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Development and validation of the community empowerment scale in the context of social forestry

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ABSTRACT: This study aims to develop and validate a multidimensional measurement scale for community empowerment within Indonesia's Social Forestry program. The urgency of empowerment arises from the need for equitable and sustainable forest management, yet measurement tools remain limited, especially in forest-dependent communities in developing countries. This study employed a quantitative, cross-sectional design involving 512 respondents from Social Forestry Groups. Instrument development followed a systematic process: literature review, conceptualisation of dimensions, and content validation via Focus Group Discussions with experts and community members. Data analysis consisted of content validity (Item-CVI), exploratory factor analysis (EFA) using Principal Axis Factoring with Varimax rotation, reliability testing (Cronbach's Alpha), and confirmatory factor analysis (CFA) via covariance-based SEM. The findings confirm a five-dimensional structure of community empowerment: Capacity to Act, Interpersonal Power, Interactional Power, Collective Power, and Resilience Power. The measurement scale showed strong validity and reliability, with excellent CFA fit indices (Chi-Square/df = 2.14; CFI = 0.943; TLI = 0.931; RMSEA = 0.054; SRMR = 0.041), factor loadings > 0.60, and satisfactory AVE (> 0.50) and CR (> 0.70). Practically, this study provides a robust, contextual tool for evaluating Social Forestry programs. Theoretically, it enriches discourse on empowerment measurement in natural resource governance, emphasizing the role of cultural context in psychometrics.
Keywords: community empowerment; social forestry; scale validation; psychometrics; factor analysis.

Desenvolvimento e validação da escala de empoderamento comunitário no contexto da silvicultura social

RESUMO: Este estudo visa desenvolver e validar uma escala multidimensional para a medição do empoderamento comunitário no programa de Silvicultura Social da Indonésia. A urgência do empoderamento decorre da necessidade de um manejo florestal equitativo e sustentável, mas as ferramentas de medição permanecem limitadas, especialmente em comunidades dependentes de florestas em países em desenvolvimento. Este estudo empregou um delineamento quantitativo e transversal envolvendo 512 respondentes de Grupos de Silvicultura Social. O desenvolvimento do instrumento seguiu um processo sistemático: revisão da literatura, conceituação das dimensões e validação de conteúdo por meio de discussões em grupo focal com especialistas e membros da comunidade. A análise de dados consistiu em validade de conteúdo (Item-CVI), análise fatorial exploratória (AFE) por Fatoração de Eixo Principal com rotação Varimax, teste de confiabilidade (Alfa de Cronbach) e análise fatorial confirmatória (AFC) por SEM baseada em covariância. Os resultados confirmam uma estrutura de cinco dimensões do empoderamento comunitário: Capacidade de Agir, Poder Interpessoal, Poder Interacional, Poder Coletivo e Poder de Resiliência. A escala de mensuração apresentou forte validade e confiabilidade, com excelentes índices de ajuste CFA (Qui-quadrado/df = 2,14; CFI = 0,943; TLI = 0,931; RMSEA = 0,054; SRMR = 0,041), cargas fatoriais > 0,60 e AVE (> 0,50) e RC (> 0,70) satisfatórios. Na prática, este estudo fornece uma ferramenta contextual robusta para avaliar programas de silvicultura social. Teoricamente, enriquece o discurso sobre a mensuração do empoderamento na governança de recursos naturais, ao enfatizar o papel do contexto cultural na psicometria.
Palavras-chave: empoderamento comunitário; silvicultura social; validação de escalas; psicometria; análise fatorial.

1. INTRODUCTION

The issue of equitable and sustainable forest resource management has become a crucial global concern in recent decades, particularly in response to the environmental crisis and growing social inequality (GIVENS et al., 2019; WINSTON, 2022; VINEIS; GAMBHIR, 2023). As the paradigm shift from centralized to decentralized governance shifts, community-based forest management (CBFM) approaches are seen as an effective strategy for bridging conservation and socio-economic development goals

(REYES et al., 2024; MENGIE; SZEMETHY, 2025). Various countries, particularly in tropical regions, have adopted similar schemes within the framework of sustainable development and natural resource-based poverty alleviation (SAMBODO et al., 2023; PULHIN et al., 2024).

