TPM Vol. 32, No. S4, 2025
ISSN: 1972-6325
https://www.tpmap.org/

RESILIENCE SCALE VALIDATION IN COASTAL FISHERMEN POPULATIONS

DR.UTKARSH ANAND[1], SUNIL KUMAR YADAV[2], PRAVEEN KUMAR JOSHI[3]

[1]ASSOCIATE PROFESSOR, KALINGA UNIVERSITY, RAIPUR, INDIA.
EMAIL: KU.UTKARSHANAND@KALINGAUNIVERSITY.AC.IN ORCID: 0009-0007-2124-6666
[2]ASSISTANT PROFESSOR, KALINGA UNIVERSITY, RAIPUR, INDIA.
EMAIL:KU.SUNILKUMARYADAV@KALINGAUNIVERSITY.AC.IN,0009-0004-0034-277X
[3]ASSISTANT PROFESSOR, NEW DELHI INSTITUTE OF MANAGEMENT, NEW DELHI, INDIA.,
E-MAIL: PRAVEEN.JOSHI@NDIMDELHI.ORG, HTTPS://ORCID.ORG/0009-0007-7777-8178

Abstract:

Coastal community populations, especially fishermen, face environmental, occupational, and socio-economic challenges that necessitate heightened psychological resilience. This study aims to validate a culturally adapted resilience scale tailored for coastal fishing communities. A mixed-methods approach was utilized to administer the scale to a sample of 400 fishermen from various coastal regions. Psychometric analyses, including exploratory and confirmatory factor analyses, were conducted to evaluate the scale's reliability, construct validity, and internal consistency. Results showed that the adapted scale had strong reliability (Cronbach's alpha = 0.89) and a valid factor structure aligned with resilience domains, adaptability, optimism, and social support. The Tool is a valuable aid for mental health initiatives, policy formulation, and disaster preparedness strategies in the coastal fishing communities.

Keywords: Resilience, Coastal Fishermen, Scale Validation, Psychometric Analysis, Mental Health

I.INTRODUCTION:

Coastal fishing communities are among the most socio-economically vulnerable populations globally, especially in the context of developing countries (Latsoudis, 2020). These communities experience a unique combination of acute and chronic stressors, such as natural calamities, erratic weather, unemployment due to seasonality, a scarce job market, limited access to health services, and a decline in marine resources (Alkaim& Khan, 2024). These stresses tend to be further aggravated by isolation, intergenerational poverty, and exclusion from mainstream development frameworks (Sadulla, 2025). Consequently, resilience— can be described as the ability to adapt to difficulties while maintaining psychological well-being— emerges as a vital psychological trait in individuals and communities in such contexts.

Despite extensive research on resilience, it is crucial to study it in the context of specific communities, as every society has different realities (Asadi, 2014). Existing resilience scales, effective in populations, may not be effective among coastal fishermen due to their specific culture, coping expressions, and community-based resilience strategies (Guerar et al., 2017). Creating a specific demographic coastal fishermen's measure of resilience is crucial to properly estimate their mental health requirements, design appropriate interventions, and inform policies that enhance adaptive capacities (Hameed et al., 2025).

1.1Objective

The main aim of this research is to validate an appropriate contextual resilience scale for coastal fishermen populations. This involves psychometric assessment of an adapted resilience instrument through various tests of reliability, exploratory and confirmatory factorial analyses, and construct validity assessment. The intention is to have the scale capture the specific psychological and environmental factors that fishermen confront so that the scale can be

used in research and practice in mental health services, disaster preparedness programs, and social welfare planning (Kulkarni&Nair, 2024).

