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## Title

Community-based fisheries organisations and sustainable development: Lessons learned from a comparison between European and Asian countries.

## Author names and affiliations

*Iria García-Lorenzo<sup>1</sup>, Dewan Ahsan<sup>2</sup> and Manuel Varela-Lafuente<sup>3</sup>*

<sup>1</sup> Corresponding author. Department of Applied Economics, ERENEA, ECOBAS, University of Vigo, Spain.

Address: Department of Applied Economics, Faculty of Economics, Campus As Lagoas-Marcosende, University of Vigo, 36310 Vigo, Spain. E-mail: [iriagarcia@uvigo.es](mailto:iriagarcia@uvigo.es)

<sup>2</sup> Associate Professor, Department of Sociology, Environmental and Business Economics and Co-head, Danish Center for Risk and Safety Management, University of Southern Denmark, Denmark.

Address: University of Southern Denmark, Esbjerg 6700, Denmark. E-mail: [dah@sam.sdu.dk](mailto:dah@sam.sdu.dk)

<sup>3</sup> Department of Applied Economics, ERENEA, ECOBAS, University of Vigo, Spain.

Address: Department of Applied Economics, Faculty of Economics, Campus As Lagoas-Marcosende, University of Vigo, 36310 Vigo, Spain. E-mail: [mmvarela@uvigo.es](mailto:mmvarela@uvigo.es)

## Highlights

- CBFOs contribute to sustainable development
- CBFOs occupy an important position within the SSF co-management system
- CBFOs are influenced by the type of resources and the governance conditions
- The importance of CBFOs' internal structure and their capacities can be observed
- Strengthening of CBFOs can help to reinforce the advantages associated with the SSF

## Abstract

Small-scale fisheries (SSF) provide livelihoods for millions of people, contribute to global food security and economic development, and are considered a less aggressive type of fishing activity. Therefore, SSF can significantly contribute to sustainable development, particularly in areas related to the sea and marine resources. However, the characteristics of the local communities involved in SSF, and their organisational and managerial capacities, can significantly affect the effectiveness and sustainability of the activity.

From this perspective, this paper discusses different aspects of the contribution of *community-based fisheries organisations (CBFOs)* to sustainable development in SSF. To do this, a comparative analysis was carried out for several European, Southeast Asian and South Asian countries, in contexts with institutional, historical and environmental diversity. The cases studied are Spain, Portugal, Cambodia, Vietnam and Bangladesh. The analysis was based on the approaches from the New Institutional Economics and the Social and Solidarity Economy (specifically on compliance with the cooperative principles).

## Keywords

Small-scale fisheries, fisheries organisations, co-management, governance, cooperative principles

# **Community-based fisheries organisations and sustainable development: Lessons learned from a comparison between European and Asian countries.**

## **1. Introduction**

Global fish production reached about 179 million tons in 2018, with capture fisheries contributing 54% of the total catch (47.3% in marine waters and 6.7% in inland waters) and aquaculture representing 46% (17.3% marine; 28.7% inland) [1]. These current figures are the result of various trends in the last few decades, among which the constant increase in aquaculture and inland waters production stands out, as does the increase in production in Asia and particularly in China. In parallel, production from capture fisheries in marine waters has stabilised, especially due to trends in European and American countries (owing to their long fishing traditions and trajectories of intensive exploitation of marine resources) and more recently in China and other Asian countries. About 59.5 million people around the world are directly or indirectly involved in the fisheries sector, with 50.5 million (85%) working in Asia [1].

Small-scale fisheries (SSF) contribute about half of the global fish production, a share that goes up to two-thirds when considering catches destined for direct human consumption. About 90% of people who are directly dependent on capture fisheries are in the SSF sector, mostly in developing countries, and they usually are rooted in local communities [1,2]. Furthermore, SSF positions and characteristics have encouraged the study of their possible contribution to sustainable development [3].

In this sense, SSF provide livelihoods for millions of people and contribute to global food security [1], playing an important role in the eradication of hunger, malnutrition and poverty. Furthermore, SSF are considered less aggressive to the environment and ecosystems compared to other types of fisheries [2]. SSF also make significant contributions to the national and regional economy in terms of income and employment, and they are an activity in which many women participate [1,4]. However, fishers and traders from SSF still have very limited ability or opportunity to take part in any decision-making processes, as they are still marginalised in many countries and are not included in the fisheries governance system [5]. Hence, the contribution of SSF in achieving global sustainable development should not be overlooked as they play pivotal roles in the three basic pillars of sustainable development: social, economic and environmental development.

Considering SSF's potential contribution to global sustainable development goals, the opportunities and challenges they present have become relevant areas of study. Nevertheless, the study of SSF is conditioned by the high degree of diversity and complexity derived from the characteristics of the fisheries resources, the rules applied and the multiplicity of actors involved. In addition, SSF have different problems and characteristics depending on the region and the period, mainly due to historical and environmental factors, which makes it difficult to find unique solutions [6,7]. Due to these factors, regional studies of SSF are being conducted throughout the world [7-10].

This complexity in SSF requires an understanding of the multiple interrelationships between social and environmental aspects, as well as their impact on the results of fishing activities and their sustainability. Given the diversity of existing SSF and the factors involved, interdisciplinary initiatives appear to be necessary for the development of analysis frameworks. New approaches such as "interactive governance" have been proposed, allowing the recognition of different fields, levels of application and governance modes [7,11]. Similarly, SSF analysis can benefit from more specialised theoretical approaches and specific case studies, which can be integrated into a broader perspective [6].

In this context, this paper aims specifically to advance the analysis of those fisheries organisations that are formed and managed by local communities. These local communities involved in SSF are organised in very different ways, with their own specificities in each region. Thus, there is a great diversity of what could be broadly called *community-based fisheries organisations (CBFOs)*, including producer organisations, cooperatives, associations and traditional organisations, among others [4,9,12-16]. This paper also studies how these CBFOs contribute to the sustainable development of SSF, given their characteristics and positions.

From this perspective, the analysis was oriented to the CBFOs, proposing a comparative study of these organisations in five countries: Spain, Portugal, Cambodia, Vietnam and Bangladesh. The study focuses in particular on some aspects of the associated socioecological systems (including resources, management and organisations' internal structure) and considers the integration in co-governance systems (or hybrid systems).

This paper is structured into five sections. Following this introduction, the second section presents the theoretical framework and methodological approaches applied in this research. In the third section, CBFOs from five countries are presented, focusing on their internal structures, dynamics and positions within their respective fisheries management systems. A detailed discussion on the contributions of CBFOs to sustainable development is covered in the fourth section. The final section is devoted to the drawing of general lessons learned and conclusions.

## **2. Theoretical framework and methodological aspects**

To integrate complexity and facilitate theoretical and methodological approaches related to natural resources management and progress towards interdisciplinary researches, general "analysis frameworks" have been developed. These frameworks represent advancement in establishing common terminology on the key variables, the relevant actors and the levels of analysis. Once these frameworks and common terminology have been established, theories or analytical models can focus on more specific aspects and levels [6].

In the specific case addressed in this study, governance is not simply the definition and dynamics imposed by a Public Administration but depends on the several variables of the system. The interactive governance approach differentiates three ideal modes: hierarchical governance (top down and usually conducted from the government); co-governance (partnership between government, civil society, and industry stakeholders); and self-governance (conducted by stakeholders themselves at a community or group level, without interference from an external authority) [7,11,17]. These governance modes usually occur in hybrid forms that evolve over time as adaptations of changing political, economic or ecological circumstances [17].

SSF organisations can hold especially prominent positions in the co-governance and self-governance modes [17] as well as in their hybrid forms. In this context, their study can focus on a diversity of variables, such as horizontal cooperation between groups, the establishment of regimes and public-private participations, the conditions that facilitate self-organisation in resource management and effective cooperatives solutions. To address complexity, analysis frameworks specify different levels of analysis [6,7,18] by which governance modes can be studied and assessed.

