

Article

Drivers of Small-Scale Fishers' Willingness to Adopt Property Rights Co-Management in the Lake Nokoué and Porto-Novo Lagoon Complex in Southeast Benin

Sètondji Ben-Vital Kolawolé Kpanou ^{1,2,*} , Sylvain Kpenavoun Chogou ¹ , Fèmi E. Hounnou ¹ ,
Augustin K. N. Aoudji ¹, Philippe A. Lalèyè ³ , Houinsou Dedehouanou ¹ and Thomas Dogot ²

¹ Laboratory of Agroecology and Agribusiness, Faculty of Agronomic Sciences, University of Abomey-Calavi, Cotonou 01 BP 526, Benin

² Laboratory of Economy and Rural Development, Gembloux Agro-Bio Tech, University of Liege, Passage des Déportés 2, 5030 Gembloux, Belgium

³ Laboratory of Hydrobiology and Aquaculture, Faculty of Agronomic Sciences, University of Abomey-Calavi, Cotonou 01 BP 526, Benin

* Correspondence: vital.kpanou@gmail.com

Abstract: The estuarine and lagoon areas of southeast Benin are atypical lake territories where private property rights are hereditary from endogenous legal tradition. People live in stilt dwellings and are exclusively dedicated to free-to-access fishing. Consequently, an increasing number of fishers with low respect for the State's general rules for sustainable fishing contribute to legal pluralism and the tragedy of the commons. Co-management of small-scale fisheries has been advocated to offer various benefits, including improved socio-ecological integration, shared sustainable livelihoods, and adherence to biodiversity objectives. This study aims to assess the factors that influence the willingness of small-scale fishers to adopt property rights co-management options in southeast Benin. The data were collected using the discrete choice experiment method. The results show that 44% of fishers are willing to adopt property rights co-management options. This willingness is determined by their involvement in the co-management committee, access to a subsidy and livelihood diversification options. These fishers are the oldest in the sample and primarily owners of Acadja, a traditional fishing tool made of bush and tree branches planted in the lake. Institutional agreements for co-management establishment, such as subsidies to support small-scale fishers' livelihood diversification and capacity-building, must be set up to achieve co-management goals.

Keywords: fishers' choices; management options; subsidy; Benin



Citation: Kpanou, S.B.-V.K.; Kpenavoun Chogou, S.; Hounnou, F.E.; Aoudji, A.K.N.; Lalèyè, P.A.; Dedehouanou, H.; Dogot, T. Drivers of Small-Scale Fishers' Willingness to Adopt Property Rights Co-Management in the Lake Nokoué and Porto-Novo Lagoon Complex in Southeast Benin. *Fishes* **2022**, *7*, 249. <https://doi.org/10.3390/fishes7050249>

Academic Editor: Jiemin Lee

Received: 13 August 2022

Accepted: 17 September 2022

Published: 22 September 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The role of inland fisheries in livelihoods, food security, and sustainable development is often eclipsed by the strongest interest given to ocean issues. Even though inland fisheries capture and contribute to food and nutrition security and the economy less than marine fishing, global-level comparisons of fish production obscure considerable livelihood impacts in certain countries and subnational areas [1]. In several parts of Africa, communities near rivers and water bodies rely on small-scale fisheries, vital in providing food, nutrition, income, and employment for local people [2–4]. Policymakers have frequently overlooked small-scale fisheries in rural development planning, rural economic development, and pro-poor growth policy formulation, mainly due to the lack of reliable data on their gross domestic production (GDP) contribution [5]. Understanding critical behaviour and transitions is essential for the sustainable management and restoration of the environment and ecosystems [6–9].

On the Beninese coast, the Lake Nokoué–Porto-Novo lagoon complex is the largest water body in the country [10,11]. It provides more than 600,000 people livelihoods through

various ecosystem services such as fisheries, floodplain agriculture, and increasing sand extraction activities [12,13]. This complex has been reported as the primary contributor to inland fish production, mainly due to its direct communication with the Atlantic Ocean and the use of Acadja [14,15]. Acadja is a traditional fishing practice where many bush and tree branches are artificially planted to establish brush parks [14]. The Acadja is surrounded by a net supported above the water by stakes during fishing. The branches are removed, the net is gradually moved inwards as the branches are removed, and the whole area is cleared, with the fish concentrated in a small area where they are collected in pots and brought up in a pirogue [16].

Therefore, this complex is subject to the effects of Acadja exploitation pressure on the territories under the lakeside lifestyle: Ganvié and Vekky in “So-Ava”; Zoungamè and Houedomè in “Les Aguégues” [17,18].

Moreover, in these territories, access, extraction, exclusion, and alienation of property rights are inherited from endogenous legal tradition [19]. Given the lake’s lifestyle, these individual property rights are used to construct dwellings on stilts. The historical settlement around water bodies in the study area of indigenous communities (Pedah, Pla, Goun, and Aïzo) since the 15th century has given rise to governance by traditional standards of the property rights of fisheries [20–23]. Traditional property rights in general and ownership of Acadja, in particular, are therefore transferred from one generation to the next [22].

Therefore, the perception of the water body goes beyond simple exploitation but is considered a living space and, as such, is transferable to future generations [19]. According to Sonneveld et al. [22], southeast Beninese inland fishers work like entrepreneurs and invest in their techniques and tools. For instance, Acadja owners know how to organise harvesting labour, and all fishers have good channels to markets. This situation could explain the increase in Acadja from 309 in 1995 to 2227 in 2019 [24]. The majority of those Acadja (1164) are located in “So-Ava” district and only 196 in “Les Aguégues” district. Therefore, there has been a reduction in the area available for free fishing, resulting in an increase in the number of free fishers per unit area and an expected reduction in catch per unit effort.

However, there are acts and regulations to ensure more effective management of fisheries resources and protection of fisheries and the aquaculture environment in Benin. Since 2014, the Law N° 2014–2019 of 7th of August 2014, regulating fishing and aquaculture in the Benin Republic, provided that water bodies and their resources are part of State property [25]. In addition, the law stipulates several measures of a prohibition on using destructive gear and methods such as Acadja. Acadja contributed to the lake’s eutrophication. In fact, hyacinth occurred within the branches of the Acadja where they are blocked and protected from being moved by the wind [26]. Dissolved oxygen, one of the critical factors of aquatic life, becomes scarce because it is much more consumed for the decomposition of tons of discharge wood, degrading the quality of water in the Acadja area [27].

The tragedy of the commons occurs when the norms of self-limitation, carefulness, and community solidarity no longer restrain the actions of individuals, failing communication, agreement, and cooperation [28]. This leads to an “us versus them” attitude in which excluded fishers view the flouting of regulations as fair game, as expressed in the literature [29]. Reducing social pressure to follow the imposed restrictions results in political disassociation and illegal activities [30]. Scholars have increasingly focused on the potential of different forms of stakeholder engagement to achieve better resource, economic, and social outcomes [31]. The shift from expert-led approaches to participatory engagement has taken various forms, as well as cooperative management [32,33], co-management [34,35], and other types of stakeholder engagement in resource management policies, strategies, and decisions [36]. Co-management of natural resources is a well-known approach to managing common-pool resources such as small-scale fisheries because it promotes social and ecological benefits, such as sustainable livelihoods and biodiversity goals [37]. Co-management is a hybrid scheme that emphasises sharing responsibility for fishery management between stakeholders to reduce information and regulation costs and improve

decision-making and regulatory effectiveness [38,39]. Co-managed small-scale fisheries deliver positive ecological and social outcomes where improvements in governance are the most frequently reported [40]. Even though the literature specifies conditions that would encourage co-management, most authors agree that co-management success depends on the specific context [41–44].

Worldwide, policy frameworks such as subsidies or payments for ecosystem services are implemented to reinforce households' involvement and engagement in innovative agri-environmental schemes [45–48]. According to the World Trade Organization, a subsidy is a financial contribution by a government or any public body that confers a benefit to the private sector via transfers of funds, including grants, loans, and equity in fusions or potential fund transfers such as loan guarantees. The subsidy is beneficial if it supports a positive externality, such as improving stock sustainability or social welfare [49]. Following this logic, grants to fisheries management (monitoring, enforcement, stock assessment, etc.), fisheries research, and development are generally classified as good for resource sustainability [50]. However, the theory and available empirical studies are clear—subsidies that artificially increase profits by reducing fishing costs and increasing fishers' revenue result in overcapacity and overfishing [45,51]. Therefore, subsidy promotion should first aim at adjusting consumption and production capacities to a size commensurate with sustainable exploitation limits [52].

To help with the transition to a sustainable fisheries sector, it is necessary to understand better fishers' willingness and motivation to invest in and adopt sustainable practices [53,54].

For decades, studies have been conducted with different environmental and economic methods on how consumers value the environmental benefits of various policy initiatives [55]. Based on the random utility theory (RUT), the discrete choice experiment (DCE) has become one of the most popular survey-based methods among valuation researchers [56]. In stated choice experiments, consumer valuations are elicited indirectly by asking consumers to choose their preferred option from several alternatives given a set of attributes. By varying the characteristics in different scenarios, it is possible to estimate consumers' sensitivity to changes in these attributes and estimate, for example, the price reduction required to compensate for unfavourable attributes [57–59]. Thus, Villamayor-Tomas, Sagebiel, and Olschewski [48] used a DCE to explore farmers' willingness to participate in a tree-planting measure in Germany, Switzerland, and Spain. Their findings illustrate the interest in further integrating farmers in the design of agri-environmental schemes and further testing the feasibility of coordinated plans in the light of the influence of both monetary and social incentives. Christensen et al. [60] employed a DCE to explore Danish farmers' interest in agri-environmental subsidy schemes. They found that farmers are willing to trade-off the size of the subsidy for less restrictive scheme requirements. Phong, Tang, and Hoai [61] used a DCE to identify what motivates farmers to accept good aquaculture practices in development policy. They found that increasing the adoption of good aquaculture practices in Vietnam needs other support policies, such as aquaculture insurance provision, subsidies for wastewater treatment, and compliance with regulations on antibiotic use. Oleson et al. used [62] the DCE method to characterise what is essential to improve fisheries ecosystem protection in the indigenous area of Madagascar. They found that bequest is highly valued and necessary for the respondents, who were willing to pay a substantial portion of their income to protect ecosystems for future generations. Ngoc et al [53] used a choice experiment approach to model fishers' choices when purchasing different potential fishing lots in the communal fishing grounds. They showed that the bidding behaviour of the more privileged group out-competes the other group irrespective of the lot characteristics. One likely suitable policy tool that has had some traction in promoting sustainability and diversification in fisheries and agriculture in developing countries is subsidies [63–65]. The inland fisheries of southeast Benin are not immune to the global debate on the challenges of different approaches of fisheries management at a time when co-management is being promoted in other contexts. The present study assesses

small-scale fishers' willingness to adopt the property rights co-management scheme for water resource sustainability.

