

Article

Notes on the Quality of Life of Artisanal Small-Scale Fishermen along the Pacific Coast of Jalisco, México

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Abstract: Sustainable fishing includes the socioeconomic status of fishers. We combined empirical quality of life (QOL) and subjective lived experiences methods to explore the social sustainability of artisanal fishers in five fishery collectives along the coast of Jalisco, Mexico, where the average daily income is slightly above the poverty level. The QOL scores were also related to annual catch and incomes within each collective. A QOL index is used in this study that combines importance and achievement ratings scores; the results are indicative of an acceptable QOL for fishermen. The concept of lived experiences, incorporating aspects of life relating to *Mind*, *Body*, *Work* and *People* was explored through interviews with 12 fishers. The QOL data revealed that family and friends are important indicators related to positive QOL reported by the sample, while economic indicators were not important. Although four of the five collectives perceived that the future looks worse than the present and past, there was limited correlation between catch or income and QOL. However, while the lived experiences exercise in part supported the QOL findings, in that *People* was the most important dimension for almost all of the fishers interviewed, negative economic gaps related to poor catches and

incomes were prevalent in the *Mind* and *Work* dimensions. The findings suggest that to understand the socioeconomic component of sustainable fisheries, both of these approaches should be considered, as they can illuminate different aspects of fishers' lives that need to be considered during the development of fisheries' management policies.

Keywords: lived experiences; sustainable fishing; gap

1. Introduction

Fishing is an important economic and social activity that humans have practiced from the time of prehistory wherever access to water is available. Every year, more than 100 million tons of fish are caught in the world and, together with fish products, contribute significantly to human wellbeing by providing a way of life to approximately 200 million people. More than a billion people, especially in poor countries, depend on fishing to satisfy their needs for animal proteins. Fishing also promotes human wellbeing by contributing to cultural needs, for example, for the Amazonian ritual *Yakwa* (*Yakwa* is the largest indigenous ritual in the Brazilian Amazon where the Enawene Nawe, spend several months in the jungle to build complex wooden dams across the river and catch fish, which are then smoked before taking them to their communities by canoe. When they go back, they perform an exchange of food between humans and spirits that lasts for four months), and as a food supply, besides providing other social benefits [1].

Coastal, artisanal fishing is carried out mainly by fishermen in a cooperative (A cooperative organization is a voluntary association of people who seek common benefits and all participate in making decisions. The cooperative movement was strengthened in recent years in Mexico, as a response to the difficulties imposed by the neoliberal model). These coastal fishermen's cooperatives are mostly rural organizations characterized by the use of traditional fishing gears and methods, such as gillnets and hooks [2]. These collective societies are considered one of the most vulnerable social groups in many countries [3–6], and although this activity may not contribute significantly to gross national products, for a large number of coastal inhabitants, fishing is the only possibility to help develop a local economy. If the prevailing conditions in these communities are poverty and negative environmental impacts of fishing, what socio-economic variables linked to sustainability are important?

Agyeman and Evans define sustainability as “the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems” ([7], p. 157). This definition includes a statement regarding quality of life for the resource users. Sustainable fishing has mainly been focused on achieving conservation success of the target fisheries, which should lead to attainment of the social and economic goals of fishing communities [8]. We are interested in the indicators that can measure social conditions related to sustainable fisheries.

Recent research has drawn attention to the traditional role played by governments as an effective administrator of the sustainable use of natural resources, advocating instead for an emphasis on the role of local institutions and stakeholders in conserving ecosystems, including local access rights and privileges. Thus, viable fish stocks require viable fishing communities [9,10]. This approach requires active participation of regional community members in defining the ecological and social values

underlying the development of their fishery, but this element is often lacking. Local communities that structure fisheries around social concerns successfully contribute to the sustainable biological use of the resources [10].

There are a diverse set of social indicators that can be used to understand a community. For example, wellbeing has traditionally been inferred from economic indicators under the hypothesis that a healthy economy is related to societal wellbeing; however, this is not always the case [11]. Wellbeing and quality of life (QOL) are indicators related to social sustainability, but a number of methodological issues related to their use have been identified, such as whether they are objective or subjective measures, whether they apply to the community or individual scale, and whether they focus on the present or in the future [12]. The difference between the use of QOL-wellbeing approaches and sustainability is that while QOL and well-being are related to the present, sustainability usually refers to future states [11]. The literature relating sustainability [13], wellbeing and quality of life indicators has increased significantly in the last decade, and most of the studies attempt to quantify and qualify these concepts; however, there is not widespread agreement about the significance of the work to help policymaking [14]. Even so, the concept of QOL has been used as a multipurpose indicator of sustainable development [15] and is closely linked to other indicators such as happiness and contentment.

Some researchers have proposed that objective dimensions of wellbeing related to its social, economic and health dimensions provide little or no information about the QOL of individuals [14,16–18], so most research has focused on subjective components of QOL. Although there is a lack of universal agreement about theory or procedure to measure QOL [17,19], research reveals that health, wellbeing, ratings of quality of QOL, life satisfaction and satisfaction with environmental quality of life are core elements of QOL. In recent years, researchers have combined theories to explain people's perception about QOL, by accepting that the concept implicates both theories: norms and comparisons [20].

Massam [21] reviewed and expanded the QOL concept with respect to public planning and private living, including how satisfied individuals are with their own lives [22]. It is also accepted that the QOL of an individual is affected by the social and natural environment, so that the forms of measurement are also varied and, in many cases, quite complex because of the number of factors employed. The World Happiness Report reflects a worldwide concern with respect to happiness and the absence and alleviation of misery as a more significant element of public policy than the measurement of QOL *per se* without related policy-making implications concerning well-being and sustainability [23]. The report also discusses the ways that happiness can be defined and evaluated the concept in terms that impinge on lived experiences. Another focus of the life quality concept redirects attention to intangible cultural values experienced, which takes into account the personal experiences of life as perceived and evaluates by individuals [24], which improves the understanding about important things for individuals.

We propose here to use QOL and lived experiences as a way to measure social sustainability aspects of fishing communities using the objective/subjective, community/individuals and past/present/future elements. In this note, we first comment on the importance of the coastal small-scale fisheries to local economies in Mexico, especially along the Jalisco coast. Then, we report on a survey of QOL in selected fishing communities using a methodology developed by Renwick and Brown [25]. We then present an exploration of lived experiences using a method developed by Massam *et al.* [26]. Finally, we present perceptions by fishermen of their future lives.

1.1. Background

1.1.1. The QOL of Fishermen and Lived Experiences

The characteristics of fishermen differ from region to region and also by the type of fishing they practice, e.g., deep sea *vs.* coastal fishing. Their problems, expectations and perceptions can be very different, so generalizations about the QOL of fishermen cannot be easily inferred [27]. One recognized generalization, however, is that coastal fishermen in Latin America are considered a people with low income, often living in poverty, in areas rural as opposed to urban areas [28]. Kenny [29] points out that income, as an indicator of overall QOL, is less relevant to life satisfaction perception than frequently assumed. How might this relationship manifest in poor, rural, coastal artisanal fishers? In addition, how satisfied are they with their lives related to their personal values and life expectations?

