standards provide market-related incentives to producers, such as increased market access and premium prices [25]. However, previous research has shown that it is unclear whether producers actually receive the benefits from these incentives improving their livelihoods. Another challenge is the lack of knowledge and skills among producers to comply with the standards [26–29]. In order to enhance producers' abilities, most certification schemes provide support to producers, including training [28–34]. However, many studies report that training alone is insufficient to ensure achieving the objectives of the standards [28,35].

In this study, we propose that to enable certification of small-scale fishers, standard holders must go beyond the transfer of knowledge and skills only via guidelines and training and offer support to increase their broader capabilities. Currently, incentives and benefits offered by standard holders are not fully absorbed by smallholders due to factors and constraints that play out locally and are not considered in the global context [35]. Moreover, certified smallholders are presumed to only comply with certification's required more sustainable practices when they consider themselves to be better off than before. However, in assuming this, social and biophysical dimensions are insufficiently considered [10,36,37].

This study aims to analyze how the capabilities of small-scale tuna fishers develop when complying with standards and whether their livelihood improves through sustainable fishery practices. We employ Sen's capability approach to explore this process. The capability approach is a holistic way to evaluate personal well-being and the social arrangements affecting the opportunities to achieve this [38–41]. The approach's central objective is to move away from utilitarianism and expand the evaluation of development processes by involving multiple dimensions [42]. Sen argues that people have different capacities to convert assets into desired outcomes (what they want to be or do), because of personal, social, or geographical differences, or because of differences in institutional back-up and support, defined as conversion factors [40]. Using the capability approach, this study focuses on certification as a means for the continuous improvement of fishing practices, rather than as a set of indicators to which fishers must comply. This capability approach focuses on the freedom fishers have in complying with the standard, considering conversion factors as a way for achieving sustainable livelihoods [41,43,44].

While the capability approach has been applied in studies on small-scale producers and ecological sustainability before, the ways in which standards affect the capabilities of the participants have received much less attention. A key challenge is to identify indicators to assess capabilities that are specific to the target group [38,45,46]. Samerwong et al. [27] applied the capability approach to Thai shrimp aquaculture from the perspective of the certification standard. Our study extends their analysis by also addressing the fishers' perspectives on their capabilities to comply with the standards. This study also fills another gap in the literature by defining and assessing the capabilities of a standard's target group. Our analysis is based on a case study of the uptake of the Fair Trade USA Capture Fisheries Standard (CFS) in the province of Maluku (*Moluccan*), Indonesia. In 2014, Fair Trade USA CFS started to implement a project to improve the market access of small-scale tuna fishers while maintaining the sustainability of their fishing practices. During seven years of operation, there has been an increase in the number of certified fishing groups in the province. By 2022, 28 fishing groups were successfully certified, but three committees were closed, and 23 fishing

groups were excluded from certification. These figures raise questions about the effectiveness of certification.

The rest of the paper is structured as follows. The next section reviews the capability framework and its relevance to this study. Section 3 presents the methodology to operationalize the framework and analyze the capabilities of fishers. Section 4 presents the results from the study. Section 5 discusses these results, and the last section draws conclusions from the study.

2. Expanding the lens: A capability approach to comply with a certification standard

Capabilities are defined as the real opportunities people have to act and be as they themselves value. Hereby, the focus changes from the capital and assets people have access to, to what people can do and be with these resources [41,43]. In other words, capabilities lead to doings and beings that people are actually achieving, summarized as functionings [40]. Sen conceptualizes capabilities and functionings in terms of achievement of well-being [41]. Thus, having access to resources alone does not guarantee that people can achieve the livelihoods they wish for. For example, the availability of food does not equal being well-nourished (functionings), because a person needs to be able to actually eat food that is healthy, nutritious and (preferably) tasty [47]. While availability and access to resources are important, other factors influence the actual achievement of valued doings and beings [42]. Personal characteristics, such as previous life experiences, social relations and institutions, cultural and legal norms, geographical settings are, among others, conversion factors, enabling or constraining a person's ability to achieve a desired functioning. The capability approach evaluates the influence of conversion factors on the choices a person has (capabilities) to achieve a functioning through his own account of what capabilities and functionings are valuable within his livelihood.

Capabilities are often operationalized in a set of capitals: assets or entitlements [48]. Assets are resources, claims, stocks, and accesses employed as means of living [49]. They are tools for instrumental action to make a livelihood possible, for hermeneutic action to make living meaningful, and for emancipatory action to challenge existing livelihood structures [50]. Capitals have roles as facilitators to reach end-goals that are not achievable in their absence [51] and can be categorized into five groups: human, financial, social, physical, and natural capitals [52]. Human capital accommodates assets of knowledge and labor. Financial capital covers cash, credit, savings, and debt. Social capital consists of networks, social relations, affiliations, and groups, and physical capital includes infrastructures, equipment, tools, and technologies. Lastly, natural capital covers all natural resource stocks, including air, water, soil, and environmental services [52,53]. The distribution of these capitals varies across different individuals and groups [48].

The idea of exploring smallholder livelihoods by using a range of capitals has been commonly applied in economics, but within environmental social sciences the application is still limited [49]. Several studies identified the different capitals employed by small-scale fishers [22,54–57]. The results of those studies help broaden SSFs' livelihood analyses going beyond one overriding capital, such as human or financial capital. In this study, we focus on all capitals and the opportunities fishers have to comply with the standard [43].

Fishers employ different capitals that they transform in their livelihood and many factors can facilitate or hinder this transformation process [58]. Interactions among the capitals affect the fisher's strategies and livelihood outcomes. For instance, human capital has a relationship with financial and social capital. Skills, knowledge, health, and physical ability can be gained through the availability of income, savings, or credits. This, however, can also be achieved through an expansion in formal or informal social relationships. Also, knowledge and skills are important to gain cash, but cash can also be achieved through network expansion and social relationships [59]. Mapping the

different capitals that people choose and use in their livelihood is essential.

In the context of voluntary sustainable certification schemes, we use the terms ‘prescribed capitals’ and ‘bundle of capitals’ to refer to the capitals and assets that the fishers use to comply with the certification standard [27]. Prescribed capitals are the capitals the certification standard assumes to be essential for meeting the formulated requirements. In contrast, the bundle of capitals consists of a combination of prescribed and alternative capitals that fishers may use to comply with the certification standard. Even though all certified fishers are prescribed the same capitals to conform with the certification standard, they have varied capacities to convert those capitals to the capability set. The differences are influenced by the conversion factors [40]. The notion of a bundle of capitals is aligned with the capability set in the capability approach because it accommodates fishers’ choices to adhere to the standards’ requirements based on their particular conditions. The available bundle of capitals also points to the interactions between different capitals, which can directly or indirectly support fishers’ compliance, and recognizes the multiple roles and interactions of actors within the certification system. Eventually, the fishers’ choices of capital from their capability set will enable them to accomplish their individual functionings, which are certified by the scheme (Fig. 1).