2. Methodology

2.1. Study Area

In southeast Benin, there is an estuarine and lagoon complex named Lake Nokoué–Porto-Novo lagoon in the southeast, covering 180 km² and forming part of Ramsar site 1018. It is supplied with fresh water by the Sô and Ouémé rivers and subjected to marine influences through the channels of Cotonou and Badagry [13]. The two bodies of water maintain a permanent link through the three-kilometer-long Totchè channel (Figure 1). This area was selected for the study following previous works [18,19] which demonstrated the existence of the problem of property rights on the water in these two towns.

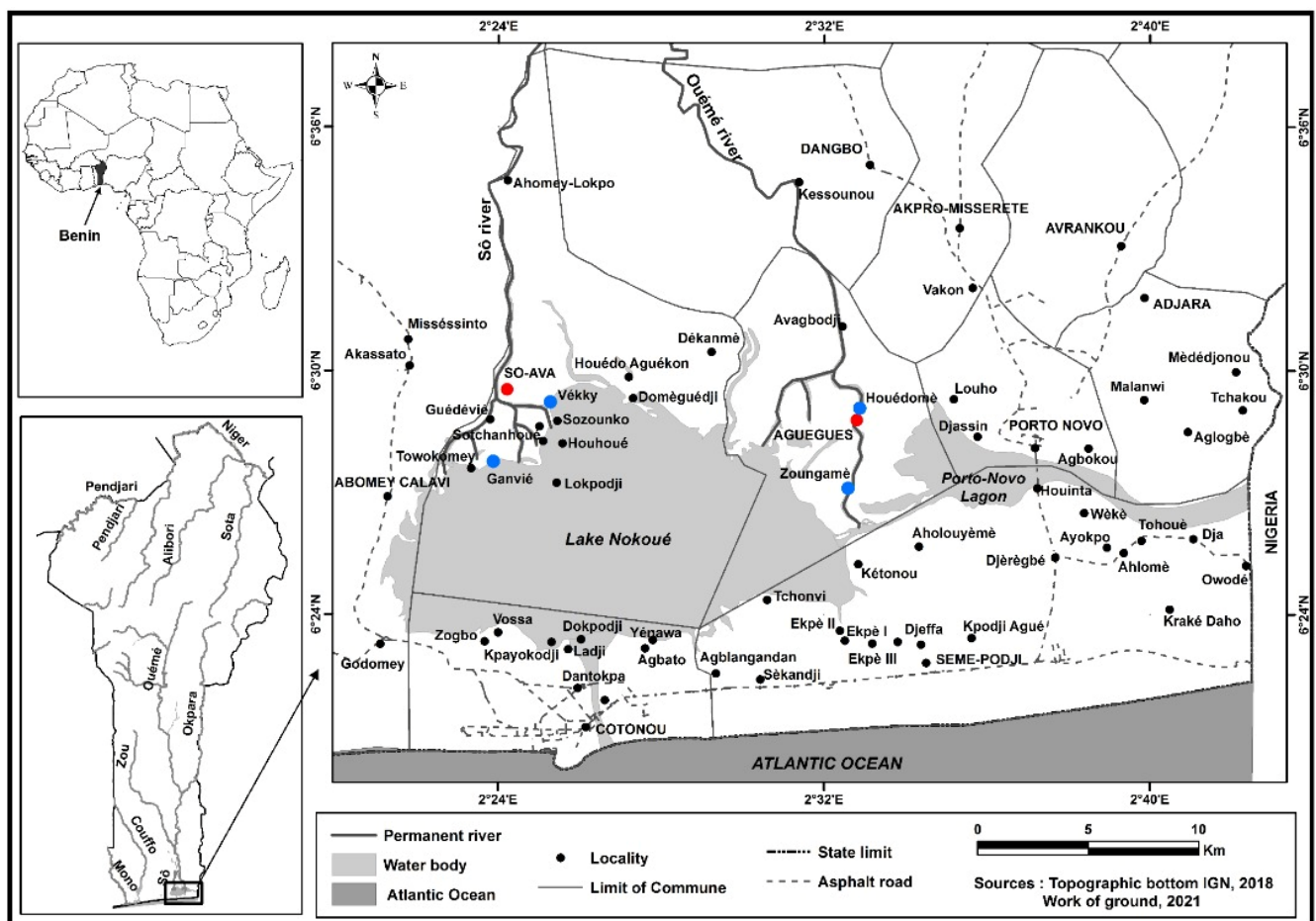


Figure 1. Map of the study area in the southeast of Benin. (**Top left**): Benin is located in West Africa. The country is key-shaped and runs almost vertically from the Atlantic Coast in the south to the north. (**Bottom**): The study zone is located in southeast of Benin, along the coastal area. (**Right**): Estuarine and lagoon complex of Lake Nokoué–Lagoon of Porto-Novo in grey. The red point indicates the two surveyed towns “So-Ava” and “Les Aguégués”, and in blue, there are the 4 sub-districts in which villages were chosen. Source: Made by authors.

2.2. Sampling

“Les Aguégués” and “So-Ava” are two districts with a lakeside lifestyle surrounding the lake that corresponds to the sampling area. The fishers living in these districts were sampled and respondents interviewed. Each district (“Les Aguégués” and “So-Ava”) included several sub-districts and, consequently, villages. Thus, two sub-districts per district and two villages per sub-district were randomly selected. The sample was constituted through the

stratified random sampling technique. The sampling frame corresponded to the estimated list provided by the village leaders. Fishers were chosen from each village according to its size in a random way. Based on Rea and Parker's [66] formula, a total of 251 fishers, including 181 from the "So-Ava" district and 70 from "Les Aguégués", were considered for the survey. To consider non-responses or incomplete questionnaires, estimated at 10%, the sample size is 277.

2.3. Theoretical Framework

2.3.1. Discrete Choice Experiment (DCE) Approach

The DCE combines consumer theory, experimental design theory, and econometric analysis and is grounded on the RUT and Lancaster's theory [67,68]. The RUT suggests that individuals associate a utility with each choice, and considering the utility maximisation behavioural rule, consumers choose the option that offers them the highest utility [56]. Yet, the utility is a latent construct that the researcher cannot observe [69]. In addition, Lancaster's theory states that products and services can be described using a set of characteristics (attributes). Therefore, the systematic utility can be represented by the attributes, levels, and individual characteristics [56]. Since the utility is a latent construct that the researcher cannot observe, it is represented by a systematic or measurable part and a random component [69].

Meanwhile, the random component contains an error term related to the unobserved preference variation [70]. The error term can also be defined as the difference between the actual utility and the utility captured by the estimated model [71]. More correctly, considering that V_{iq} is the systematic utility of alternative i for individual q and ε_{iq} is the random component associated with alternative i and individual q , the utility of alternative i for individual q (U_{iq}) is represented as follows:

$$U_{iq} = V_{iq} + \varepsilon_{iq}. \quad (1)$$

Since U_{iq} is a random variable, the model cannot predict which exact alternative the individual will choose but the probability it will be selected.

2.3.2. Mixed Logit and Latent Class Logit Models

Different discrete choice models can be derived, assuming a specific probability distribution for the error terms. The multinomial logit (MNL) model, one that is further used, is obtained when the error terms are independently and identically distributed extreme values (IID) (the Gumbel hypothesis). In this case, the choice probabilities P_{iq} can be easily calculated and are represented as:

$$P = \frac{\exp^{V_{iq}}}{\sum_j \exp^{V_{jq}}}. \quad (2)$$

The MNL model shows independence from the irrelevant alternative property, which makes its use inappropriate to model choice situations when particular substitution patterns exist. To overcome these limitations, the alternative flexible model mostly used is mixed logit (MXL) [72,73]. The MXL makes it possible to detect any unobserved heterogeneity in preferences [74]. Given their flexibility, MXL models can approximate any random utility model and overcome the main limitations of the MNL [56]. Thus, it is possible to cope with random taste heterogeneity, free substitution patterns, and the panel correlation effect inherent to stated choice data under the MXL approach. In this study, we firstly used the MXL model to show heterogeneity between fishers' choices among co-management alternatives and the factors determining them. The utility function in mixed logit is formulated as follows:

$$U_{in} = V(X_n(\gamma + \delta_i)) + \varepsilon(X_n), \quad (3)$$

where γ is a parameter that varies with the random component δ_i due to preference heterogeneity between individuals, V is the systematic utility of each alternative, and X_n is the vector of the attributes. The MXL estimates the probability that individual n will choose alternative i from a set of choice alternatives J as follows:

$$Prob_{in} = \frac{\exp[v(X_n(\gamma + \delta_i))]}{\sum_{j=1}^J \exp[v(X_n(\gamma + \delta_i))]} \quad (4)$$

The indirect utility function derived is as follows:

$$V_{in} = \alpha_0 \times ASC + \sum (\alpha_{jk} \times X_{jk}) + \sum (\tau_{nk} \times X_{jk}) + \sum \varphi_{jk}(S_n \times ASC), \quad (5)$$

where τ_{nk} is a parameter vector that reflects the heterogeneity of preferences between individuals. It is assumed constant for all choice alternatives but varies across respondents.

However, it may be easier to interpret heterogeneity by looking at discrete groups, especially if preferences might be very distinct [75]. We relax the assumption of preference homogeneity by assuming that fishers' preferences can be described by a finite set of distinct values [65]. This will lead to a latent class specification. The latent class logit (LCL) model does not violate the IIA hypothesis and differs from the MXL model as it admits that coefficient distribution can be discrete rather than continuous [76]. The benefit of an LCL over an MXL is that in the former, we, as researchers, do not have to make any distributional assumptions, but we do have to decide how many support points to include in our discrete distributions [77,78]. LCL uses a statistical methodology based on the concept of likelihood to identify the sources of heterogeneity at the segment level rather than the individual level, similar to the MXL model [79]. This model is increasingly applied in recent segmentation studies and generates good results [61,75,80].