In Indonesia, CBFM principles are implemented in the Social Forestry policy, which was officially mainstreamed in the last decade (PARHUSIP et al., 2019; PURNOMO et al., 2020). This program provides local communities with legal access to manage state forest areas through various schemes such as Community Forests (CF), Village Forests (VF), and Community Plantation Forests (CPF). In addition to aiming to maintain ecological sustainability, this program is explicitly designed to improve the welfare of forest communities - a group that has historically been marginalized in natural resource governance (ERBAUGH, 2019; FAJAR; KIM, 2019; PUTRADITAMA et al., 2021).

More than simply redistributing access to land and resources, community empowerment is a fundamental pillar and key indicator of the success of Social Forestry. Conceptually, empowerment is a multidimensional process that encompasses strengthening individual and collective capacity, gaining control over decision-making, and increasing critical awareness of existing social structures (CLARK et al., 2019; SHARAUNGA et al., 2019). In this context, empowerment is not limited to economic aspects but encompasses psychological, social, and political dimensions that are essential for realizing long-term structural transformation (WAHYU et al., 2020; VAINAUSKIENĖ; VAITKIENĖ, 2021).

However, while the urgency of empowerment has been widely highlighted (GRASS et al., 2020; JOO et al., 2020), conceptual and methodological gaps remain in its measurement. Conceptually, there is no consensus on the relevant dimensions of empowerment in the socio-ecological context of forest communities in Indonesia, which are often characterized by indigenous diversity, strong dependence on forest resources, and complex power dynamics. Methodologically, most studies use narrow proxy indicators (such as income or meeting participation) that do not reflect the complexity of the empowerment construct. Furthermore, the instruments used are often adopted from Western contexts without adequate cross-cultural adaptation and psychometric validity testing (KANTH et al., 2024). This lack of standardized instruments hampers program evaluation and contextual, evidence-based policy formulation.

This study aims to develop and validate a community empowerment measurement scale within the context of Indonesia's Social Forestry Program. Employing a rigorous psychometric approach and maintaining sensitivity to the local socio-cultural context, this research is anticipated to make significant contributions in three ways: (1) Methodologically, by providing a valid and reliable instrument for measuring empowerment; (2) Practically, by offering a useful evaluation tool for policymakers and program implementers; and (3) Theoretically, by enriching the literature on empowerment in community-based natural resource governance in developing countries. Ultimately, this study will substantially contribute to strengthening the implementation and evaluation of Social Forestry in Indonesia through a valid and contextual measurement tool, while also enriching the academic discourse on community empowerment in natural resource governance.

2. MATERIAL AND METHODS

2.1. Study Design

This study employed a quantitative approach with a cross-sectional survey design. This design was chosen because it allows for simultaneous data collection from a large sample, making it well-suited for complex psychometric analyses such as exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), in accordance with (COPE et al., 2016; GERYK et al., 2016). The primary objective was to develop and validate a community empowerment measurement scale in the context of Social Forestry. Instrument development was carried out systematically through three stages. The first stage involved a literature review and in-depth conceptualisation of dimensions to identify a theoretical framework for empowerment. The researchers referred to the community empowerment theory (Zimmerman; Eisman, 2017) and a more applied empowerment framework from the World Bank (HEINZEL; LIESE, 2021; SWAISS, 2024). From this synthesis, the researcher identified five key conceptual dimensions: (1) Interpersonal Power (an individual's ability to influence and negotiate), (2) Interactional Power (communication and collaboration skills), (3) Action Capacity (the ability to plan and implement initiatives), (4) Collective Power (group strength in achieving shared goals), and (5) Resilience Power (resilience in the face of challenges and crises). Based on these dimensions, an initial set of 60 items was developed.