This study assumes that different bundles of capital can be employed to develop fishers’ capabilities to comply with the certification standard and positively influence their livelihood. Identifying the bundle of capitals allows us to determine the fishers’ dependency on different capitals. Whether fishers have freedom to develop their capabilities depends on the distribution of capitals [40]. This study examines the development of fishers’ capabilities through the distribution of their bundle of capitals.

3. Methods

3.1. A case study of Fair Trade USA CFS in Indonesia

This study follows a case study research design [60], focusing on the ability of Indonesian small-scale handline tuna fishers to comply with the Fair Trade USA CFS standard. The first pilot project of Fair Trade USA CFS was implemented in the Indonesian Province of Maluku (*Moluccas*). The province is rich in tuna fishery resources, and the use of handline techniques for small-scale fishers to catch tuna is widespread, which is very traditional yet environmentally-friendly [61]. The certification process begun in 2014 by focusing on Buru, Seram, and Ambon Islands, with the target participants being the value chain actors in handline tuna fisheries. The actors include small-scale tuna fishers, middlemen, processors, exporters, and international buyers. The certification is funded and supported by the buyer, Anova Food, LLC. The implementation of the certification is accommodated by the implementing partner, Indonesian Non-Governmental Organization-Yayasan Masyarakat dan Perikanan Indonesia (MDPI). To access certification, fishers have to join fisher groups and supply their catches to registered middlemen, who supply the loins to the Indonesian processing company,

PT. Harta Samudra. In addition to supplying loins, the fishers are responsible for filling out a logbook to record information about catches and interactions with endangered, threatened, and protected species. The processing company further handles and supplies the loins to the exporter, Coral Triangle Processors, LLC, to be exported to Vietnam. The processed products are then exported from Vietnam to Anova Food LLC and are finally distributed to various retailers in the United States.

Most certified fishers operate around Indonesia Fisheries Management Area (FMA) 714 in the Banda Sea and FMA 715 in the Seram Sea. During the initial audit (2014) approximately 150 fishers were registered, and by 2020, 616 small-scale fishers were successfully certified. When successfully certified, the product can be sold with the Fair Trade USA logo, and as an incentive, the fishers are awarded a premium. The premium is calculated as a percentage of the ex-vessel price multiplied by the weight of the coded Fair Trade USA-certified tuna loins. The fund is disbursed collectively to the fisher groups, which can spend 70 % on community projects, but according to the Fair Trade USA CFS standard, 30 % must be spent on environmental projects. Environmental projects are activities designed by the fisher groups that contribute to the sustainability of the fishery and/or the marine ecosystem. According to the standard, such projects can also be extended to other environmental needs identified in the needs assessment. Some environmental projects that were implemented by the fisher groups include building waste disposal units, posting signs prohibiting littering on the beach and protecting the environment, and organizing beach clean-up activities.

In our study, we selected nine fishing groups in eight villages from Buru and Seram Islands with long-term experience in the scheme. All groups are certified since 2014 and supply their catch to PT. Harta Samudra. The four villages within the Buru Committee are Waepure, Wamlana, Waprea and Wailiang, located in Buru regency, Buru Island. The four villages within the Seram committee are Tehoru, Yeholu, Ampera and Haruo, located in Maluku Tengah regency, Seram Island. Both Islands are situated in the Province of Maluku, Indonesia (Fig. 2).

3.2. Analysis of the Fair Trade USA Capture Fisheries Standard

We performed a document analysis of the certification standard to identify the prescribed capitals and the bundle of capitals that are necessary to comply with Fair Trade USA CFS certification. We used the Fair Trade USA CFS version 1.1.0., published November 15, 2017 on the Fair Trade USA website and applied since January 15, 2018. The standard is regularly updated, and significant revisions occur every five years. The Fair Trade USA CFS consists of six sections that address different aspects. These sections are 1) Structural Requirements (STR), 2) Empowerment and Community Development (ECD), 3) Fundamental Human Rights (FHR), 4) Wages, Working Conditions, and Access to Services (WWS), 5) Resource Management (RM), and 6) Trade Requirements (TR) [62]. We included all sections since they are relevant for fishers’ capabilities to improve their livelihood. However, because we identify the capitals from the fishers’ perspective, we excluded the criteria that do not apply to fishers. Excluded criteria are those that only apply to the certificate holders, such as arranging a contract with third

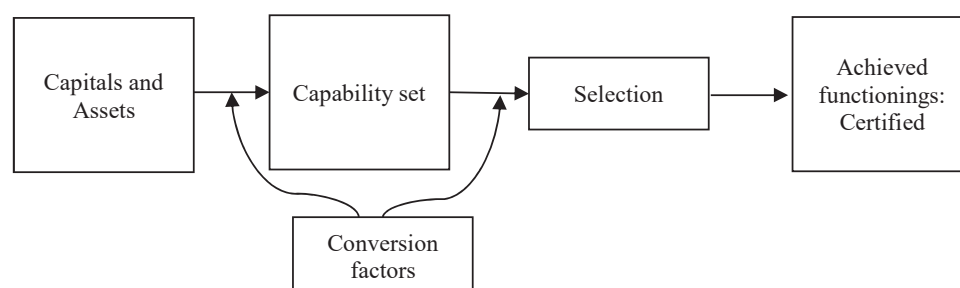


Fig. 1. Conceptual framework.

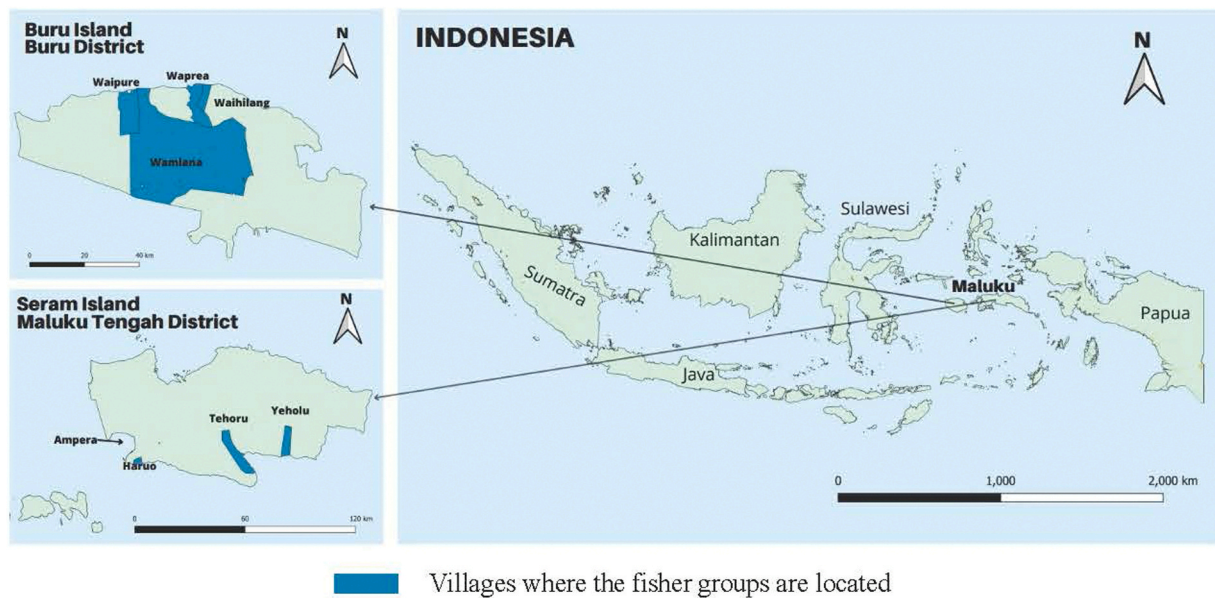


Fig. 2. Case study areas in the Province of Maluku, Indonesia.

parties to create systems to ensure the project's continuity or strategies to provide funding for the programs.

