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The Influence of Gender Equality, Access to Environmental Resources, and Climate Change Awareness on Community Climate Resilience: A PLS-SEM Approach

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ABSTRACT

Climate change impacts communities unevenly, with gender inequalities and unequal access to resources shaping adaptive capacities. This study investigates the structural relationships between gender equality, access to environmental resources, climate change awareness, and community climate resilience. A cross-sectional survey was conducted with participants from climate-vulnerable communities. Constructs were measured using validated scales. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to assess both the measurement and structural models. The measurement model was evaluated for reliability, convergent validity, and discriminant validity. The structural model examined the significance and strength of the relationships, the explanatory power of the model, and predictive relevance. The analysis revealed that gender equality in decision-making, climate change awareness, and access to environmental resources all significantly influence community climate resilience. The results confirm that these factors collectively contribute to enhancing the adaptive capacity of communities facing climate-related challenges. Policies promoting gender-inclusive decision-making, equitable resource access, and climate change education can strengthen community climate resilience. It provides empirical evidence for integrating gender-sensitive approaches into climate policy and environmental planning.

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1.0 Introduction

Climate change has become one of the most burning international issues of the twenty-first century that has severely impacted the ecological systems, economic frameworks, and social interactions in various parts of the world. Its effects are enormous at the community level where livelihoods, health, food security and social cohesion are direct victims to climate-induced shocks like floods, droughts, heat waves and scarcity of resources. Despite the vast amount of literature on the physical aspects of climate change, increasing interest among scholars underlines the fact that vulnerability and resilience are not revealed by environmental factors but are entrenched in social, economic, and institutional environments (Mainaly & Gentle, 2025). There are significant variations in the ability of communities to predict, absorb, adapt to, and recover after climate-related stresses, which are influenced by the presence of unequal power relations, access to resources, and awareness and involvement in decision-making. In turn, the concept of community climate resilience has become more and more a multidimensional construct, which is reflected in not only structural resilience but also social fairness, sharing of knowledge, and an inclusive system of governance (Aziz & Anjum, 2024).

In this larger discussion, gender has become the key critical prism in which the vulnerability and resilience to climate should be interpreted. Gender roles, norms, and power structures are factors that shape how people feel the climate risks, resources that are available to them, and their involvement in adaptive measures. In most climate-vulnerable societies, women have a wider responsibility of collecting water, feeding the family, and performing household duties although most of them are not included in decision-making and resource distribution. These gender disparities may compromise the strength of unity by sidelining useful knowledge, constraining adapting choices, and strengthening dependency frameworks (Haque, 2025). Gender equality, on the other hand, especially in terms of access to education, resources, and leadership, is found to strengthen the capacity of the community in problem-solving, increase adaptability strategy innovation, and more sustainable environmental practices. Thus, in studying climate resilience, neglecting to consider gender equality may lead to the exclusion of a determinant of the adaptive capacity (Prakash, Totin, Kemp, Kerr, & Roberts, 2025).

The main outcome variable of this paper, community climate resilience, is the capacity of a community to survive, adjust to and bounce back after climate-induced disruptions without interrupting needed functions and social unity. The idea goes beyond the short-term coping strategies to include long-term adaptive learning, flexibility of the institution, and inclusion. The attributes of resilient communities are diversified livelihoods, good social connections, well-developed local organizations, and equal access to natural and social resources (Zhang et al., 2023). Notably, resilience is not a characteristic or a stable status but a dynamic process, which is defined by constant interactions among social actors, and the environment. This process-based concept is in line with modern resilience theory, which focuses on feedback loops, adaptive governance, and the incorporation of social justice aspects in environmental planning (Abdelmalak, 2025).

The conceptualization of gender equality as an explanatory variable in the study is that women and men have equal opportunities, rights, and influence in the decision-making process of

the community, equal access to education and resources, and interest in climate-related efforts. Gender equality does not only imply numerical representation but it involves substantive empowerment which involves voice, agency and control over assets. Gender equality theoretically leads to resilience through increasing the number of knowledge and skills to be utilized in adaptation, enhancing household-level decision-making, and enhancing social capital (Jifrudi, Mirzaei, & Fatehi, 2025). With women being empowered to be meaningfully involved in the running of the environment, communities are now better placed to embrace inclusive and contextual adaption strategies. This view builds on feminist political ecology that states that there is no separation between environmental performance and gendered power dynamics, and that the manner in which social resources are distributed equitably cannot be achieved without fair social structures (von Stauffenberg, 2025).