Understanding the relationship between governance systems and natural resources is one of the central ideas of these frameworks. Thus, the approach to the study of the socioecological system (SES) is structured around four main components (resource system, resources units, governance systems and actors) that are exposed to exogenous influences from the environment [6]. Among the socio-economic and political contexts, aspects such as economic development, demographic trends, and degree of political stability, markets, communication systems and technological progress stand out. The SES is thus presented as a dynamic system, where actions carried out by a multiplicity of actors generate changes on environment variables at a future time [6,19-21]. These actors include local fishing communities, which can occupy different positions in the system (even though their historical presence has not always been reflected in the governance systems [22]). In recent studies on SSF, the analysis of local communities has gained relevance [7-10], including the importance of their direct participation in decision-making and management processes [6,7,21,23]. Knowing how these communities are organised and what characteristics they have that might facilitate or hinder SES management could provide useful insights for creating effective SES management.

The analysis of the SES is also strengthened by several multidisciplinary contributions. Thus, Ostrom's approach is directly related to institutional analysis (especially to the New Institutional Economics; NEI), present from its origins [21]. The NEI emphasises the rules that condition interactions in the system (including property rights and hybrid rules). The resulting system conditions fishers' strategy,

both individually and collectively [7,24]. In this context, co-management strategies often develop when there is a definition of shared rights over resources by a group of users or when the regulator recognises and legitimises previous associative experiences that have shown capacity for management. In these cases, the recognition of historical presence can allow potential conflicts between users to be resolved. Results depend on three additional factors in the specific definition: i) the set or combination of rights granted; ii) the rules that the group of users have to control opportunistic behaviours; iii) and the characteristics of the resource system subject to exploitation and the adequacy of the management instruments [25,26]. In this respect, both governing common resources and co-management experiences still present certain challenges [27-30].

Another theoretical approach applied in this article is the Social and Solidarity Economy, used to analyse the internal structure of fisheries organisations formed and managed by local communities, or CBFOs. Many CBFOs can be framed within the *Social and Solidarity Economy* because it designates a broad set of organisations and enterprises (in particular cooperatives, mutual benefit societies, associations, foundations and social enterprises) that are specifically geared to producing goods, services and knowledge, while pursuing both economic and social aims and fostering solidarity [31]. In this sense, the Social and Solidarity Economy includes both entities that carry out a strictly economic activity and those that only have a social purpose [32]. All these entities are well positioned to become essential parts of the set of tools needed to achieve sustainable development and the sustainable development goals [31].

The historical development of the cooperative movement in Europe led to the establishment of the current cooperatives principles and cooperative societies [33]. These cooperative societies are firms self-managed by their workers [34], where the relationship between the organisation and its members involves more actions/effects than those usually associated with a traditional capitalist firm. Thus, members' participation in the organisation (decision-making, real activity and financial) is the focus of the study, as members function both as members and as workers [35]. This analysis of participation approach has been addressed by different authors [36-38] within the framework of the International Association for the Economics of Participation. Participation and rights of members/workers is conditioned by their compliance with the cooperative principles.

The current cooperative principles were defined at the Congress of the International Cooperative Alliance held in 1995. Seven principles serve as the guidelines by which cooperatives develop their values: i) the open and voluntary membership principle means that cooperatives are voluntary organisations, open to all persons able to use their services and prepared to accept the responsibility that membership brings; ii) the democratic management principle requires that organisations be democratic, that their members participate in the decision-making processes and that the people and the corporate purpose are given priority over capital; iii) the economic participation principle means that cooperatives' members receive the results obtained from the economic activity based on the work or service provided to the entity, not based on any capital contribution; iv) the autonomy and independence principle reflects that they are autonomous, self-help organisations controlled by their members; v) the education, training and information principle indicates that organisations should provide education and training for their members so they can contribute effectively to the development of their cooperatives; vi) the cooperation among cooperatives principle is related to the idea that the cooperative movement should work together through local, national, regional and international structures; vii) and the concern for the community principle reflects the idea that cooperatives work for the sustainable development of their communities through policies approved by their members [39,40].

Within the fishing sector, CBFOs have different characteristics in different regions. However, many of them seem to approach or fully comply with the philosophy of the Social and Solidarity Economy and, specifically, with the cooperative principles. Cooperative societies are used in many countries, such as Turkey, India, Korea and Japan to organise fishing communities [11,17,18,20,41], and at the international level there is the International Cooperative Fisheries Organisation [42]. Beyond cooperatives, in the European context, producers' organisations emerged under EU regulations, especially in certain sectors and not exclusively related to small scale [21]. Other fishing communities around the world organise themselves into associations or other regional organisations based on

historical experiences [4,43], as in the case for Spain, France and Italy [19]. Communities can be also organised without having rights granted by the laws of the country.

Consequently, this study was based in the theoretical concepts presented above, both general and specific. From these base concepts, as well as the authors' previous knowledge about certain fishing regions, a selection of countries was made in order to develop a comparative analysis with the selected objective. These countries (European and Asian) are Spain, Portugal, Cambodia, Vietnam and Bangladesh. The interest of this comparison was justified by the differences among them in respect to levels of development, historical trajectories and resulting institutional conditions. In addition, the environmental and socio-economic conditions also have different characteristics.

Beyond the characterisation of the SES in each case study, it was necessary to identify and describe the main CBFOs in each country, delimiting their functions and positions of power within their fisheries management systems. For this purpose, a bibliographic search based on specialised journals was carried out, focused on the characterisation of the fishing activity and their regulation framework. The key concepts of the search were "fisheries policy", "governance" and, especially, "fisheries organisations", with particular attention to community-based organisations.

Additionally, complementary primary data was obtained through personal and telephone interviews with public and private stakeholders involved in fisheries organisations in the reference countries, including fishery administration officials, NGO personnel, organisations managers and researchers. This information was especially useful for identifying normative sources of fisheries regulation in these countries and contrasting perceptions resulting from the review of bibliographic and documentary materials.

### **3. Results: managing small scale fisheries through community-based fisheries organisations**

To study community-based fisheries organisations as an essential element in SSF activity that contributes to their sustainable development, this section presents some of the existing diversity in the international context. For this, the main CBFOs of the selected countries were studied, and both their role within the social and global context of the SSF as well as their internal structure as social economy entities are presented.

#### **Spain**

Spain is a developed country in south-western Europe, with 47.1 million inhabitants. Its territory is made up of a peninsula and two archipelagos (505,991 km<sup>2</sup> of extension and 7,661 km of coastline), conditions that favoured the development of its fishing sector [44,45]. In Spain, the main fishing activities are carried out in maritime and estuarine waters, with a clear differentiation between the Atlantic Ocean and the Mediterranean Sea as spaces with different characteristics. International fishing grounds are also very relevant for deep-sea fishing, while freshwater fishing (in rivers or lakes) is a secondary activity. Thus, the Spanish fishing sector is quite diverse and is divided between highly industrialised fisheries (deep-sea, aquaculture farms) and SSF (artisanal, coastal and shell fishing).

The fisheries governance system is conditioned by Spain's membership in the European Union and the internal structure of the Spanish State. The first involves the assumption of an international regulatory framework, where States are able to define competences only in those aspects and areas that are not directly regulated by the European Commission [46]. The latter implies a delegation of powers from the Spanish State to the different regional governments in the country, such as powers in inland waters and in all activities involved with shellfish resources [47-49]. Furthermore, professional organisations occupy a prominent position in the fishing sector [46,50]. Spanish fisheries governance system has thus a high level of decentralisation and a diversity of actors that has led to co-management of fisheries resources.

In this fisheries system, Cofradías are the main CBFOs for fishers involved in SSF and shell fishing activities. They developed out of the historical experiences of the XI-XII centuries and are currently regulated at the national level and especially at the regional level [48,49]. This situation makes Cofradías diverse across and within Spanish regions, although they maintain common characteristics. Table 1 presents the Cofradías' positions within the fisheries sector.

Cofradías are hybrids entities [7,51] with a public-private nature [50]. They combine public administration tasks with business activities managed autonomously by their members [40]. This self-managed activity allows Cofradías to be considered social economy entities under Spanish legislation [52] and to share the philosophy of the social economy [53]. Thus, Cofradías are internally organised by cooperative principles. The specific fulfilment of each principle is analysed below and is also presented in Table 2.