In line with Samerwong et al. [27] we used a stepwise approach. The first step involved the authors identifying the prescribed capitals for each criterion of Fair Trade USA CFS based on an explicit interpretation of the Fair Trade USA CFS standard document version 1.1.0. The second step involved the authors determining the alternative capitals fishers can use for compliance. The bundle of capitals include prescribed and alternative capitals. The capitals were grouped into human, financial, social, physical, and natural capitals. The lead author first identified the capitals through an iterative process. To check the accuracy of the identification of capitals, the co-authors checked and evaluated the first identification. For example, one criterion in the certification standard mentions that certified fishers have basic knowledge of Fair Trade USA CFS, which requires human capital. Therefore, human capital is a prescribed capital. However, we identified the alternative that fishers may share knowledge with other fishers to gain understanding about Fair Trade. In this case, social capital becomes necessary for fishers to comply with the criterion. Therefore, the bundle of capitals consists of human and social capitals. The final bundle of capitals from the document analysis was operationalized as indicators to develop interview questions, resulting in 25 indicators for human capital, four indicators for social capital, two for financial capital, eight for physical capital, and five for natural capital (Fig. 3).

3.3. Fisher-level analysis

We interviewed 127 of the 169 certified fishers from the nine fishing

groups between February and April 2022, using a semi-structured questionnaire. The survey aimed to, first assess the importance of the different capitals for fishers' livelihood, and second review the availability of these capitals. We developed a questionnaire based on the operationalization of the bundle of capitals from the document analysis (Fig. 3). We followed Lax & Krug [63], who argue that an ordinal scale with three levels is suitable for inexperienced participants in rural communities. Thus, the question items were presented in ordinal scales ranging from 1=not; 2=medium; 3=very. The ranking order is part of the capability approach-evaluative process, which allows for comparability [64]. The capitals were weighed equally since we assume that all capitals are equally important for fishers to develop the capabilities for standard compliance [65]. The parametric t-test was used to compare the importance and the availability of capitals using EViews. The null hypothesis to be tested is that the difference in the mean score of the importance and the availability of the capitals is zero.

The interview included questions on the fishers' general characteristics, the importance and availability of the prescribed capitals, and other alternative capitals that the fishers used. In addition, we tried to identify fishers' motivations behind their choices and their motivation for joining Fair Trade USA certification. Through interviews with fishers, we identified the actual bundle of capitals and confirmed the initial identification from the document analysis. We then calculated the proportional distribution of the importance and availability of the prescribed capitals based on the fishers' responses. The higher the score, the more fishers perceive the importance of the availability of the capitals for their livelihood. The composite scores of each criterion ranges between 25 (25 times a minimum score of one for human capital) and 75

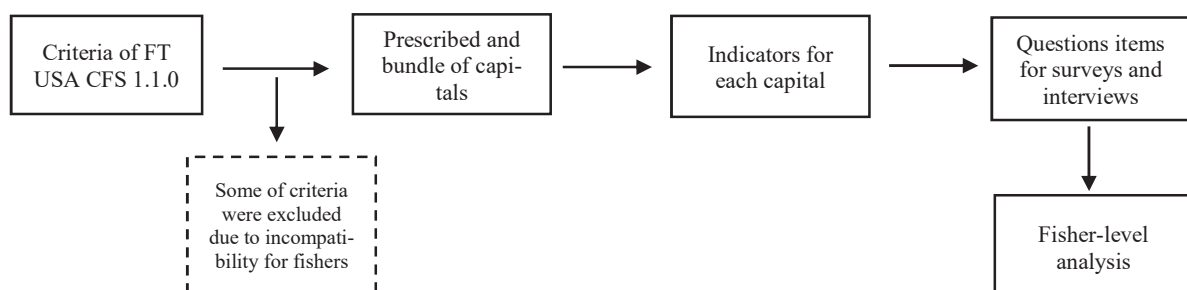


Fig. 3. The flow of data analysis.

(25 times a maximum score of three for human capital) or between 4 (four times a minimum score of one for social capital) and 12 (4 times a maximum score of three for social capital). We calculated the proportional distribution of the composite scores, and the results are presented in a two-dimensional spider gram. The closer to 1.0, the more significant the capitals are in fishers' livelihood and the more available the capital.

For both the prescribed and the bundle of capitals, we calculated the proportional distribution of the capitals across all criteria. The closer the distribution value to 1.00 shows that the more fishers' compliance depends on one type of capital. We calculated the standard deviations to show whether the proportional distribution values are close to the mean values of 0.20. The lower standard deviations indicate that fishers have more equally distributed capitals than relying only on the capitals prescribed by the certification standard [26]. Finally, we used an institutional context of fishers' level analysis to analyse institutions that are expected to be involved in the prescribed and bundle of capitals. Qualitative data analysis applying Atlas.ti 9 and relative frequencies (%) were used to compare the code distributions of institutions across the certification standard.

4. Results

4.1. The result of document analysis of Fair Trade USA CFS

Based on the Fair Trade USA CFS document analysis, human capital is the most dominant capital prescribed by the standard across all five capitals (a proportional distribution value of 0.74). It is followed by financial capital (0.09), social capital (0.06), physical capital (0.06), and natural capital (0.06). This indicates that human capital is the key focus of the certification. A higher value close to 1.00 implies that fishers have limited freedom to utilize other capitals to fulfil the standard's requirements. Based on the bundle of capitals, the distribution of all the capitals remains the same. Human capital remains the most critical aspect, with a proportional distribution value of 0.52. However, all the capitals have experienced a drop in their proportional distribution values, with social and financial capitals getting closer to the normalized capitals (Fig. 4).