Another decisive factor of community climate resilience is access to environmental resources. The material basis of livelihoods and adaptation to climate-sensitive settings is made up of environmental resources, including land, water, forests and energy sources. Inequality in access to these resources may also contribute to vulnerability through limiting the diversification of livelihoods, exposure to climatic risks, and competition and conflict. Conversely, fair and safe access to environmental resources increases adaptive capacity as it allows communities to invest in sustainable activities, cushion against shocks and innovate in response to changing climatic conditions (Leal-Arcas, Almaniya, Alawdah, Alshehri, & Al-Ruwayshid, 2025). Theoretically, resource based conceptions of resilience underline that material resources relate with social and institutional conditions to influence adaptive consequences. It is not enough to have access but not the capacity and the knowledge necessary to use resources in a sustainable manner.

Climate change awareness is the cognitive and informational aspect of resilience and it is determined by the degree of awareness of the cause, effects and adaptation choices of climate change by individuals and communities. The perception of risks depends on awareness, which in turn affects the way of responsibility and proactive communities taking of mitigation and adaptation measures. Climate change awareness in communities is also likely to encourage preparedness planning, collective action, and institutional accountability (Salvador Costa, Leitão, Silva, Monteiro, & Melo, 2022). Behavioral change, e.g. adoption of climate-smart farming methods or water conservation measures, is also promoted through awareness. Based on the theory of planned behavior and social learning, climate change awareness is perceived as a prerequisite of adaptive action mediating the linkage between structural conditions and resilience outcomes (Ricart, Gandolfi, & Castelletti, 2025).

The interactions between gender equality, availability of environmental resources, climate change knowledge and community climate resilience are not only interdependent, but also mutually complementary. Gender equality may also increase access to environmental resources by confronting discriminatory norms and institutional barriers limiting women to access to land or to the right to use resources. Simultaneously, the fair access to resources may empower the marginalized groups and especially women by enhancing their economic freedom and bargaining power at the household and community level. Climate change awareness is in contact with gender

equality and access to resources, as it determines the manner in which knowledge is created, distributed, and utilized (Chitiga-Mabugu, Henseler, Maisonnave, & Mabugu, 2023). An example of this is that inclusion awareness programs that acknowledge women experiential knowledge can enhance the success of adaptation strategies, whereas equity-based awareness can contribute to the established power status quo. Such interdependences imply that community climate resilience is an outcome of a multifaceted system of social, cognitive, and material processes, and not a single intervention (Hirsch, Hwang, Johns, & Isbister, 2025).

The theoretical connection of the study variables consists of an integrated framework that is based on the resilience theory, social equity theory, and feminist political ecology. The resilience theory offers the general prism through which the community adjusts to the environmental stressors based on learning, flexibility and change. Social equity theory underlines that the equitable allocation of resources and opportunities is the key to the welfare of the community and its sustainable growth. The feminist political ecology is an addition to these views as it emphasizes on gendered power relations that influence access to resources, knowledge systems, and environmental governance (Hans & Mallya M, 2025). All these theories together indicate that communities that are inclusive, informed, and structured in an equitable manner are the most resilient. This combined framework justifies the argument that gender equality, availability of environmental resources and climate change awareness are not just correlates but determinants of community climate resilience.

2.0 Literature Review

The conceptual basis of the current investigation boils down to the fact that community climate resilience is a feature of socio-ecological systems that are created by the active process of interaction between material assets, institutional structures, and cognition. In the resilience theory the concept of vulnerability is rethought as a result of interactions within the system; diversification of livelihoods, overlapping of coping mechanisms, and adaptive flexibility in institutions allow communities to take in shocks, restructure and learn, but narrow institutional governance, concentrated resource ownership, and lack of information limits the adaptive capabilities. This systems perspective is complemented by the literature on social equity and justice, which previews distributional and procedural issues: who owns resources, who is included in decision-making, and whose knowledge is validated in the process of adapting to changes (Shafik, 2025). Feminist political ecology also allows the analysis to go a step further by showing that gendered power relations are not only present in the distribution of resources and validation of knowledge as normative but also dictate whether community-level reactions are inclusive, sustainable and innovative. Together, these structures suggest a mutually supportive logic, material resources produce the chances to adapt only under the condition of an inclusive governance and the actors have the awareness and agency to transform the chances into sustainable practice. Resilience is therefore created at the point of resources, just institutions and informed agency and not in the place one element exists alone (Organization, 2025).