Membership in a Cofradía is free and voluntary, and anyone who has the necessary requirements to conduct fishing, shell fishing or aquaculture activities can become a member, including entrepreneurs (as ship owners) and employees (as fishers and shell fishers). The specific legal requirements vary and are associated with measures to prevent overexploitation of resources and ensure the sustainability of the fishing activity [48]. At the same time, regional regulations link fishers to the territory where they carry out their activities [54] and the payment of a membership fee is usually required. Once fishers become members of the Cofradía, they participate in the management and decision-making system through the governing bodies. These bodies must be made up of the same number of entrepreneurs and employees and representatives are democratically elected [19,40,55]. This system allows members of different sectors to co-exist in the Cofradías, which can create internal tensions. Of note, participation among young people is low, and the presence of women is mainly, although not exclusively, related to shell fishing activities [52].

Cofradías members can carry out fishing, shell fishing and aquaculture activities, and they do it both in a collective and self-organised way [19,40,55]. In the fishing sector, ship owners and fishers cooperate to catch fisheries resources using their own production means (e.g., vessels and gear), while in case of shell fishing, this cooperation is stronger. After a process of transformation of on-foot shellfish gathering [56], shell-fishers now extract resource jointly but also participate in other collective tasks (e.g., seeding, cleaning, regeneration activities and monitoring), which are established in special management instruments. In addition to productive tasks, this cooperation extends to the commercialisation of fishery products, to establish a stronger, collective position in the market and reduce price competition among members [57]. Cofradías members can jointly sell products in the auction markets, many of which are managed by the Cofradías themselves. However, not all Cofradías carry out this activity, and in some regions, they are still working to establish joint commercialisation that guarantees the socio-economic competitiveness of their organisations [58]. Cofradías also carry out other activities related to the development of fishing activity, such as monitoring and surveillance, the sale of ice and bait, space assignment, provision of health services, management of tourism and external administration [40,55].

Cofradías develop their production and commercialisation activities as business activities [40,59], so fishers who participate in the Cofradía obtain a benefit based on their membership status and their participation in fishing and shell fishing activities. Cofradías offer their members better conditions in which to carry out their activities (lower production costs and higher selling prices), so that members can share and benefit from the use and exploitation of marine resources. Hence, Cofradías follow the principles of the social economy, with the results of economic activities distributed based on the work or services provided by the member to the entity, not based on any capital contribution [40].

Cofradías regularly carry out several activities related to local communities and members' development, such as training in fisheries activities and in occupational risk prevention, sustainable tourism, heritage conservation and support for sports activities [40]. Cofradías also cooperate among themselves within Spain, where there are multiple federations [60] and bilateral collaborations with other Cofradías and other nearby entities are promoted. Even so, in some regions, both the training of fishers in management skills and the collaboration between organisations must be strengthened [58].

## Portugal

Portugal is a developed country located in south-western Europe with 10.3 million inhabitants and an area of 92,090 km<sup>2</sup> [61]. Excluding the archipelagos of the Azores and Madeira, the Portuguese continental coast (832 km) is mostly rectilinear, with various estuaries located almost exclusively in the southern region. Thus, in the region north of Lisbon, the coast offers less protection, while the climate is more humid and rainy. These characteristics mean shellfish-harvesting activities are concentrated in the south of the country [62,63].

Portuguese fisheries management has undergone a historical evolution similar to Spain and is currently subjected to the European regulatory framework. However, the Portuguese administrative structure is centralised in the national government and it only contemplates the transfer of competence to island regions. In this sense, the government manages fishing activity through quotas, licenses, output control systems and restrictions on fishing in certain areas and seasons. In relation to the professional organisations' relevance, certain factors (e.g., a preference for fishing companies in the 21st century; a lack of institutionalisation of fishers' associations during the 20th century; a predominant position of deep-sea fishing versus small-scale fishing; or the open geomorphology of the coast in certain regions [64-66]) have made traditional and best adapted small-scale organisations unable to survive in Portugal. Since Portugal implemented its democratic Constitution of 1976 and integrated into the European Union in 1986, the Portuguese fishing system has undermined the position of traditional fisheries organisations and rather focused on a more Europeanised framework [67-69].

Within this centralised governance system, Fisheries Associations and Producers Organisations are the main CBFOs for small and large-scale fisheries [70]. Fisheries Associations emerged in the late 20th century, some of which sought alternative ways to institutionalise their rights and occupy a privileged position in the sector. To do this, they have simultaneously formed Producer Organisations, which have competencies granted by the European Union and an important position in the market [71]. Thus, although both types of organisations coexist in the fishing sector, this study focuses only on Fisheries Associations because they are more involved in small-scale activities. Fisheries Associations do not encounter specific regulation, so they must exclusively adhere to the general regulations and to their by-laws [67-69]. This situation means their characteristics can be very different from each other and while making it difficult for them to establish a strong and organised position within the fisheries governance system (Table 1). Moreover, an important number of small-scale fisheries are not represented at all [72].

Focused on the analysis of compliance with cooperative principles, membership in the Fisheries Associations is free, voluntary and usually linked to the development of fishing, shell fishing and/or aquaculture activity. Because no common regulation exists, each association establishes its membership requirements in its by-laws, with associations formed only by ship owners and others by ship owners as well as employees. In most associations, young people participate at a low rate, and women's participation is related to the shellfish sector [71], which is similar with the Spanish case. Even so, women's participation in the Portuguese fishing sector extends to other extractive, processing and distribution activities, but they have traditionally been a hidden workforce [73].

As a member of a Fishery Association, a fisher has the right to participate in the decision-making process democratically and through the management bodies (in those better-organised associations) [71]. However, the final participation of fishers in the Portuguese management system and their political influence is small, and they lack empowerment [72]. The octopus fishery in southern Portugal is a recent case study of an attempt to change a centralised, top-down decision-making process with a low level of compliance with regulations to a bottom-up, participatory approach aimed at improving the fishery governance system [74].

Different production sectors coexist in the Portuguese Fisheries Associations, with small-scale fishing but also deep-sea, purse seine, trawling or other forms of exploitation. In addition to carrying out these productive activities, they also participate in the commercialisation of their products, although to a lesser extent than in the Spanish case. The main reason is that first sale is made through DOCAPESCA (on the mainland and other entities in the archipelagos), a state-owned company responsible for organising Portuguese fish markets [72]. However, some associations have certain capacity to market



their products by themselves because they can manage small market stalls and sell directly through private contracts. As the Cofradías, Fisheries Associations also carry out other widely varied activities that benefit fishing activity development, such as training fishers, selling gasoline or ice, or even canning activities [71]. In the same way, they carry out heritage conservation activities and support sports, activities that contribute to local communities.

Because the commercialisation of fishery products through the fish market is not managed directly by the Fisheries Associations, these complementary activities become even more important to obtaining resources and to ensuring their economic capacity. For fishers and shell fishers, participation in the association allows them to achieve a better and collective organisation of their activity, have common representation and obtain an advantage by having lower production costs [71]. Even so, most associations remain poorly organised and cooperation between them is generally lacking [72].

## **Cambodia**

Cambodia is a Southeast Asian country with almost 17 million inhabitants [75] that in the last two decades has developed from one of the poorest countries in Asia to a fast-growing economy. It has 181,035 km<sup>2</sup> with a high relevance of inland waters (4,520 km<sup>2</sup>) and large floodplains (more than 30% of the territory in the form of coastal areas and freshwater bodies). These large freshwater bodies made Cambodia the world's fifth largest capture producer in inland waters in 2018 [1]. Cambodia has three major aquatic ecosystems: i) Tonle Sap Lake, the largest freshwater lake in Southeast Asia and one of the most productive ecosystems in the world; ii) the Mekong River, highly interrelated with bordering countries; and iii) and the coastal region, with only 443 km of coastline [76]. These resources are essential to the country's sustainable development by providing ecosystem services such as access to clean water, fishing as a main food source (about 70%-80% of Cambodian total animal protein intake), capacity to fight climate change, geopolitical control, hydropower generation and inland water transport [76,77].

Related to the governance system, in the 2000s the Royal Government of Cambodia initiated a profound reform of fisheries laws and regulations (the fisheries reform) that changed the conditions to access and use of fisheries resources. After moving between situations of open and private access for more than a century and abolishing private fishing concessions (the commercial fishing lots, inherited from the French protectorate), the Cambodian government currently seeks to grant rights to local fishers [78]. Thus, Community Fisheries have been established, which represent a new type of organisation to ensure rural communities have access to fisheries resources for food and livelihoods by providing them a right to participate in SSF [79]. At the same time, and in line with other government policies of decentralisation and economic development [80], the government has sought to bring decision making closer to the regional level. Although the government has the power to define the regulation system for fisheries, the Department of Fisheries, the Fisheries Administrations and the Cantonments work closely with local organisations and people, who are the intended beneficiaries of the overall planning process [76]. In this sense, Community Fisheries collaborate with Cambodian public administrations and NGOs in developing a system of fishery resource co-management, although public authorities have still a strong position.