Due to the inherent dangers involved in fishing, QOL studies of fishers have often focused on risk at work and the effect of risks taken on fishers' families. For example, Bering Sea pollock fishing is characterized by high levels of physical risk, uncertainties in wages and schedule, and long absences from home. These stressors lead to considerable impacts on the family. Robinson [30] examined the effects of this occupation on the QOL and working life through a teamwork perspective. The breakdown in family cooperation reduces the family's ability to respond to its members' needs for love, inclusion and intimacy, and this has important ramifications for the quality of family life. The enhancement of cooperation in the work setting contributes to the creation of important social benefits such as trust, agreement and a sense of inclusion. These social outcomes and improved task performance influence the quality of working life in positive ways.

Another example is presented by Ramirez-Acosta [2] in la Ciénega de Mallorquín, Colombia, where she determined that fishermen had low to medium mental health related to threatened fishery resources; in this case, physical risks were not significant to their physical health. Similarly, Udho [31] studied Ibaka and James Town communities in Nigeria, where a lack of infrastructure elements such as electricity, medical facilities, potable water, storage facilities and fishing gear were related to low QOL. He suggested that the government and financial institutions could help these communities to improve infrastructure, income and therefore QOL.

Currently, humanity's general global goals are to eradicate misery and poverty, and increasing QOL and strategies to achieve these goals at different scales have been discussed [32]. As pointed out by Massam *et al.* [26], analysis of *Lived experiences* may help individuals reflect on the important things in their own life, and then make modifications to their living patterns in order to balance elements of wellbeing, dignity and contentment. They involve a myriad of activities that embrace a variety of ways to use time, deal with life and individual habits and preferences, which reflect individual's circumstances (see Section 4.2). These variables relate to the *Mind, Work, People* and *Body* dimensions of life, all of which can contribute to an individual's efforts to live a good life and so achieve a high QOL [26]. The individual interpretations of patterns among the four dimensions can be used to inform public policy-making to encourage individuals to succeed.

Studies of QOL, e.g., Brown, Raphael and Renwick [33], use questionnaires to collect individual opinions of QOL. These are indicators that together provide rating scores for importance and achievement. The scores are combined arithmetically to derive an overall cumulative score of QOL. However, these

numbers do not reveal behavior patterns or the experiences of an individual's life on matters such as satisfaction or distress as manifestations of QOL. The Nobel prize-winner Kahneman [34] has elaborated this important point. Instead of just stating numerical levels of QOL, the approach suggested by Massam *et al.* [26] is to observe patterns of activities as a surrogate for QOL. The authors asked individuals to identify their lived experiences over a specific period rather than ask them explicit questions such as “how good is your life for you now?” Kahneman [34] argues convincingly that asking this question explicitly about QOL distorts the reality for the interviewee by forcing them to reflect on a conceptual matter that they normally do not take into account as they go about their daily lives.

1.1.2. Research Context: Artisanal Fishers along Coastal Jalisco, México

The study area for this research is along the Pacific coast of México, in the state of Jalisco (Figure 1). Along the coast the Ameca River and the state of Nayarit and to the south by the Cihuatlán River the state of Colima border Jalisco to the north. The region includes the municipalities of Puerto Vallarta, Cabo Corrientes, Tomatlán, La Huerta and Cihuatlán.

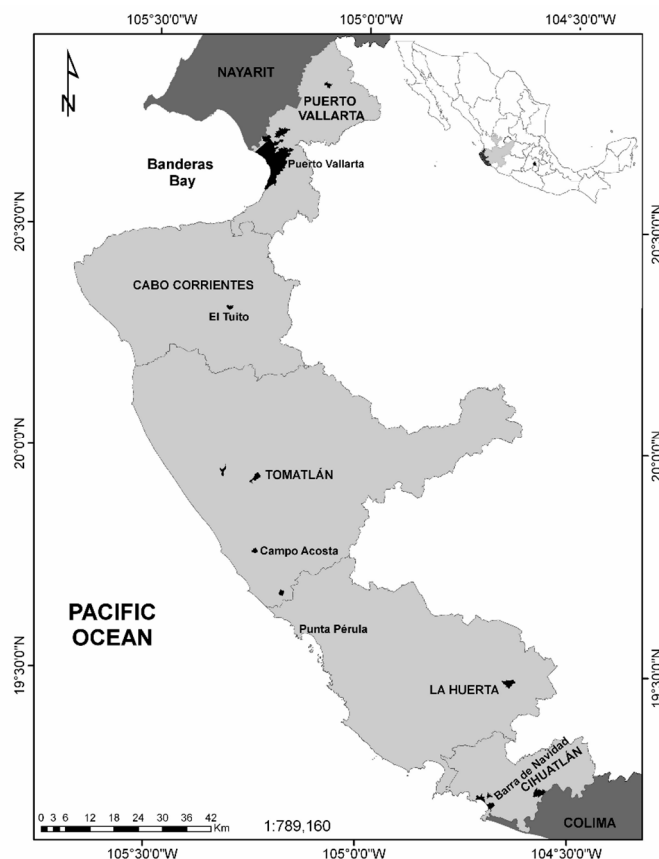


Figure 1. The study area and sampling sites along the coast of Jalisco.

Studies related to the social aspects of sustainable coastal fisheries along the coast of Jalisco, Mexico (Figure 1) are few but do provide some insight into the social and environmental weaknesses of the regional fishing sector. Reported fundamental characteristics of the regional artisanal fishery in the study include that few fishers are legally registered, many work without permits, nearly 40% of the catch is unrecorded and there is a very poor infrastructure to manage the activity [35–37]. Beginning in the 1970s

and continuing to the present, a number of tourism infrastructure developments along the coast have resulted in the “forced sale” of communal land properties, relegating coastal fishing to a secondary activity [38].

Despite the social and economic importance of coastal fishers, fisheries research on the coast of Jalisco is mainly based on biological and ecological aspects of commercially important marine resources [39–45]. None of this work offers insight into the quality of life of fishers and their families. The impacts of tourism on fishing communities have been reported in the Bahía de Banderas area in the north of Jalisco [46], where the authors identified some positive QOL perceptions reported by fishers. In addition, although the authors reported low incomes in fishing communities, fishers indicated high future expectations; however, these two indicators are unlikely to allow for the achievement of a sustainable fishery economy. Overall, a lack of quality data and reliable information restricts systematic long-term successful planning in the fishing sector of the economy.

Gear used by artisanal fishers off the coast of Jalisco includes gillnets, hand lines, cast nets, long lines, seine, crab rings and diving equipment in few cases. Fishing is done aboard small boats called “pangas” and conducted through fishery cooperative organizations. In addition to commercial fish species, they also fish for tuna, snapper and dorado, and are allowed to fish for octopus, lobster, flake, crab, shrimp, rock oyster, gorro (Chinese hat gastropod) and river shrimp [39,47]. The catch is distributed in the villages for self-consumption as well as in the cities of Puerto Vallarta, Guadalajara and the states of Colima, Guerrero and Sonora, often at fish markets operated by the collectives. The recorded catches include 75 species: 94% of registered species are fish, 4% crustaceans and 2% mollusks. The largest catches correspond to fish and octopus, which together represent 80% of the total catch [47].