The second stage was content validation and contextualization through Focus Group Discussions (FGDs). Content validity is crucial to ensure that the scale items comprehensively and relevantly represent the conceptual domain being measured (ALMANASREH et al., 2019; MADADIZADEH; BAHARINIYA, 2023). The FGDs were conducted involving members of the Social Forestry program recipient communities and field facilitators in Indonesia. The purpose of the FGDs was to refine the language, ensure the items' relevance to the local context and culture of forest communities in Indonesia, and ensure they were easy to understand.

2.2. Participants and Sampling Procedures

The target population for this study comprised active members of Social Forestry Groups (SFG) in Indonesia who had participated in the program for at least two years. We purposively selected this region because it represents the diversity of forest socio-ecological conditions and Indonesia's Social Forestry program dynamics. The sample was obtained using multi-stage sampling. We purposively selected three regions with significant Social Forestry implementation in the first stage. Next, two SFG groups were randomly selected from each chosen region. Finally, members from each selected group were drawn using simple random sampling. With a target ratio of at least 10:1 between the number of respondents and the number of items (HAIR et al., 2019), the minimum sample size was 490 respondents. Five hundred twelve valid data sets were collected and used in the analysis, exceeding the minimum target and ensuring sufficient data for robust psychometric analysis.

2.3. Measurement Instrument and Scale

The research instrument consisted of 49 items using a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). The 4-point scale was intentionally chosen to avoid

central tendency bias, often occurring in scales with a neutral option (THEMISTOCLEOUS et al., 2019). Each item was specifically designed to reflect one of the five community empowerment dimensions established in the theoretical development.

2.4. Data Collection Procedures and Ethics

Before the main data collection, a pilot test was conducted on 30 respondents from villages not included in the main sample. This pilot test aimed to assess item readability, clarity of the questionnaire flow, and estimated time for completion. Problematic or confusing items were revised based on feedback. Data were collected through face-to-face interviews by trained enumerators. This method was chosen to address potential literacy limitations among respondents in rural areas and ensure a consistent understanding of each item. All data collection procedures met research ethics standards, with informed consent obtained from each respondent and full confidentiality guaranteed for all data collected.

2.5. Data Analysis Strategy

Data analysis was conducted in four sequential stages to ensure the validity and reliability of the developed instrument. The first stage was content validity, which involved five experts - three academics and two empowerment practitioners - to evaluate the suitability of each item to the operational definitions of the established theoretical dimensions. This process used the Item Content Validity Index (I-CVI) as a selection criterion, with only items with an I-CVI value ≥ 0.78 being retained (SHROTRYIA; DHANDA, 2019). Next, in the second stage, exploratory factor analysis (EFA) was conducted to identify the latent factor structure of the data. The technique used was Principal Axis Factoring with Varimax rotation, which was chosen because it assumes independence between factors. Data suitability was checked using a Kaiser-Meyer-Olkin (KMO) value ≥ 0.60 and a significant Bartlett's Test of Sphericity ($p < 0.05$). The number of factors was determined based on eigenvalues > 1 and the interpretation of the scree plot. Items with factor loadings ≥ 0.40 and without significant cross-loadings were retained for the next stage. The third stage was reliability testing, which assessed the internal consistency of each dimension (subscale) using Cronbach's Alpha coefficient. An alpha value ≥ 0.70 is considered to indicate adequate reliability (HOEKSTRA et al., 2019). Finally, in the fourth stage, confirmatory factor analysis (CFA) was conducted to test the suitability of the factor structure obtained through EFA with the empirical data. The approach used was covariance-based Structural Equation Modelling (CB-SEM) with IBM SPSS AMOS software version 26, which was chosen because of its ability to confirm the measurement model and test the suitability of the theoretical model to the covariance matrix of the observed data. This CFA evaluates various aspects of construct validity, including convergent validity as measured by Average Variance Extracted (AVE), where a value ≥ 0.50 indicates that the variance explained by the construct is greater than the error variance. Discriminant validity is evaluated through the Heterotrait-Monotrait ratio (HTMT) with a value < 0.85, and by ensuring that the square root of the AVE for each construct is greater than the correlation between constructs. In addition, the overall model fit is also tested using several common goodness-of-fit indices in CB-SEM, such as Chi-Square/df (≤ 3.0), CFI (≥ 0.90), TLI (≥ 0.90), RMSEA (≤ 0.08), and SRMR (≤ 0.08) (DASH; PAUL, 2021).