A *Community Fishery* is defined as a group of Khmer (Cambodian) citizens living in one or more villages in the Kingdom of Cambodia who voluntarily agree to cooperate and participate with each other for the purpose of participating in the sustainable management, conservation, development and use of fisheries resources in their local areas [81]. No evidence shows that Community Fisheries have been based on any traditional organisation that previously existed because: i) during the Angkor era and in the following centuries, it seems there were not significant structures for fisheries management [82], and ii) the fisheries reform did not consist of transferring rights from private actors to community organisations, but rather the creation of new common property rights [78]. Community Fisheries have thus arisen from experiences of developed countries and by the direct financial and technical supports of international organisations and NGOs (which can be adjusted to existing needs through different approaches and pursuing different objectives [83]). These international partners introduced the community-based approach in different regions, such as Siem Reap and the upper Mekong [84,85].

Subsequently, the government reflected this approach and experiences in Cambodian regulation [86], establishing Community Fisheries as small-scale fisheries management bodies through the creation of specific regulations for them [79,81,87] (Table 1).

Formed by fishers and local inhabitants, Community Fishery membership is voluntary and open to anyone with the capacity to use their services and who is ready to accept the responsibility of being a member. The primary condition of membership, specified in both the Law of Fisheries, the Royal Decree and the Sub-Decree on Community Fisheries, is Cambodian citizen status with residence in the community territory (Table 2). Being located in the territory is a means to ensure the transfer of rights to the communities while operating in state-owned resources. The relationship of the member with the fishing activity is assumed in the regulation, not established as a requirement in itself.

Once a group of citizens decides to form a Community Fishery and become members, they must organise a founding congress. During this congress, they need to elect the management bodies, where women are encouraged to stand as candidates for election (Table 2). Thus, members lead and manage the community through the management bodies, using various management instruments such as by-laws and internal regulations they have established under the direct supervision and control of the government authorities. One of the most relevant instruments is the Community Fishery Area Management Plan, which includes detailed information about the community (e.g., demographic and socio-economic characteristics, existing fisheries resources, permitted equipment, and conservation activities). In this sense, membership grants the right to participate democratically in decision-making processes to manage a given fishery resource [79,81,87].

Community Fisheries have entrusted activities of organisation, production and conservation of fishery resources. Communities and their members mainly operate small-scale fisheries throughout the year and without restrictions on fishing efforts. Cambodian policy also seeks to enhance aquaculture development by encouraging members to carry out aquaculture activities. While considering other main activities, such communities should not only extract resources but also develop monitoring and conservation activities for the resources' sustainability. For this purpose, they need to perform a variety of functions (Table 2) and need to have a conservation area in their territory. Together, these production and conservation activities are organised through the community by-laws and the management plan, where the detailed rules are established [79,81,87].

Related to the commercialisation, little is mentioned in the legislation, although the fishers can sell all harvested fishes in accordance with the Community Fishery Area Agreement and Management Plan [81]. Because nothing else is said, it seems members might not commercialise their products through the community. By carrying out the commercialisation individually, Community Fisheries can neither help fishers maximise the profit nor obtain sources of funding (e.g., a sales tax). In fact, according to the regulations, the financial sources of the Community Fisheries are derived mainly from charitable donations and from government or support from NGOs. There is a provision of an entrance and/or an annual membership fee, but it is not fully enforced yet [78,85].

In addition, the empowerment of local communities is paramount to the reform and, to be effective, must be accompanied by developing the skill of proper management via training. One of the key responsibilities of the Department of Fisheries is to educate and train Community Fisheries to increase their technical and managerial capacities, while the communities must train their members. Strengthening cooperation among the fishing communities for sustainable resource management is also one of the objectives of the fisheries reform (Table 2).

## **Vietnam**

Vietnam is a Southeast Asian country with more than 98 million inhabitants. Over the last 30 years, it has developed important economic and political policies that have led to a rapid economic growth (sustained by robust domestic demand and export-oriented production) [88]. With an extension of 331,210 km<sup>2</sup> and 3,444 km of coastline, it has a great variety of aquatic natural resources. Its territorial sea stretches across the South China Sea, sharing the Gulf of Tonkin with China and the Gulf of Thailand with Cambodia and Thailand. In the in-shore zones, the estuary of the Mekong River and the

Red River Valley stand out over other rivers and lagoons [89]. Vietnam is among the main major fish producers of the world and is the world's third largest seafood exporter after China and Norway [23].

Fisheries management in Vietnam has passed through several phases during the last 150 years. In precolonial times, there was a community-based management derived from a high level of decentralisation. Kings empowered local governments to lease fisheries and collect local taxes. Communities thus had a traditional system to follow, and village customs were more important than a king's law [90]. Under French colonisation (1859-1954), the government maintained this community management system and collection of rents. After Vietnam's independence (1945-1975), the country was divided in two systems. In the south, the Republic of Vietnam continued with the traditional system, whereas in the north, the Democratic Republic of Vietnam transformed fisheries production into a collectivised system [90,91]. After 1975, when the north and the south formed the Socialist Republic of Vietnam, the country became a central planned economy and the collective system expanded. In 1986, Vietnam began with the *doi moi* policy, which aimed to liberalise trade and move towards a market-oriented economy. This is the period when fishing cooperatives emerged, which had different forms (i.e., collective people's fisheries and state-owned fisheries) [92].

At the beginning of the 21st century, the fishing sector left behind the *doi moi* policy and became an export production-oriented industry. The governance system is decentralised and governed both at the state level, by the Ministry of Agriculture and Rural Development and the Directorate of Fisheries, and at provincial levels. Provincial People's Committees of coastal regions are responsible for implementing the national fisheries policy at the provincial level and can make regulations by adapting national ones to local conditions [92]. In this scenario, the Vietnamese government developed different fishing regulations, including a first Fisheries Law [93,94]. However, a problem of resource overexploitation remains, derived from the traditionally open access system, the high competence and the importance given to increased production rather than sustainable fishing [91,92].

This situation has begun to change in recent years because a new constitution gives greater importance to environmental protection [95]. The new Law of Fisheries of 2017 and the decree to enforce it [96,97] aims to establish a management system to empower local communities, grant them with rights and improve resource protection. This new regulation presents a framework for the creation and development of community-based organisations, although they still do not have regulations. However, the presence of community organisation in Vietnamese fisheries is not new because traditional local stakeholder organisations (*van chai*) have existed by which marine fishing communities historical regulated fisheries and ensured mutual assistance for their members [90]. After the reunification, these traditional practices were neglected by the government or adapted to the collectivised system (which was beyond fisheries management) as cooperatives and production collectives [90,92], most of which collapsed and did not survive in the market-oriented economy. In this way, a *Community* (or *Community Organisation*) is currently defined as an organisation established by voluntary members who manage and share their benefits and protect aquatic resources in a certain area (Table 1).

Voluntary membership in the Community is established in the definition, whereas the main requirement is to live nearby and benefit from aquatic resources (Table 2). Each Community is linked to a specific geographical area, and two communities cannot operate in the same area. There is a lack of information on the community management bodies; it is only specified that there is a representative of the Community. Communities must have plans for protecting and extracting aquatic resources as well as operational regulations, with the sustainability of resources a central point in the new regulation. The plans for aquatic-resource exploitation management must be made in accordance with the instructions provided by the government in its decrees and guidelines, and with the support of the competent public authorities. In this sense, both the plan and the operational regulations must be authorised by the People's Committee of each province, district or city, depending on the area covered. A Community is also required to report its activity every year or extraordinarily upon a request to the governmental regulatory body [96,97].

A Community can mainly develop activities relating to organisation, fish harvesting, and tourism and resource protection. Specifically, they are entitled to organise and manage aquaculture, protection and extraction of aquatic resources and tourism in combination with fishery activities. Regarding protective

activities, they must cooperate with competent authorities in patrolling, inspecting, investigating, preventing and taking action against violations committed in the area under their management. The regulation also contemplates the creation of protected marine areas, whereby communities are entrusted with more functions (Table 2). To fulfil these functions, regulatory authorities have to provide assistance for Communities' involvement in co-management through financial, human and technical support [96,97].