2. Results

2.1. General Characteristics of Fishermen

All individuals included were males, as women collaborate in fishing near-shore but are not registered as members in a collective organization. In general, most respondents indicated that their sole occupation was fishing (43%), while others stated that they combine fishing with another primary sector activity such as agriculture (37%). While the ages of the fishers varied between 16 and 69 years old, most of them were in the range of 35 to 50 years old. Less than half had completed elementary school. Most of them were born in the same community in which they are now working and live in their own house. Monthly income ranged from US \$64 to more than US \$485, but most earned between US \$242 and US \$485. A very low percentage of fishermen had a monthly income larger than US \$500. Almost 65% of interviewed fishers claimed to have social security but not as part of their collective organizations’ benefits. As members (partners), they had to pay an annual fee for having a popular health insurance plan at a low cost (less than US \$84): the poorest families are exempt from payment.

The fishers in the Puerto Vallarta collective were between 21 and 65 years old, all were born in the community and 75% combine their economic activity of fishing with another activity in the secondary sector. In this community, fishers reported a higher level of education than other locations, with 50% finishing high school. Monthly income was between US \$152 and US \$760.

In Chimo, respondents were between 21 and 70 years old (Figure 2) and approximately 90% were born and lived in the same community. Although a small percentage reported fishing as their sole economic activity, 64% are engaged in fishing and agriculture. Most fishermen had an unfinished, basic education. Their monthly income is between US \$75 and US \$455 (Figure 3).

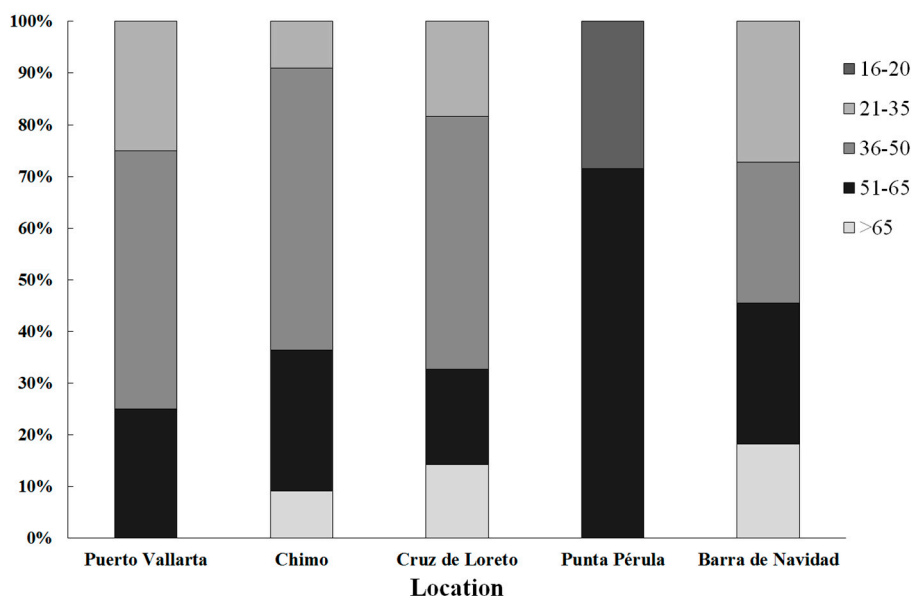


Figure 2. Age of fishermen in each collective organization.

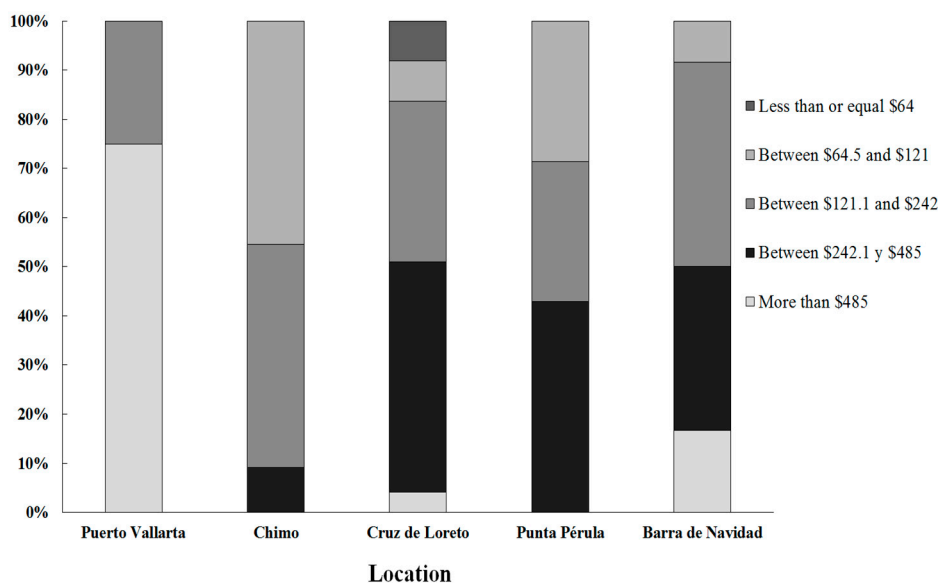


Figure 3. Average monthly income of fishermen in each collective organization.

The respondents in the “SCPP fishermen of La Cruz de Loreto” are between 21 and 70 years old (Figure 2) and approximately 76% were born in the community. In this community, fishers reported a more diversified labor type: 45% are dedicated solely to fishing, while 31% practice fishing and agriculture, and other secondary and tertiary sectors, although in all cases the main activity reported is fishing. About 50% of fishers have only unfinished primary education. The monthly income of fishermen in this community is between US \$60 and US \$606 (Figure 3).

In Punta Pérula, fishers reported the largest age range, between 16 and 65 years old, including the youngest participants in the study (Figure 2). The majority of fishers in this community (72%) were born here. Most respondents in this place (71%) indicated that their sole occupation is fishing while the rest combine fishing with service sector jobs such as tourism. As in the previous community, approximately 50% of fishers did not finish primary education. Approximately 40% have no social security services. The monthly income of fishers in this community is between US \$75 and US \$530 (Figure 3).

Barra de Navidad comprises older fishermen between 21 and 70 years of age (Figure 2), slightly more than half of whom who were born in the community (58%). Almost 90% of respondents indicate their sole occupation is fishing. A slightly larger percentage of fishers in Barra de Navidad have basic primary studies (59%). All live in their own home. The monthly income of fishers in this community is between US \$75 and US \$758 (Figure 3).

In all cases, the higher end incomes are from fishermen who perform some administrative position in the fishing collectives.

2.2. QOL Analysis

An overall score of +4.3 was obtained for the five fishing collectives. The highest scoring indicator for all five locations is *family* (+10). Other indicators that respondents consider important and for which they were satisfied are *health* with scores between +5 and +10 per collective and *general* with a mean score of +7. By contrast, the indicator with the lowest score was *holidays* (+1), indicating that this aspect is not relevant to them (Figure 4).