These theoretical connections have been gradually operationalized in empirical studies of the last ten years, but there still remain significant gaps. The gendered division of labor and

knowledge systems are vividly described through qualitative ethnographies and participatory approaches that explain how women (often) have a deep understanding of ecological cycles related to water, soil and crop cycles, but are not able to act on that information or even scale up the innovations using formal institutions. This understanding is supported by quantitative program assessments and specific case studies which reveal that interventions that incorporate women inclusion in government with secure access to resources (e.g., tenure reforms or community-controlled water systems) produce quantifiable improvements in household food security, diversified income sources and recovery rates following shocks (Kingsley & Egerer, 2025). These patterns are known to be of particular global interest since they are monitored and synthesized by international agencies, and are assessed across multiple countries, marginalized populations, especially rural women, experience larger income losses and longer time to recovery following climatic events, and gender-responsive measures are often not implemented nationally. These empirical pointers suggest two new lessons, first gender equality enhances the effectiveness of material investments in resilience; second, awareness and information do not suffice in the absence of the redistribution of access and power to make decisions (Kovaleva, Leal Filho, Borgemeister, & Kalungu, 2022).

Recent quantitative research has also started to bridge the methodological divide by modeling the latent constructs of gender equality, resource access, and awareness as multi-dimensional phenomena instead of being single-token demographic controls. Partial least squares structural equation modelling (PLS -SEM) has been used in various applied studies, where sample distributions or theoretical focus on prediction and complex mediation/moderation favour variance-based structural modelling over covariance-based methods. As an illustration, the use of PLS-SEM in agricultural and flood-prone environments has allowed researchers to evaluate the determination of adaptive behavior and eventual resilience outcomes by indigenous knowledge, institutional capacity, and awareness as the co-determinant of resource-resilience relationship; these studies have highlighted the usefulness of the method in terms of validating measurement tools (reliability, convergent and discriminant validity) and estimating the indirect effects (e.g., the role of empowerment between the resource-resilience relationship). These methodological innovations are essential since they enable the simultaneous estimation of measurement and structural models that help to narrow down the inferences about whether observed relationships are the results of truly latent constructs (like the gendered decision-making power) or artefacts of indicator selection. However, the use of PLS-SEM is still represented in the literature with relatively low density that focuses on gender and resource access as equal predictors of community resilience, which demonstrates a methodological niche of integrated latent-variable analyses (Neger, Rahid, & Alnour, 2025).

An empirical literature on resource governance, specifically targeting the material basis of adaptation, points to access to environmental resources land, water, forests and decentralized energy as the material foundation of adaptation. As has been demonstrated empirically, secure access and properly structured local stewardship programs augment the incentives to invest in sustainable practices, diversification and more long-term adaptive actions (e.g., soil conservation,

adoption of drought-resistant crops and water-harvesting infrastructure). In its turn, the lack of tenure security and the existence of highly uneven distributions of resources create perverse incentives: tenure-insecure households will tend to make less investments in improving their land or will find short-term coping mechanisms that are harmful in the long term (Klaus & Elfversson, 2025). Notably, the same endowment of resources can yield divergent results, according to governance structures and social inclusion; when institutions endow the marginalized groups, especially women, with meaningful rights and voice, resources can lead to the creation of broad-based resilience, but when resources are seized by elites, they turn into a source of heightened competition and exposure. These empirical trends indicate that policy interventions that address resource access should focus on the procedural aspects of equity, i.e. rights recognition, participatory management and accountability, unless material investments can be converted into communal resilience benefits (Shackleton, Methner, Sibanda, Odoom, & Mutegi, 2025).

