Affective Mediators Of The Influence Of Climate Social Resilience On Young Fishermen's Life Satisfaction In Malaysia's Coastal Regions

Zeinab Zaremohzzabieh[1*], Hayrol Azril Mohamed Shaffril[1], Haslinda Abdullah[1,2]

[1]*Institute for Social Science Studies, Universiti Putra Malaysia, Serdang, 43400, Selangor, Malaysia
[2]Faculty of Human Ecology, Universiti Putra Malaysia, Serdang, 43400, Selangor, Malaysia

*Corresponding Author: Zeinab Zaremohzzabieh
*Institute for Social Science Studies, Universiti Putra Malaysia, Serdang, 43400, Selangor, Malaysia,
Email: z_zienab@upm.edu.my

Abstract

This study delves into the effects of climate change on the coastal regions of Malaysia, with a specific focus on fishing communities and the vulnerability of young fishermen. Recognizing the potential impact on their mental well-being, the researchers aim to understand how climate change influences the life satisfaction of these individuals and investigate the role of positive and negative emotions in this context. The study engages 400 participants who completed questionnaires encompassing social climate resilience, positive and negative emotions, and overall life satisfaction. The results of the study uncover a noteworthy association between social climate resilience and life satisfaction among young fishermen. It becomes evident that those who exhibit higher levels of resilience in coping with climate-related changes tend to experience greater life satisfaction. Moreover, an intriguing finding emerges as positive emotions play a crucial mediating role in this relationship. In fact, positive emotions fully account for the link between resilience and life satisfaction, emphasizing their significant influence on the well-being of young fishermen. This study provides valuable insights into the well-being of young fishermen in the face of climate change and the crucial role of positive emotions in shaping their life satisfaction. The findings highlight the need to develop strategies and interventions that foster resilience and promote positive emotional well-being among young fishermen, ultimately enhancing their life satisfaction.

Keywords: Climate social resilience, climate change, life satisfaction, negative affect, positive affect, young fishermen

1. Introduction

Climate change's numerous impacts threaten coastal communities (IPCC 2019). The population density in coastal areas is twice that of inland areas (Magalhães Filho et al. 2022). In Southeast Asian nations such as Malaysia, approximately 70% of the population lives in coastal areas. Malaysia's fisheries sector's gross domestic product (GDP) was 11.22 billion Malaysian ringgit in 2021. In the face of climate change, the country's GDP from the fisheries sector has declined compared to previous years (Statista 2023). Tang (2019) lists seven sectors in Malaysia that are vulnerable to climate change, including marine, ocean, and coastal resources. Malaysia experienced the highest temperature of 2019 (39.3 degrees Celsius) and the Super El Nino phenomenon, which led to widespread drought (Malaysian Meteorological Department 2020). This led to changes in the function and structure of marine ecosystems and increases in sea surface temperature and acidity, affecting fishing communities that rely on the availability and abundance of marine resources (Bryndum-Buchholz et al. 2019; World Economic Forum 2020). These developments threaten many people's jobs and food security (Schneider and Asch 2020).

According to prior studies, fishing societies will face more severe obstacles from climate change due to their residence in climatically vulnerable areas, frequent dependence on the marine ecosystem, and their experience of chronological and intergenerational disturbance related to past colonial practices (Gomez-Zavaglia et al. 2020). These changes can significantly impact their well-being and living standards (Rizal and Anna 2019; Bell et al. 2020). The health of marine ecosystems has implications for fishermen's life satisfaction (LS). LS is defined by Breslow et al. (2017) as "when social and natural demands are met, when people and communities can act purposefully to achieve their goals, and when individuals and societies have a satisfying quality of life, a state of togetherness with others and the environment emerges"(p.5).

This study found a likely elevated risk of climate change influences and LS, especially among Malaysia's young fishermen, who represent a significant and rapidly growing component of the country's coastal population (MacDonald et al. 2013; Willox et al. 2013). Additionally, recent studies have shown that young Malaysian fishermen are aware of the impacts of sea, ocean, and weather changes on their lives (Ahmad et al. 2020). Given the rapid environmental changes experienced by young fishermen in coastal Malaysia and the existing challenges to their LS and well-being, exploring protective factors from a youth perspective and in the setting of climate change could open novel avenues for adaptive capacity.