Fishery Associations also exist in Vietnam as community-based organisations in certain communities. They were developed within the framework of the first Fisheries Law [93], and given the decentralisation of fisheries management, their regulations have mainly been developed at the provincial level. These Fishery Associations are under the Vietnam Fishery Society and operate at various levels. A well-studied case is the Tam Giang Lagoon, where some Fishery Associations are allocated a Territorial Use Right for Fishing. These associations form regulations on resource management and are organised by executive boards. They are entrusted with different executive and legislative functions, although they have challenges owing to the low legitimacy of their powers [91,98,99].

## **Bangladesh**

Bangladesh is a South Asian country with nearly 162 million inhabitants and an extension of 148,460 km<sup>2</sup> [100]. Its territory is mainly made up of delta areas formed by the world's two largest riverine systems, the Ganges and the Brahmaputra. The country is rich with aquatic natural resources and fishing is one of the key livelihoods for millions of people. This sector contributed about 3.57% to Bangladesh's GDP in 2017-18 [101]. Bangladesh has three major types of fisheries: i) inland open-water fisheries (rivers, estuaries, lakes, reservoirs and floodplains); ii) inland closed-water fisheries (oxbow lakes, floodplains, dead rivers, ponds, etc.); and iii) and the marine fisheries of Bay of Bengal [102,103].

Fisheries management in Bangladesh has inherited characteristics from the British period in Indian subcontinent. Before 1947, *Zaminders* (landlords) obtained ownership and control of inland fisheries through a system of leasing of water bodies, called *Jalmahals*. Fishers could fish in these semi-closed and closed water bodies with the tax given to the Zaminders. After independence from the British regime, the present Bangladesh became part of Pakistan and known as East Pakistan. In this period, through the East Bengal State Acquisition and Tenancy Act of 1950, the Zamindari system was abolished and all Jalmahals were vested in the East Pakistan Government. As a result, almost all the water bodies became public property, but the leasing system continued. However, after achieving independence in 1971, Bangladesh's government attempted to change this short-term leasing system several times, but the allocation of fishing rights through periodic leasing still remains in some cases [102,103].

Nowadays, Bangladesh has different regulatory procedures to manage fisheries resources. While marine fisheries use a licensing system [102,103], coastal water and inland open waters (rivers) follow free access rules for the full-time fishers, part-time fishers and all other users. On the other hand, fishers' true rights in inland closed water fisheries are not yet established and are largely restricted by the conventional short-term leasing systems that hand over rights to the top rent payers [104]. This leasing system has been considered detrimental to sustainable resource management because no scientific management system exists (e.g., equipment restrictions, size restrictions, and stock assessments) [105]. Thus, leaseholders do not think about sustainability and extract fisheries resources to maximise their economic benefits as much as possible within the leasing period. The first attempt by the government of Bangladesh to provide rights to real fishers was made in 1986, with the New Fisheries Management Policy. Fishing cooperatives emerged during this period, but they tended to be under the patronage of moneylenders, local elite groups and lessees, who also controlled fishers directly or indirectly. It was not until 1992 when the government adopted Community Based Fisheries Management policy as part of a pilot program where NGOs, local fishers' groups and the Department of Fisheries collaborate together [106].

Unlike in Cambodia and Vietnam, Bangladesh's fisheries policy has no specific regulations for any

CBFOs and there are a few references to fishing communities in the main fisheries laws. For example, the Marine Fisheries Ordinance of 1983, which regulates marine fisheries, exclusively mentions local fishing vessels and certain benefits and exemptions for them [107]. Furthermore, the National Fisheries Policy Law of 1998, which covers all categories of fisheries, refers to fishing communities in different ways such as fishers' societies, local fisher communities, small-scale fisher folk communities and poor fishers. For inland fisheries, especially in the closed water bodies, the law establishes that these groups of fishers have certain priorities and it aims to encourage women's participation in the fish industry [108]. In this regard, community-based fisheries management projects (CBFM projects), adopted by the government due to external influences and close cooperation with donors and NGOs, are the main organising strategy for fishing communities in Bangladesh. The government grants access to the inland closed water fisheries for the fishing communities through the leasing system, and NGOs are responsible for organising the community and providing technical and financial support to operate the projects [106]. CBFM projects comprise a wide range of cooperative arrangements that can be classified into three broad categories (i.e., NGO-led strategy, government-led strategy, and government and NGO partnership) [109] and do not seem to be based on any traditional Bangladeshi organisation.

In general, to participate in the CBFM project, members have to be real fishers living around the resource. However, it is also noticed that in some cases, not only the groups of fishers organised by the partner NGO but also other fishers and other wetland resource users such as farmers and local elites could be represented in these projects [106]. To have an inland public water body under community-based management, local fishers require the formation of a fishery user group (e.g., a fishery users' association or fishers' cooperative association), a management committee, and a nine-member decision-making body for two years. To manage fisheries, specific by-laws are introduced [104]. Thus, local communities form a CBFO framed within a CBFM project.

Regarding the activities developed, fishers have to manage resources and maintain a sustainable stock (stocking with fingerlings, ban on destructive fishing practices, fishing ban in spawning seasons, etc.). They are also responsible for integrated management of wetland resources including fish, plants, agriculture, livestock, forestry and wildlife over entire ecosystems. Department of Fisheries field officials closely monitor whether all the regulations are properly followed. National and international NGOs provide technical support and help to evaluate the outcomes of the management system [105].

These Bangladeshi CBFOs raise funds from their members (in a few cases, they also receive support from NGOs) to cover expenditures (paying rent to the government, covering the cost of fingerlings, feeding, and performing surveillance against poaching, etc.) to manage the fisheries' resources. Typically, the harvested and/or captured fish are sold at an on-site auction [110] or taken to the nearby auction markets. Members share the profits based on the allocation of shares or financial contributions to the organisation. CBFOs also organize management trainings for their members with the technical assistance of NGOs and government officials. Thus, members have experienced significant increases in their fishing incomes [105].

#### **4. Discussion**

A comparative analysis of community-based fisheries organisations in five countries in Europe and Asia revealed both common and distinctive characteristics of SSF systems. These characteristics demonstrate certain significant advantages that CBFOs contribute and challenges they present to global sustainable development (Tables 3 and 4).

The first difference in the cases analysed is that the resource systems on which the fishing activity is carried out are different: open waters, coastal waters, estuaries, rivers, wetlands, lakes or floodplains, among others. A comparison of these resource systems in existing organisations shows a certain trend. In the European cases, Spanish Cofradías have a more substantial role in the organisation and planning of shellfish activities carried out in inland waters than in marine fishing activities, and in Portugal, fewer co-management experiences exist in the north's open coast than in the central and southern estuaries. In the same way, CBFM projects in Bangladesh are linked mostly to inland waters, the main co-management experiences developed to date in Vietnam are in lake fisheries, and, in Cambodia (of all

the cases, the country in which marine fishing has the least relevance), there are specific laws and regulations for Community Fisheries. A relationship seems to be established where the greater the presence of delimited resource systems (and thus sedentary resources), the greater the definition and establishment of regulations for CBFOs.

Regarding the institutional conditions and governance, all the co-management systems analysed have a centralising attitude to a greater or lesser extent, depending on the country. European organisations must comply with the European Union and national governments' regulatory frameworks, but they can participate in the decision-making process and have greater capacity to act at the operational level. In Spain, given the existence of strong regional governments, the decision-making on certain activities such as shell fishing is carried out at a more regional level, and the weight of the communities becomes greater. This does not prevent the government from having a paternalistic attitude towards Cofradías that can discourage innovative experiences and implies significantly higher management costs over time [50]. In Asian countries, centralisation seems to be greater, and most of the powers fall on the national governments, since they do not have a regulatory supra-entity. Nevertheless, the governments of Cambodia and Vietnam wish to bring divisions of their government closer to the regional territories (Provincial People's Committees, Cantonments) to enable co-management in fishing communities. Furthermore, the role of NGOs as facilitators of co-management was seen in all Asian cases studied. The participation of governments and public administration in CBFOs can have advantages, such as greater granting of rights and the existence of fewer intermediaries between decision levels, but it can also create challenges. The involvement of the public organisation could be too strong and make the weight of fishers within the organisation smaller. For example, many CBFM projects in Bangladesh remain non-participatory, with power relations that exclude fishers from fisheries management [104].