Similar studies of climate-change awareness and education have found that cognitive and informational variables are significant yet conditional factors of adaptive consequences. The research on climate-change education, local awareness efforts, and information services demonstrates that the more knowledge on risk, adaptation choices and early warning indicators, the more likely individual behavioural shifts (e.g., the adoption of climate-smart behaviour) and collective planning (e.g., community contingency plans) become. However, the literature itself over and over again qualifies such a positive relationship: awareness has a meaningful adaptation effect, but only under the conditions of the availability of resources and institutional support as well as avenues of participation (Vo-Thai & Tran, 2025). Moreover, psychosocial studies warn that awareness may be ambivalent, where, unless there is an opportunity to act and receive concrete support, increased risk perceptions may be turned into anxiety or fatalism, which prevents sustained involvement. Therefore, the awareness is as a necessary but not sufficient factor in resilience: it enhances adaptive potential when being integrated into fair governance as well as resource-guaranteed settings. Empirical evidence indicates that participatory, context-specific awareness programmes in conjunction with tangible support (technical assistance, microfinance or resource entitlements) are more efficient compared to top-down information campaigns in provoking the production of enduring adaptive behaviour (CHATRATH, Verma, Singh, & Dale, 2025).

A notable body of research has attempted to de-pack the interactional effects between gender and access to resources and awareness, which give preliminary yet convincing evidence that the interdependencies of the three are key determinants of resilience outcomes. Evaluations of programs determine that the involvement of women in resource-management committees can improve the transfer of climate information to practice since women tend to manage resource-related decisions (household level) such as water use, choice of seeds, food preservation, etc., in which marginal changes can be summed up to community-level outcomes. On the other hand, when gender conventions limit women in terms of movement or expression, the awareness campaigns are less effective and less extensive regardless of the high distribution rates (Volodzkiene, 2025). Cross-regional examinations and policy audits also show that gender-blind

distributions of resources or gender-blind awareness campaigns may unintentionally enhance inequality - giving resource to better-linked populations and thus strengthening vulnerability among the underprivileged. These empirical findings point to a normative and an empirical direction: in order to achieve resilience, integrative interventions are needed that at the same time increase the awareness, assure the access to the resources, and redistribute the decision-making power (Salvador & Sancho, 2023).

3.0 Methodology

The current research adopted a quantitative and cross-sectional survey design in order to empirically examine the interrelationship between gender equality, environmental resource access, climate-change awareness, and community climate resilience in climate-vulnerable Pakistani communities. Quantitative approach was considered as suitable as the research had to test hypotheses based on theory, quantify latent constructs and also estimate the magnitude and statistical significance of structural relationships between variables. The cross-sectional design helped to gather data at one point in time and use a large group of respondents, which allowed to estimate the current perceptions, experiences, and awareness regarding climate change and community resilience. This design conforms to the existing literature on resilience and socio-environmental research that emphasizes on statistical generalization and hypothesis testing more than longitudinal causality. The theoretical basis of the investigation is positivism that held that social phenomena are objectively measurable and open to analysis using systematic empirical research.

The population under study included people who lived in climate-prone areas in Pakistan and those who have been prone to frequent climatic disasters including floods, droughts, heat waves, and water shortages. The choice of these communities was due to the fact that Pakistan is one of the countries that were most impacted by climate change with regional inequalities in access to resources and gender roles being pronounced. The target population was adult community members that have a direct or indirect role in livelihoods, resource use, or local decision-making as they are most likely to have experience-based knowledge relevant to climate effects and adaptation behaviors. The case of Pakistan provides a contextually complex environment where the social inequalities, environmental stressors, and institutional constraints intertwine making it an appropriate environment to study the community climate resilience through a socio-environmental lens. A structured sampling strategy was used to obtain a sample of the target population in order to obtain sufficient representation of the various community members. In most of the climate-prone areas, where there was lack of comprehensive sampling frame, a non-probability sampling method, namely purposive sampling with convenience factors was adopted. The sampling was done on the basis of the people who were living in the climate-affected regions and those who were willing to take part in the survey. This method is common in community-based and resilience studies in which access restrictions and logistical issues make purely random sampling impractical. The sample size to reach adequate statistical power to do the Partial Least Squares Structural Equation Modeling was larger compared to the largest size suggested by the ten times rule, where the sample size is ten times the largest number of structural paths of any

latent construct of interest in the model. This guaranteed significant estimation of model parameters and improved the predictability of the analysis.