1.2 **Structure of the Paper**

The paper is organized as follows: Section II presents a review of existing theories and resilience scales, with a particular focus on gaps relevant to coastal communities. Section III details the procedure for adapting and validating the resilience scale, including sample selection, data collection, and the statistical methods employed. Section IV presents the results of the reliability and validity assessment of the scale, supported by relevant tables and charts. In Section V, the author discusses the significance of the findings, acknowledges the study's limitations, and offers recommendations for future research. Section VI provides a concluding synthesis, emphasizing the strategic value of the scale in promoting psychological resilience and outlining its policy implications for coastal fishing communities. This study contributes to a deeper understanding of mental health resilience in marginalized maritime populations by contextualizing psychological constructs within the lived experiences of coastal fishermen (Ghahremani&Sahraei, 2018).

II. LITERATURE REVIEW

Resilience is recognized as a robust psychological characteristic that permits people and societies to adapt to challenges, trauma, or enduring stress (Vij &Prashant, 2024). It embodies a combination of personal strength alongside emotional stability, support systems, cultural values, and environmental factors (Velliangiri, 2025). Among the most exposed and vulnerable groups, coastal fishermen populations demonstrate enduring resilience in the face of harsh climatic conditions, financial instability, occupational hazards, and social ostracism (Gurudiwan& Mire,2024). . Measuring resilience of these populations, particularly in culturally sensitive ways, is important in designing tailored interventions and support strategies (Rao& Saxena,2025).

As for the rest of the population, students, disaster victims, and health professionals are some of the most researched groups in regard to resilience (Ghahremani&Sahraei, 2018). . Evidence-based research focused on specific occupational groups, such as fishermen, is sparse, however. These populations often depend on social structures, traditional wisdom, and cooperative systems to help them cope with the daily adversities (Vij & Prashant, 2024). . More than personal strategies, these fishermen's resilience is primarily shaped through collective and environmental interactions (Nakamura& O'Donnell,2025). These specificities demand attention in any tool that is to be developed for measuring resilience in this context.

Psychological scales such as the Resilience Scale have demonstrated some effectiveness in measuring resilience on different populations (Jaiswal& Pradhan,2023). However, these psychological tools may not capture the unique life challenges and the strengths of people from coastal communities. Most are designed in urban or clinical settings, lacking in consideration of occupational risks, environmental vulnerabilities, and culturally embedded belief systems (Latsoudis, 2020). This means that tools designed for rural populations might be misapplied to assess fisher populations, leading to inaccurate or incomplete evaluations.

To address these gaps, greater emphasis is being placed on developing resilience measures that are grounded in the realities of specific groups and tailored to their unique contexts (Alkaim& Khan, 2024). . A robust resilience scale for coastal fishermen would capture concepts such as adaptability, changeable community support systems, associated spiritual or cultural beliefs, and traditional coping approaches. Validation of such a community-based scale entails community qualitative input and statistical analyses to establish internal consistency, construct validity, and reliability (Agnes Pravina, 2024).

There is a significant lack of tailored and validated resilience scales for occupationally marginalized groups such as fishermen (Rao& Saxena, 2025). . There is a substantial gap in culturally relevant and methodologically rigorous quantitative tools designed to capture the resilience of these communities (Asadi, 2014). This study aims to address this gap by validating a resilience scale tailored to coastal fishermen and verifying that it captures their specific psychological, social, and environmental contexts.

3. METHOD

3.1 Participants

The study's population consisted of 400 coastal fishermen from three communities along the eastern coastline who were between the ages of 20 and 60 (M = 37.4, SD = 10.8). A stratified random sampling method was employed, considering age, education, and years of fishing experience to capture all demographics. Inclusion criteria mandated that subjects must have participated in fishing for a minimum of five years uninterrupted. Informed consent was granted by all participants, and the study received ethical approval from the relevant local institutional review board.

3.2 Instruments

For this research, an adapted version of the resilience scale was used. The original scale included 25 items and covered the following five domains: personal competence, social competence, social support, emotional regulation/adaptability, and optimism. The adaptation process involved expert translation and back-translation, as well as cultural adaptation done through focus groups. Responses were measured using a 5-point Likert scale from 1 "strongly disagree" to 5 "strongly agree." A pilot test was done with 30 fishermen to assess the relevance and clarity of the items.