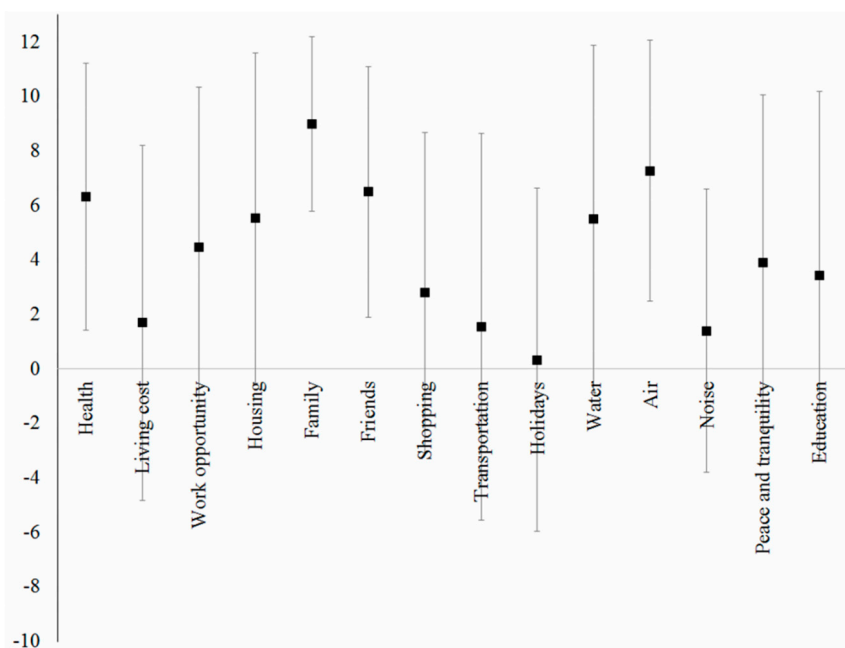


Figure 4. QOL score, mean and standard deviation by indicators for fishers along Jalisco coast.

The highest overall QOL score obtained by a collective was that of the town of Puerto Vallarta (+7.1), while the lowest scores were obtained in Punta Pérula and Cruz de Loreto (+3.6 for both). All collectives had scores greater than +2.5, indicating that fishermen perceive their quality of life “very acceptable”

(Cruz de Loreto and Punta Pérula) or “excellent” (Puerto Vallarta, Chimo and Barra de Navidad) (Figure 5) (Table 7). A Kruskal-Wallis test, used because the data was not normally distributed, indicated no significant differences between the values of QOL of fishers in the five localities (Kruskal-Wallis: $H(4, 83) = 8.80$, $p = 0.066$).

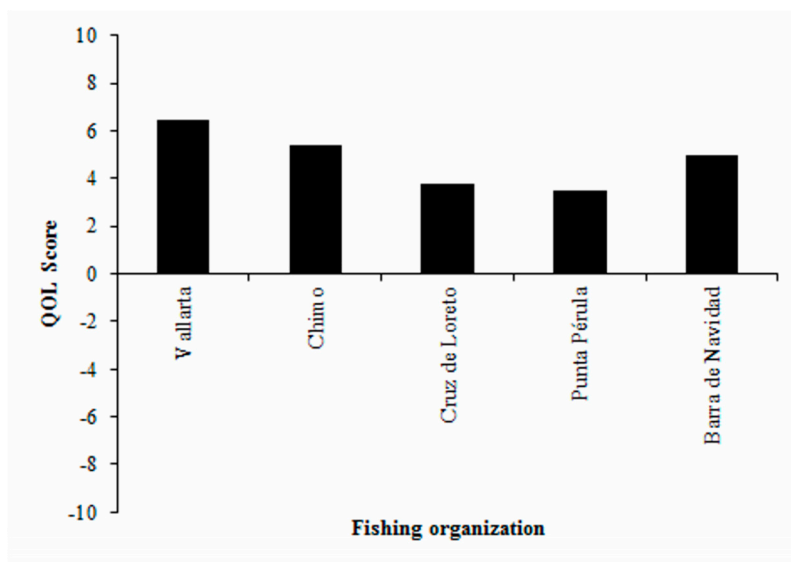


Figure 5. Mean QOL score of fishing collectives along the coast of Jalisco, Mexico.

Mean annual catch per fisher vs. mean QOL by collective is presented in Figure 6. Puerto Vallarta fishers report a high QOL for the highest catch, while the Chimo collective fishers report the second highest QOL with the lowest mean catch per fisher. Although the fishers at Punta Perula had the second highest mean catch per fisher they reported the lowest QOL. As a result of this variation, there does not seem to be a correlation between catch and QOL (Pearson’s $r = 0.3492$, $p = 0.565$).

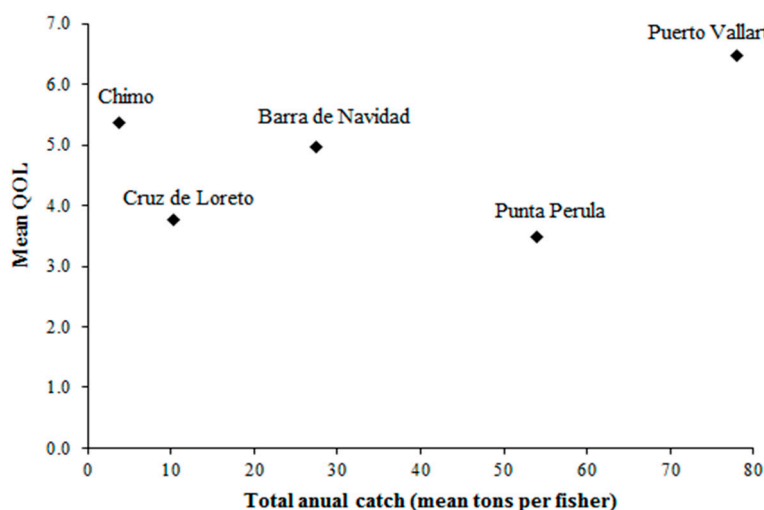


Figure 6. Total catch and average QOL in each collective organization.

Mean annual income per fisher vs. mean QOL per collective is presented in Figure 7. Puerto Vallarta fishers again reported the highest income and QOL. Chimo fishers have the lowest mean income, but

again, reported the second highest QOL. In this case, there is a moderate positive relationship between the two variables but it is not statistically significant (Pearson’s $r = 0.6065$, $p = 0.278$).

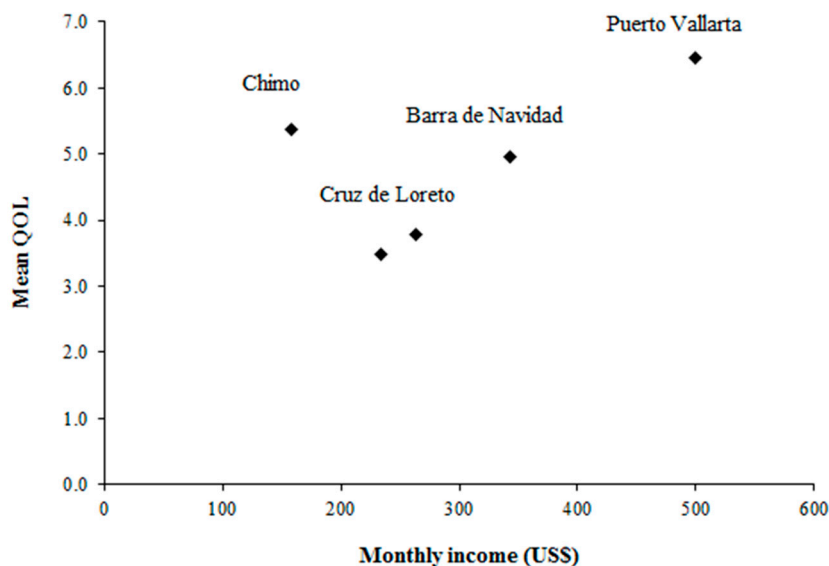


Figure 7. Monthly income and QOL by collective society in Puerto Vallarta, Chimo, Cruz de Loreto Punta Pérula and Barra de Navidad.