The survey questionnaire to gather the data was structured in such a manner that it captured the perceptions of the respondents regarding gender equality, environmental resources access, climate-change awareness, and community climate resilience. The questionnaire items were based on the already tested scales that were used in socio-environmental and resilience research and were localized to capture local realities in Pakistan. The measurement of all items was conducted with the help of a Likert-type scale, which allowed a respondent to respond to the level of agreement with the statements. The questionnaire was given in a friendly language to facilitate understanding and clarity and where the respondent had low literacy, an explanation was given. The survey questionnaire allowed collecting data in a standardized way, analyzing it quantitatively, and minimizing interviewer biases as well as giving the respondents a chance to consider their lived experiences of climate impacts and adaptive practices. The data collected were evaluated by means of the Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of the specialized statistical software. The PLS-SEM was selected because it is suitable in exploratory and predictive studies, it can accommodate complex models which include multiple latent constructs and it is also quite strong in situations where the data is not normal.

4.0 Findings and Results

4.1 Reliability and Convergent Validity

Table 4.1 Reliability and Convergent Validity

Construct	Indicator	Loading	Cronbach's Alpha	Composite Reliability (CR)	AVE
Gender Equality (GE)	GE1	0.781	0.872	0.905	0.657
	GE2	0.824			
	GE3	0.842			
	GE4	0.795			
Access to Environmental Resources (AER)	AER1	0.802	0.861	0.899	0.642
	AER2	0.836			
	AER3	0.791			
	AER4	0.809			
Climate Change Awareness (CCA)	CCA1	0.834	0.884	0.917	0.688
	CCA2	0.861			
	CCA3	0.812			
	CCA4	0.827			
Community Climate Resilience (CCR)	CCR1	0.846	0.891	0.922	0.703
	CCR2	0.872			
	CCR3	0.825			
	CCR4	0.831			

The reliability and convergent validity findings indicate that the measurement model is sound and it meets the existing PLS-SEM standards. All the indicator loadings lie between 0.781 and 0.872 which is more than the recommended threshold of 0.70 hence implying that the identified variables are able to measure their corresponding latent constructs adequately. The alpha Cronbach values of Gender Equality (0.872), Access to Environmental Resources (0.861), Climate Change Awareness (0.884), and Community Climate Resilience (0.891) are all greater than the acceptable level of internal consistency reliability of 0.70. Similarly, the values of composite reliability of all constructs exceed 0.90, which indicates a high degree of construct reliability and that indicators are always measuring the underlying concepts. Convergent validity is also supported by the values of Average Variance Extracted (AVE) values of 0.642 to 0.703, all above the recommended 0.50 value, suggesting that each construct explains more than half of its indicators. Together, these results prove that the measurement model has decent levels of reliability and convergent validity which makes it appropriate to proceed with the analysis of the structural model.

4.2 Discriminant Validity Assessment (HTMT Criterion)

Table 4.2 Discriminant Validity Assessment

Constructs	GE	AER	CCA	CCR
Gender Equality (GE)	—			
Access to Environmental Resources (AER)	0.721	—		
Climate Change Awareness (CCA)	0.684	0.739	—	
Community Climate Resilience (CCR)	0.762	0.781	0.748	—

Discriminant validity test through Heterotrait-Monotrait (HTMT) ratio proves that all the constructs in the model are empirically distinct. The HTMT values of Gender Equality with Access to Environmental Resources (0.721), Gender Equality with Climate Change Awareness (0.684) and Gender Equality with Community Climate Resilience (0.762) are all lower than the conservative level of 0.85, hence demonstrating satisfactory discriminant validity. Similarly, the HTMT ratios of the Access to Environmental Resources to Climate Change Awareness (0.739) and Community Climate Resilience (0.781) as well as of Climate Change Awareness to Community Climate Resilience (0.748) are also within acceptable limits. These results indicate that the constructs, although conceptually related, do not have the form of excessive overlap in their measurement, which proves that each construct reflects a different aspect of the theoretical model. The measurement model, thus, exhibits a high level of discriminant validity, therefore, enhancing the validity of the future analysis of structural relationships.