3. RESULTS

3.1. Demographic Characteristics of Respondents

This study involved 512 respondents from various villages assisted by the Social Forestry program in Central Kalimantan. Respondent demographic characteristics included age, gender, highest level of education, and length of involvement in social forestry groups. A complete overview of the demographic data is presented in Table 1.

Table 1. Demographic characteristics of respondents.
Tabela 1. Características demográficas dos respondentes.

Characteristic	Category	Frequency	Percentage (%)
Age	< 30 years	95	18.5
	30–50 years	264	51.6
	> 50 years	153	29.9
Gender	Male	383	74.8
	Female	129	25.2
Last Education	Did not complete primary school	36	7.1
	Primary School or Equivalent	170	33.1
	Junior High School or Equivalent	197	38.6
	Senior High School/Vocational School	94	18.1
	Diploma/Bachelor's Degree	16	3.1
Length of Membership	< 3 years	83	16.1
	3–6 years	244	47.6
	> 6 years	186	36.2

3.2. Instrument Content Validation

In the initial stage of instrument development, content validity was assessed by five experts (three academics and two empowerment practitioners). Each expert evaluated the relevance of the initial 60 items to the established operational definitions of empowerment dimensions. An Item Content Validity Index (I-CVI) was calculated for each item. Based on the I-CVI criterion of ≥0.78 (Polit; Beck, 2006), 11 items were eliminated and did not meet the criteria. Thus, 49 items were retained and proceeded to the next psychometric validation stage (EFA and CFA). These results ensured that the instrument had relevant and comprehensive content coverage in line with the theoretical construct of community empowerment in Social Forestry.

3.3. Construct Validity: Results of Exploratory Factor Analysis (EFA)

Before factor exploration, the researcher conducted a data feasibility test. The Kaiser-Meyer-Olkin (KMO) test showed a value of 0.912, well above the minimum threshold of 0.50, and Bartlett's Test of Sphericity showed a significance of p = 0.000 (p <0.001). Both results indicate that the data are suitable for factor analysis. The EFA process was conducted using the Principal Axis Factoring (PAF) method and Varimax rotation. Based on the eigenvalue criterion > one and inspection of the scree plot (Figure 1), five main factors were successfully extracted, cumulatively explaining 72.85% of the total variance. These factors were interpreted based on clustering items with factor loadings ≥0.50 and named according to their indicator content. It should be noted that the fifth dimension, hypothesised as "Self-Resilience" during the conceptualisation stage, is empirically more appropriately interpreted as "Resilience" based on the items that make up that factor. The factor structure and item loadings are presented in Table 2.

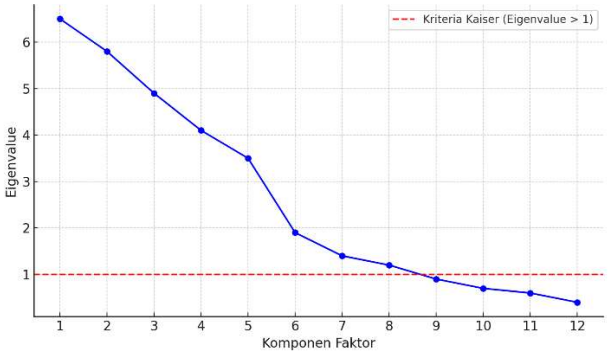

Figure 1. Scree plot of EFA results.
Figura 1. Gráfico de sedimentação dos resultados da EFA.