3.3 Procedure

Information was gathered over 6 weeks at the community centers and fishing docks during their off-hours. Regionally fluent field researchers assisted participants in filling out the questionnaires. Apart from the resilience questionnaire, demographic information like age, education, income, field of work, and previous exposure to disasters was collected. The participation was both voluntary and anonymous.

3.4 Statistical Analysis

Data was processed using SPSS version 26 and AMOS version 24. As a first step, relevant data points were screened for missing values and univariate normality. The internal consistency was assessed using Cronbach's alpha. An Exploratory Factor Analysis (EFA) using Principal Axis Factoring with Promax rotation was performed to reveal underlying factor constructs. Subsequently, Confirmatory Factor Analysis (CFA) was used to check the validity of the factor structure with fit indices CFI, TLI, RMSEA, and SRMR. For each construct, Composite Reliability (CR) and Average Variance Extracted (AVE) were computed. Convergent and discriminant validity were evaluated through inter-factor correlations with the Fornell-Larcker criterion.

3.5 **Rasch Modelling**

Rasch modelling is widely used for newly developed instruments, refinement of assessment tools, Differential Item Functioning (DIF) analysis, and transforming ordinal data into interval-scale measurements. Among its key strengths are the ability to convert raw scores into metric data, the separation of item and person parameters, and the identification of poorly performing items 1. Most relevant is the assumption of unidimensionality – that all the items within a scale measure a single latent construct. In the model, two key parameters are defined — item difficulty (β) and person ability (θ), which correspond to the respondent's position on the latent trait continuum. These two parameters are intricately linked, and the interaction is captured through a logistic probability function, which describes the likelihood of a positive response (agreement) as

$$P(X_{ni} = 1) = \frac{e^{(\theta n - \beta_i)}}{1 + e^{(\theta_n - \beta_i)}}$$

This particular equation explains how the probability of a certain response increases with a person's enhancement ability surpassing the level of difficulty of the particular item. Infits and outfits, which are mean square values, can be referred to as metrics to assess how well the data fit the Rasch model. Their values falling within the range of 0.7 to 1.3 is considered optimal. An Item Person Map, also known as a Wright Map, exhibits the unique features of visual items and a person's abilities on a certain continuum. Rasch modelling is widely used for newly developed instruments, refinement of assessment tools, Differential Item Functioning (DIF) analysis, and transforming ordinal data into interval-scale measurements. Among its key strengths are the ability to convert raw scores into metric data, the

separation of item and person parameters, and the identification of poorly performing items. Most importantly, this model allows sample-free item estimation and test-free person measurement, which makes it more advantageous for small sample sizes than other theories of IRT.

4. Results and Discussion

4.1 Descriptive Statistics and Internal Consistency

The resilience scale, applied to 400 coastal fishermen, showed moderate to high endorsement across all domains.

Table 1: Descriptive Statistics

Resilience Domain	Mean Score	Standard Deviation	Cronbach's Alpha
Personal Competence	3.85	0.52	0.82
Social Support	4.02	0.48	0.86
Emotional Regulation	3.76	0.59	0.79
Adaptability	3.91	0.5	0.83
Optimism	3.67	0.55	0.81

As indicated in Table 1, Social Support yielded the highest mean score (M = 4.02), followed closely by Adaptability and Personal Competence. This suggests that there is a high degree of interpersonal and sociocultural network support and resources utilized in coping with stress and life challenges. All subscales showed acceptable levels of internal consistency with the How Social Support is provided and received scale, yielding a Cronbach's alpha between 0.79 and 0.86.