In all case studies, the CBFOs occupy a position within the co-management system. Unlike in Portugal and Bangladesh, in Spain, Cambodia and Vietnam (within the last few years), this position is recognised by specific laws. The development or improvement of regulatory frameworks facilitates the recognition of fishers' and local communities' rights, which gives them a solid position in decision-making processes. The historical experiences also seem to influence fishers' positions in co-management systems. For instance, in the Spanish case, over time, the fishing sector has maintained and adapted the traditional organisations, Cofradías, giving them a strong position within the current governance system. On the contrary, the Portuguese fisheries sector has not managed to maintain these traditional practices, and fishers have had to reorganise themselves. Furthermore, as Fisheries Associations do not seem to be enough, producer organisations or even cooperatives are needed in parallel. In the cases of Cambodia, Vietnam and Bangladesh, the different CBFOs have arisen from international experiences (influenced by a redirection to a market-oriented economy and with a significant presence of international donors and NGOs), later promoted by national governments. Among these cases, the traditional community management system seems to exist only in Vietnam, although a direct relation between current organisations and traditional experiences cannot be assured. Incorporating those experiences and pre-modern organisations into fisheries management systems could make positive contributions to the governance of coastal zones [111] and the establishment of specific regulations for CBFOs.

Regarding the internal characteristics, all the CBFOs analysed have adopted the principle of voluntary and open membership, and some share similarities in the requirements for this membership. These similarities revolve around the link with the territory that associated fishers must have, not only to be a citizen of the country but also to live close to fisheries resources or carry out their activity in the organisation's territory. The payment of a membership fees does not seem to be mandatory in the cases analysed but is common in some of them. Thus, the aim is to involve populations that have their livelihood in the fishing activity in the resources co-management and, at the same time, to define their rights against exploitation by third parties and to avoid overexploitation. A clear definition of who can be a member is needed because in many organisations, a diverse group of actors comes together (NGOs, public administrations at local and national levels, fishers from different sectors), which can hinder fishers' interests and favour the appearance of conflicts. On the other hand, better knowledge and greater registration of the members can help implement policies to solve various problems, such as gender inequality (ensure women's participation [112]), the lack of generational replacement (particularly

relevant in European countries and nowadays also common in developing states) or stopping child labour (an especially important problem in the primary sector of developing countries).

In all cases, management of CBFOs is carried out by management bodies, and their election process is confirmed to be democratic in Spain, Portugal and Cambodia. It is important to have a democratic process to form the governing bodies to ensure the effective participation of fishers in the co-management systems and to avoid positions of excessive power within the organisations. Likewise, training should be provided for members to develop co-management skills and to make the members aware of their rights and obligations in order to strengthen their decision-making capacities. In Spain and Portugal, many CBFOs have recruited staff for administrative functions, while in Cambodia, Bangladesh and Vietnam, this technical support is provided mainly by the government and NGOs. The participation of women in the management bodies is also promoted by some countries' regulations and internal by-laws, to strongly show their roles within the CBFOs. Well-coordinated management can foster strong leadership attitudes that act in favour of the entire community, while a weak management system can create spaces for opportunistic and individualistic attitudes, where a few members hold control of the organisation for their personal benefit. In Cambodia, for instance, many fishers still have limited power, are not aware of their rights or cannot exercise and claim their rights, and multiple conflicts among stakeholders remain [78].

The main activities carried out by the CBFOs are fishers' representation, fisheries sectors' organisation and production. In Spain, Portugal and Bangladesh, organisations also carry out commercialisation and other complementary activities collectively, to a greater or lesser extent. When commercialisation tends to be more individual and less organised, higher transaction costs are created for the fishers, and the negotiation power of the buyers is favoured. In this sense, small-scale fisheries as productive activities are means of subsistence for many populations, but also business activities [113]. Carrying out a business activity in a local and rural environment has advantages for the endogenous and sustainable development of the region, such as population fixation or the generation of added value [33]. Furthermore, if there is an obligation to be linked to the territory and to carry out the fishing activity to be part of the organisation, benefits obtained from the economic activity are based on the work or service provided, not on any capital contribution (which could be foreign or from any other sector). In this sense, fishers obtain different advantages from their participation in the organisations: securing fishing rights to be able to carry out a subsistence activity, having means of representation and participation in decision-making, and having advantages in prices (through the collective sales) and lower costs (derived from the organisational improvements and the services offered by the organisations).

All the organisations studied also have adopted several measures of resource conservation and protection, both from organisational management (management plans, conservation areas, minimum sizes) and implementation (control and surveillance tasks) perspectives. In the three Asian cases, these activities are particularly relevant because tropical ecosystems have a higher vulnerability to climate change, with negative impacts on their dependent communities. To achieve sustainable development through co-management, it is important not only that the communities are entrusted with certain functions to protect resources, but also that they have the capacity to fulfil those functions. For example, in Vietnam, insufficient funds and human resources are key reasons for poor management [92], and there is a lack of legitimacy to enforce the rules in the CBFOs [98]. This situation also applies to many of the other cases studied. Therefore, to overcome these challenges, a clear definition of rights, better planning in a coordinated way and the development of specific regulations and resource provisions are necessary. In this sense, the resources that communities have to develop their activities are one of the main points for the sustainable development of the region and the fishing activity. These resources have to be both administrative and technical (diverse training for members, technical help from administrations or NGOs, staff) and economic (possible membership fees; percentages of the sales of aquatic resources; economic contributions from governments, international organisations and NGOs; etc.).

Consequently, the analysis of the main similarities and differences of the CBFOs studied has helped to bring attention to certain advantages they have for contributing to sustainable development and to identify several challenges which could act as barriers to sustainable growth.

## 5. Conclusions

This article is situated from this perspective to analyse scenarios, circumstances and strategies that can contribute to the achievement of sustainable development. International organisations, such as FAO, have highlighted the importance of SSF in actions aimed at achieving the sustainable development goals, particularly those related to the sea and the marine environment (goal 14). In this area, CBFOs of SSF seem to be able to play a significant role in meeting these objectives. Specifically, the main fisheries organisations of five European and Asian countries (Spain, Portugal, Cambodia, Vietnam and Bangladesh) are analysed and compared. These cases provide a varied perspective for studying the roles of the organisations, within different management systems and under different institutional circumstances, to develop a better understanding of their capacities and the problems they have to face.

For this purpose, different theoretical frameworks are combined, which provides both an overall perspective and a novel approach. On one hand, the comparative and interdisciplinary analysis of resource and governance systems (socioecological systems in Ostrom's analysis frameworks) provides a necessary knowledge about the context in which fisheries organisations emerge and management takes place. On the other hand, introducing the social economy approach, using the cooperative principles as an analysis guideline, allows for studying the structure of these organisations and highlighting certain internal information that is not always considered. In this sense, both the socioecological system and the cooperative principles are presented as useful references for conducting an international comparative study.

The case studies analysed show CBFOs occupy an important position within the SSF system, but their roles may vary in each case depending on both the type of resources and the governance conditions. Thus, the weight of aquaculture and inland fisheries production in Asian countries can facilitate the significant presence and participation of small-scale fisheries and their organisations, in the context of a better definition of fishing rights (including territorial rights) depending on the type of resource. The case of Cambodia, with fishing activity linked almost exclusively to inland waters and extensive regulatory development on fishing communities, especially stands out. Even in European countries, the difference in resource systems is relevant, with a greater significance of sedentary species and different dynamics for small-scale fishers and shellfish gatherers in the Spanish case.

The roles of CBFOs can also vary depending on the level of decentralisation existing in the co-management systems and the willingness of regulatory bodies to empower them, as well as the self-organisation capacities of fishers. In this sense, there are different historical experiences of community management in fisheries regulation. In these case studies, Spanish organisations show the strongest organisational capacities, in correspondence with a consolidated historical trajectory and a closer relationship with public administrations. The capacities of Asian organisations, which have been weaker so far, can be related to more unstable historical processes and remarkable institutional breakdowns before recent times. The still-limited experience in these cases opens an important space for the action of external organisations such as NGOs, as it does not occur in the European cases. Even so, Asian countries are currently in a phase of establishing new definitions and reformulations that may favour the training of fisheries organisations, as seems to be happening in Vietnam.