The future is predicted to be worse than the past five years and the present except for Puerto Vallarta, where fishers believe the future will be better than both the past and present (Figure 8). The main reason expressed by fishermen for a belief in a worse future is the downward trend in the catch over the past 10 years.

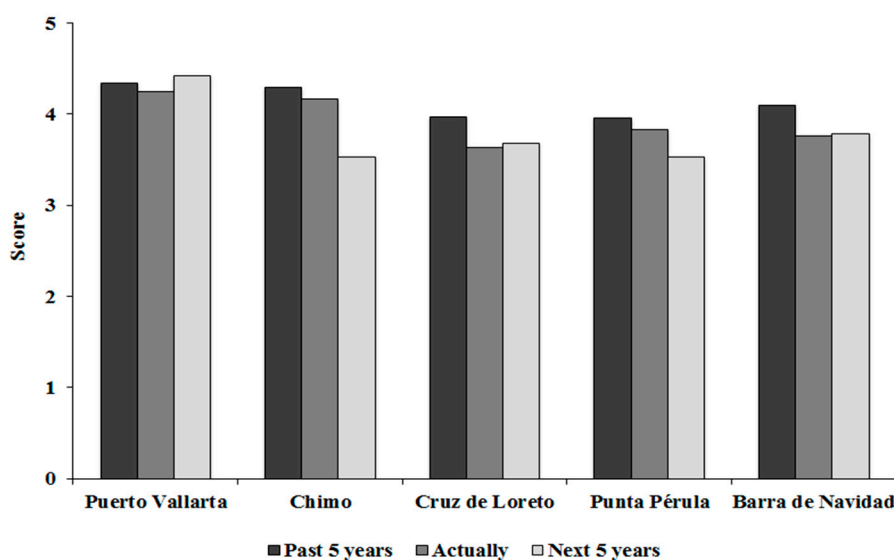


Figure 8. Past, present and future QOL perception in each fishing community.

2.3. Lived Experiences Interpretation

The five case studies of lived experiences in collective societies at La Cruz de Loreto (CL) in the municipality of Tomatlán; Punta Pérula (PP) at municipality of La Huerta; Barra de Navidad (BN) at municipality of Cihuatlán and La Rosita (R) at Puerto Vallarta, showed varied patterns related to *Mind*, *Body*, *Work* and *People* dimensions (Figures 9–13, Tables 1–5).

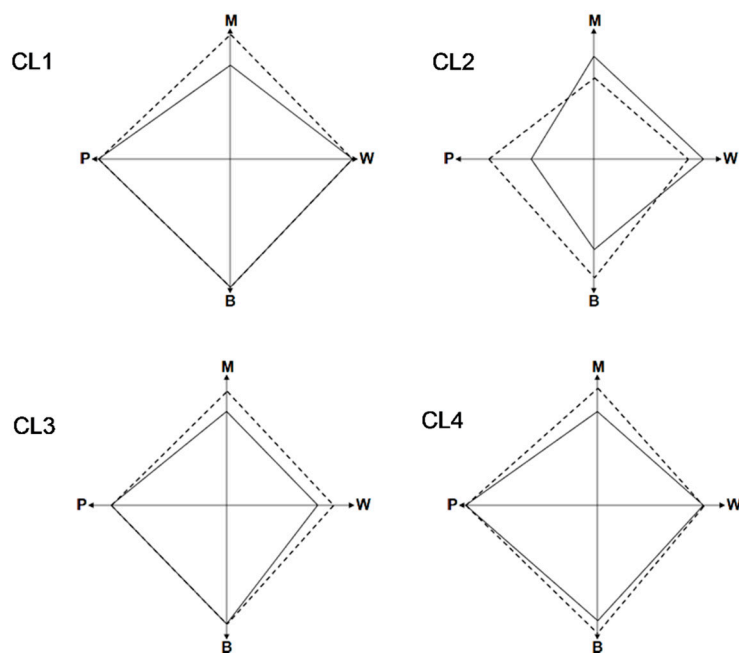


Figure 9. Fishermen’s ideal (**broken line**) and actual patterns of lived experiences in the fishing collective society La Cruz de Loreto (four respondents: CL1–CL4). M = Mind, P = People, B = Body, W = Work.

Ideally, other models would reveal a balanced pattern of experienced life at the highest level for each dimension; however, some fishers marked the axes at lower levels. The *Work* dimension received the greatest number of lower reports (BN1-2, Figure 10; CH1, Figure 11; PP1, Figure 12 and R1, Figure 13). The individuals who did so, therefore, see this dimension as less important in their lives compared to the other dimensions. A high level of participation might be the result of a positive and desirable level of lived experience (as CL1 in Figure 9); on the other hand, a high level may indicate negative and undesirable lived experience as R1 (Figure 13).

Gaps were found for all respondents in the *People* dimension, although it was primarily reported as high desired and actual levels, indicating that fishers are more satisfied in this dimension. The *Mind* dimension also revealed gaps in all cases, some of them small, but was the most frequently unsatisfied dimension.

CH1 and R1 cases (Figures 11 and 13) illustrate relatively balanced patterns, although in R1 the ideal broken line was reported at a lower level than that of actual (solid line), CH1 showed an opposite pattern to that of R1, but both indicate a negative condition. R1 can be interpreted as “the four dimensions are important in my life but I am doing more than I need to for my level of satisfaction without sense”. R1 should reduce activities/participation to match the ideal situation, while CH1 showed an actual participation lower than desired.

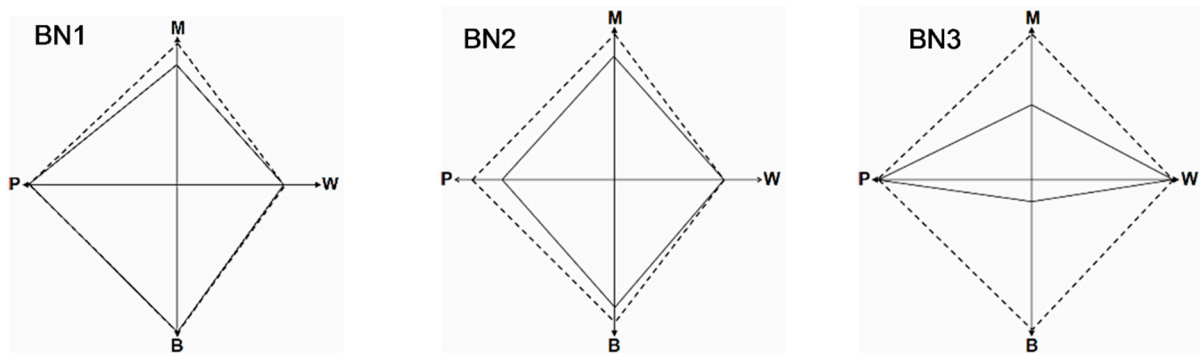


Figure 10. Fishermen's ideal (**broken line**) and actual patterns of lived experiences in the fishing collective society at Barra de Navidad (three respondents: BN1–BN3). M = Mind, P = People, B = Body, W = Work.