Additionally, within property rights co-management alternatives, such segmentation of the fishers seems appropriate because they may have a different point of view [81]. The LCL model can be principally convenient for detecting sub-groups of people who could benefit from a common intervention based on their shared characteristics [82]. Therefore, we also estimated a latent class logit model where distinct classes numbered model heterogeneity. Considering that fisher i chooses options j from K co-management options in a choice set and assuming that the fisher belongs to segment s , with $s \in S$, the indirect utility function for the preferred fisher co-management profile j is written as follows:

$$U_{ij/s} = \beta_s X_{ij} + \varepsilon_{ij/s}, \quad (6)$$

where X_{ij} is a vector representing the attributes associated with K co-management options, β_s are segment s and the parameter vector associated with the vector X_{ij} , and $\varepsilon_{ij/s}$ is an error term. Assuming that the error terms are independently and identically distributed following the Gumbel distribution, the probability that fisher i chooses an alternative among K co-management options while belonging to a given segment is as follows:

$$P_{k/s} = \prod_1^K \frac{\exp(X_{ij}\beta_s)}{\sum_1^K \exp(X_{ik}\beta_s)}. \quad (7)$$

Now, consider $M_{ns}^* = \lambda_s Z_n + \xi_{ins}$ to be a function of the probability (P_s) belonging to the characteristics of fisher, and λ_s ($S = "2, 3, \dots S"$) are the specific parameters used to estimate each segment. We assume that the error terms ξ_{ins} are IID between the fishers and segments, aligning with the Gumbel model. The probability that a fisher r belongs to segment s can be expressed as follows:

$$P_s = \frac{\exp(\lambda_s Z_n)}{\sum_1^S \exp(\lambda_s Z_n)}. \quad (8)$$

By combining Equations (7) and (8), we obtain the following expression representing the probability that fisher i belongs to segment s and chooses K co-management options j :

$$P_{jn/s} = \sum_1^S P_S P_{K/S} = \sum_1^S \left(\frac{\exp(\lambda_S Z_n)}{\sum_1^S \exp(\lambda_S Z_n)} \right) \prod_1^k \frac{\exp(X_{ij}\beta_S)}{\sum_1^k \exp(\beta_S X_{ik})}. \quad (9)$$

The log-likelihood function to be maximised to obtain parameters λ_S and β_S is expressed as follows:

$$L = \sum_k \sum_n l_i l_n P_{jn/s}, \quad (10)$$

where l_i is a dummy variable of observed choice.

2.4. Empirical Approach

2.4.1. Identification of Attributes and Choice Setting

The attributes and levels involved in our discrete choice experiments were determined through exchange with experts in the Beninese fisheries sector, local government officials, and previous studies [65,83]. According to Bateman et al. [84], four to six attributes with two to five levels per attribute are sufficient to characterise a good or service. When deciding on their property rights used for fishing, dwellings, and livelihood satisfaction, fishers will choose the co-management alternatives among the possible ones that maximise their utility. If none offers good utility, they will not adopt.

The co-management committee will consist of various actors such as the fisher's community representatives, the towns' administration and the public agents of fisheries, and the public sector structures in charge of the quality of life, health, transport and traffic, and other well-being services. In this configuration, the various zones' designation would result from negotiation between the co-management committee members. Considering both demographic growth and development issues would enable the committee actors to anticipate the need for space for a fisheries free access zone, socio-community services, and dwellings, and ultimately make institutional and regulatory proposals for sustainable settlements.

Thus, following the literature, five attributes and their levels varying between 2 and 5 were selected to describe the fishing property rights co-management scheme:

- (i) the area of the property on the water body that the fisher accepts to concede to the co-management scheme [85];
- (ii) membership of the committee, of which the fisher could be required to personally be a member or one of his parents or one member of his community could be required to be involved in the committee [37];
- (iii) social incentive: access to other income-generating productive and sustainable activities in water bodies or outside to build resilient livelihood systems and avoid Acadja settlement [86,87];
- (iv) financial incentives: access to National Fund for Agricultural Development (NFAD) subsidy to invest in other activities [64];
- (v) ecological incentive: availability of fishing space, no pollution in water bodies, and juvenile fish conservation where the fishers could obtain a guarantee that the water body will be clean and proper, without pollution caused by Acadja waste [88–90].




To test the relevance of the attributes to respondents, we conducted two focus groups with representatives of fishers using the different gear types (nets and Acadja). The levels of attributes retained from the focus group are presented in Table 1.

Table 1. Selected co-management committee attributes and attribute levels.

Co-Management Schemes Attributes	Attribute Levels
Water area conceded to co-management (WAC)	(1) 100% (2) 75% (3) 50% (4) 25% (5) 0%
Membership of co-management committee	(1) The fisher must be involved in the committee (2) One community member involved in the committee (3) Fisher community members must be involved in the committee
Social incentive (agree with activity diversification)	(1) Yes (2) No
Financial incentives (agree with NFAD subsidy)	(1) Yes (2) No
Ecological incentive	1 = Juvenile fish conservation 2 = No water pollution 3 = More space available for free fishing and navigation

The second step of the choice experiment method was to develop choice cards. Combining the five selected attributes and their respective levels generated $5 \times 3 \times 2 \times 2 \times 3 = 180$ co-management schemes profiles. Using the orthogonal design method in SPSS v25, 24 realistic and applicable co-management schemes profiles were selected, considering the literature about co-management and participatory management in fisheries and focus group discussions. Choice cards were constructed by randomly pairing the profiles and using a status quo option as a reference. The status quo option refers to fishers' current management practices for property rights on water bodies. Twelve (12) cards with three options (two co-management schemes, profiles options, and status quo) were constructed. One of the choice cards is shown in Table 2.

Table 2. Example of choice card.

Attributes	Option A	Option B	Option C
Water area conceded to co-management (WAC)	100%	75%	Status quo
Co-management committee membership	A fisher must be involved	One community member involved	
Social incentive	Agree with activity diversification	Agree with activity diversification	
Financial incentives	Agree with subsidy	Disagree with backing subsidy	
Ecological incentive	Juvenile fish conservation	Juvenile fish conservation	
I prefer			

Data were collected with a structured two-section questionnaire. The first section concerned the socio-demographic questions (age, education, fishing experience, fishing association membership, access to extension services, etc.). In the second section, the fishers were asked to choose a property rights co-management option (A or B) or their current practice (option C) in the choice game. Attributes with more than three levels have been disaggregated ($n - 1$) by considering an attribute level as a reference. In the model, status quo, which was designed as a dummy, was equal to 1 if respondents chose their current practice (option C) and 0 otherwise (option A or B). ASC is an alternative specific constant which captures the utility corresponding to the status quo.

2.4.2. Models' Specification

For the MXL model, the basic model explains the importance of the defined attributes in the fishers' choice. The explanatory variables included in this model are water area conceded to co-management (WAC), fisher must be co-management committee member (FCM), fisher family member must be co-management committee member (FFC), social incentive, agree to activity diversification (SI), financial incentive, agree to NFAD subsidy (FI), no water pollution as ecological incentive (NWP), more space available as ecological incentive (MSA), and ASC. The indirect utility function of individual n opting for a choice set i can be formulated as follows:

$$V_{in} = \alpha_0 ASC + \alpha_1 WAC_{in} + \alpha_2 FCM_{in} + \alpha_3 FFC_{in} + \alpha_4 SI_{in} + \alpha_5 FI_{in} + \alpha_6 NWP_{in} + \alpha_7 MSA_{in},$$

where α are the parameters to be estimated. The interaction model includes the socio-economic characteristics of fishers as interacting variables with ASC. The interaction model was specified as follows:

$$V_{in} = \alpha_0 ASC + \alpha_1 WAC_{in} + \alpha_2 FCM_{in} + \alpha_3 FFC_{in} + \alpha_4 SI_{in} + \alpha_5 FI_{in} + \alpha_6 NWP_{in} + \alpha_7 MSA_{in} + \alpha_8 ASC * Age_n + \alpha_9 ASC * Exp_n + \alpha_{10} ASC * Educ_n + \alpha_{11} ASC * Fsize_n + \alpha_{12} ASC * Assoc_n + \alpha_{13} ASC * ManualC_n + \alpha_{14} ASC * MotorC_n + \alpha_{15} ASC * Acadja_n.$$

The LCL model is written as follows:

$$V_{in} = \beta_{0ij} + \beta_{1ij} WAC + \beta_{2ij} FCM + \beta_{3ij} FFC + \beta_{4ij} SI + \beta_{5ij} FI + \beta_{6ij} NWP + \beta_{7ij} MSA + \beta_{8ij} Age + \beta_{9ij} Exp + \beta_{10ij} Educ + \beta_{11ij} Fsize + \beta_{12ij} Assoc + \beta_{13ij} ManualC + \beta_{14ij} MotorC + \beta_{15ij} Acadja + \lambda_{ij},$$

where β_{0j} is the constant profile j , $\beta_{.i}$ represents the coefficients of the explanatory variables, and λ_{ij} is a composed error term.

A statistically significant and negative partial coefficient associated with the interaction between any variable and ASC indicates that the variable generates a higher probability that fishers will choose the co-management options, while a positive partial coefficient indicates a higher probability that fishers will choose the status quo. The socio-economic factors influencing co-management adoption were tested using the interaction equation.

Socio-economic variables are modelled through interactions with ASC. Thus, a statistically significant and negative partial coefficient of the interaction between any variable and the ASC shows that the variable generates a higher probability that fishers will choose the alternative co-management options. Thus, a positive partial coefficient indicates a higher likelihood that fishers prefer the status quo.

The socio-economic variables included in the MXL and LCL models were fishers' characteristics, and the co-management schemes attributes, as described in Table 3. Data analysis was performed using STATA software, version 15.0 (Copyright 1985–2017 Stata-Corp LLC, 4905 Lakeway Drive, College Station, TX, USA).

Prior to latent class model estimation, the first step in estimating was the determination of the optimal number of classes and choosing the best class for analysis. The best model is the one with the lowest BIC value [82,91]. In Table 4, the model information criteria show that the BIC was minimised to four (4) segments. Therefore, a four (4)-segment model was selected to better explain the heterogeneity of preferences.