The analysis shows that the very nature of small-scale fishing activities (more traditional and linked to a specific territory and culture) favours cooperation within local communities, who organise themselves to secure their fishing rights and work collectively. The collective development of activities beyond the extractive ones also presents different possibilities and can reinforce the initiatives of CBFOs. This situation stands out in the Spanish case (commercialisation), the Portuguese case (development of other complementary activities) and the Bangladeshi case (purchase of supplies for aquaculture activities and commercialisation). Given the collective nature of the organisations, in all cases, the confluence of collaborative attitudes that encourage possible long-term objectives (sustainability) and short-term attitudes that accentuate individual income objectives can be a challenge. Success in defining the rules will be important for these purposes, both for the administrations and within the CBFOs themselves.



The review of case studies has made it possible to highlight the importance of defining the management model and the associated rules that establish the weight of CBFOs. In the same sense, the importance of the internal strength of organisations can also be observed, which can be assessed from the perspective of the social economy. In this way, the contribution of fisheries CBFOs to sustainable development is determined not only by their position within fishing systems but also by their internal structures and the capacities they have to carry out co-management functions. Thus, having an adequate fisheries organisation allows better protection of local communities' rights of access to resources.

A strong institution also gives legitimacy to third parties and strengthens decision-making processes, while a better definition of its management bodies can allow local communities to be less influenced by stakeholders (such as buyers). In the same way, and in line with sustainable development goals, organisations can encourage women's participation in the management of fishing activities and improve fishers' and local communities' capacities through training and technical assistance. In general, fostering the improvement and strengthening of CBFOs can help reinforce the advantages associated with the development of SSF highlighted by FAO: employment generation, food supply and recovery of the organisations' identities and cultural heritage as signs of the cultural and historical values of the activity. These actions must be consistent with the general regulation of fisheries and the marine environment.

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**Table 1. Small-scale fisheries and community-based fisheries organisations**

Resources Systems		Governance Systems		Main regulations for the CBFOs
Location	Main activities	Rule-making organisations and management instruments	Network structure	
<b>Spain</b>				
Marine Waters: national waters, coastal region and estuarine	Small scale fisheries Middle scale fisheries Shell fishing (seeding and harvesting)	European Union: TACs and Quotas Government of Spain: licenses, output control Regional Governments: licenses, exploitation permits, administrative concessions, fishing bans	Governments Fishing and Aquaculture companies <b>Cofradías, Shipowners' Associations, Producers' Organisations, Mussel Farmers' Associations</b> Fishers, Shellfish Gatherers, Farmers	1°. National laws for fisheries activities establish a general regulatory framework for Cofradías 2°. Regional Governments develop specific laws, decrees and regulations for Cofradías
<b>Portugal</b>				
Marine Waters: national and international waters, coastal region and estuarine (to a lesser extent)	Small scale fisheries Large and middle scale fisheries Aquaculture	European Union: TACs and Quotas Government of Portugal: licenses, exploitation permits, output control, fishing bans	Governments Fishing and Aquaculture companies <b>Fisheries Associations, Shipowners' Associations, Producers' Organisations</b> Fishers, Shellfish Gatherers, Farmers	1°. National laws for fisheries activities do not present specific conditions for the establishment of Fisheries Associations
<b>Cambodia</b>				
Inland Waters: lakes, rivers, paddy fields and wetlands Marine Waters (to a lesser extent): coastal regions, mangroves	Small scale fisheries Aquaculture	Royal Government of Cambodia: licenses, output control, fishing bans Fisheries Administration, Regional Cantonments: control and surveillance	Governments, <b>NGOs</b> Fishing and Aquaculture companies <b>Community Fisheries</b> Fishers, Farmers, <b>Families</b>	1°. Based on the Fisheries Reform of 2000-2012, there are national laws for fisheries activities and specific national regulations for the establishment of the Community Fisheries
<b>Vietnam</b>				
Inland and Marine Waters: lakes, rivers, paddy fields, estuaries, coastal regions, mangroves	Aquaculture Small scale fisheries	Social Republic of Vietnam: licenses, output control, fishing bans Provincial People's Committees: regulation, control and surveillance	Governments, <b>NGOs</b> Fishing and Aquaculture companies <b>Community Organisations, Fisheries Organisations</b> Fishers, Farmers, <b>Families</b>	1°. National laws for fisheries activities establish a general regulatory framework for Vietnamese Fisheries Organisations 2°. Provincial People's Committees develop specific regulation for Vietnamese Fisheries Organisations
<b>Bangladesh</b>				
Closed Inland Waters: lakes, haors, oxbow lakes, big public ponds	Mostly aquaculture	Government of Bangladesh: leasing system, common property rights	Governments, <b>NGOs</b> Aquaculture companies <b>CBFM Projects,</b> Fishers, Farmers, <b>Families</b>	1°. National laws for fisheries activities do not present specific conditions for the establishment of CBFM projects

Sources: Compiled by authors on the basis of Ostrom and McGinnis [7]

**Table 2. Fulfilment of the cooperatives principles in the community based fisheries organisations**

Cofradías - Spain	Fisheries Associations - Portugal	Community Fisheries - Cambodia	Community (Organisations) -Vietnam	Community based fisheries management (CBFM) Projects - Bangladesh
<b>1. Autonomy and Independence Principle: Origins and nature</b>				
Partially Based on previous private experiences of the XI-XII, they institutionalised their rights in the 20th century. Currently they have public-private nature.	Partially They emerged at the end of the 20th century, in an Europeanised context, are not based on traditional organisations and created OPs in parallel. Promoted by fishers	Partially The government reflected previous experiences developed by international organisations in the Fisheries Reform of the 2000s. Establishment coordinated by the public administration.	Partially After half a century of diverse policies, the new Fisheries Law of 2017 seeks to empower communities granting rights to these organisations. Establishment coordinated by the public administration.	Partially In 1992 the government adopted CBFM policy as pilot program where NGOs, local fishers' groups and the government collaborate together
<b>2. Voluntary and Open Membership Principle: Requirements to be member</b>				
Yes 1. Carry out fishing, shell fishing and/or aquaculture activities in Cofradía's territory 2. To have the corresponding administrative certification 3. The payment of a membership fee is usually established (not required by law)	Yes 1. No specific regulation, according to the general regulations on associations and each Fisheries Associations' by-laws 2. The payment of a membership fee is usually established (not required by law)	Yes 1. Be a Cambodian citizen 2. Living in the Community Fishery territory 3. The payment of a membership fee is not enforced	Yes 1. Households and individuals living and benefiting from aquatic resources in this area 2. The payment of a membership fee is not enforced	Yes 1. Fishers living around the resources 2. There is membership fee
<b>3. Democratic Member Control Principle: Management bodies</b>				
Yes General Board; Board of Directors; Chairman and Vice-Chairman (they have traditional names but comparable to these bodies)	Yes General Board; Board of Directors; Fiscal Council and Chairman (for more organised Fisheries Associations)	Yes Founding Congress; Community Fishery Committee; Chairman; Vice-Chairman.	Partially Representative of the Community (thus Communities that have a Fishery Association have an Executive Board and Chairman)	Partially Management Committee (committee election is not specified)
<b>4. Member Economic Participation: Activities fishers can carry out through the organisation and economic advantages obtain</b>				