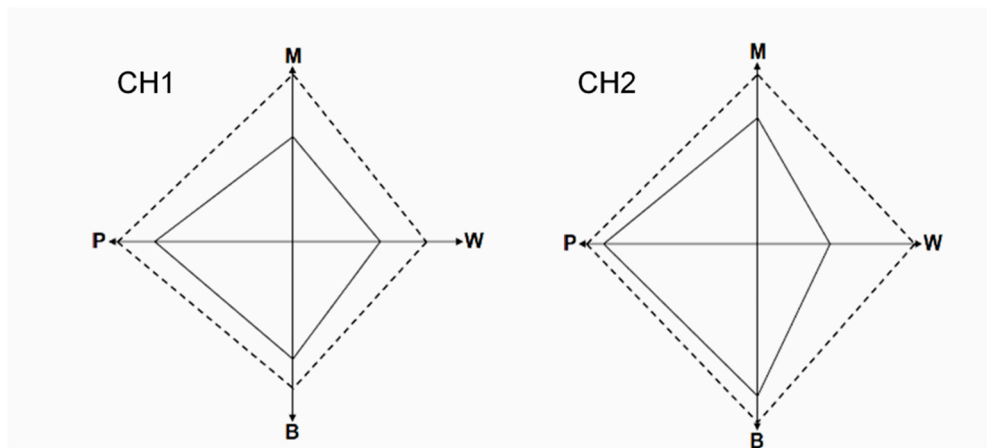


Figure 11. Fishermen's ideal (**broken line**) and actual patterns of lived experiences in the fishing collective society at Chimo (two respondents: CH1–CH2). M = Mind, P = People, B = Body, W = Work.

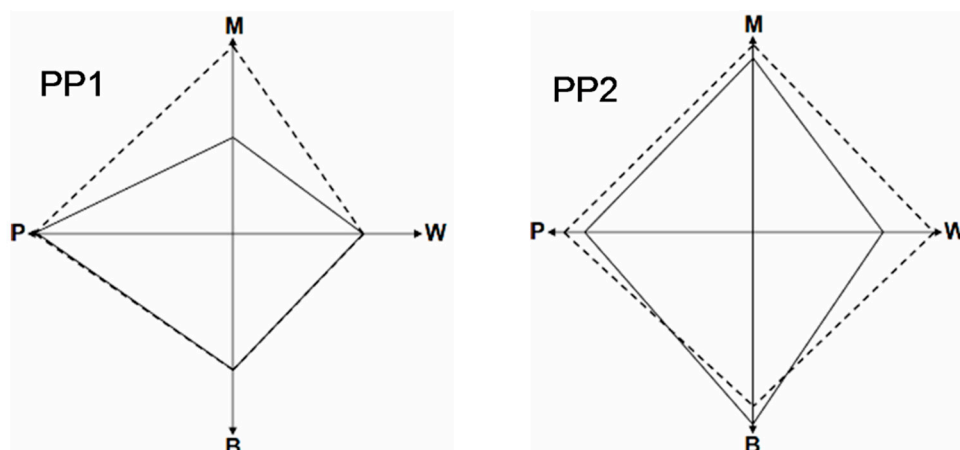


Figure 12. Fishermen's ideal (**broken line**) and actual patterns of lived experiences in the fishing collective at Punta Pérula (two respondents: PP1–PP2). M = Mind, P = People, B = Body, W = Work.

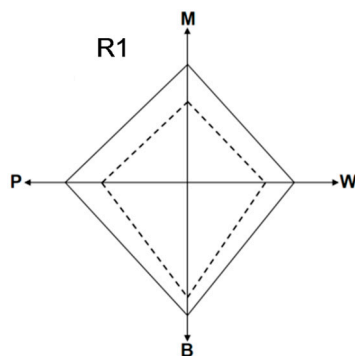


Figure 13. Fishermen’s ideal (**broken line**) and actual patterns of lived experiences at La Rosita collective society in Puerto Vallarta (one respondent: R1). M = Mind, P = People, B = Body, W = Work.

The word “satisfied” is used in the tables (Tables 1–5) when there is no difference or ideal and actual lines (solid and broken) in Figures 9–13 match closely; “significant” when there is a gap, and “very significant” when the gap is bigger (one of the lines is near the origin). When the individual pondered the gap and assumed it as important, it was registered as “important” in each table.

Table 1. Data summary interpretation sheet for dimensions and gaps of four respondents (by gender, age and birthplace) from Barra de Navidad collective (CL1–CL4).

CL1 Male (37) from Cruz de Loreto	
MIND	Anxious. Worried about security problems in the collective.
BODY	Health. Satisfied.
WORK	Catch. Satisfied.
PEOPLE	Family, friends. Satisfied.
Gaps	Mind gap is significant and important. I am responsible to close gap, but government too.
CL2 Male (37) from La Cruz de Loreto	
MIND	Happy. Satisfied.
BODY	Alcohol impairs my physical condition.
WORK	Little work, poor catch, little financial support.
PEOPLE	Alcoholism keeps away from people.
Gaps	Mind gap significant but not important now; body, work and people gaps are significant and important. I am responsible to close gap with help of family and government support.
CL3 Male (35) from La Cruz de Loreto	
MIND	Stress and fatigue.
BODY	Feel good, good physical condition. Satisfied.
WORK	Wants more work. “No fish, no money”.
PEOPLE	Family and friends .Satisfied.
Gaps	Significant and important gaps for mind and work. I am responsible and government policies.
CL4 Male (38) from La Cruz de Loreto	
MIND	Worried about insecurity.
BODY	Good health. Satisfied.
WORK	Fatigue, I need to sleep longer.
PEOPLE	Family, collective members and friends. Satisfied.
Gaps	Significant for mind and work, I am not responsible; government should give me better working conditions.

Table 2. Data summary interpretation sheet for dimensions and gaps of three respondents (by gender, age and birthplace) from Barra de Navidad (BN1–BN3) collective.

BN1 Male (45), born in Barra de Navidad	
MIND	Worried about economic problems.
BODY	Health. Satisfied.
WORK	Catch. Work is unstable.
PEOPLE	Family. Satisfied.
Gaps	Work and mind are significant and important gaps. Some depends on boss. Government should give support. I can't do anything.
BN2 Male (52) from other state in Mexico	
MIND	Anxious.
BODY	Aging, pain. I am too busy to worry about it.
WORK	Enough catch to survive. Satisfied.
PEOPLE	Significant. I need to spend more time with my family and friends.
Gaps	Body, mind and people are significant and important but I'm not responsible.
BN3 Male (55), born in Barra de Navidad.	
MIND	Fear. Worried about my family.
BODY	Chronic distress. I need to feel healthier.
WORK	Better paying job but satisfied for the moment.
PEOPLE	Family. Satisfied.
Gaps	Mind, body and work are very important. Body gap is very significant. I'm responsible, but government too.

Table 3. Data summary interpretation sheet for dimensions and gaps of two respondents (by gender, age and birthplace) from Chimo (CH1–CH2) collective.