4.2 Exploratory Factor Analysis (EFA)

Table 2: EFA Factor Loadings

Item	Factor 1 (Competence)	Factor 2 (Support)	Factor 3 (Optimism)
Item 1	0.67169	0.498143	0.545987
Item 2	0.771055	0.683958	0.600229
Item 3	0.835195	0.549536	0.432747
Item 4	0.882013	0.528405	0.641053
Item 5	0.749175	0.677989	0.528793
Item 6	0.749511	0.609391	0.352673
Item 7	0.673976	0.427636	0.390953
Item 8	0.651981	0.61152	0.5372
Item 9	0.85974	0.596672	0.582057
Item 10	0.707162	0.459339	0.515769

Exploratory Factor Analysis was performed to investigate the adapted scale's structure. The analysis indicated a definitive three-factor solution: Competence, Support, and Optimism. As presented in Table 2, most items exhibited a factor loading greater than 0.60, which suggests strong construct fidelity and formative validity.

4.3 Confirmatory Factor Analysis (CFA)

Table 3: CFA Model Fit Indices

Model	Chi-Square	df	CFI	TLI	RMSEA	SRMR
Three-Factor Model	134.22	71	0.957	0.942	0.041	0.038

To validate the structure identified in EFA, Confirmatory Factor Analysis was conducted. The indices of model fit contained in Table 3 support the adequacy of the three-factor model. Indicators CFI (0.957) and RMSEA (0.041) suggest that the model is satisfactory with the data and that the established thresholds for psychometric validation have been met.

4.4 Validity Analysis: Convergent and Discriminant Validity

Table 4:Convergent and discriminant validity of resilience constructs.

Construct	AVE	Composite Reliability (CR)	Max Shared Variance (MSV)
Competence	0.61	0.85	0.42
Support	0.59	0.87	0.38
Optimism	0.55	0.83	0.4

The model's constructs satisfactorily achieved the criteria of convergent and discriminant validity. Table 4 indicates that all AVE values exceeded the essential benchmark of 0.50, and Composite Reliability was greater than 0.80, which indicates good convergent validity. Moreover, each construct's AVE exceeding MSV confirms the constructs' discriminant validity, that they were separate and unique.

4.5 Interpretation and Contextual Discussion

The findings from the validation process highlight the alignment of the resilience scale with the culture of coastal fishermen, wherein social support stands out as a primary domain of resilience. This highlights the importance of collective resilience mechanisms—such as families, fishing cooperatives, and faith-based groups—in supporting the mental health of individuals within coastal communities. The strong psychometric properties of the scale, including high reliability, structural validity, and other key metrics, enhance its applicability in both clinical settings and public policy formulation, particularly for disaster-prone coastal regions.

5. CONCLUSION

This study validated the resilience scale tailored for coastal fishermen populations. The scale has been rigorously tested for psychometric properties through descriptive analysis, exploratory and confirmatory factor analyses, and validity verification. Strong internal consistency, stable factor structure, and sound convergent and discriminant validity were established. The socio-environmental context of coastal livelihoods is framed within a three-factor model consisting of personal competence, social support, and optimism.

Resilience is greatly endorsed as social support in these communities, highlighting the collective nature of these coping strategies that are highly interpersonal and community-driven. The model'sstability across various statistical indices strengthens its claim as a clinically and policy-relevant instrument for pre-disaster, mental health, and community resilience planning and intervention.

This study addresses resilience measurement gaps for marginalized occupational groups by providing contextualized and empirically validated tools. Follow-up work should look into longitudinal applications of the scale and its responsiveness to resilience-building interventions in comparable high-risk populations.