Table 3. Definition of the socio-economic variables in the interaction model.

Variables	Definition	Modality
ASC	Status quo or current management	1 = Option (C) 0 = Option (A or B)
WAC	Water area conceded to co-management (WAC)	(1) 100% (2) 75% (3) 50% (4) 25% (5) 0%
Co-management committee membership		(1) The fisher must be involved in the committee (2) One community member involved in the committee (3) Fisher community members must be involved in the committee
SI	Social incentive (agree with activity diversification)	(1) Yes (2) No
FI	Financial incentives (agree with NFAD subsidy)	(1) Yes (2) No
EI	Ecological incentive	1 = Juvenile fish conservation 2 = No water pollution (NWP) 3 = More space available for free fishing and navigation (MSA)
Age	Age of fisher in years	Continuous
Exp	Number of years of experience in fishing	Continuous
Educ	Access to formal education	0 = Did not go to school 1 = At least primary school level
Fsize (Family size)	Number of people the fisher is in charge of	Continuous
Assoc	Membership of an anglers' group	0 = No; 1 = Yes
ManualC	Manual canoe ownership	0 = No; 1 = Yes
MotorC	Motorised canoe ownership	0 = No; 1 = Yes
Acadja	Acadja ownership	0 = No; 1 = Yes

Table 4. Latent class logit model information criteria.

Number of Classes	AIC	BIC
1	11,561.89	11,619.55
2	10,734.93	10,886.29
3	10,332.78	10,613.87
4	10,113.14	10,473.52
5	9983.177	10,494.91
6	10,004.08	10,559.06

3. Results

3.1. Socio-Demographic and Fishing Characteristics

The fishers in the study area have an average age of 50 with 35 years of professional fishing experience (Table 5). The average number of dependents of these fishers is nine.

Sixty-six percent of the fishers have no formal education, compared to 24% who have primary education and 9% who have secondary education. In addition, 64% are not literate in their local language. Only 14% of the fishers are members of fishers' associations, and among them, 64% always respect the decisions taken in the association.

Table 5. Fishers' socio-demographic and fishing characteristics (standard deviation in between brackets).

Variables	Statistics
Socio-demographics	
Average age (years)	50(17)
Average fishing experience (years)	35(17)
Average household size	9(5)
Education level	
% of fishers with no education	66
% of fishers with primary school	24
% of fishers with college-level education (%)	9
% of fishers with a university degree (%)	2
Literacy level	
% of fishers who have no literacy in the local language (%)	64
Fishing tools characteristics	
% of fishers who are members of the fishing association	14
% of fishers who always follow the association decision (%)	64
The average number of fishing days per week during the period of abundance	5(1)
The average number of fishing days per week in periods of scarcity	3(2)
% of fishers who practice fishing in free space (%)	83
% of fishers who practice fishing in Acadja (%)	62
Number of prohibited gear (Acadja) installed per fishers	
% of fishers with 1 Acadja	62
% of fishers with 2 Acadja	23
% of fishers with more than 2 Acadja	9
% of fishers with manual canoe ownership	96
% of fishers with motorised canoe ownership	32
Fishing labor characteristics	
% of fishers fishing alone	19
% of fishers fishing with family labour	68
% of fishers fishing with temporary labour	68
% of fishers fishing with hired labour	2

Concerning fishing practices, the fishers in the study area go fishing on average five days a week, especially in periods of the highest fish abundance (March, April, May, and June). They work an average of 3 days per week for the rest of the year. Concerning fishing methods, 83% of the fishers work in open spaces, free to access, using gear such as still nets, drag nets, dip nets, hawks, pots, lines, longlines, crab scales, etc. In addition, 62% of the fishers practice fishing in restricted access areas with fixed gear, such as Acadja. Regarding the use of Acadja, 62% of the fishers have only one installation, as opposed to 23% who have two, and the rest have more than two Acadja installations. To move around on the water, 96% of the fishers have rowing dugout canoes, and 32% have motorised dugout canoes. About the labour force, 19% of the fishers work alone while 68% employ either family or casual labour. Only 2% of the fishers employ permanent workers.

3.2. Mixed Logit Models

Table 6 shows the results of the MXL model estimation. The basic model is globally significant at 1%. All the coefficients associated with the attributes are significant at 1% except the coefficients of the attribute "one fisher family member involved in the committee", which is significant at 5% and the coefficient of attribute "ecological motivation (no water pollution)" which is not significant. It indicates that the attributes "water area conceded to co-management", "fisher must be involved in the committee", "agree with activity diversification", and "agree with NFAD subsidy" significantly determine the probability that fishers choose a co-management option.

Table 6. Mixed logit results (^a = ASC (status quo) is current management practices (1 if the respondent chooses the status quo and 0 otherwise). **, *** indicate statistical significance at 5, and 10 percent levels, respectively).

Variables	Basic		Interaction	
	Coef.	Std. Err.	Coef.	Std. Err.
ASC ^a	−0.709 ***	0.101	−1.887 ***	0.437
Agree with NFAD subsidy	1.269 ***	0.078	1.322 ***	0.081
Water area conceded to co-management	−0.680 ***	0.053	−0.712 ***	0.052
A fisher must be involved	−0.458 ***	0.097	−0.503 ***	0.100
Fisher family members must be committee members	−0.224 **	0.103	−0.174	0.108
Agree with activity diversification	0.791 ***	0.074	0.852 ***	0.072
No water pollution	0.098	0.070	0.100	0.069
More space available	0.322 ***	0.089	0.364 ***	0.089
ASC_Fishers' age			0.107 ***	0.010
ASC_Fishing experience			−0.133 ***	0.010
ASC_Education level			0.160	0.151
ASC_Fishers family size			0.006	0.016
ASC_Fishers association membership			−0.840 ***	0.234
ASC_Manual canoe ownership			0.245	0.332
ASC_Motorised canoe ownership			0.852 ***	0.163
ASC_Acadja ownership			−0.169	0.160
Standard Deviation				
Water area conceded to co-management	0.762 ***	0.051	0.671 ***	0.048
A fisher must be involved	−0.604 ***	0.151	0.679 ***	0.140
Fisher family members must be committee members	−0.083	0.344	−0.167	0.266
Agree with activity diversification	−0.613 ***	0.095	0.502 ***	0.109
No water pollution	−0.024	0.140	−0.019	0.140
More space available	−0.024	0.129	−0.037	0.137
Log likelihood	−2729.810			−2612.305
LR chi2(6)	811.83			590.25
Prob > chi2	0.0000			0.0000
Number of obs	9972			9972
AIC	5487.621			5268.611
BIC	5588.526			5427.177

The coefficients associated with the attributes “agree with NFAD subsidy”, “agree with activity diversification”, and “more space available” are positive. Results indicate that the less the fishers access NFAD subsidy and diversification activities, the less their utility would increase. Additionally, they are motivated to contribute to making more space available for fishing for co-management establishments.

The coefficients associated with the attributes “a fisher must be involved”, “fisher’s family members must be committee member”, and “water area conceded to co-management” are negative. It indicates that the more the fishers or at least one member of his family are involved in the committee, the more they are willing to adopt co-management options. In addition, fishers are motivated to concede water areas (Acadja, dwellings, and other community areas) to contribute to co-management establishment. The results also reveal significant standard deviations of the coefficients associated with the attributes. It means that fishers have effective heterogeneous preferences concerning the attributes “a fisher must be involved”, “agree with activity diversification”, and “water area conceded to co-management”.

The results of the interaction model show that age, fishing experience, membership in a fishers' association, and ownership of a motorised canoe significantly determine the fishers' choice. The negative sign associated with the fishing experience indicates the ability of more experienced fishers to opt for co-management options. The same trend is observed with fishers included in fishing associations. In contrast, the positive sign associated with fishers' age and ownership of a motorised canoe indicates that if fishers are not older or owners of motorised canoes, they are unwilling to adopt co-management options.

3.3. The Latent Class Logit Model

LCL models with different numbers of classes were estimated and compared using the Bayesian information criterion (BIC). The variables such as education, years of fishing experience, fisher's family size, membership in fishers' association, manual and motorised canoe ownership, and Acadja ownership were significantly relevant to characterise the classes of fishers (Table 7). Fishers in class 1 were likelier to have less fishing experience than those in other classes. Fishers in class 2 were likely to be more educated, have a larger family size, and be older but have fewer Acadja than other classes. Class 3 fishers were likely to own Acadja but had less fishing experience than others. Class 4 comprises older, more experienced fishers and Acadja owners as a priority, compared to other classes. Fishers in classes 1, 2, 3, and 4 represented 22%, 10%, 24%, and 44% of the sample.

The model showed that all co-management attributes were significantly relevant to the choices made by fishers on the cards except the attribute "no water pollution". Additionally, the parameter of the ASC is significant and negative for class 4 only. It expresses that only these fishers found their utility increased with co-management options and are willing to adopt them. The non-significance of the status quo for classes 1, 2, and 3 does not allow us to capture the preference of these classes' fishers for co-management options. The "water area conceded to co-management" parameter was negatively significant only for class 4. This shows that class 4 fishers are ready to concede area on the water body and are willing to adopt co-management options. The attribute "agree with NFAD subsidy" parameter was significant and positive for classes 1 and 4 and negative for class 3. It shows that class 3 fishers' utility will increase if they are granted a subsidy. Additionally, the less the fishers of classes 1 and 4 receive a grant, the less their utility will increase, and the less class 4 fishers will adopt co-management options. The parameter of the attribute "a fisher must be involved" was significant and positive for class 4 and negative for class 1. It specifies that the less the class 4 fishers are involved in the committee, the less their utility will increase. Conversely, the more class 1 fishers are engaged in the co-management committee, the more their utility will grow. In the same trend, the utility of class 3 fishers will grow if at least one of their family members is on the co-management committee.

Furthermore, the "agree with activity diversification" parameter is significant and positive for classes 1 and 4. It points out that their utility will rise if they have access to other income-generating activities while adopting co-management options, especially for class 4 fishers. The parameter associated with the attribute "more space available" is significant and positive for class 3 and negative for class 4. This shows the class 4 fishers' tendency for extensive area availability conversely to class 3, who do not find this profitable for their utility.