Table 2. Rotated Component Matrix from EFA.
Tabela 2. Matriz de componentes rotacionados da EFA.

Item No	Capacity to Act	Interpersonal Power	Interactional Skills	Collective Power	Resilience Power
KB1	0.812				
KB2	0.798				
KB3	0.745				
KB4	0.728				
KB5	0.707				
KB6	0.684				
KB7	0.672				
KB8	0.668				
KB9	0.655				
KB10	0.643				
KB11	0.629				
KB12	0.613				
KB13	0.601				
DI1		0.801			
DI2		0.794			
DI3		0.783			
DI4		0.765			
DI5		0.749			
DI6		0.726			
DI7		0.711			
DI8		0.703			
DI9		0.687			
DI10		0.673			
DI11		0.662			
DI12		0.649			
DI13		0.638			
KI1			0.763		
KI2			0.758		
KI3			0.749		
KI4			0.735		
KI5			0.721		
KI6			0.713		
KI7			0.698		
KI8			0.683		
KI9			0.675		
KI10			0.661		
KI11			0.649		
KI12			0.634		
DK1				0.781	
DK2				0.775	
DK3				0.762	
DK4				0.748	
DK5				0.734	
DK6				0.721	
DK7				0.703	
KBt1					0.765
KBt2					0.759
KBt3					0.748
KBt4					0.732

Figure 1 shows a clear elbow point at factor 5, supporting the extraction of the five main factors that have been interpreted.

3.4. Scale Reliability

Reliability analysis was conducted to test the internal consistency of each factor formed from the EFA using Cronbach's Alpha values. The results (Table 3) indicate that all factors had alpha values above 0.70, indicating excellent internal reliability for each dimension and the entire scale.

Table 3. Scale reliability test results.
Tabela 3. Resultados do teste de confiabilidade da escala.

Dimension/Factor	Number of Items	Cronbach's Alpha
Capacity to Act	13	0.923
Interpersonal Power	13	0.911
Interactional Skills	12	0.903
Collective Power	7	0.887
Resilience Power	4	0.869
Overall Scale	49	0.948

3.5. Confirmatory Validity: Confirmatory Factor Analysis (CFA) Results

To confirm the five-factor structure found in the EFA analysis, the researcher conducted a Confirmatory Factor Analysis (CFA) using the covariance-based Structural Equation Modelling (SEM) approach (CB-SEM) using IBM SPSS AMOS v.26 software. The CFA model demonstrated excellent goodness-of-fit and strongly supported the identified factor structure (Table 4).

Table 4. Goodness-of-Fit Index of the CFA Model.
Tabela 4. Índice de Ajuste do Modelo AFC.

Fit Index	Value	Ideal Threshold
Chi-Square/df	2.14	≤3.0
CFI (Comparative Fit Index)	0.943	≥0.90
TLI (Tucker-Lewis Index)	0.931	≥0.90
RMSEA (Root Mean Square Error of Approximation)	0.054	≤0.08
SRMR (Standardised Root Mean Square Residual)	0.041	≤0.08

The model diagram (Figure 2) illustrates the relationship between the indicators and the five main constructs. All indicators showed standardised factor loadings above 0.60 and were significant ($p<0.001$), indicating each item's substantial contribution and strong convergent validity to its respective construct.

The CFA model was further evaluated using convergent and discriminant validity tests. Convergent validity was demonstrated by Average Variance Extracted (AVE) values all above 0.50 and Composite Reliability (CR) values exceeding 0.70 (Table 6), indicating that the constructs explained more than 50% of the variance in their items and had high internal consistency. Discriminant validity was achieved when the square root of the AVE for each construct was greater than the correlation between the constructs, confirming that each dimension is unique and distinct from the other dimensions.