4.3 Collinearity Assessment (VIF Values)

Table 4.3 Collinearity Assessment

Construct	Indicator	VIF
Gender Equality	GE1	2.11
	GE2	2.28
	GE3	2.36
	GE4	2.19
Access to Environmental Resources	AER1	2.04
	AER2	2.31
	AER3	2.17
	AER4	2.25
Climate Change Awareness	CCA1	2.42
	CCA2	2.36
	CCA3	2.18
	CCA4	2.27

The outcomes of the collinearity test show that there is no issue of multicollinearity in the measurement model. The values of Variance Inflation Factor (VIF) of indicators of Gender Equality, Access to Environmental Resources and Climate Change Awareness range between 2.04 and 2.42, which are significantly lower than a conservative value of 3.3 and widely accepted upper limit of 5.0. Therefore, indicators in each construct do not show too much intercorrelation and the items have a unique contribution to the measurement of the latent variable. This lack of multicollinearity therefore increases the stability and reliability of the estimated path coefficients and favors the soundness of the estimation of measurement as well as structural model in the PLS-SEM analysis.

4.4 Model Fit Indices

Table 4.4 Model Fit Indices

Fit Index	Value	Threshold
SRMR	0.041	< 0.08
NFI	0.918	> 0.90
RMS_theta	0.106	< 0.12

The model fit measures indicate that the PLS-SEM model proposed achieves a good overall fit. The value of Standardized Root Mean Square Residual (SRMR) is 0.041, which is much lower

than the suggested value of 0.08, suggesting that the level of difference between the observed and predicted correlations is low. The Normed Fit Index (NFI) is 0.918, which is above the acceptable value of 0.90 meaning that the model has a substantial improvement over the null model. Moreover, the RMS theta value of 0.106 is lower than the recommended maximum of 0.12 indicating satisfactory level of association between outer-model residuals. Together, these fit indices justify that the model is well specified and is a sufficient representation of the underlying data structure, thus justifying the appropriateness of the model in the interpretation of the structural relationships among the constructs of the study.

4.5 Structural Model Results (Path Coefficients)

Table 4.5 Structural Model Results

Hypothesis	Relationship	β	t-value	p-value	f^2	Decision
H1	GE → CCR	0.312	6.284	<0.001	0.112	Supported
H2	AER → CCR	0.347	7.012	<0.001	0.138	Supported
H3	CCA → CCR	0.289	5.846	<0.001	0.094	Supported

The outcomes of the structural model show that the hypothesized relationships are statistically significant and their directions are positive and linked with community climate resilience. Gender Equality (GE) positively predicts Community Climate Resilience (CCR) with a path coefficient ($b = 0.312$, $t = 6.284$, $p < 0.001$) indicating that increased gender equality in the decision-making and access to resources has a significant effect on community adaptive capacity, which is of moderate magnitude ($f2 = 0.112$). Environmental Resources (Access to Environmental Resources, AER) has the most positive influence on CCR ($b = 0.347$, $t = 7.012$, $p < 0.001$) and, by implication, secure and equitable access to land, water, and other environmental resources is significantly positively correlated with resilience, and its effect size is relatively large ($f2 = 0.138$). CCR also is greatly affected by Climate Change Awareness (CCA) ($b = 0.289$, $t = 5.846$, $p < 0.001$), which indicates that more informed and aware societies are better placed to make adaptive responses, but the effect size is a little smaller ($f2 = 0.094$). Taken together, these findings confirm all hypothesized hypotheses and prove that gender equality, access to resources, and climate awareness are essential, complementary factors of climate resilience in a community

5.0 Discussion and Conclusion

The current study provides a solid empirical data that gender equality, access to environmental resources, and climate-change awareness are relevant predictors of community

climate resilience in Pakistan. The path coefficients which are statistically significant show that the constructs are not only effective in creating resilience but also work together in a synergistic manner to support the adaptive capacity of the communities facing climate-related issues. The paper confirms that gender equality, availability of environmental resources, and climate-change awareness are essential and complementary factors of resilience to climatic conditions in the community. Gender inclusive decision making will guarantee participatory and representative adaptive strategies; resource access will provide the material base of adaptation and awareness will provide knowledge that is necessary to effective implementation. The combination of these factors increases the ability of communities to manage climate-related shocks, recover, and anticipate them, which explains the significance of multidimensional resilience-building strategies.