Climate social resilience (CSR) is crucial for enhancing LS and is a protective factor for quality of life (Shaffril et al. 2022). A separate line of studies has demonstrated the importance of positive affect (PA) and negative affect (NA), which influences LS (Kuppens et al. 2008; Extremera and Rey 2016). However, it has long been recognized that fisheries policies are necessary to promote resilience in fishing communities (Carpenter et al. 2017). Fisheries policies have focused mainly on financial effectiveness and environmental sustainability, with little attention paid to social resilience, PA and NA, and LS fishing communities as policy goals (Urquhart and Acott 2014). Therefore, this study combines these two research streams to examine the processes underlying the relationship between CSR components and LS. This study looks into the potential mediating effects of PA and NA on associations. Consequently, this study attempts to evaluate the hypotheses listed below:

H_1. There is a positive correlation between CSR and LS in young fishers.

H_2. PA mediates the positive correlation between CSR and LS among young fishers.

H_3. NA mediates the positive correlation between CSR and LS among young fishers. H_4. PA and NA have a chain mediation effect on the effects of CSR on LS among young fishers.

The antecedents chapter begins with a comprehensive literature review on CSR, followed by the description of the current research, including the research design, methodology, and data collection methods. The chapter then presents the results of the empirical analysis, followed by a discussion of the findings, implications for retail practitioners, and limitations of the study in understanding and enhancing CSR in Malaysia's Coastal Regions.

2. Literature Review
2.1. Climate Social Resilience and Life Satisfaction
CSR and LS of fishing groups are crucial to fisheries' future potential, and resource management strategies that do not consider climate resilience may undermine the sustainability of fisheries (Marshall 2010; Feiner et al. 2022). Fishing communities worldwide face unprecedented issues such as resource depletion, climate change influences, and regulatory changes (Kilpatrick et al. 2015). The fisheries' socio-ecological system's ability to absorb disturbance and maintain the same essential structure and functioning, self-organization, and adaptability to stress and change are all aspects of social resilience (Davidson et al. 2013).

Social resilience refers to the ability of human societies to endure change and hardship while sustaining their livelihoods (Cinner and Barnes 2019). For instance, Despite revolutionary technical or cultural changes associated with system shifts, such as a shift from a fishing industry to a tourism-based economy, fishing communities may sustain social resilience if such changes preserve or enhance their livelihoods and raise their LS (Berkes and Ross 2013).

For example, Szaboova et al.'s (2022) demonstrated that women in fisheries and "Fishers' Health" projects in the United Kingdom support social resilience to promote fishing families' physical and mental well-being, often at the expense of their material, social, and emotional well-being. Increases in personal resources (e.g., resilience) were likewise related to greater LS and less depressive symptoms, according to Fredrickson et al.(2008). These verdicts emphasize the significance of resilience in LS improvement. This might be because people with high levels of resilience are more likely to be competent of surviving with life obstacles, swiftly responding to stress, and reaching future success, well-being, and LS (Ong et al. 2006). In general, resilience has a PA on LS.

2.2. Positive and Negative Affect as Mediators
There is strong evidence that both PA and NA are related to resilience. Unquestionably, resilience is one of the most powerful determinants of feelings and emotions (Zautra et al. 2005). Several studies have found that resilience is linked to NA in a variety of settings (Howell and Rodzon 2011; Ungar 2019). In addition, There is evidence that resilient people can use their PA to improve their well-being (Lin et al. 2014). Although they are associated with aspects of subjective well-being, LS and emotional experiences are not the same (Zander et al. 2019). According to studies, PA and NA have a causal influence on LS evaluations, which is related to the association between the emotional and cognitive components of subjective wellbeing. Moreover, empirical studies have shown that the absence of negative emotions is more strongly linked to LS than the presence of PA (Joshanloo 2019).

According to Frederickson and Cohn's (2008) broaden-and-build theory (BBT) of positive emotions, PA is evolutionary adaptation that help people create long-term resources. Unlike NA, which concentrates attention, cognition, and physiology on dealing with an immediate threat or problem, PA generates novel and extended ideas and activities that are not always necessary for an individual's immediate safety, well-being, or survival (Cosmides and Tooby 2000). Nevertheless, over time, these new encounters accumulate as significant assets that have the power to change people's lives. Positive emotions increase future levels of resilience (Fredrickson et al. 2020; Baker et al. 2021). For example, in the face of an uncertain future, fishermen who are more resilient than their peers experience more positive emotions. When a fisherman is in a good mood and uses his emotions and resources to cope with threats and obstacles he may encounter, LS may increase.