CH1 Male (41), born in Chimo	
MIND	Significant, worried about economic problems, stressed.
BODY	Food, health, exercise.
WORK	Significant. Work is unstable, climate, boat, permission.
PEOPLE	Family, friends. Satisfied.
Gaps	All gaps are significant but work and mind are more important Depends mainly on climate and government.
CH2 Male (44), born in Chimo	
MIND	Employment, study, work.
BODY	Sick but too busy to worry about it.
WORK	Payment, catch and fishing equipment.
PEOPLE	I need to spend more time with my family and friends but satisfied.
Gaps	Body, mind and people are significant and important gaps that should be closed, but I'm not the only one responsible. Work gap is significant too but can't be closed.

Table 4. Data summary interpretation sheet for dimensions and gaps of two respondents (by gender, age and birthplace) from Punta Pérula collective (PP1–PP2).

PP1 Male (26), from another locality but 10 years in Punta Pérula	
MIND	Stress. Worried about financial problems.
BODY	Sick but feel good. Satisfied.
WORK	More work needed but satisfied.
PEOPLE	Many friends and good relations.
Gaps	Mind is significant and is related to work, boss and government would offer better job opportunities. Time working depends on the sea conditions.
PP2 Male (30), from another locality but 15 years in Punta Pérula	
MIND	I have plans. Satisfied.
BODY	Satisfied despite having muscle diseases.
WORK	Fishing work is unstable. Significant.
PEOPLE	Alone. Needs to socialize a little bit more.
Gaps	Work gap is significant but people and work gaps are important. I am responsible to close gap with help of God and government support.

Table 5. Data summary interpretation sheet for dimensions and gaps of one respondent (by gender, age and birthplace) from La Rosita collective (R1).

Male (48) from Puerto Vallarta	
MIND	Happy, harmonious feeling. Satisfied.
BODY	Illness, physical culture, health.
WORK	Lot of work, poor catch and poor income.
PEOPLE	Family, friends and work companions.
Gaps	All gaps are significant but not important now. Body gap is significant and very important. I am the only responsible person to deal with this.

3. Discussion

Fishers in the state of Jalisco are generally adult male individuals who have a low level of education yet have important economic responsibilities to their family. Women participate in some fishing activities such as for the “gorro” gastropod but are not associated with collective organizations. Fishers in this study have deep emotional attachments to the communities where they were born, in which many remain to live, and tend to work in nearby fishing areas. The high positive reported QOL indicators of family and friends, coupled with the high importance placed on *People* by 11 of the 12 fishers interviewed in the lived experience exercise, suggest that family and community are priorities and fishers chose their fishing locations based on these variables rather than by other items such as fishery infrastructure or other potential income sources that might offer better financial situations.

For example, fishers in Puerto Vallarta have the highest perception of their quality of life, while the lowest was reported by those in Punta Cruz de Loreto Pérula (although QOL was still perceived as Very Good). Fishers in Bahía de Banderas described by Chávez-Dagostino *et al.* [46] reported low income yet high future expectations, explained by their hopes for benefits from tourism. In this study, fishers in Puerto Vallarta were the only group to predict that the future would be better than the present or past. This perception is likely due to the continued growth of tourism in this urban area and the potential for other

income opportunities, as evidenced by fishers in the Puerto Vallarta community that supplement their income in this manner. This opportunity is not as readily available to fishers in the other rural communities, yet they choose to remain in these locations. Even though their perception of the future is negative, family and community likely cause them to remain. Money is, therefore, not one of the most important indicators for quality of life in the fishers who participated in this study. This argument is reflected in the weak and moderate relationships between catch and income in Tables 6 and 7 and supports Kenny's [29] statement that income is not an important QOL indicator. Family and the collective work in these fishing communities to create important social benefits, which positively affect perception of QOL and satisfaction, as suggested by Robinson [30].

Table 6. Quality of life (QOL) scores using importance and achievement (satisfaction) ratings. From Brown *et al.* [33].

If Importance =	And Satisfaction =	QOL Score
5	5	+10
	4	+5
	3	0
	2	-5
	1	-10
4	5	+8
	4	+4
	3	0
	2	-4
	1	-8
3	5	+6
	4	+3
	3	0
	2	-3
	1	-6
2	5	+4
	4	+2
	3	0
	2	-2
	1	-4
1	5	+2
	4	+1
	3	0
	2	-1
	1	-2

Table 7. Interpreting QOL scores. Above +1.5 is considered as *Very acceptable* or *Excellent*. From Brown *et al.* [33].

QOL Score	Situation
Less than −4.5	Very problematic
−1.5 to −4.5	Problematic
−1.5 to +1.5	Adequate
+1.5 to +4.5	Very acceptable
+4.5 and above	Excellent

Quality of life indicators do not necessarily tell the whole story, however, as negative economic issues are prevalent in the *Work* and *Mind* elements of lived experiences in the form of poor catches, which is similar to the results found by Ramirez-Acosta [2] and Udho [31], and the generally unstable nature of fishing. This finding supports the importance of using both objective and subjective methods of inquiry. Most of fishermen indicated gaps, sometimes significant and important, for *Mind* in particular, followed by *Work* and *Body*, with less gaps in *People*. Participants identified declining responsibility for closing these gaps as self, government, self with family help, and God. They likely perceive themselves as having the primary responsibility for closing these gaps because there is a perception that if they work harder, they will catch more fish. Effective government fishery management is necessary to provide financial support for purchase of equipment, ensuring access to fishing areas, and conserving fish stocks. Family is then important, as its members can cooperate to help fishers achieve their objectives. Faith is the least important.

Based on the ages of fishers reported in this study, there appears to be a low recruitment of young people into fishing activities along the coast. This could be interpreted as either a lack of interest in the activity or the perception that fishing is not a financially stable lifestyle. The average monthly income is US \$227.50, which places this group above the poverty line of US \$60.00 per month [48]. Higher incomes are earned by fishermen in charge of the collective organization's administrative activities. The individual annual income of most of the fishers peaks at US \$3790.00 for 350 days worked a year. Although most participants in this study are primarily fishers, there is some diversification of economic income evident in activities such as agriculture and the service sector. However, this level of income is not enough to reduce stress.

If the concept of sustainability includes quality of life [7] yet looks to the future, then, although currently artisanal fishers in the state of Jalisco perceive themselves to have a Very Good or Excellent QOL (albeit with considerable variability), overall their perception of social indicators for the future indicates that QOL will decline, and also, therefore, the sustainability of local fisheries. This negative finding is supported by the qualitative lived experiences exercise, in which the fishers reported negative socioeconomic elements to their lives. This is an important element of understanding in terms of fisheries sustainability that should be considered in public policy development. Although fishers recognize their own responsibility for closing gaps between desired and realized lived experiences, the government which, for the eyes of fishers, has favoured coastal tourist development over fisheries, has an important social responsibility in the future of fishery sustainability.

The concept of wellbeing in terms of both QOL and lived experiences provides a comprehensive framework for understanding what is important to people, communities and society, as argued by

Weeratunge *et al.* [49]. Beyond simplistic cause and effect relationships that link the poverty of the fishermen to the ineffective conservation of fishery resources, there is a need for greater attention to many aspects of the wellbeing of fishing communities, in particular the “aspirational” dimension of the lived experiences model. Combining both approaches can reveal situations related to exclusion, disempowerment, marginalization, lack of access to public services as well as fishing grounds, equipment and infrastructure, exposure to risk and a failure to recruit young people into the industry. It also allows for discussion of other important aspects such as identity, social status and peer recognition, which are important in fishing communities.