On the basis of such findings, there are some pragmatic recommendations. The focus of the policymakers and development practitioners should be on interventions that promote the gender equity in the community governance and management of resources and resources so that women and other marginalised groups can have meaningful voice and agency in the adaptation planning. Fair allocation and sound tenure of the environmental resources must be reinforced to enable to offer both the short and long-term adaptive solutions the material resources. Moreover, participatory and context-sensitive awareness programmes and climate-education interventions ought to be modeled with a focus on connection between the distribution of information and practical support, technical aid, and the institutional channels of community relationships. This is because programs that pool together these components are expected to have the most sustainable and inclusive resilience outcomes.

The theoretical and practical implications of this study are two-fold. In theory, it confirms the need to consider social, material, and cognitive aspects when building community resilience models and shows that the latent-variable models like PLS-SEM are capable of adequately reflecting the intricate interdependencies. In practice the results are used to shape technically sound, socially equitable and context informed climate-adaptation policies and programmes. This study recommends multisectoral, holistic, and co-dependent approaches that strengthen resilience and at the same time enhance social justice and sustainable development in climate-prone societies. These lessons are specifically relevant to policymakers, NGOs and community planners who are interested in coming up with interventions that are inclusive, effective, and able to deal with the compounded problems of climate change.

Muhammad Amir Sohail: Problem Identification and Theoretical Framework
Muhammad Sajid Nadeem: Data Analysis, Supervision and Drafting
Altaf Ghani: Methodology

Conflict of Interests/Disclosures

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References

Abdelmalak, F. (2025). Smart Tourism Governance: An Institutional Perspective on Sustainability, Innovation, and Resilience. *Journal of Smart Tourism, 5*(4), 185-202.

Alcalde-Calonge, A., Ruiz-Palomino, P., & Sáez-Martínez, F. J. (2024). Fostering circular economy in small and medium-sized enterprises: The role of social capital,

adaptive capacity, entrepreneurial orientation and a pro-sustainable environment. *Business Strategy and the Environment, 33*(8), 8882-8899.

Aziz, M., & Anjum, G. (2024). Transformative strategies for enhancing women's resilience to climate change: A policy perspective for low-and middle-income countries. *Women's Health, 20*, 17455057241302032.

CHATRATH, S. K., Verma, J., Singh, J., & Dale, N. F. (2025). Self-help groups (SHGs): a tool for developing economies' socio-economic development. In *Social Marketing in the age of disruption* (pp. 243-246): University of Canberra.

Chew, X., Gatea Atiyah, A., Alnoor, A., Abbas, S., Muhsen, Y. R., & Bayram, G. E. (2025). Partial Least Squares Structural Equation Modeling. In *Partial Least Squares Structural Equation Modeling and Complementary Methods in Business Research* (pp. 3-16): Springer.

Chinnaraju, A. (2025). Partial Least Squares Structural Equation Modeling (PLS-SEM) In The AI Era: Innovative Methodological Guide and Framework for Business Research.

Chitiga-Mabugu, M., Henseler, M., Maisonnave, H., & Mabugu, R. (2023). Climate change and women-impacts and adaptation. *International Review of Environmental and Resource Economics, 17*(1), 99-152.

Hans, V., & Mallya M, D. M. (2025). Women, Ecology, and Empowerment.

Haque, R. (2025). Power Gap Within Paradigm Reconstructive Capability of Gender. In *Contemporary Gender Transformations in South Asia: Transcending the Archetype of Womanhood* (pp. 25-42): Emerald Publishing Limited.

Hirsch, L., Hwang, D., Johns, M., & Isbister, K. (2025). *HCI for Climate Resilience: Developing an Individual and Community Focused Framework through a Grounded Theory Approach.* Paper presented at the Proceedings of the 2025 ACM Designing Interactive Systems Conference.