3. The Current Research

According to the above considerations and the current literature that has demonstrated links between PA and NA and CSR, and between PA and NA and LS, PA, and NA are expected to act as mediators between the associations between CSR and LS in this study. It has been specifically suggested that both PA and NA due to CSR may indirectly influence LS. No study has yet addressed the potential mediating role of PA and NA in the link between CSR and LS. This study aimed to address this knowledge gap. This research examines the function of PA and NA as mediating factors in the correlations between CSR and LS.

4. Materials and Methods

4.1. Participants and Procedures

To inspect the chain-mediating effects of PA and NA as mediating factors in the links between CSR and LS in fishermen, a cross-sectional study was carried out. This study design was combined with a survey to examine and describe the variables in focus.

Four hundred registered young fishermen were recruited from four Malaysian localities affected by climate change. Most respondents (99.3%) were males, with a mean age of 29.94 years (SD = 6.2). The Malaysian Youth Policy, enacted in 2015, describes youth as individuals aged 18 to 30 (ISDB 2019). Regarding ethnicity, a sizable proportion of respondents were Malays (more than 95%). Nearly 8% of the respondents never attended formal school, while 60% had completed secondary school. Nearly 54% of them were single. 38.3% of the respondents, having worked in the fishing sector for over ten years, can be considered experienced. In our sample, 31.3% of fishermen earned less than RM1000 (about US$250). Instead of deep-sea fishermen, more than 77% of the respondents were coastal fishermen.

A multistage simple random sampling was utilized in this study. In the first stage, areas affected by climate change were named. The list of climate change-affected places was compiled using information from the Meteorological Department and past research by Kwan et al. (2013) and Mohd et al. (2018). The main criterion for including regions was that they are affected by one or both climate change impacts listed below rising temperatures, rising sea levels, or both. A total of 14 places were included in the list. Then, four regions-Bayan Lepas, Kuantan, Kuala Terengganu, and Setiawan were randomly selected from the list by drawing a cluster sample based on geographic segmentation. By the end of the 21st century, Malaysia, according to Tangang et al. (2012), will see a considerable temperature increase of 3 to 5° C. Similarly, Kwan et al. (2013) found that the proportion of warm nights in these areas increased by more than 90%.

In the second step, 100 young fishers from each selected location were chosen to participate as respondents. A questionnaire based on previous research was prepared and pre-tested as a research tool for this study. The village leaders or relevant authorities gave their consent for the data collection to be conducted in the regions. Data were collected at popular locations with fishermen, including a pier, a café, and a waqf (a small restaurant typically located in coastal regions). Trained and knowledgeable enumerators helped with the process while research team members monitored it. The survey carried out in Malay, served as the primary way of data collection. Respondents were free to ask questions or leave the session if they were in doubt or confused about the topics asked.

4.2. Measures

The questionnaire used in this study aims to assess various aspects related to climate social resilience, positive and negative affect, and life satisfaction. It consists of several sections or scales designed to measure different constructs. Here's a description of each section:

Climate social resilience. CSR was assessed using Marshall and Marshall's (2007) study of social resilience. This measure includes 12 items, each answered on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Sample items include: "I am adaptable to minor changes in the workplace," "Compared to other fishermen, I am more able to adapt to change," and "I will not last long if there are more changes." Perez et al. (2015) demonstrated the scale's validity and reliability. This study's coefficient α study was .867.

Positive and negative affect. Watson et al.'s (1988) Positive and Negative Affect Schedule assessed PA and NA. This scale includes six items for the PA subscale (e.g., active, alert, and attentive) and six for the NA subscale (e.g., fearful, ashamed, and worried) on a 5-point scale ranging from "very little or not at all" to "extremely," participants were asked to describe the degree of PA and NA descriptions according to how they typically feel. In this study, Cronbach's α was .707 for the PA subscale and .861 for the NA subscale.

Life satisfaction. Satisfaction with Life Scale (1985) was utilized to assess LS. It includes five items, such as "I am happy with the way my life is going," which were rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Pavot et al. (1991) demonstrated reliability and reliability. In this study, Cronbach's α was .747.

Additionally, demographic questions such as age, gender, race, education level, income, fishing experience, and types of fisheries may be included to gather relevant participant information.

4.3. Data Analysis

An independent sample t-test, descriptive analysis, and one-way analysis of variance (ANOVA) were used to analyze and report the main sociodemographic parameters. Pearson's coefficient was calculated for each variable. To collect quantitative data on the multiple mediation effects of PA and NA on the relationship between CSR and LS, Hayes' (2012) process macro-model 6 was used. The Hayes method allows researchers to investigate the indirect effects of an independent variable on a dependent variable through one or more mediating variables. This study used a p-value of 0.05 as the statistical threshold. Five thousand bootstrap samples were used, and the confidence interval

(CI) was set at 95%. The absence of zero in the 95% confidence interval (CI) interval, according to Hu and Bentler (1999), denotes a substantial mediating influence.