Table 7. Latent class model results (^a = ASC (status quo) is current management practices (1 if the respondent chooses the status quo and 0 otherwise). Numbers without brackets are estimated parameters; numbers in brackets are standard errors of the estimated parameters. *, **, *** indicate statistical significance at 1, 5, and 10 percent levels, respectively. Class 1 was considered as the reference. This means that a positive parameter indicates a higher probability that the respondent with a given characteristic is a member of class 2, 3, or 4 compared to class 1. Conversely, a negative parameter indicates a higher probability that the respondent is a member of class 1 compared to class 2, 3, or 4).

Parameter Estimation Results for Co-Management Attributes Included in the Four-Class LCL Model				
Attributes	Class 1	Class 2	Class 3	Class 4
ASC ^a	−15.954 (150.436)	15.548 (637.082)	−15.850 (338.585)	−0.682 *** (0.136)
Agree with NFAD subsidy	2.848 *** (0.808)	−12.091 (110.660)	−9.498 ** (3.751)	7.731 *** (0.731)
Water area conceded to co-management	−0.074 (0.467)	−35.800(0)	0.888 (0.999)	−3.176 *** (0.277)
A fisher must be involved	−0.924 * (1.680)	−211.826(0)	−8.361 (179.025)	6.230 *** (0.658)
Fisher family member must be committee member	−2.601 (1.533)	−13.632(0)	−9.904 ** (3.256)	−0.446 (0.336)
Agree with activity diversification	1.904 *** (0.298)	2.483 * (1.223)	−3.082 (2.511)	2.489 *** (0.408)
No water pollution	−0.909 (0.680)	19.598 (258.82)	4.972 (3.708)	−0.307 (0.318)
More space available	−2.294	12.669	14.547 *** (4.083)	−7.59 *** (0.895)
Parameter Estimation Results of the Socio-Economic Variables Included in the Four-Class LCL				
Variables	Class 2	Class 3	Class 4	
Fishers' age	0.300 *** (0.023)	0.202 *** (0.023)	0.223 *** (0.023)	
Fishing experience	−0.354 *** (0.0244)	−0.177 *** (0.022)	−0.208 *** (0.021)	
Education	0.714 ** (0.221)	0.065 (0.227)	0.011 (0.232)	
Fishers' family size	0.079 ** (0.0240)	−0.019 (0.017)	0.003 (0.017)	
Fisher association membership	−71.913	−0.200 (0.236)	−0.653 * (0.259)	
Manual canoe ownership	−4.410 *** (0.470)	−3.665 *** (0.484)	−3.807 *** (0.509)	
Motorised canoe ownership	1.069 *** (0.234)	−0.3968 (0.288)	−0.284 (0.295)	
Acadja ownership	−0.2623 (0.387)	1.403 *** (0.285)	2.322 *** (0.307)	
Number of respondents = 277				
Number of obs = 9972				
Log likelihood = −5006.5717				

4. Discussion

Fishers' individual preferences differ in several ways. It is therefore challenging to identify the co-management options that are suitable solutions for all fishers together. Whether improving dwelling installation, fixed fishing gear (Acadja) repartition, or free fishing area allocation, the co-management options are likely to have both advocates and critics.

The mixed logit model's estimation results show that the ASC parameter is significant and negative. This result indicates that fishers globally prefer co-management options and

are ready to abandon the current situation (status quo) of property rights management on water bodies. These findings conform to those of Masud et al. [90], who showed that most of Malaysia's fishers acknowledged the co-management approach as necessary to conserve and develop diverse natural resources. Additionally, the co-management process increased participation alongside trade unions, producer organisations, and scientists, as expressed by [92]. However, co-management adoption and establishment must avoid shifting the burden of responsibility onto resource users' local institutions to overcome dilemmas. This shift in responsibility should avoid neglecting the nuanced understanding of the realities of many resource-dependent communities, including the disparity in users' access to resources and the social inequality and poverty they face [88,93,94].

As well, the results of the latent class model indicate that class 4 (44% of the sample) involved the leading adopters. These fishers are the oldest in the sample, are part of fishers' associations, and are Acadja owners. The less they are individually involved in the co-management committee with access to income-generating activities, the less they are willing to adopt co-management options. In agreement with these findings, Villamayor-Tomas et al. [48] related that further integrating farmers in the design of agri-environmental schemes with both monetary and social incentives could influence their adoption and participation in such programs. Jentoft [95] reported that together with institutional building (committee involvement), capacity building (social incentive) plays an essential role in facilitating the participation of fishers in co-managing fisheries. Hossain and Banik [96] also suggested that social capital is the primary determinant of fishers' resilience in the co-managed fisheries systems and should be reinforced.

In sum, the membership in fishers' associations, the involvement in co-management committees, and the respect for their desire to would allow for solid institutional arrangements between fishers and other fisheries stakeholders. These findings agree with Varughese and Ostrom's [97] and Poteete and Ostrom's [98] findings that institutional well-suited local users' preferences should promote their willingness to co-manage resources. As part of their willingness to adopt, these fishers would like to have a subsidy. This result follows Czajkowski et al.'s [99] findings, which led to broader adoption of extensive farming practices requiring a high subsidy level increase. These results also confirmed those of Jara-Rojas, Bravo-Ureta, and Díaz [100], who presented farmer access to subsidies as positively associated with water irrigation technology adoption. According to Notohamijoyo et al. [101], in Indonesia, subsidy programs for small-scale fisheries were demonstrated to create benefits to the well-being of the fishers and fisheries' sustainability when focused on fishing vessels, vessel machines, and environmentally friendly fishing gear. From a co-management perspective, unemployment insurance subsidy implementation was suggested by shellfish harvesters to improve fishery sustainability during the closed period in northeast Brazil [102]. Furthermore, Rodriguez-Canul et al. [103] advocated a subsidies program set up by the Mexican federal government to improve women's inclusion in fishing organisations for protected area development and conservation.

However, Symes, and Phillipson [104] argued that support for the artisanal fisheries sector could be provided without a financial subsidy. Several forms of action are possible: (i) granting preferential access to coastal waters for vessels under a given size, (ii) limiting the transferability of fishing rights granted to local coastal vessels, and (iii) relaxing some of the regulations surrounding licensing and quota restrictions. In a country such as Benin, where accurate fisheries information, such as catch and effort data, is scarcely available, measures such as a fishing quota, access permit, etc., seem to be not applicable. Thus, fishery subsidies might serve as significant livelihood support for low-income small-scale fisheries [105]. There are, therefore, advantages to providing subsidies and grants for supporting fisheries' well-being and sustainability [106]. As Sakai, Yagi, and Sumaila [51] emphasised, the challenge is to direct these subsidies toward the real needs of the fishers in the socio-ecological systems and avoid overexploitation.

However, the fishers of classes 1 (22% of the sample) and 3 (24% of the sample) own fixed gear (Acadja) and are not members of fishers' associations. Their utilities will increase

when receiving subsidies and activity diversification support. Nonetheless, they would not concede any water area for co-management option implementation. If conceding water area for co-management is considered a payment, these fishers are not willing to pay but want to receive subsidies and social incentives to participate in the process. This result confirms Phong, Thang, and Hoai's [61] research which indicated that Vietnamese farmers are unwilling to pay for good aquaculture practices but requested a subsidy to treat wastewater using biological processes. Furthermore, this result seems to demonstrate a lack of trust and loss of faith between individual fishers and fishers' associations' leaders in one part and towards fishery authorities in the second part, as noted in southeast Benin by Sonneveld [22]. These fishers could probably meet their utility goal in conceding areas on the water bodies to contribute to the co-management process if they were confident of the transparency of the process. As confirmed by Trimble and Plummer's [107] findings, trust and communication are essential for co-management of social–ecological systems. If they are missing, the committees will not work since fishers will doubt their partners and vice versa. Murunga, Partelow, and Breckwoldt [108] emphasised that the linkage between leadership and trust is essential for promoting strong stakeholder interactions and the emergence of collective action in social–ecological systems. Though fisheries governance through co-management promotes interplays between fishers' communities and the government, the lack of trust could lead to the perception that the government would reinforce its current management rules and remove the fishers' property rights.

Finally, fishers of class 2 (10% of the sample) do not meet their utility goal in adopting property rights co-management options. Since they do not use fixed equipment such as Acadja, class 2 fishers cannot see the adoption of co-management of properties as a priority. Therefore, even without co-management, their fishing activity could continue. This result is in agreement with Pita, Pierce, and Theodossiou's [109] and Quynh et al.'s [110] findings. They found that mobile gear fishers do not perceive the necessity for fishing restrictions, while fixed gear fishers perceive the need for fishing restrictions.

5. Conclusions

Co-management has been advocated worldwide under the assumption that fisher participation in resource regimes increases the authority of decisions, reduces transaction costs, and contributes to resource sustainability. This study focused on determining small-scale fishers' willingness to adopt property rights co-management in the Lake Nokoué and Porto-Novo Lagoon complex in southern Benin. Applying the discrete choice experiment approach shows that less than half of fishers are willing to adopt such co-management schemes. However, more fishers can be converted to adopters if appropriate schemes are devised. The socio-ecological context of southern Benin fisheries recommends helping fishers diversify their livelihood assets and reduce fishing time to contribute to property rights co-management.

This study demonstrates that some fishers do not want to concede water area to contribute to co-management establishment. Therefore, some questions arise: Will fishers who only have space for dwellings be able to access the same facilities as those who also have space for fixed gear? How can we ensure that the areas formerly under Acadja are not taken over again by other fishers? Considering the local context, how could this co-management be operationalised? It will probably be necessary to set up solid institutional trust agreements between fishers at the fishers' association level and with the government and relative stakeholders. Furthermore, capacity building, subsidy, and livelihood diversification programs should be explored.