4. Methods

4.1. The QOL of Fishermen

The study includes registered fishermen in five collectives (fishing organization) on the coast of Jalisco: Puerto Vallarta, Chimo, Cruz de Loreto, Punta Pérula and Barra de Navidad. The collectives varied in the number of current members; 70% of in the membership were interviewed per collective. For the life satisfaction perception survey, 83 questionnaires were applied within the five localities. The survey included a set of 14 indicators previously developed and tested in Puerto Vallarta by Massam and Everitt [22]. The first set of questions collected basic information including gender, age, occupation, birthplace, schooling, marital status, children, ownership of house, social security and monthly income. We used the World Bank Poverty Index to identify a poverty threshold of less than US \$2.00 a day [48].

Following Renwick and Brown [25] and Massam [50], interview respondents were asked to rate their individual perception of importance and satisfaction (achievement) for fifteen QOL indicators: health, living costs, opportunity of work, housing, family, friends, shopping, transportation, holidays, water, air, noise, peace and tranquility and education. Scores ranged from 1 to 5, where five indicated a very high importance and satisfaction, and 1 indicated a very low level of importance and satisfaction. A value of 3 was interpreted as neutral. The mean importance and achievement ratings for each individual and all the collectives was then used to calculate QOL scores following Brown *et al.* [33] (Table 6). Guidelines for interpreting the QOL scores are shown in Table 7.

The survey also included an analysis of fishers’ perspectives with respect to personal satisfaction, time devoted to recreation and leisure, time spent with family, time spent on working activities, time spent with friends and perceived current health status these items were rated for the previous five years, the present and the level envisioned five years in the future. The ratings system used was the same 1 to 5 scale described above for QOL.

A correlation coefficient was then calculated to evaluate the strength between income and QOL, and catch and QOL.

The data were analyzed using the Statistical Package for Social Science Software Package (SPSS) (Version 17) and Sigmastat (Version 3.5).

4.2. The Lived Experiences of Fishermen

A list of lived experiences was derived from a random sample of 12 fishermen interviewed during the period June–August 2012 in the same fishing organizations as used for the QOL survey. Three basic

questions were used to prompt each respondent to yield a list of lived experiences and activities. The questions were: 1. Which activities were enjoyed in the last 2–3 weeks and activities that the participant would like to continue in the coming weeks; 2. Which activities were undertaken in the last 2–3 weeks which were not enjoyed, but the participant felt some responsibility, obligation or duty to undertake; 3. Which activities that filled some of their time in the last 2–3 weeks were not included in the first two categories.

From the list of responses, we prepared a four basic dimensions diagram that was used for data collection following the methodology developed by Massam *et al.* [26]. Four dimensions were identified, namely *Mind* (intellectual/thinking and reflection, feelings), *Body* (state of being, health, physical condition), *Work* (activities, paid or unpaid, that require effort and some degree of commitment to be busy) and *People* (interactions with others) (Figure 14).

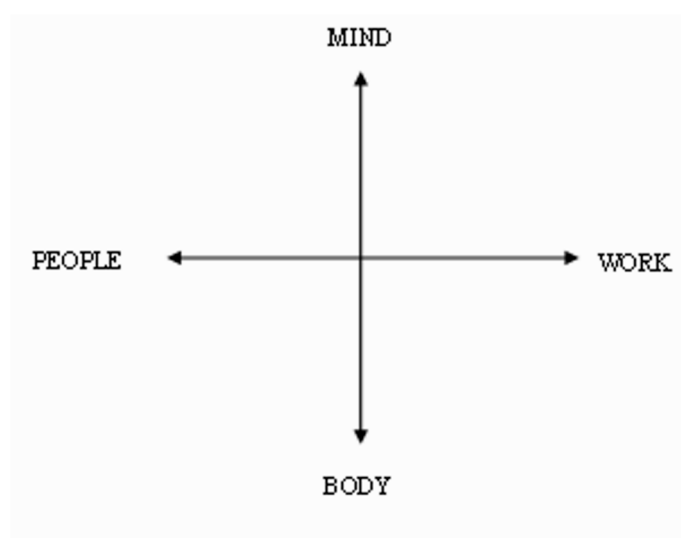


Figure 14. Template to display data on lived experiences. From Massam *et al.* [26].

The protocol proposed by Massam *et al.* [26] was used to collect information from a sample of willing volunteers of 12 fishermen. A brief preamble on the concepts of *lived experiences* and *activities* was offered to each interviewee and an overview of the variety of responses compiled in a long list held by the researchers. Then the list of activities for each of the four dimensions was presented and discussed. Each respondent was asked to identify some relevant activities that apply to their unique lived experiences, and to add others in order to identify the sets of activities for the individual for each cluster that suited their particular case and life style.

Figure 14 and the four clusters/dimensions of lived experiences/activities, were explained to each volunteer. For each axis the respondent was asked to reflect and think about the activities that fitted into each cluster for a specific time period namely the last 2–3 weeks. The implications of placing the mark at the center or the edge of each axis were discussed with each respondent.

For each axis, the respondent was asked to suggest a level of engagement (marked with a 0) with the set of activities in each cluster: ranging from low (center) to high (edge): this point was marked on each axis.

Here the respondent had to make a judgment about the selected level in terms of satisfaction: was the level to their liking or not? Was it too low or high? By how much was it too high or low? It was pointed out by the interviewer that there was neither a right nor a wrong answer to each question.

Each individual was asked to look at the gaps between the actual level of activities and the desired level for each of the four dimensions and reflect on the significance. If in the opinion of the respondent the gap should be closed, whose responsibility is it to close the gap? In addition, what are some of the reasons why the desired level is not actively sought? The results for all the fishermen in the survey were interpreted and summarized in Tables 1–5.

5. Conclusions

We integrated two methods in this research project to explore social indicators of fishers along the coast of Jalisco, Mexico: an objective, empirical approach to derive QOL scores and a more subjective approach that asked fishers about their lived experiences. We believe that the combined approaches have merit, as demonstrated by this small scale study, and we suggest that, in the future, larger scale spatiotemporal research be undertaken to examine trends in perceived QOL of individuals as it pertains to the sustainability of fisheries. This element needs to be taken into account, especially if public policies are implemented to aid the fishing sector, or alternatively to offer individuals alternate economic opportunities, particularly in rural communities. Without these elements, it will be difficult to ascertain whether public policies related to the social aspects of sustainability are successful. To do so, government fisheries authorities, in collaboration with fishing communities, including women, and social researchers should work closely together to provide critical feedback to policies within the management process that have social impacts.

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Author Contributions

Myrna Leticia Bravo-Olivas and Rosa María Chávez–Dagostino designed the research, collected data, interpreted results and wrote the paper. Malcolm collaborated in the literature review, performed research, checked results and extensively updated the paper. Espinoza-Sánchez reviewed and assisted in the interpretation of results. All authors read and approved the final manuscript, analyzed the data and took part in the discussion conjointly.

Conflicts of Interest

The authors declare no conflicts of interest.

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