5. Results

Results in Table 1 indicate that young coastal fishermen with less fishing experience exhibited substantially higher social resilience and LS levels than their counterparts. Younger fishermen with higher incomes tended to be more resilient to climate change than those with lower incomes. There are also significant differences in LS between young fishermen who had completed high school than other fishermen.

Table 1. The research population's demographic characteristics and their link to climate social resilience and life satisfaction.

Variable		N (%)	CSR	n = 400	LS	
			(M±SD)	F/t	(M±SD)	F/t
FE	10 years	247(61.7)	3.867(.962)	2.816**	5.08(1.077)	2.02*
	Above 10 years	153(38.3)	3.57(1.10)		5.19(.92)	
FC	Coastal fishermen	308(77)	3.85±.936	3.656***	5.19(.957)	2.369**
	Deep-sea fishermen	92(23)	3.417±1.22		4.91(1.18)	
IN	US$250>	125(31.3)	3.66±1.07	2.63**	5.09±1.10	1.378
	US$250<	275(68.8)	3.95±.885		5.14±.983	
EL	No schooling	3(8)	3.66±0.45	1.731**	2.49±.345	1.101
	Primary school	63(15.8)	3.73±0.67		3.29±.465	
	Low Secondary school	92(23.0)	4.00±0.70		3.32±.587	
	Upper secondary school	221(55.3)	4.34 ±0.98		3.7±.827	
	Higher education	21(9.8)	3.36±0.60		3.25±.471	

Note. Climate social resilience = CSR, life satisfaction = LS. Fishing Categories= FC, Fishing experience=FE, Income=IN, Educational level=EL, * $p < .05$, ** $p < .001$.

The bivariate correlations, means, and SDs for all research constructs are displayed in Table 2. NA is inversely related to PA, LS, and CSR. Conversely, as predicted, CSR is positively related to PA and LS.

Table 2. Study variable means, SDs, and correlations.

No.	Construct	M±SD	1	2	3	4
			n = 400			
1	CSR	3.75±1.024	1			
2	LS	5.127±1.021	.098*	1		
3	PA	4.11±.842	.160**	.323**	1	
4	NA	1.814±.921	-.185**	-.121*	-.646**	1

Note. Climate social resilience=CSR, life satisfaction=LS, negative affect=NA, positive affect=PA, standard deviation= SD; * $p < .05$, ** $p <. 01$, *** $p < 0.001$.

After adjusting for the fishing experience and fishing category items, the mediated PA and NA models were tested using SPSS 26 Process Macro Model 6 (Table 3). CSR had a significant positive effect on PA (β = .246, t = .2.008, p < 0.05). CSR (β = −0.051, t = −2.133, p < 0.05) and PA (β = -.313, t = -6.52, p < 0.001) were significant in negatively predicting NA. CSR (β = 0.306, t = 14.007, p < 0.001), PA (β = .494, t = −6.066, p < 0.001), and NA (β = -.165, t = 2.008, p < 0.01) had a significant predictive effect on LS. **Table 3**. Regression analysis of the link between constructs of study.

Models	β	SE	t
Model 1			
FC	-.085	.051	-1.668
FE	.081	.099	.825
CSR	.246	.123	.2.008*
R2		.022	
F		2.927*	
Model 2			
FC	-.083	.117	-1.712
FE	.055	.094	1.158
CSR	−0.051	0.024	−2.133*
PA	-.313	.058	-6.52***
R2		171	
F		13.053***	
Model 3			
FC	-.165	.118	-1.402

FE	.114	.094	1.214
CSR	0.306	0.022	14.007***
PA	.494	.081	6.066***
NA	-.165	.075	-2.008**
R2		.261	
F		11.329***	

Note. Climate social resilience=CSR, positive-affect=PA, negative affect=NA, life satisfaction=LS, Fishing Categories= FC, Fishing experience=FE, Model 1: Outcome Variable= PA, Model 2: Outcome Variable= NA Model 3: Outcome Variable = LS, *** $p < 0.001$, **$p<0.01$, * $p < 0.05$.