Author Contributions: All authors were involved in preparing the manuscript. Conceptualisation, S.B.-V.K.K., S.K.C., H.D. and T.D.; data curation, S.B.-V.K.K., F.E.H., A.K.N.A., P.A.L. and T.D.; formal analysis, S.B.-V.K.K., F.E.H., A.K.N.A., P.A.L. and T.D.; funding acquisition, S.B.-V.K.K., H.D. and T.D.; investigation, S.B.-V.K.K., S.K.C., F.E.H., A.K.N.A. and H.D.; methodology, S.B.-V.K.K., S.K.C., F.E.H., A.K.N.A., P.A.L., H.D. and T.D.; project administration, T.D.; resources, S.B.-V.K.K., H.D. and T.D.; software, S.B.-V.K.K., F.E.H. and H.D.; supervision, H.D. and T.D.; validation, S.B.-V.K.K., S.K.C., F.E.H., P.A.L., H.D. and T.D.; visualisation, S.B.-V.K.K., S.K.C., F.E.H., A.K.N.A., P.A.L., H.D. and T.D. writing—original draft, S.B.-V.K.K., S.K.C., F.E.H., A.K.N.A., P.A.L., H.D. and T.D.; writing—review and editing, S.B.-V.K.K., S.K.C., F.E.H., A.K.N.A., P.A.L., H.D. and T.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the “Académie de Recherche et de l’Enseignement Supérieur de la Fédération Wallonie Bruxelles (Belgium), Commission de la Coopération au Développement (ARES CCD)” through exceptional scholarship program: Ref/TD/001/2022.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors are particularly grateful to “Académie de Recherche et de l’Enseignement Supérieur de la Fédération Wallonie Bruxelles (Belgium), Commission de la Coopération au Développement (ARES CCD)” and to all fishers and stakeholders involved in this study for their valuable time and the vital information they gave.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Funge-Smith, S.; Bennett, A. A fresh look at inland fisheries and their role in food security and livelihoods. *Fish Fish.* **2019**, *20*, 1176–1195. [\[CrossRef\]](#)
2. FAO. *The State of World Fisheries and Aquaculture 2016: Contributing to Food Security and Nutrition for All*; FAO: Rome, Italy, 2016; p. 200.
3. Lynch, A.J.; Cowx, I.G.; Fluet-Chouinard, E.; Glaser, S.M.; Phang, S.C.; Beard, T.D.; Bower, S.D.; Brooks, J.L.; Bunnell, D.B.; Claussen, J.E.; et al. Inland fisheries—Invisible but integral to the UN Sustainable Development Agenda for ending poverty by 2030. *Glob. Environ. Chang.* **2017**, *47*, 167–173. [\[CrossRef\]](#)
4. Welcomme, R.L.; Cowx, I.G.; Coates, D.; Béné, C.; Funge-Smith, S.; Halls, A.; Lorenzen, K. Inland capture fisheries. *Philos. Trans. R. Soc. B Biol. Sci.* **2010**, *365*, 2881–2896. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Weeratunge, N.; Béné, C.; Siriwardane, R.; Charles, A.; Johnson, D.; Allison, E.H.; Nayak, P.K.; Badjeck, M.-C. Fish and Fisheries-2013-Weeratunge-Small-scale fisheries through the wellbeing lens.pdf. *Fish Fish.* **2014**, *15*, 255–279. [\[CrossRef\]](#)
6. Egoh, B.; Reyers, B.; Rouget, M.; Richardson, D.M.; Le Maitre, D.C.; van Jaarsveld, A.S. Mapping ecosystem services for planning and management. *Agric. Ecosyst. Environ.* **2008**, *127*, 135–140. [\[CrossRef\]](#)
7. Carpenter, S.R.; Mooney, H.A.; Agard, J.; Capistrano, D.; Defries, R.S.; Diaz, S.; Dietz, T.; Duraipappah, A.K.; Oteng-Yeboah, A.; Pereira, H.M.; et al. Science for managing ecosystem services: Beyond the Millennium Ecosystem Assessment. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 1305–1312. [\[CrossRef\]](#)
8. Scheffer, M.; Carpenter, S.R.; Dakos, V.; Van Nes, E.H. Generic Indicators of Ecological Resilience: Inferring the Chance of a Critical Transition. *Annu. Rev. Ecol. Syst.* **2015**, *46*, 145–167. [\[CrossRef\]](#)
9. Spears, B.M.; Futter, M.N.; Jeppesen, E.; Huser, B.J.; Ives, S.; Davidson, T.A.; Adrian, R.; Angeler, D.G.; Burthe, S.J.; Carvalho, L.; et al. Ecological resilience in lakes and the conjunction fallacy. *Nat. Ecol. Evol.* **2017**, *1*, 1616–1624. [\[CrossRef\]](#)
10. Lederoun, D.; Lalèyè, K.R.; Boni, A.R.; Amoussou, G.; Vodougnon, H.; Adjibogoun, H.; Lalèyè, P.A. Length–weight and length–length relationships of some of the most abundant species in the fish catches of Lake Nokoué and Porto-Novo Lagoon (Benin, West Africa). *Lakes Reserv. Res. Manag.* **2018**, *23*, 351–357. [\[CrossRef\]](#)
11. Degila, H.W.; Azon, N.B.N.; Adoukpe, J.G.; Chikou, A.; Aïna, M.P. Mercury content of sarotherodon melanotheron and chrysischthys nigrodigitatus of Lake Nokoué and Porto Novo lagoon in Benin. *Int. J. Biol. Chem. Sci.* **2020**, *14*, 2322–2332. [\[CrossRef\]](#)
12. Mama, D. *Méthodologie et Résultats du Diagnostic de L’eutrophisation du Lac Nokoué (Bénin)*; Université de Limoges: Limoges, France, 2010.
13. Djihouessi, M.B.; Aina, M.P.; Kpanou, B.-V.; Kpondjo, N. Measuring the Total Economic Value of Traditional Sand Dredging in the Coastal Lagoon Complex of Grand-Nokoué (Benin). *J. Environ. Prot.* **2017**, *8*, 1605–1621. [\[CrossRef\]](#)
14. Djihouessi, M.B.; Djihouessi, M.B.; Aina, M.P. A review of habitat and biodiversity research in Lake Nokoué Benin Republic: Current state of knowledge and prospects for further research. *Ecohydrol. Hydrobiol.* **2019**, *19*, 131–145. [\[CrossRef\]](#)
15. Okpeitcha, O.V.; Chaigneau, A.; Morel, Y.; Stieglitz, T.; Pomalegni, Y.; Sohoun, Z.; Mama, D. Seasonal and interannual variability of salinity in a large West-African lagoon (Nokoué Lagoon, Benin). *Estuar. Coast. Shelf Sci.* **2022**, *264*, 107689. [\[CrossRef\]](#)

16. Niyonkuru, C. Etude Comparative de L'exploitation et de la Démographie des Poissons Cichlides Dans les Lacs Nokoué et Ahémé au Bénin. Ph.D. Thesis, Université d'Abomey-Calavi, Godomey, Benin, 2007.
17. *Synthèse des Analyses sur l'Etat et la Structure de la Population*; INSAE: Cotonou, Bénin, 2017; 21p.
18. Djihouessi, M.B.; Aina, M.P. A review of hydrodynamics and water quality of Lake Nokoué: Current state of knowledge and prospects for further research. *Reg. Stud. Mar. Sci.* **2018**, *18*, 57–67. [\[CrossRef\]](#)
19. Kpanou, S.B.-V.K.; Dedehouanou, H.; Kpenavoun-Chogou, S.; Aoudji, A.K.N.; Dogot, T. Factors Influencing Small-Scale Fishers' Individual Perceived Wellbeing Satisfaction in Southern Benin. *Sustainability* **2021**, *13*, 6279. [\[CrossRef\]](#)
20. Pliya, J. *La Pêche Dans le Sud-Ouest du Bénin. Étude de Géographie Appliquée sur la Pêche Continentale et Maritime*; Agence de Coopération Culturelle et Technique: Paris, France, 1980.
21. Sidi, L. Contribution à L'étude de la Pêche Continentale en République Populaire du Bénin. Ph.D. Thesis, Université de Dakar, Dakar, Senegal, 1981.
22. Sonneveld, B.; Thoto, F.; Houessou, D.; van Wesenbeeck, L. The tragedy of the inland lakes. *Int. J. Commons* **2019**, *13*, 609–636. [\[CrossRef\]](#)
23. Kpanou, B.-V.; Dedehouanou, H.; Dogot, T. Dynamique socio-économique et institutionnelle de la pêche continentale dans les milieux estuariens et lagunaires du sud bénin: Synthèse bibliographique. *Ann. Sci. Agron.* **2020**, *24*, 25–39.
24. Chaffra, S.A.; Agbon, C.A.; TchiBozo, É. Cartographie par télédétection des Acadjas, une technique de pêche illicite sur le lac Nokoué au Bénin. *Sci. Tech. Lett. Sci. Soc. Hum.* **2020**, *5*, 11–29.
25. Bénin, P.; de la Rue, D. *Loi Cadre n°2014 du 07 Août 2014 Relative à la Pêche et L'aquaculture en République du Bénin*; FAO: Rome, Italy, 2014. Available online: <https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC162059/> (accessed on 20 September 2022).
26. Djihouessi, M.B.; Tigo, B.A.; Aina, M.P. The use of nutrient budget approach for informing eutrophication management in urbanised shallow coastal lakes: A case study from Lake Nokoué in Benin. *Ecolhydrol. Hydrobiol.* **2021**, *21*, 341–353. [\[CrossRef\]](#)
27. Dedjiho, C.A.; Alassane, A.; Chouti, W.; Sagbo, E.; Changotade, O.; Mama, D.; Boukari, M.; So-Hounhloue, D.C.K. Negative Impacts of the Practices of Acadjas on the Aheme Lake in Benin. *J. Environ. Prot.* **2014**, *5*, 301–309. [\[CrossRef\]](#)
28. Ostrom, E.; Alt, J.E. *The Evolution of Institutions for Collective Action*; Alt, J.E., North, D.C., Eds.; Political; Cambridge University Press: Cambridge, UK, 1990.
29. Charles, A.T. Towards sustainability: The fishery experience. *Ecol. Econ.* **1994**, *11*, 201–211. [\[CrossRef\]](#)
30. May, C.K. Sustainable Development-2008-May-Achieving sustainability in US fisheries community engagement in co-management.pdf. *Sustain. Dev.* **2008**, *16*, 390–400. [\[CrossRef\]](#)
31. Schewe, R.L.; Hoffman, D.; Witt, J.; Shoup, B.; Freeman, M. Citizen-Science and Participatory Research as a Means to Improve Stakeholder Engagement in Resource Management: A Case Study of Vietnamese American Fishers on the US Gulf Coast. *Environ. Manag.* **2020**, *65*, 74–87. [\[CrossRef\]](#)
32. Bailey, M.; Sumaila, R.; Martell, S.J.D. Can Cooperative Management of Tuna Fisheries in the Western Pacific Solve the Growth Overfishing Problem? *Strateg. Behav. Environ.* **2013**, *3*, 31–66. [\[CrossRef\]](#)
33. Bibb, S.; Bloom, S.; Brinson, A.; Chandler, M.; Davenport, G.; Denit, K.; Dinardo, G.; Gange, J.; Giordano, S.; Gutierrez, A.; et al. *Cooperative Research and Cooperative Management: A Review with Recommendations*; NOAA Fisheries: Washington, DC, USA, 2017.
34. Berkes, F. Co-management. Bridging the Two Solitudes. *North. Perspect.* **1994**, *22*, 18–20.
35. Marin, A.; Berkes, F. Network approach for understanding small-scale fisheries governance: The case of the Chilean coastal co-management system. *Mar. Policy* **2010**, *34*, 851–858. [\[CrossRef\]](#)
36. Chuenpagdee, R.; Jentoft, S. Step zero for fisheries co-management: What precedes implementation. *Mar. Policy* **2007**, *31*, 657–668. [\[CrossRef\]](#)
37. Quimby, B.; Levine, A. Participation, power, and equity: Examining three key social dimensions of fisheries comanagement. *Sustainability* **2018**, *10*, 3324. [\[CrossRef\]](#)
38. Schreiber, D.K. Co-management without involvement the plight of fishing communities. *Fish Fish.* **2002**, *2*, 376–384. [\[CrossRef\]](#)
39. Plummer, R. The evolution of sustainable development strategies in Canada: An assessment of three federal natural resource management agencies. *Sustain. Dev.* **2005**, *14*, 16–32. [\[CrossRef\]](#)
40. D'Armengol, L.; Prieto Castillo, M.; Ruiz-Mallén, I.; Corbera, E. A systematic review of co-managed small-scale fisheries: Social diversity and adaptive management improve outcomes. *Glob. Environ. Chang.* **2018**, *52*, 212–225. [\[CrossRef\]](#)
41. Jentoft, S.; Bavinck, M.; Johnson, D.S.; Thomson, K.T. Fisheries Co-management and Legal Pluralism: How an analytical Problem Becomes an institutional One. *Hum. Organ.* **2009**, *68*, 27–38. [\[CrossRef\]](#)
42. Trimble, M.N. Towards Adaptive Co-Management of Artisanal Fisheries in Coastal Uruguay: Analysis of Barriers and Opportunities, with Comparisons to Paraty (Brazil). Ph.D. Thesis, University of Manitoba, Winnipeg, MB, Canada, 2013.
43. Williams, K.W.; Tai, H.-S. A Multi-Tier Social-Ecological System Analysis of Protected Areas Co-Management in Belize. *Sustainability* **2016**, *8*, 104. [\[CrossRef\]](#)
44. De la Cruz-González, F.J.; Patiño-Valencia, J.L.; Luna-Raya, M.C.; Cisneros-Montemayor, A.M. Self-empowerment and successful co-management in an artisanal fishing community: Santa Cruz de Miramar, Mexico. *Ocean Coast. Manag.* **2018**, *154*, 96–102. [\[CrossRef\]](#)
45. Sumaila, U.R.; Ebrahim, N.; Schuhbauer, A.; Skerrett, D.; Li, Y.; Kim, H.S.; Mallory, T.G.; Lam, V.W.L.; Pauly, D. Updated estimates and analysis of global fisheries subsidies. *Mar. Policy* **2019**, *109*, 103695. [\[CrossRef\]](#)