4.2. The characteristics of certified fishers and group membership

The 127 interviewed fishers were members of five fisher groups from Buru (established in 2014), and four fisher groups from Seram (established in 2015) (See Table 1). Their primary source of livelihood was

fishing, mainly on yellowfin and skipjack tuna. Other catches included bigeye tuna, small tuna, mackerel, marlin, lamadang, and other small-sized fish categorized as by-catch. Two kinds of fishing vessels were used: fibre vessels with a gross tonnage of 1–1.5 GT (91.4 %) and wooden vessels (locally referred to as 'ketinting') with 6.5 PK engines (8.6 %). Almost all fishers owned their vessels (92.9 %). The others used vessels from their families, the processing company, middlemen, or other people from the village. Fishers usually carried out fishing activities within 12 miles from the coastline, with an average duration of 12 hours/fishing trip.

The average duration of fisher group membership was five years, and the average age was 40.7. Of all fishers, 37.8 % had high school education, 30.7 % junior high school education, 29.1 % primary education, 1.6 % a university education, and 0.8 % was without formal education. Most fishers came from families where fishing knowledge was passed on from generation to generation. The average family had five members, and dependents were not only direct family members but also siblings, parents, or in-laws. The average fishing experience was 16 years, including their time working as helpers before they had their own vessel. The Buru and Seram committees received the same intervention from the implementing partner. Therefore, we used both as a single case study, and no further distinction was made in this study.

4.3. The importance and the availability of prescribed capitals for fishers

Fishers perceived all prescribed capitals as almost equally important (all proportional distribution values above 0.90) (Fig. 5). Still, financial capital was considered as the most important (0.98), followed by physical capital (0.95), social capital (0.94), natural capital (0.94), and human capital (0.90). However, regarding their availability, fishers' perceptions varied per capital. In general, fishers perceived capitals' availability lower than their perception of the capitals' importance. Social capital was the most available capital (0.88), followed by natural capital (0.80) and human capital (0.79). In contrast, physical and financial capital were considered least available (0.53 and 0.69, respectively).

In the cases of human, financial, physical, and natural capitals, the mean score of the importance and the availability of capitals differed significantly ($p < 0.01$). This shows a gap between the fishers' perception of the capital importance and the availability of the capital as prescribed by the standard (Table 2). However, there was no significant difference between the importance and availability of social capital ($p = 0.13$), hence fishers perceived social capital not only as highly important but also as highly available.

Most fishers revealed that they joined certification because of social networks and trust in the group members or leaders (42.5 %). Others affirmed that the extension programs from MDPI significantly influenced their interest in joining the group (29.1 %). The way fishers communicated their needs was through pre-premium plan meetings. During these meetings, the fishers determined how they would allocate and spend the premium funds. Given the close networks between members of the fishing groups, it was only natural for them to communicate their needs collectively and help each other when somebody faced difficulties. For instance, when someone needed assistance repairing vessels, required a financial contribution, or when someone was grieving after illness or death. Their networks with middlemen also enabled them to access vessels, fuels, fishing gear, cash, and food (e.g., rice).

4.4. A gap between the standard's prescribed capitals and fishers' bundle of capitals

Fig. 6 shows the overall distribution of the prescribed and bundle of capitals. The bundle of capitals has a more normalized distribution value than the prescribed capitals, as the values are clustered around the centre. The more normalized graph shows the changes in the importance

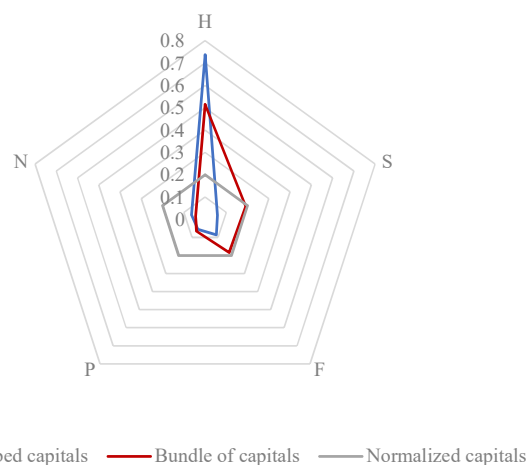


Fig. 4. Distribution of prescribed and bundle of capitals based on the document analysis, H= Human capital; S= Social capital; F= Financial capital; P= Physical capital, and N= Natural capital, The number represents the proportional distribution values ranging from 0 to 1.

Table 1
Characteristics of respondents based on different committees and groups.

Committees	Groups	N	Length of participation in groups (years)	Age (years)	Education (years)	Family size (number of people)	Fishing experiences (years)	Vessel ownership (number of people)
Buru	Wamrugut Teguh Bersatu	17	3.9	42.6	8.6	4.6	17.0	Yes (14) No (3)
	Leisela Indah	8	5.0	39.3	10.4	5.0	12.1	Yes (7) No (1)
	Setia Selalu	11	4.3	44.0	9.9	4.3	20.9	Yes (11) No (0)
	Waeplabung	5	6.2	48.8	9.6	5.6	19.6	Yes (5) No (0)
	Latamiha	14	4.0	34.1	8.8	4.5	13.2	Yes (11) No (3)
Subtotal		55						
Seram	Tuna Yapana	13	4.9	39.9	8.5	4.7	16.0	Yes (12) No (1)
	Tunas Beringin	27	4.7	38.1	9.4	4.6	13.4	Yes (27) No (0)
	Teluk Ampera	10	4.4	44.4	9.5	6.9	19.0	Yes (9) No (1)
	Darah Tuna Haruo Abadi	22	5.0	42.5	9.7	4.8	17.2	Yes (22) No (0)
Subtotal		72						
All respondents		127	4.6	40.7	9.3	4.9	16.0	Yes (118) No (9)

N=Number of fishers

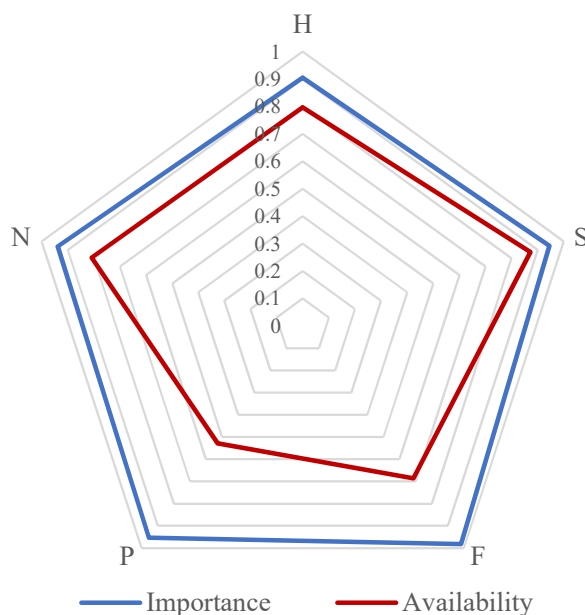


Fig. 5. The fishers' perception of the importance and the availability of prescribed capitals.

Table 2,
Independent sample t-test to test the difference between the importance and availability of capitals.