<p>Yes</p> <p>1. Organisation and production of the small-scale fisheries, shell fishing and aquaculture sector</p> <p>2. Commercialisation through the fish market</p> <p>3. Monitoring and surveillance</p> <p>4. Use of complementary goods and services necessary for the development of the fishing activity and provided by the Cofradía</p> <p>Fishers obtain an advantage in prices (through sale at the fish market) and lower costs (derived from the organisational improvements and the services offered by the Cofradía)</p>	<p>Yes</p> <p>1. Organisation and production of the small-scale fisheries, shell fishing and aquaculture sector</p> <p>2. Commercialisation of part of the production through small market stalls and direct sale</p> <p>3. Use of complementary goods and services necessary for the development of the fishing activity and provided by the Fisheries Association</p> <p>Fishers obtain an advantage mainly by having lower costs (derived from organisational improvements and the services offered by the Association)</p>	<p>No</p> <p>1. Organisation and production of the small-scale fisheries (aquaculture activities are encouraged)</p> <p>2. Resources conservation, MPA management, monitoring and surveillance</p> <p>Economic participation is not the main objective, but to ensure fishing rights to be able to carry out a subsistence activity and have means of representation and participation in decision-making</p>	<p>No</p> <p>1. Organisation and production of aquatic resources and aquaculture</p> <p>2. Resources conservation, MPA management, monitoring and surveillance</p> <p>3. Tourism</p> <p>Economic participation is not the main objective, but to ensure fishing rights to be able to carry out a subsistence activity and have means of representation and participation in decision-making</p>	<p>Partially</p> <p>1. Organisation and production of aquaculture activities</p> <p>2. Resources conservation</p> <p>3. Collective sale of aquaculture products</p> <p>Fishers obtain access to the fisheries resources and ensure their rights</p> <p>Fishers obtain an advantage in prices (through the collective sale) and lower costs (better input prices)</p>
<b>5- 7. Principles of Education, training and Information; Concern for the Community and Cooperation among Cooperatives</b>				
<p>Yes</p> <p>Other activities: Training; heritage conservation; support for sports</p> <p>Existence of national, regional and provincial federations of Cofradías</p>	<p>Partially</p> <p>Other activities: Training; heritage conservation; support for sports</p> <p>Even there is a National Producers Organisations for the associations that have a POs, the sector is not organise and there is a lack of cooperation</p>	<p>Yes</p> <p>Other activities: training</p> <p>Communication with other communities, physical persons or legal entities and the establishment of Community Fisheries Federations are encouraged</p>	<p>Yes</p> <p>Other activities: training</p> <p>Organisation through the Vietnamese Fisheries Society (VINAFIS) and Provincial Fishery Associations</p>	<p>Partially</p> <p>Other activities: Training of fish cultivation and fisheries resource managements specially these trainings are organized by NGOs</p> <p>Less cooperation among the CBFM projects</p>

Source: Compiled by authors on the basis of International Co-operative Alliance [39]

**Table 3. Advantages that community-based fisheries organisations have to achieve sustainable development**

Aspects of the sustainable development	Contribution of CBFOs
<p><b>Poverty eradication, Food security and protection of aquatic resources and their ecosystems</b></p>	<p>Artisanal fisheries and aquaculture play in the eradication of hunger, food insecurity, malnutrition and poverty and these organisations aim to ensure the fishing rights of local communities and involve them in the resources co-management</p> <p>Definition of a group and their exploitation rights against third parties</p> <p>A clear definition of who can be a member can favour local communities' interest among a multiplicity of actors</p> <p>Organisations are entrusted with certain functions to protect resources: management plans, control, surveillance, etc.</p> <p>Provide local knowledge about environmental issues</p> <p>Gives fishers legitimacy to enforce the rules</p>
<p><b>Economic growth, reduction of inequalities and gender equality</b></p>	<p>Generation of rural employment, population fixation</p> <p>Having a better knowledge and registration of community members helps to make visible sex-disaggregated data</p> <p>Women can be empowered through their participation in management bodies</p> <p>Benefits obtained from the economic activity are based on the work or service provided, not based on any capital contribution</p> <p>Lower transaction costs when performing activities collectively</p> <p>Stronger position against thirds buyers</p> <p>Possibility of including certificates of origin and / or sustainability in production</p>
<p><b>Strengthening of institutions</b></p>	<p>The participation of governments and Public Administration in CBFOs can grant better rights and bring fishers closer to administrations</p> <p>The establishment of specific regulations for CBFOs, if possible based on pre-existing traditional experiences, seems to strengthen the organisation' position in the co-management system</p> <p>The election of representative management bodies can foster strong leadership attitudes that act in favour of the entire community</p> <p>A democratic system to select CBFO's management bodies ensures a more effective participation of fishers in the co-management system and avoids positions of excessive power within the organisation</p> <p>Provision of technical staff to support the management bodies and provision of training on the administrative functions and on fishers' rights and obligations helps to strengthen decision-making capacities of fishers</p> <p>Encourage cooperation among communities from different territories</p>

Source: Compiled by authors

**Table 4. Challenges that community-based fisheries organisations have to achieve sustainable development**

Challenges	How to overcome those challenges
<b>European countries analysed</b>	
Greater difficulty of implementing co-management over non-delimited resource systems, such as marine fishery resources	Improve the definition of property rights over non-delimited resources, involve communities and fishers at higher levels of the decision-making process, replicate successful experiences on delimited resources, promote cooperation between communities
Lack of specific regulation for <i>Portuguese Fisheries Associations</i> , insufficient participation in decision-making processes an excess of bureaucracy	Development specific regulations for <i>Portuguese Fisheries Associations</i> to strengthen their position in the decision-making and define their rights and obligations
Paternalism attitude of the Administration towards <i>Spanish Cofradías</i> , which create problems in the decision-making an excess of bureaucracy	Improvement of the effectivity of the decision-making (more decentralised, better leadership) Reduce bureaucracy resulting from centralist and paternalistic attitudes
Coexistence of short term and private attitudes (economic incentives, opportunistic behaviours) vs. long term and collective attitudes (environmental and social sustainability) in both CBFOs	Strengthening long term and collective attitudes through: better compliance with rules, rules better adapted to the small-scale fisheries, secure long-term rights, and more surveillance.
Low participation of youth in fishing activity and participation of women mainly linked to shell fishing activities	Enhance women and youth participation, also in the management bodies of the CBFOs
Difficulty of maintaining stable financial resources and thus ensuring the proper functioning of the CBFOs	Improve the participation in commercialisation activities, market-oriented activities Facilitate the introduction innovative activities in organisations (through an advantage in taxes and insurance or better access to financing), such as the development of canning, treatment plants, sustainable tourism, museums for heritage conservation, renewable energy, etc.
<b>Asian countries analysed</b>	
Greater difficulty of implementing co-management over non-delimited resource systems, such as marine fishery resources	Improve the definition of property rights over non-delimited resources, involve communities and fishers at higher levels of the decision-making process, replicate successful experiences on delimited resources, promote cooperation between communities
Power relations that exclude fishers from the fishery management	Take advance of the traditional fisheries management for the improvement of the co-management through CBFOs and strengthen their rights against third parties
Weak coordination among stakeholders, lack of institutional collaboration, lack of formal organisation among the country's CBFOs	Enhance formal collaboration between CBFOs, creation of federations
Non-recognition of the organisations' rights by external fishers and other actors to enforce regulations	Development of specific regulations for <i>Bangladeshi CBFM Projects</i> to ensure they are not governed by power groups (such as moneylenders)
Lack of specific regulation for <i>Bangladeshi CBFM Projects</i>	
Many CBFOs remain non-participatory organisations	Establish a clear definition of who are the members of the CBFO and what are their rights and obligations
Participation of multiple actors in the CBFOs (fishers, NGOs, National Government, Regional Governments, etc.) that can difficult management and reduce fishers' power	Ensure the democratic election process to select the management bodies in the <i>Bangladeshi CBFM Projects</i> and the <i>Vietnamese Community Organisations</i>
Conflict between fishery users or with the community	Establish monitoring mechanisms to ensure correct fishers participation in the management bodies and the decision-making to avoid positions of excessive power (for example, limitation of terms)
Existence of opportunistic attitudes by those who occupy positions in the management bodies of CBFOs	Provide technical support (human resources or training)
There is still an overexploitation of resources there is little compliance with the rules	Improve control and surveillance of fisheries resources and involve CBFOs in these activities by providing them with means (technical, economic and human) to enforce the rules
Lack of training and technical knowledge about administrative issues	
Lack of economic resources and access to financial services, both for CBFOs and fishers	Improve the participation in commercialisation activities, market-oriented activities

Carry out other activities such as the provision of goods and services necessary to carry out the fishing activity (gear, baits, transport) collectively to have greater bargaining power and better prices  
The administration can provide organisations with some economic resources for the functions of surveillance and protection of resources that they carry out  
Establish a small membership fee, fishes must perceive that it is being used to their benefit (improve the functioning of the organisation, carry out surveillance tasks, provide training, etc.).

*Source: Compiled by authors*