This study's hypotheses were tested using Hayes' (2012) Process Macro Model 6 with a bootstrapping sample of 5000. Table 4 indicates that CSR positively correlates with LS (B = .0977, p < 0.05). Consequently, H_1 was accepted. Moreover, the direct relationship between CSR and LS was not significant after including PA (β = 0.043, p = 0.094), indicating that PA served a partial mediating role between CSR and LS (β= .0668, CI (.0202, .1277). Thus, H2 was supported. In addition, the findings revealed that NA did not mediate the relationship between CSR and LS (β = .0437, CI (-.0007, .0942). H_3 was thus rejected. The results also discovered that when PA and NA were entered into the model, the bootstrapping analysis found that CSR did not impact LS through PA and NA sequentially. Its chain mediating effect was .0164, with a 95% confidence interval not containing zero [-.0421, .0009]. Therefore, H_4 was rejected (Figure 1).

Table 4. The chain mediating model's mediating effect analysis.

Items	Effect size	Boot SE	Boot CI	
			Lower	Upper
Total effects	.0977	.024	.357	.264
Direct effects	.051	0.024	.004	.099
Total indirect effects	.0938	.0337	.0308	.1647
CSR → PA → LS	.0668	.0275	.0202	.1277
CSR → NA → LS	.0437	.0239	.0007	.0942
CSR → PA → NA → LS	.0164	.0109	.04298	.0007

Note. Climate social resilience=CSR, positive-affect=PA, negative affect=NA, life satisfaction=LS
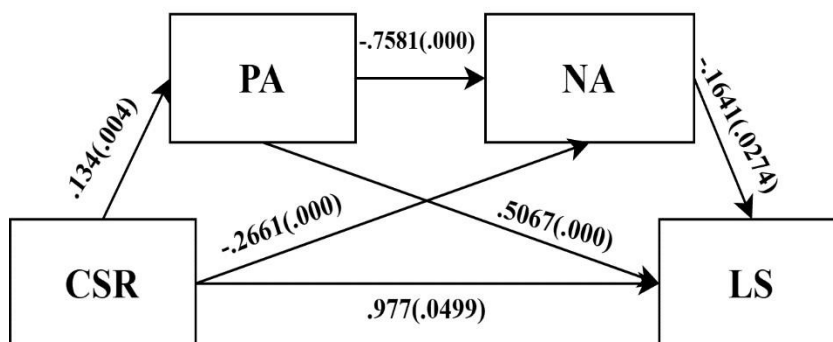

Figure 1. Diagram for the study variables association.
Note: climate social resilience=CSR, positive affect=PA, negative affect=NA, life satisfaction=LS.

6. Discussion

Young Malaysian fishermen face various challenges, including those caused by climate change. This study, therefore, focused on young fishers in Malaysia. The authors aimed to provide new information on the underlying mechanisms and constructive explanations for the positive correlation between the LS and the social resilience of young fishermen to climate change. In this study, the authors conceptualized and operationalized a chain mediation model that illustrates the relationships between CSR, LS, PA, and NA, with the latter two constructs acting as sequential mediators. Although climate change impacts are likely to intensify, empirical data have broadly supported our prediction, underscoring that young fishermen with high resilience will likely have higher LS because they know how to mitigate the impacts. Samah et al. (2019) assert that despite their strong attachment to their jobs, fishermen are open to learning new skills to earn a living and are highly mobile occupationally. Resilient fishermen use various methods to mitigate the impacts of severe storms. Individuals with alternative livelihood options may engage in non-fishing, money-making activities rather than wait for the weather to improve. They can travel to different regions in search of potential work opportunities. Furthermore, it was shown that resiliency is adversely associated with bad sentiments—their higher resiliency lowers their negative emotions. Positive emotions are less likely to affect highly resilient fishermen since they can anticipate changes and know how to mitigate their consequences. As predicted, path analyses in this study revealed that PA acted as a partial mediator between CSR and LS.

Alternatively, resilient young fishermen reported more positive than negative emotions, which predicts better levels of LS. This finding backs up Fredrickson's (2001) BBT, which says that happy emotions can assist young fisherman in developing a range of personal resources (such as a feeling of life purpose and social support), which improves their lives. This understanding of pleasant emotions may explain why fishermen who experience more happy emotions report higher levels of LS. However, it appears plausible that fishermen who are still not resilient have lower levels of LS, given that they often experience lower amounts of PA.