Capitals	t	df	p-values	Mean differences
Human	20.899	252	***	8.252
Social	1.532	252	0.13 (ns)	0.264
Financial	24.721	252	***	1.779
Physical	130.090	252	***	10.788
Natural	-18.664	254	***	2.008

*** Significant at the 0.001 level

of the capitals compared to the prescribed capitals. We observed that all the capitals are grouped together around the central peak which support our assumption that fishers develop their capabilities for standard

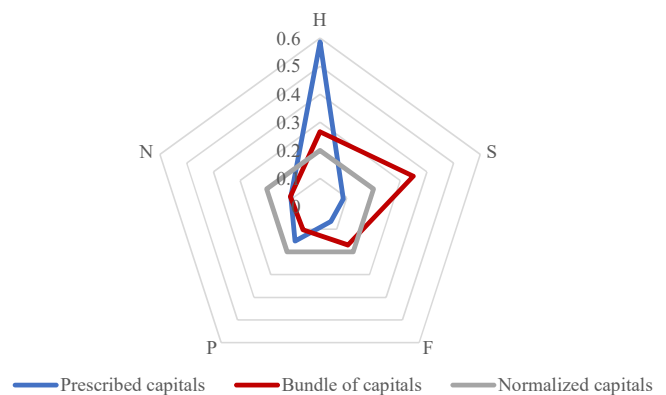


Fig. 6. Prescribed and bundle of capitals.

compliance by relying on all capitals, instead of just relying on the prescribed ones. This finding aligns with the main idea of the capability approach, which suggests that it is not the selection of a capability set that is important, but rather whether or not the fisher has access to a bundle of capitals that allows them to develop the necessary capabilities.

According to the standard, fishers are expected to rely mainly on their human capital to ensure their compliance. This means that their knowledge and skills are deemed crucial for making the right choices when it comes to the certification. However, in practice, fishers use social capital as the most important capital to comply with all criteria (proportional distribution value of 0.35). The significant reduction in the proportional distribution value of prescribed human capital parallels the increasing values of the other capitals in the bundle of capitals and in particular the dominance of social capital.

Fig. 7 shows the changes in the proportional distribution values relative to each prescribed capital. The blue line indicates what the fishers do when they only use prescribed capital to comply with the certification standard (the proportional distribution value is 1.00). The red line indicates the proportional distribution values of the bundle of capitals that fishers actually used to comply with the certification standard (between 0.00 and 1.00). Overall, the figure shows that there are reduced proportional distribution values of the bundle of capitals for all capitals relative to the prescribed capitals. This indicates that instead

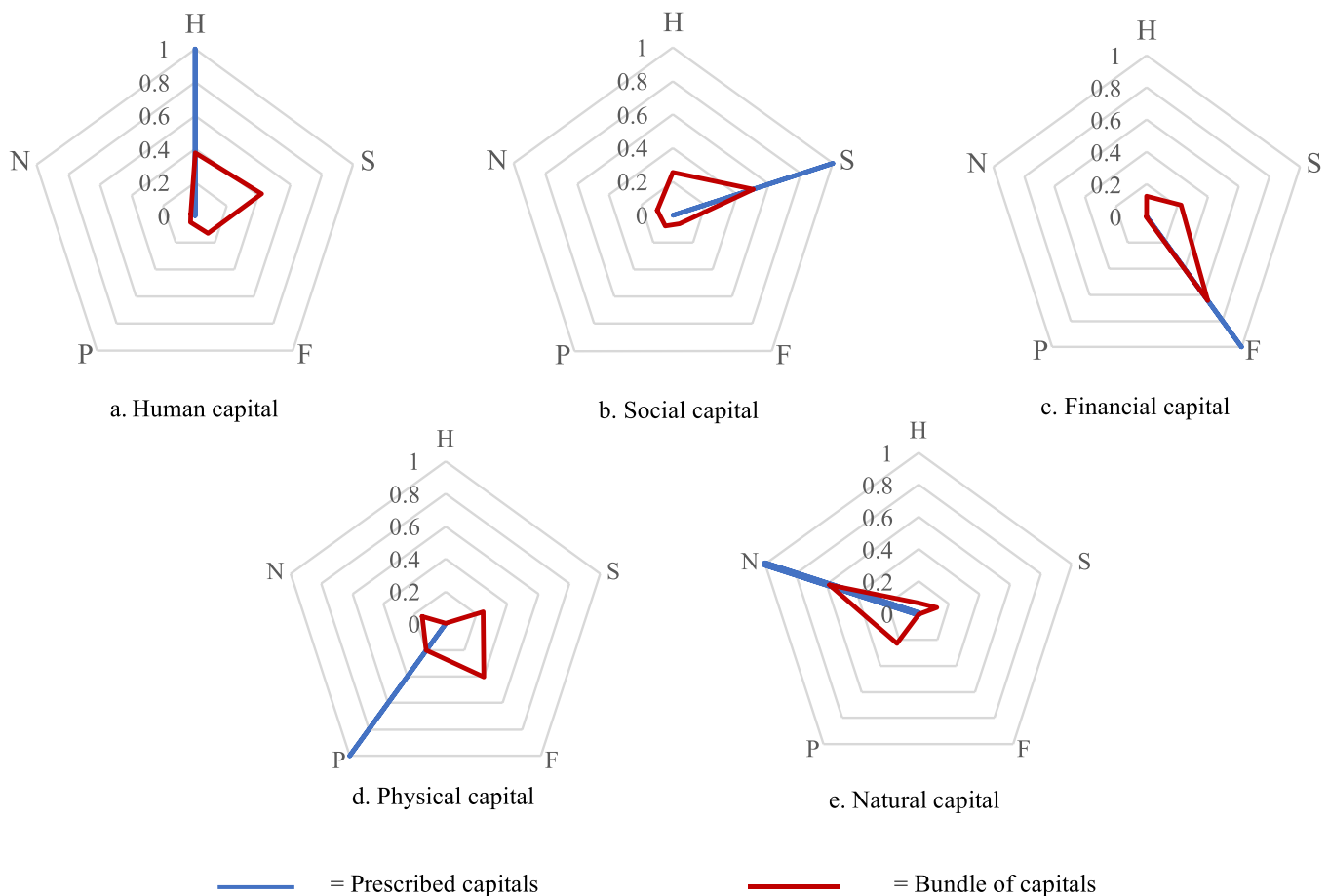


Fig. 7. Alternative of prescribed capitals.

of adhering to the prescribed capital, fishers used different capitals to comply with each criterion of the certification standard.

The proportional distribution of human capital reduces from 1.00 to 0.38. Fishers used a combination of human, social, financial, physical, and natural capital to comply with human capital criteria. Conversely, there is an increasing proportional distribution value of social capital from 0.00 to 0.42, which makes social capital the dominant capital used by the fishers to comply with requirements for which the standard prescribes human capital. Despite the reduced proportional distribution value, improving fishers' ability through human capital (receiving, processing, reflecting on, and applying information) remains essential. Fishers attended the training and group meetings to receive knowledge from the NGO. However, they also shared knowledge as an additional and/or an alternative strategy. All fishers reported that they had local knowledge, shared inter-generationally, on how to read the direction of the wind or waves as an addition to safety training.