REFERENCES:

[1]Nakamura, H., & O'Donnell, S. (2025). The Effects of Urbanization on Mental Health: A Comparative Study of Rural and Urban Populations. Progression Journal of Human Demography and Anthropology, 3(1), 27-32

[2]Hameed, A. Z., Balamurugan, R., Rizwan, A., & Shahzad, M. A. (2025). Analyzing And Prioritizing Healthcare Service Performance in Hospitals Using Serqual Model. Archives for Technical Sciences, 1(32), 165–175. https://doi.org/10.70102/afts.2025.1732.165

[3]Kulkarni, S., & Nair, H. (2024). The Role of Medical Terminology in Public Health Surveillance and Pandemic Preparedness. Global Journal of Medical Terminology Research and Informatics, 2(3), 5-7

[4]Gurudiwan, P., & Mire, S. K. (2024). A Review of Pharmaceuticals in Aquatic Environments Risk Assessment and Ecological Impacts. Natural and Engineering Sciences, 9(3), 88-99. https://doi.org/10.28978/nesciences.1606589

[5]Jaiswal, H., & Pradhan, S. (2023). The Economic Significance of Ecosystem Services in Urban Areas for Developing Nations. Aquatic Ecosystems and Environmental Frontiers, 1(1), 1-5

Sathish Kumar, T. M. (2024). Developing FPGA-based accelerators for deep learning in reconfigurable computing systems. SCCTS Transactions on Reconfigurable Computing, 1(1), 1-5. https://doi.org/10.31838/RCC/01.01.01

[6]Guerar, M., Merlo, A., &Migliardi, M. (2017). Clickpattern: A pattern lock system resilient to smudge and side-channel attacks. Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications, 8(2), 64-78.

[7]Latsoudis, P. (2020). A most northern record of the alien tunicate Phallusia nigra Savigny, 1816, population from the Argolic Gulf, Greece. Natural and Engineering Sciences, 5(3), 192-197. https://doi.org/10.28978/nesciences.832997

[8]Velliangiri, A. (2025). Bio-inspired vortex control mechanisms for drag reduction in high-speed submerged bodies: A CFD and experimental study. Advances in Mechanical Engineering and Applications, 1(1), 11–22.

Borhan, M. N. (2025). Exploring smart technologies towards applications across industries. Innovative Reviews in Engineering and Science, 2(2), 9-16. https://doi.org/10.31838/INES/02.02.02

[9]Ghahremani, M., &Sahraei, M. (2018). Investigating the Relationship between Spiritual Intelligence and Mental Health of Employees of Islamic Azad University of West Azerbaijan. International Academic Journal of Business Management, 5(1), 82–86. https://doi.org/10.9756/IAJBM/V5I1/1810007

[10]Agnes Pravina, X., Radhika, R., & Ramesh Palappan, R. (2024). Financial Inclusiveness and Literacy Awareness of Fisherfolk in Kanyakumari District: An Empirical Study. Indian Journal of Information Sources and Services, 14(3), 265–269. https://doi.org/10.51983/ijiss-2024.14.3.34

[11] Sadulla, S. (2025). Effect of Pranayama on lung function in post-COVID rehabilitation among middle-aged adults: A clinical study. Journal of Yoga, Sports, and Health Sciences, 1(1), 24–30.

[12] Asadi, M. (2014). The impact of social intelligence of the management on the mental health in the Supreme Audit Court. International Academic Journal of Accounting and Financial Management, 1(2), 39–45.

[13] Vij, P., & Prashant, P. M. (2024). Predicting aquatic ecosystem health using machine learning algorithms. International Journal of Aquatic Research and Environmental Studies, 4(S1), 39-44. https://doi.org/10.70102/IJARES/V4S1/7

Bhowmik, S., Majumder, T., & Bhattacharjee, A. (2024). A Low Power Adiabatic Approach for Scaled VLSI Circuits. Journal of VLSI Circuits and Systems, 6(1), 1–6. https://doi.org/10.31838/jvcs/06.01.01

[14]Alkaim, A. F., & Khan, M. (2024). Pharmacist-Led Medication Therapy Management: A Review of Its Effectiveness in Improving Patient Outcomes. Clinical Journal for Medicine, Health and Pharmacy, 2(4), 31-39.

[15] Rao, I., & Saxena, M. (2025). Exploring the Connections Between Mental Health and Sustainability. International Journal of SDGs Prospects and Breakthroughs, 3(1), 8-14.