46. Birge, T.; Herzon, I. Exploring cultural acceptability of a hypothetical results-based agri-environment payment for grassland biodiversity. *J. Rural Stud.* **2019**, *67*, 1–11. [\[CrossRef\]](#)
47. Haile, K.K.; Tirivayi, N.; Tesfaye, W. Farmers' willingness to accept payments for ecosystem services on agricultural land: The case of climate-smart agroforestry in Ethiopia. *Ecosyst. Serv.* **2019**, *39*, 100964. [\[CrossRef\]](#)
48. Villamayor-Tomas, S.; Sagebiel, J.; Olschewski, R. Bringing the neighbors in: A choice experiment on the influence of coordination and social norms on farmers' willingness to accept agro-environmental schemes across Europe. *Land Use Policy* **2019**, *84*, 200–215. [\[CrossRef\]](#)
49. Squires, D.; Clarke, R.; Chan, V. Subsidies, public goods, and external benefits in fisheries. *Mar. Policy* **2014**, *45*, 222–227. [\[CrossRef\]](#)
50. Li, S. Incorporation of Fisheries Policy into Regional Blocs?—Lessons from the EU's Common Fisheries Policy. *Fishes* **2022**, *7*, 102. [\[CrossRef\]](#)
51. Sakai, Y.; Yagi, N.; Sumaila, U.R. Fishery subsidies: The interaction between science and policy. *Fish. Sci.* **2019**, *85*, 439–447. [\[CrossRef\]](#)
52. Markus, T. Towards sustainable fisheries subsidies: Entering a new round of reform under the Common Fisheries Policy. *Mar. Policy* **2010**, *34*, 1117–1124. [\[CrossRef\]](#)
53. Ngoc, Q.T.K.; Xuan, B.B.; Sandorf, E.D.; Phong, T.N.; Trung, L.C.; Hien, T.T. Willingness to adopt improved shrimp aquaculture practices in Vietnam. *Aquac. Econ. Manag.* **2021**, *25*, 430–449. [\[CrossRef\]](#)
54. Kumar, G.; Engle, C.; Tucker, C. Factors Driving Aquaculture Technology Adoption. *J. World Aquac. Soc.* **2018**, *49*, 447–476. [\[CrossRef\]](#)
55. Silva, P.; Cabral, H.; Rangel, M.; Pereira, J.; Pita, C. Ready for co-management? Portuguese artisanal octopus fishers' preferences for management and knowledge about the resource. *Mar. Policy* **2019**, *101*, 268–275. [\[CrossRef\]](#)
56. Cantillo, J.; Martín, J.C.; Román, C. Discrete choice experiments in the analysis of consumers' preferences for finfish products: A systematic literature review. *Food Qual. Prefer.* **2020**, *84*, 103952. [\[CrossRef\]](#)
57. Louviere, J.J.; Hensher, D.A.; Swait, J.D.; Adamowicz, W. Combining Sources of Preference Data. Cambridge University Press: Cambridge, UK, 2000; ISBN 9780511753831.
58. Hensher, D.A.; Rose, J.M.; Greene, W.H. *Applied Choice Analysis*; Cambridge University Press: Cambridge, UK, 2005; pp. 1–1188. [\[CrossRef\]](#)
59. Olesen, I.; Alfnes, F.; Røra, M.B.; Kolstad, K. Eliciting consumers' willingness to pay for organic and welfare-labelled salmon in a non-hypothetical choice experiment. *Livest. Sci.* **2010**, *127*, 218–226. [\[CrossRef\]](#)
60. Christensen, T.; Branth, A.; Oersted, H.; Raun, M.; Hasler, B.; Denver, S. Determinants of farmers' willingness to participate in subsidy schemes for pesticide-free buffer zones—A choice experiment study. *Ecol. Econ.* **2011**, *70*, 1558–1564. [\[CrossRef\]](#)
61. Phong, T.N.; Thang, V.T.; Hoai, N.T. What motivates farmers to accept good aquaculture practices in development policy? Results from choice experiment surveys with small-scale shrimp farmers in Vietnam. *Econ. Anal. Policy* **2021**, *72*, 454–469. [\[CrossRef\]](#)
62. Oleson, K.L.L.; Barnes, M.; Brander, L.M.; Oliver, T.A.; Van Beek, I.; Zafindrasilivonona, B.; Van Beukering, P. Cultural bequest values for ecosystem service flows among indigenous fishers: A discrete choice experiment validated with mixed methods. *Ecol. Econ.* **2015**, *114*, 104–116. [\[CrossRef\]](#)
63. Garrity, D.P.; Akinnifesi, F.K.; Ajayi, O.C.; Weldesemayat, S.G.; Mowo, J.G.; Kalinganire, A.; Larwanou, M.; Bayala, J. Evergreen Agriculture: A robust approach to sustainable food security in Africa. *Food Secur.* **2010**, *2*, 197–214. [\[CrossRef\]](#)
64. Cisneros-Montemayor, A.M.; Sanjurjo, E.; Munro, G.R.; Hernández-Trejo, V.; Rashid Sumaila, U. Strategies and rationale for fishery subsidy reform. *Mar. Policy* **2016**, *69*, 229–236. [\[CrossRef\]](#)
65. Xuan, B.B.; Sandorf, E.D. Potential for Sustainable Aquaculture: Insights from Discrete. *Environ. Resour. Econ.* **2020**, *77*, 401–421. [\[CrossRef\]](#)
66. Rea, L.M.; Parker, R.A. *Designing and Conducting Survey Research: A Comprehensive Guide*; Josey-Bass: San Francisco, CA, USA, 1997.
67. McFadden, D. Conditional Logit Analysis of Qualitative Choice Behavior. In *Frontiers in Econometrics*; Zaremba, P., Ed.; Academic Press: New York, NY, USA, 1973; pp. 105–142.
68. Lancaster, K.J. A new approach to consumer theory. *J. Polit. Econ.* **1966**, *74*, 132–157. [\[CrossRef\]](#)
69. Louviere, J.J.; Flynn, T.N.; Carson, R.T. Discrete Choice Experiments Are Not Conjoint Analysis. *J. Choice Model.* **2010**, *3*, 57–72. [\[CrossRef\]](#)
70. Domencich, T.A.; McFadden, D. *Urban Travel Demand—A Behavioral Analysis*; North-Holland Publishing Company Limited: Oxford, UK, 1975.
71. Train, K.E. *Discrete Choice Methods with Simulation*, 2nd ed.; Cambridge University Press: New York, NY, USA, 2009; ISBN 978-0-521-76655-5. (hardback)-ISBN 978-0(521-74738-7).
72. Bonnicksen, O.; Ladenburg, J. Reducing Status Quo Bias in Choice Experiments—An Application of a Protest Reduction Entreaty. *Nord. J. Health Econ.* **2015**, *3*, 47–67. [\[CrossRef\]](#)
73. Mariel, P.; Hoyos, D.; Meyerhoff, J.; Czajkowski, M.; Dekker, T.; Glenk, K.; Bredahl Jacobsen, J.; Liebe, U.; Bøye Olsen, S.; Sagebiel, J.; et al. *Environmental Valuation with Discrete Choice Experiments Guidance on Design, Implementation and Data Analysis*; Springer: Berlin/Heidelberg, Germany, 2021; ISBN 9783030626686.
74. Vidogbèna, F.; Adégbidi, A.A.; Garnett, S.T.; Koudandé, D.O.; Agbo, V.; Zander, K.K. Peace, health or fortune? Preferences for chicken traits in rural Benin. *Ecol. Econ.* **2010**, *69*, 1848–1857. [\[CrossRef\]](#)