Overall, the psychometric analysis results indicate that the instrument for measuring community empowerment in Social Forestry has strong validity and reliability. The five empirically formed dimensions: Capacity to Act, Interpersonal Power, Interactional Power, Collective Power, and Resilience Power, are consistent with the theoretical framework and statistically proven valid and accountable constructs. These findings confirm that the developed scale can be used effectively for further measurement in the context of program evaluation and evidence-based social forestry policy formulation.

Table 5. Standardised Factor Loadings from Confirmatory Factor Analysis (CFA).
Tabela 5. Cargas fatoriais padronizadas da Análise Fatorial Confirmatória (AFC).

Construct	Indicator	CFA Loading
Capacity to Act	KB1	0.76
	KB2	0.83
	KB3	0.78
	KB4	0.81
	KB5	0.79
	KB6	0.77
	KB7	0.82
	KB8	0.75
	KB9	0.84
	KB10	0.80
	KB11	0.78
	KB12	0.76
	KB13	0.79
Interpersonal Power	DI1	0.81
	DI2	0.83
	DI3	0.79
	DI4	0.77
	DI5	0.82
	DI6	0.80
	DI7	0.84
	DI8	0.78
	DI9	0.76
	DI10	0.81
	DI11	0.79
	DI12	0.83
	DI13	0.82
Interactional Skills	KI1	0.79
	KI2	0.76
	KI3	0.81
	KI4	0.83
	KI5	0.78
	KI6	0.82
	KI7	0.77
	KI8	0.80
	KI9	0.79
	KI10	0.84
	KI11	0.83
	KI12	0.76
Collective Power	DK1	0.81
	DK2	0.83
	DK3	0.78
	DK4	0.76
	DK5	0.80
	DK6	0.82
	DK7	0.79
Resilience Power	KBt1	0.84
	KBt2	0.82
	KBt3	0.80
	KBt4	0.83

Table 6. AVE and CR for Convergent Validity.
Tabela 6. AVE e CR para Validade Convergente.

Factor	AVE	CR
Capacity to Act	0.583	0.910
Interpersonal Power	0.596	0.915
Interactional Skills	0.561	0.902
Collective Power	0.548	0.884
Resilience Power	0.571	0.876

4. DISCUSSION

This discussion interprets the results of developing and validating a community empowerment measurement scale in the context of Social Forestry in Indonesia. Researchers successfully identified and confirmed a consistent five-dimensional structure of community empowerment through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA): Capacity to Act, Interpersonal Power, Interactional Power, Collective Power, and Resilience. This structure strongly aligns with the initial theoretical framework that adapts the multidimensional perspective of empowerment from (Friedman; Kuttner, 1992; Zimmerman, 2014) and an applicable framework from the World Bank (CORMIER; MANGER, 2022). The consistency between the theoretical conceptualisation and the empirical findings, supported by the excellent goodness-of-fit values of the CFA model (Chi-Square/df = 2.14; CFI = 0.943; TLI = 0.931; RMSEA = 0.054; SRMR = 0.041), indicates that the proposed measurement model has a strong fit with the field data. It is important to note that naming the dimension 'Resilience', previously hypothesised as 'Self-Resilience', was found to reflect better the content of the items forming the factor empirically, indicating effective adaptation of the scale to the local context. The convergent and discriminant validity of the scale were also strongly confirmed, supported by high standardized factor loadings (all >0.60) and adequate AVE (>0.50) and CR (>0.70), with excellent internal reliability (Cronbach's Alpha >0.869 for all dimensions and 0.948 for the overall scale).