Contrary to PA, which acted as a mediator in the relationships between CSR and LS, NA did not play a role in these relationships. This situation could be because, as demonstrated by other investigations, a positive impact on LS appears functionally separate from a negative effect on LS (Cohn et al. 2009). Therefore, attempts to improve young fishermen's quality of life need not focus solely on reducing their NA. Additionally, we must prioritize enhancing the positive effects of young fishermen rather than just minimizing their NA. Hence, we should embrace programs that encourage young fishermen's positive experiences to increase their LS. The present research's method for comprehending CSR and LS contributes to this emerging but crucial literature. It also emphasizes the need to situate and comprehend social protection program success in terms of CSR and LS outcomes from the perspectives of the beneficiaries. These findings suggest better policy and decision-making considering young fishermen's needs to make fisheries more resilient to future shocks, changes, and uncertainties.

7. Implications

Efforts to improve the lives of young fishermen in the face of climate change can be guided by understanding and resolving practical and social implications for greater well-being and happiness within these vulnerable communities. According to the findings, strengthening social networks, encouraging collaboration, and supporting neighbourhood-based activities might help people better adjust to changing climates and discover ways to be happy. Additionally, encouraging community resilience profoundly affects the general well-being and social structure of fishing communities.

Policymakers, communities, and other relevant parties can concentrate on creating and implementing strategies to increase resilience and offer resources to assist these people in overcoming the difficulties brought on by climate change. This could involve lucrative activities like tourism-related businesses, aquaculture or fish farming, maritime activities, including shipping, ports, and logistics, and salt farming or seaweed cultivation to enhance their well-being and quality of life.

The study also emphasizes how important positive emotional experiences are in determining how satisfied young fishermen are with their lives. It means that, in addition to extrinsic elements like resilience in coping with climatic changes, their subjective emotional experiences are extremely important in determining their level of overall LS. This emphasizes the value of mental health and the requirement to meet the emotional needs of young fishermen in coastal areas affected by climate change. This may entail projects like counselling services, public awareness campaigns about mental health, and neighbourhood programs that foster joy and support young fishermen in successfully navigating the problems of climate change. It implies prospective intervention techniques if happy emotions are recognized as a mediating component in the link between resilience and LS.

Supporting career training programs, promoting eco-tourism initiatives, or facilitating the development of other income-generating activities related to coastal resources are examples of mitigation strategies, as are community-based initiatives that encourage local communities to collaborate and develop community-based adaptation and resilience strategies. This could be participating in group decision-making processes, putting local conservation measures into action, or creating community-led projects to improve the wellbeing of the community members.

In addition, promoting activities that result in positive experiences, such as community involvement, leisure activities, and chances for social support, is one way to do this. These interventions can help young fishermen become more resilient, experience more positive emotions, and ultimately be happier with their lives. Besides, decision-makers and local authorities can priorities creating programs that focus on mental health, emotional well-being, and social assistance in fishing communities. This could entail allocating funds, encouraging laws, and fostering an atmosphere that values and nourishes joyful feelings as vital elements of general well-being.

8. Conclusion

In conclusion, the study's examination of the vulnerability of young fishermen and how it impacts their mental health has social and practical implications that call for greater awareness, individualized support, the development of policies, and community empowerment. Understanding these social and practical implications can help safeguard young fishermen's mental health and general well-being in light of a changing climate.

9. Limitations

The limitations of this study need careful consideration of its results. PA is shown to predict resilience, while resilience also increases PA. Resilience and PA may be causally related. Nevertheless, this research mainly emphasized the

relationship between CSR and PA. Future studies might employ a longitudinal approach to examine any potential reciprocal causation. Second, when discussing generalizability, it is crucial to stress that Malaysians comprised the bulk of this study's sample. It is uncertain how effective these results would be when generalized to other culture samples. Future studies must look at how culture impacts the interactions between the variables under consideration, taking into account the distinct differences between individualistic and collectivistic countries. Future studies should focus more on the impoverished fishermen group that is striving to make ends meet. These particular groups of people are now more dependent on humanitarian assistance due to the impact of climate change, which has exposed them to environmental and health threats. The consequences of climate change on people experiencing poverty reduce their access to water and food, which raises competition for them. It should be highlighted that while resilience was shown to mediate all of the proposed hypotheses, it only displayed substantial impacts on positive feelings and poor prediction accuracy for LS and negative feelings. Future researchers should thus take into account several different and critical mediating effects. Future studies can use this framework to study a specific fishery to learn how the many resilience elements interact and change in significance according to the setting. Similarly, comparing quantitative evaluations of fisheries under various management regimes can offer insights into how management organizations support or impede resilience to climate change.

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