75. Ankamah-Yeboah, I.; Jacobsen, J.B.; Olsen, S.B. Innovating out of the fishmeal trap: The role of insect-based fish feed in consumers' preferences for fish attributes. *Br. Food J.* **2018**, *120*, 2395–2410. [\[CrossRef\]](#)
76. Gbénou-Sissinto, E.; Adegbola, Y.P.; Biao, G.; Zossou, R.C. Farmers' Willingness to pay for new storage technologies for maize in Northern and Central Benin. *Sustainability* **2018**, *10*, 2925. [\[CrossRef\]](#)
77. Greene, W.H.; Hensher, D.A. A latent class model for discrete choice analysis: Contrasts with mixed logit. *B. Methodol. Transp. Res.* **2003**, *37*, 681–698. [\[CrossRef\]](#)
78. Kaczan, D.; Swallow, B.M.; Adamowicz, W.L.V. Designing payments for ecosystem services (PES) program to reduce deforestation in Tanzania: An assessment of payment approaches. *Ecol. Econ.* **2013**, *95*, 20–30. [\[CrossRef\]](#)
79. Birol, E.; Asare-Marfo, D.; Karandikar, B.; Roy, D. *A Latent Class Approach to Investigating Farmer Demand for Biofortified Staple Food Crops in Developing Countries: The Case of High-Iron Pearl Millet in Maharashtra, India, HarvestPlus Working Paper 7*; International Food Policy Research Institute (IFPRI): Washington, DC, USA, 2011.
80. Vivithkeyoonvong, S.; Jourdain, D. Willingness to pay for ecosystem services provided by irrigated agriculture in Northeast Thailand. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2017**, *13*, 14–26. [\[CrossRef\]](#)
81. Ayers, A.L.; Kittinger, J.N.; Vaughan, M.B. Whose right to manage? Distribution of property rights affects equity and power dynamics in comanagement. *Ecol. Soc.* **2018**, *23*, 37. [\[CrossRef\]](#)
82. Weller, B.E.; Bowen, N.K.; Faubert, S.J. Latent Class Analysis: A Guide to Best Practice. *J. Black Psychol.* **2020**, *46*, 287–311. [\[CrossRef\]](#)
83. Brewer, T.D.; Moon, K. Towards a functional typology of small-scale fisheries co-management informed by stakeholder perceptions: A coral reef case study. *Mar. Policy* **2015**, *51*, 48–56. [\[CrossRef\]](#)
84. Bateman, I.J.; Carson, T.R.; Day, B.; Hanemann, M.W.; Hanley, N.; Hett, T.; Lee, J.M.; Loomes, G.; Mourato, S.; Özdemiroglu, E.; et al. *Economic Valuation with Stated Preference Techniques: A Manual*; Edward Elgar Publishing: Cheltenham, UK, 2002; ISBN 9781840649192.
85. Buckley, C.; Hynes, S.; Mechan, S. Supply of an ecosystem service—Farmers' willingness to adopt riparian buffer zones in agricultural catchments. *Environ. Sci. Policy* **2012**, *24*, 101–109. [\[CrossRef\]](#)
86. Suharno; Anwar, N.; Saraswati, E. Do fishers need to diversify their source of income? A special reference in vulnerable fishers of cilacap waters, Indonesia. *AACL Bioflux* **2018**, *11*, 1605–1615.
87. Sène-Harper, A.L.; Camara, S.M.E.; Matarrita-Cascante, D. Does Diversification Lead to Livelihood Security in Fishing-Farming Communities? Insight from the Senegal River Delta. *Hum. Ecol.* **2019**, *47*, 797–809. [\[CrossRef\]](#)
88. Ebel, S.A. Moving beyond co-management: Opportunities and limitations for enabling transitions to polycentric governance in Chile's territorial user rights in fisheries policy. *Int. J. Commons* **2020**, *14*, 278–295. [\[CrossRef\]](#)
89. Rahman, M.J.; Wahab, M.A.; Nahiduzzaman, M.; Haque, A.B.M.M.; Cohen, P. Hilsa fishery management in Bangladesh. *IOP Conf. Ser. Earth Environ. Sci.* **2020**, *414*, 012018. [\[CrossRef\]](#)
90. Masud, M.M.; Shahabudin, S.M.; Baskaran, A.; Akhtar, R. Co-management approach to sustainable management of marine protected areas: The case of Malaysia. *Mar. Policy* **2022**, *138*, 105010. [\[CrossRef\]](#)
91. Kornher, L.; Schellhorn, M.; Vetter, S. Disgusting or innovative—consumer willingness to pay for insect based burger patties in Germany. *Sustainability* **2019**, *11*, 1878. [\[CrossRef\]](#)
92. Garza-Gil, M.D.; Pérez-Pérez, M.I.; Fernández-González, R. Governance in small-scale fisheries of Galicia (NW Spain): Moving toward co-management? *Ocean Coast. Manag.* **2020**, *184*, 105013. [\[CrossRef\]](#)
93. Béné, C.; Friend, R.M. Poverty in small-scale fisheries: Old issue, new analysis. *Prog. Dev. Stud.* **2011**, *11*, 119–163. [\[CrossRef\]](#)
94. Davis, A.; Ruddle, K. Massaging the misery: Recent approaches to fisheries governance and the betrayal of small-scale fisheries. *Hum. Organ.* **2012**, *71*, 244–254. [\[CrossRef\]](#)
95. Jentoft, S. Fisheries co-management as empowerment. *Mar. Policy* **2005**, *29*, 1–7. [\[CrossRef\]](#)
96. Hossain, M.A.; Banik, A.K. What drives the resilience of wetland-dependent fishermen? Social determinants of co-management in Bangladesh. *Environ. Dev.* **2022**, *42*, 100668. [\[CrossRef\]](#)
97. Varughese, G.; Ostrom, E. The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal. *World Dev.* **2001**, *29*, 747–765. [\[CrossRef\]](#)
98. Poteete, A.R.; Ostrom, E. Heterogeneity, group size and collective action: The role of institutions in forest management. *Dev. Change* **2004**, *35*, 435–461. [\[CrossRef\]](#)
99. Czajkowski, M.; Zagórska, K.; Letki, N.; Tryjanowski, P.; Waś, A. Drivers of farmers' willingness to adopt extensive farming practices in a globally important bird area. *Land Use Policy* **2021**, *107*, 104223. [\[CrossRef\]](#)
100. Jara-Rojas, R.; Bravo-Ureta, B.E.; Díaz, J. Adoption of water conservation practices: A socioeconomic analysis of small-scale farmers in Central Chile. *Agric. Syst.* **2012**, *110*, 54–62. [\[CrossRef\]](#)
101. Notohamijoyo, A.; Wiyata, A.; Billah, M. Sustainable fisheries subsidies for small scale fisheries in Indonesia. In Proceedings of the ICESD 2019, Jakarta, Indonesia, 22–23 October 2019. 11p.
102. Da Silva Mourão, J.; Baracho, R.L.; Martel, G.; Barboza, R.R.D.; de Faria Lopes, S. Local ecological knowledge of shellfish collectors in an extractivist reserve, Northeast Brazil: Implications for co-management. *Hydrobiologia* **2020**, *847*, 1977–1997. [\[CrossRef\]](#)
103. Rodríguez-Canul, R.; López-Ercilla, I.; Solano, N.; Melo, F.-R.F.; Fernández-Rivera Melo, F.J.; Torre, J.; Biodiversidad, C. Unveiling Women's Roles and Inclusion in Mexican Small-Scale Fisheries (SSF). *Front. Mar. Sci.* **2021**, *7*, 617965. [\[CrossRef\]](#)
104. Symes, D.; Phillipson, J. Whatever became of social objectives in fisheries policy? *Fish. Res.* **2009**, *95*, 1–5. [\[CrossRef\]](#)

-
105. Owusu, V.; Adjei, M. Politics, power and unequal access to fisheries subsidies among small-scale coastal fisherfolk in Ghana. *Ocean Coast. Manag.* **2021**, *214*, 105920. [[CrossRef](#)]
 106. Ali, J.; Abdullah, H.; Saifoul, M.; Noor, Z.; Kuperan Viswanathan, K.; Islam, G.N. The Contribution of Subsidies on the Welfare of Fishing Communities in Malaysia. *Int. J. Econ. Financ. Issues* **2017**, *7*, 641–648.
 107. Trimble, M.; Plummer, R. Participatory evaluation for adaptive co-management of social–ecological systems: A transdisciplinary research approach. *Sustain. Sci.* **2019**, *14*, 1091–1103. [[CrossRef](#)]
 108. Murunga, M.; Partelow, S.; Breckwoldt, A. Drivers of collective action and role of conflict in Kenyan fisheries. *World Dev.* **2021**, *141*, 105413. [[CrossRef](#)]
 109. Pita, C.; Pierce, G.J.; Theodossiou, I. Stakeholders’ participation in the fisheries management decision-making process: Fishers’ perceptions of participation. *Mar. Policy* **2010**, *34*, 1093–1102. [[CrossRef](#)]
 110. Quynh, C.N.T.; Schilizzi, S.; Hailu, A.; Iftekhhar, S. Fishers’ Preference Heterogeneity and Trade-offs Between Design Options for More Effective Monitoring of Fisheries. *Ecol. Econ.* **2018**, *151*, 22–33. [[CrossRef](#)]