The proportional distribution value of social capital reduces from 1.00 to 0.50. Although social capital is the most important capital for the fishers, they also depend on human, financial, physical, and natural capital. Besides social networks and trust, fishers joined fishing groups because of the extension programs from MDPI (human capital). They also allocated a percentage of the premium funds as impromptu funds, which could be used anytime by any member who needs urgent financial support (financial capital). The social capital allowed the fishers to communicate fishery management strategies, mitigation efforts, stock status, harvest practices, and distribution; they also received fishing lines, hooks, and fishing equipment purchased from the premium funds (physical capital). The communication strategy also depends on natural capital. For instance, fishers revealed that over the last few years, the appearance of False killer whales (*Pseudorca crossidens*) in the ocean

had become more frequent. The fish ate big fish, including yellowfin tunas, which affected its availability.

The proportional distribution value of financial capital reduces from 1.00 to 0.64. Fishers depended highly on prefinancing and premium funds, but their social networks made it possible to get prefinancing from middlemen instead of from the certification scheme (social capital). Several groups, such as Latamiha, Tuna Yapana, and Darah Tuna Haruo, have formed cooperatives that provide savings and loans. To make the system work, the groups have created sanctions for group members who did not repay loans (human capital), such a defaulting fisher was expelled from the group. Another strategy, as one of the fishers said, was using a *ketingting* vessel, which usually needs less fuel, so he would not need prefinancing (physical capital).

The proportional distribution value of physical capital decreases from 1.00 to 0.20, while the financial capital experiences an increasing proportional distribution value from 0.00 to 0.40. The way fishers used the premium funds to provide physical capital has created mutual interactions among physical, financial, and social capitals. It is further supported by an increase in social capital proportional distribution value from 0.00 to 0.24, meaning that the availability of physical capital depends not only on the premium funds but also on how groups allocate these. In addition to the financial and social capital, fishers also depend on natural and human capital with lower proportional values (0.15 and 0.01, respectively).

The proportional distribution value of natural capital reduces from 1.00 to 0.58. Fishers used natural capital to comply with the requirements for which the standard prescribes natural capital, but did so in combination with other capitals. For instance, most fishers admitted that they depended highly on anchored fish aggregating devices (FADs) to catch primary and secondary species (a combination of natural and

physical capital). Fishing with FADs was more efficient in terms of fuel spent, reduces fishing time and effort, while 38.6 % of the fishers argued that FADs increased their catch. Another example is that all fishers said they released turtles when they accidentally hit the fishing gear or the vessel bodies. They received knowledge about endangered, threatened, and protected species primarily from MDPI (a combination of natural and human capital). However, some fishers believed that no shark should be killed because they were incarnations of their former ancestors who were once saved by sharks when they had accidents at sea (social capital). One of the fishing groups, Setia Selalu, once created training programs on turtle conservation. The program aimed to allocate a percentage of its premium fund to provide turtle egg shelters (a combination of natural and financial capital). These strategies prove that while the other four capitals can substitute the prescribed capital, this is not the case for natural capital. The lower proportional distribution is due to additional contributions from other capitals. However, the number of criteria fishers use in the prescribed and bundle of natural capital is the same, meaning that a bundle of capitals is only feasible when fishers have natural capital [64].

Table 3 shows the distribution of the capitals and Standard Deviation (SD) values. A low SD value points out that the capitals are more equally distributed, offering a higher degree of freedom to fishers when complying with the certification standard. The SD value of all the prescribed capitals is 0.45 when the fishers use only the prescribed capital to comply with the certification standard. When we go through the bundle of human capital, the SD value decreases from 0.45 to 0.19. The same direction applies to the bundle of social capital (SD of 0.19), the bundle of financial capital (SD of 0.27), the bundle of physical capital (SD of 0.14), and the bundle of natural capital (SD of 0.23). The lower SD values show that all bundles of capitals are more equally distributed than the prescribed capitals. When comparing different bundles of capitals, the bundle of physical capital has the lowest SD of 0.14, indicating that fishers have a higher degree of freedom to use the other capitals to meet requirements for which the standard prescribes physical capital.

4.5. Institutional contexts of fishers' level analysis

The expansion of capitals, assets, and capabilities in fishers' compliance cannot be separated from the involvement of institutions directly or indirectly engaging with standard's requirements. In the standard's text we identified six stakeholders required to participate in the standard's implementation: certificate holders, buyers, fisher groups, Fair Trade USA committees, fishers, and natural resources.

Five institutions are expected to participate in the implementation of

Table 3
Relative differences between prescribed and bundle of capitals.

Capitals	H	S	F	P	N	Standard Deviation
H Prescribed	1.00	0.00	0.00	0.00	0.00	0.45
H Bundle	0.38	0.42	0.13	0.05	0.03	0.19
H Difference	-0.62	0.42	0.13	0.05	0.03	
S Prescribed	0.00	1.00	0.00	0.00	0.00	0.45
S Bundle	0.26	0.50	0.06	0.08	0.10	0.19
S Difference	0.26	-0.50	0.06	0.08	0.10	
F Prescribed	0.00	0.00	1.00	0.00	0.00	0.45
F Bundle	0.13	0.23	0.64	0.00	0.00	0.27
F Difference	0.13	0.23	-0.36	0.00	0.00	
P Prescribed	0.00	0.00	0.00	1.00	0.00	0.45
P Bundle	0.01	0.24	0.40	0.20	0.15	0.14
P Difference	0.01	0.24	0.40	-0.80	0.15	
N Prescribed	0.00	0.00	0.00	0.00	1.00	0.45
N Bundle	0.07	0.12	0.00	0.23	0.58	0.23
N Difference	0.07	0.12	0.00	0.23	-0.42	

Note: H= Human capital; S= Social capital; F= Financial capital; P= Physical capital, and N= Natural capital

the prescribed human capital, including the fisher groups, certificate holders, fishers, Fair Trade USA committees, and buyers (relative frequencies of 40.3 %, 34.0 %, 9.2 %, 9.1 %, and 7.4 %, respectively). A higher participation was expected from the fisher groups (relative frequency of 40.3 %). Please note that all capitals and certification programs require fishers' participation, but here, fishers' participation means an individual contribution to the program.

The main institutions for the prescribed social capital were fisher groups, certificate holders, Fair Trade USA committees, and fishers (relative frequencies of 33.3 %, 33.3 %, 22.2 %, and 11.1 %, respectively). For the prescribed financial capital, participation from the same institution was expected, but with different relative frequencies. The certificate holders were expected to have the highest participation (relative frequency of 40 %), followed by fisher groups (relative frequency of 20 %), Fair Trade USA committees (relative frequency of 20 %), and fishers (relative frequency of 20 %). The only institution expected to participate in the prescribed physical capital was the certificate holder (relative frequency of 100 %). For the prescribed natural capital, natural capital was the only institution included because capture fisheries depend greatly on available marine resources (Fig. 8).