The five-factor empowerment structure identified in this study aligns strongly with the multidimensional empowerment literature. These findings confirm that empowerment extends beyond economic aspects to encompass crucial psychological, social, and political dimensions. Specifically, the researchers confirmed the relevance of the dimensions of Interpersonal Power, Interactional Ability, Capacity to Act, Collective Power, and Resilience in the context of social forestry communities. This supports the view that community-based forest management (CBFM) approaches are not only catalysts for conservation and economic improvement but also for profound social transformation through strengthening collective and individual capacities, in line with the notions of.

Unlike most previous studies, which often use narrow proxy indicators of empowerment (such as income or meeting participation), this study presents a more comprehensive and psychometrically valid instrument. The researchers successfully addressed the methodological gap highlighted by Budiono et al. (2021) and Wong et al. (2022), regarding the lack of standardised and contextualised instruments for forest communities in Indonesia. Thus, the researchers confirm existing theory and extend it by providing a cross-culturally valid measurement tool. This is particularly important given the diversity of customs and Indonesia's dependence on forest resources.

This research has significant practical implications for implementing the Social Forestry program. This validated empowerment measurement scale provides a robust diagnostic tool for policymakers at the Ministry of Environment and Forestry, practitioners, and field facilitators. With this instrument, they can evaluate the program's impact on community empowerment more comprehensively and multidimensionally, beyond purely economic indicators. This allows for the design of more focused and effective interventions to enhance community Action Capacity, Interpersonal Power, Interactional Power, Collective Power, and Resilience, which in turn can contribute to program sustainability and more holistic well-being. This tool is crucial for evidence-based monitoring and program adaptation to local community needs.

Theoretically, this study enriches the literature on empowerment in community-based natural resource governance. By developing and validating a scale sensitive to the socio-ecological context of forest communities in Indonesia, the researchers provide empirical evidence supporting the universality of core dimensions of empowerment while highlighting the importance of cultural adaptation in measurement. This important methodological contribution to cross-cultural psychometrics demonstrates how a rigorous approach can be applied to develop locally relevant yet theoretically sound instruments.

Although this study has successfully developed and validated a robust community empowerment measurement instrument, several limitations should be acknowledged. First, the use of a cross-sectional design does not allow the researcher to draw causal conclusions about factors influencing empowerment or track changes in empowerment levels over time. Second, although the selection of Katingan Regency represents a diverse context, generalising the findings to the entire, highly diverse context of Social Forestry in Indonesia may require further validation studies in other regions. Third, although face-to-face interviews minimised literacy issues, there is potential for social desirability bias in respondents' responses.

Based on these limitations, future research directions could focus on: (1) Longitudinal studies to examine changes in empowerment and analyse driving/inhibiting factors over the long term. (2) To confirm its generalizability, Cross-regional validation, by testing this scale in other Social Forestry implementation areas in Indonesia. (3) Testing the relationship between the identified empowerment dimensions and specific outcomes of the Social Forestry program (e.g., conservation success, increased household income, or more participatory forest governance). (4) Integrating mixed methods (quantitative and qualitative) to gain a deeper understanding of empowerment processes and experiences from a community perspective.

5. CONCLUSIONS

This research has successfully developed and validated a multidimensional measurement scale for community empowerment in the context of the Social Forestry program in Indonesia. Based on rigorous psychometric analysis, the instrument empirically confirms five core dimensions of empowerment: Capacity to Act, Interpersonal Power, Interactional Power, Collective Power, and Resilience. The resulting scale demonstrates strong validity and reliability, making it an accurate and contextually relevant tool for measuring empowerment among forest communities.

These findings fill a methodological gap in the empowerment literature in developing countries and provide significant practical contributions. This instrument can be used by policymakers and social forestry practitioners to evaluate the impact of Social Forestry programs more holistically, going beyond purely economic indicators, and to design more targeted interventions to improve community capacity and quality of life.

Overall, this research confirms that social forestry has the potential to maintain ecological sustainability and drive social transformation through community empowerment. It now provides a reliable measurement tool to monitor this progress.

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