Unlike the institutions expected to be involved in the implementation of the certification standard, according to the fishers, the main institution involved in the bundle of human capital was the fisher groups, but with a relatively low frequency (39.4 %) compared to the relative frequency in the prescribed capital (40.3 %). MDPI has played a crucial role in implementing all certification programs in the field (13.2 %), which explains a relatively low frequency for the certificate holders in the bundle of human capital (7.7 %). The participation of middlemen was unexpected in the prescribed human capital, but they played an essential role, especially in the trade agreement between fishers and middlemen (7.7 %). Social norms played a role in how fishers and village communities handled waste from fishing and other daily activities (6.8 %) (Fig. 9).

For the bundle of social capital, fisher groups have played essential roles with a higher relative frequency of 39.5 % compared to the frequencies in the prescribed social capital (relative frequency of 33.3 %), followed by MDPI (relative frequency of 26.0 %). Social norms have influenced how fishers communicate about their individual or group needs and fishery management strategies (relative frequency of 10.8 %). The Fair Trade USA middlemen had a relative frequency of 7.1 % as trade agreements and their ownership of fish aggregating devices have influenced the decision by many fishers to join the groups. Although economically beneficial, the link to a middleman also constrained fishers to supply their catch to other middlemen when prices were unfavourable.

For the bundle of financial capital, certificate holders, Fair Trade USA committees, fisher groups, and fishers have all been crucial in providing financial capital, especially the premium fund (relative frequencies of 21.0 %, 21.0 %, 27.6 %, and 21.0 %, respectively). The highest contribution came from the fisher groups. In addition, FT USA middlemen were important institutions in providing prefinancing for fishers (relative frequency of 7.8 %).

For the bundle of physical capital, fisher groups have collectively facilitated the provision of the capital (relative frequency of 34.8 %). This high relative frequency was due to the provision of assets that depends on the amount of catch the fishers supply, the premium fund, and the collective decisions in allocating the fund. Fishers contributed by supplying their catch to the processing company, PT. Harta Samudra, providing household sanitary facilities or repairing vessels due to the absence of other support (relative frequency of 22.2 %). The results also show that the certificate holders have lower relative contributions (17.4 %) compared to the expected contributions from the prescribed physical capital. Their main contribution was in paying the premium fund.

For the bundle of natural capital, natural resources remained the most critical asset (55.1 %). Nevertheless, contributions from other

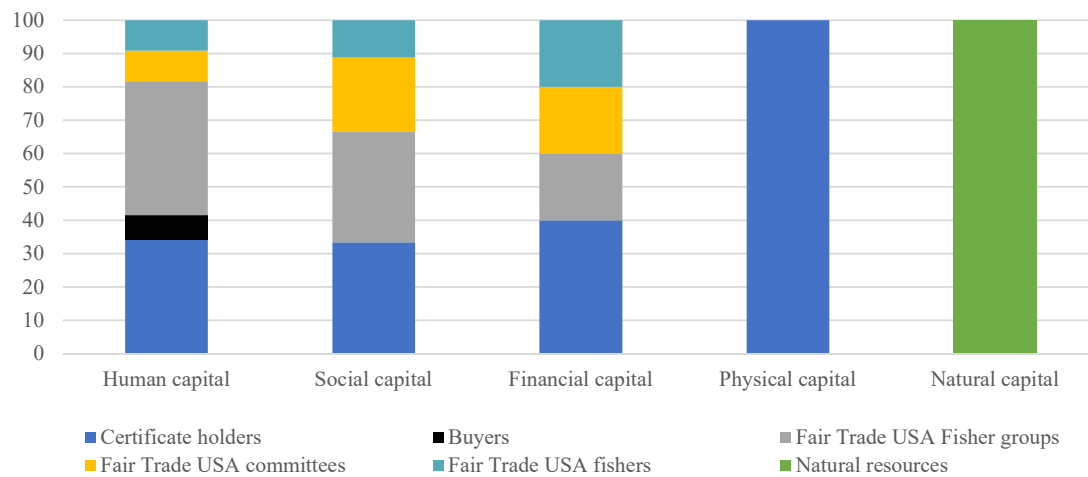


Fig. 8. Prescribed key institutions across the capitals.

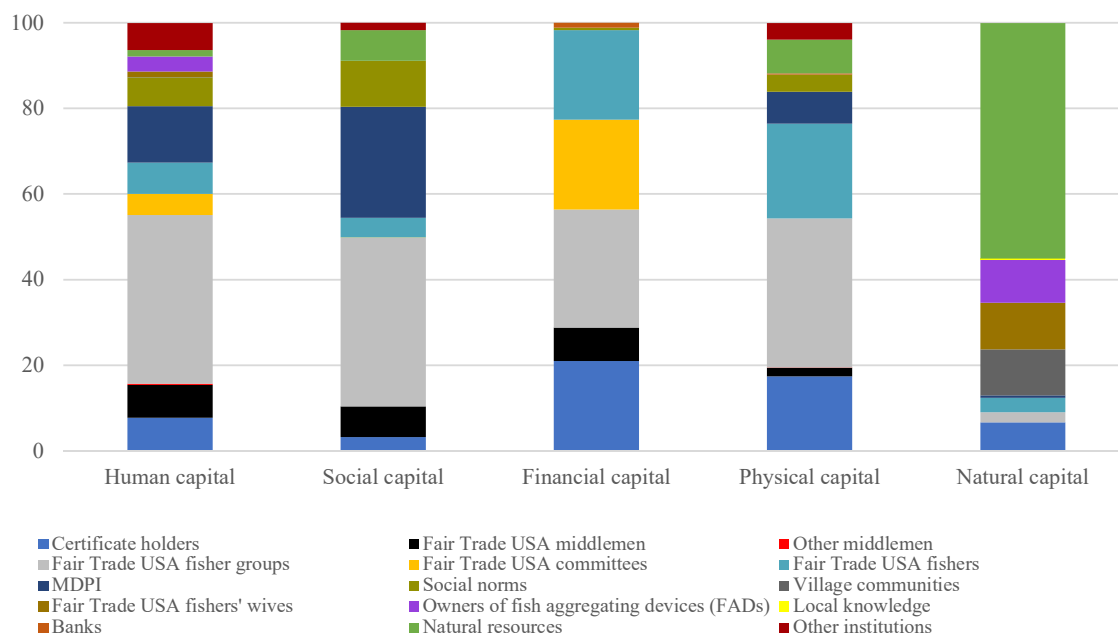


Fig. 9. Various institutions involved in the bundle of capitals.

actors also played important parts in promoting the availability of natural resources, such as village communities (10.8 %), fisher wives (10.8 %), and FAD owners (10.1 %). Village communities and fisher wives collected leftover fish for consumption, including head, skin, or bones, and FAD owners provide FADs that fishers could use in their fishing activities.

5. Discussion

Our study shows the experiences and perspectives of certified small-scale fishers in complying with the Fair Trade USA CFS. Regarding importance and availability, fishers perceived financial capital as the most essential capital for their livelihood. In contrast, as with Fair Trade USA certification for terrestrial-based commodities, social capital is the most beneficial capital they experienced during certification [66,67]. Regarding fisheries management, this study also shows the success of community-based or co-management approaches carried out by the certification scheme in collaboration with fishing groups. However, it is important to note that the fishers already had significant social capital

before the certification was implemented. This social capital helped the participants to comply with the certification [68]. This affirms that besides market incentives, smallholders' certification is usually successful when the participants have a considerable amount of positive social conditions even before the start of the certification program [66]. The group certification scheme provided opportunities for smallholders to access the certification schemes [51,69–71]. Group certification may reduce operational costs, lower diversity by supporting fishers to participate in small groups, and support collective actions [26,72]. However, despite these benefits, as with other sectors [73], improvement can be hindered when there is large diversity in groups while only limited individual freedom is allowed in the group strategies.

Previous studies have discussed how voluntary sustainability certification schemes have focused on capital-intensive interventions to persuade smallholders to participate [28–34]. Standardized criteria are used as checklists for achieving the voluntary sustainability certification goals, which gives the impression that sustainability is an absolute term [9]. In this study, we found that instead of using prescribed capitals as the necessary capitals to comply with the certification standard, fishers

use many strategies, combining or substituting capitals to comply with each criterion, thereby expanding the fishers' degree of freedom.

In contrast to the study by Samerwong et al. [27], who assumed that a bundle of capitals consisted of prescribed capital and additional alternative capitals, we found that when the prescribed capitals were not available, fishers relied on a bundle of capitals of only alternative capitals. For instance, when the standard prescribed financial capital to come from the certificate holder or the buyer, a social relationship with the middlemen proved to be the only alternative strategy fishers could use to pre-finance their fishing activities. In this case, social capital became the fishers' only alternative capital.

Furthermore, the bundle of capitals consists of capitals that have mutual interactions. For instance, the fishers received premium funds that they used to provide facilities or infrastructures such as landing sites, sanitary facilities, and areas for garbage or waste disposal. However, the decision how to spend the premium fund depends on the groups' agreements and this creates interactions among financial, physical, and social capitals [59].

Attempting to expand fishers' degrees of freedom to comply with sustainability criteria implies that a more diverse set of capitals will allow fishers to develop the required capabilities to achieve the functionings [40]. This also implies that based on the implementation, the certification standard has provided sufficient leeway for fishers to comply with the standard according to their capabilities and institutional settings. On the other hand, acknowledging the possibility of varying strategies by the fishers through the bundle of capitals also means that the sustainability standard has a limitation to accommodate the complex reality in local settings [74]. While our study used the specific case of capture fisheries standards, similar results may be obtained in other voluntary sustainability certifications as comparable dynamics may be expected to be at play [75].

Our findings furthermore prove that fishers use social capital as their main capital to comply with the different criteria of a sustainability standard. Social capital is a source of improved capabilities by creating opportunities for smallholders to access other capitals, engage with different institutions, and enhance their social networks [66,76]. Currently, Fair Trade is the only voluntary certification that requires group certification [77]. Consequently, fishers can only individually experience Fair Trade USA CFS and have other capitals in their bundle of capitals if they are involved in collective action through the fisher groups. Hence, social capital is not only a source of fishers' capability but also the primary source for improving other capabilities.

Fair Trade USA CFS includes economic, social, and environmental criteria for all commodities covered, but evidence of direct environmental impact is scarce [78–80]. In this study, we found a change in fishers' attitudes toward the environment due to the certification program. For instance, their attitudes towards the endangered, threatened, and protected species changed. Certification also encouraged fishers to fill out logbooks to support a private monitoring program as part of the certification scheme [81,82]. Since 2020, nine Fair Trade USA fishing groups within the Buru committee have also been certified by the global environmental seafood standard Marine Stewardship Council (MSC), making them double certified. It may therefore be assumed that the Fair Trade USA CFS has created opportunities for this.

The direct impact of Fair Trade USA CFS on natural resources could not be observed [83]. However, for small-scale fisheries, marine resources are a communal asset that leads to the realisation that, despite fishers' small catch, their household and community livelihoods are highly dependent on these resources. The availability of primary, secondary, endangered, threatened, and protected species, bycatch species, ecosystems, and habitats are all communal assets that will affect small-scale fishers' livelihoods. Minimum levels of natural capital must remain to make production and consumption possible [84]. This means that any marine fisheries management arrangement requires small-scale fishers' participation and that any evaluation assessment should involve their perceptions and carefully consider the impacts on their livelihood.

This underpins the entanglement between environment and socio-economic issues in fisheries management [19,85]. Moreover, the alternative capitals fishers use besides natural capital indicate that the availability of natural capital is intertwined with other capitals, such as financial and physical capitals available for further investments.

Many institutions are relevant for fishers' capabilities [86], so promoting sustainable certification schemes is only possible when they are all involved in the process [9,87,88]. This has two consequences; first, fishery certification schemes should support collaboration and design a co-management plan [22,89,90]. Second, acknowledging many actors also implies acknowledging different interests, needs, and complexities along the value chain, further validating our argument that flexibility is needed in translating the standard to local conditions. Local actors, local knowledge and social norms are part of existing social structures and networks. This means that standards need to continuously reflect on the content, involve the relevant actors, and maintain continuous dialogue to refine the criteria to fit the local context.

6. Conclusion

This study used the capability approach to explore the extent to which the capabilities of small-scale tuna fishers develop under the certification scheme. The approach emphasizes the importance of fishers' freedom to improve their compliance and maintain their participation. Based on its implementation at the fishers' level, Fair Trade USA CFS has improved fishers' capabilities to comply with its standard through the bundle of capitals. Social capital is the main capital fishers used and becomes the primary source for improving fishers' capabilities. By using the bundle of capitals, fishers can exercise their freedom to combine the different capitals according to their capabilities and institutional setting. By continuously doing so, we argue that fishers' participation can be enhanced, the chances for other fishers to be certified increased, as well as the effectiveness of the certification as a governance mechanism to improve social and environmental sustainability. By focusing on fishers' capabilities, certification schemes can also communicate broader impacts of the certification other than only the impacts that are prescribed in the certification standard.

Expansion of fishers' freedom and flexibility is impossible without the involvement of many institutions, so investigating and emphasizing capabilities will reveal critical conditions for the success of a certification scheme. Participation requires communication and negotiation between the certification schemes and other relevant institutions, including value chain actors. Since this study took the fishers' perspectives, further research is needed to explore the dynamics of fishers' collective action and its outcomes.

Research Ethics

We confirm that any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies.

CRediT authorship contribution statement

Peter Oosterveer: Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Puspi Eko Wiranthi:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Hilde M. Toonen:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Conflict of Interest

The authors declare no conflict of interest.

Data availability

The authors do not have permission to share data.

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