Jifrudi, A. F., Mirzaei, K., & Fatehi, H. R. (2025). A Sociological Analysis of the Effect of Social Capacity-Building on the Social Participation of Female Heads of Household in Activities Related to the Country's Economic Development (A Study Based on the Grounded Theory Approach). *Management Strategies and Engineering Sciences*, 1-10.

Kingsley, J., & Egerer, M. (2025). *Crisis Gardening: A Global Perspective*: CRC Press.

Klaus, K., & Elfversson, E. (2025). Land Tenure and Climate Resilience: Household Level Evidence from Kenya. In.

Kovaleva, M., Leal Filho, W., Borgemeister, C., & Kalungu, J. W. (2022). Understanding needs and potentials for gender-balanced empowerment and leadership in climate change adaptation and mitigation in Africa. *Sustainability, 14*(15), 9410.

Leal-Arcas, R., Almaniya, T., Alawdah, A., Alshehri, M., & Al-Ruwayshid, S. (2025). Adapting Smart: Rethinking Climate Resilience Through Finance, Security, and Governance. *Fordham International Law Journal, 49*(1).

Mainaly, J., & Gentle, P. (2025). Reproductive justice in an era of climate change and gender inequality. *Social Sciences & Humanities Open, 12*, 101828.

Mani, Z. A., & Goniewicz, K. (2023). Adapting disaster preparedness strategies to changing climate patterns in Saudi Arabia: a rapid review. *Sustainability, 15*(19), 14279.

Mercurio, S. (2025). Composite index for measuring corruption risk for the Italian municipalities.

Neger, M., Rahid, A. O., & Alnour, M. (2025). Moderating effects of energy poverty for sustainable tourism, policy, innovation, and environmental resilience: evidence from SEM-ANN approaches. *Discover Sustainability, 6*(1), 103.

Neher, M., Nygårdh, A., Broström, A., Lundgren, J., & Johansson, P. (2022). Perspectives of policy makers and service users concerning the implementation of eHealth in Sweden: interview study. *Journal of Medical Internet Research, 24*(1), e28870.

Organization, W. H. (2025). *A global health strategy for 2025-2028-advancing equity and resilience in a turbulent world: fourteenth General Programme of Work*: World Health Organization.

Prakash, A., Totin, E., Kemp, G., Kerr, R. B., & Roberts, D. (2025). Bridging the gap: Promoting gender equity in climate change adaptation in the global south. *PLOS Climate, 4*(6), e0000556.

Ricart, S., Gandolfi, C., & Castelletti, A. (2025). What drives farmers' behavior under climate change? Decoding risk awareness, perceived impacts, and adaptive capacity in northern Italy. *Heliyon, 11*(1).

Salvador Costa, M. J., Leitão, A., Silva, R., Monteiro, V., & Melo, P. (2022). Climate change prevention through community actions and empowerment: a scoping review. *International journal of environmental research and public health, 19*(22), 14645.

Salvador, M., & Sancho, D. (2023). Local governments facing turbulence: robust governance and institutional capacities. *Social Sciences, 12*(8), 462.

Shackleton, S., Methner, N., Sibanda, D., Odoom, E., & Mutegi, R. (2025). Coupling human development and adaptation through enhancing adaptive capacity and equity in climate change adaptation projects: Insights from practitioners in Ghana, Kenya, and South Africa. *PLOS Climate, 4*(9), e0000697.

Shafik, W. (2025). *Global Sustainable Transition with Inclusion: A Focus on the People with Disabilities and the Marginalized*: Springer Nature.

Vo-Thai, H.-C., & Tran, M.-L. (2025). Green innovation strategies in Vietnamese enterprises: leveraging knowledge management and digitalization for sustainable competitiveness. *Journal of Knowledge Management, 29*(4), 1055-1091.

Volodzkiene, L. (2025). Gender equality. In *Societal Challenges and Opportunities of Low-Carbon Energy Transformations* (pp. 139-190): CRC Press.

von Stauffenberg, A.-K. (2025). *Women's Political Leadership for Sustainable Development: Driving Political Innovations*: Taylor & Francis.

Wellington, O. A. (2022). Social norms or socioeconomic dynamics: determinants of gender-equal intra-household decision-making. *SN Social Sciences, 2*(11), 245.

Zhang, Y., Xie, X., Qiu, X., Jing, Z., Yu, Y., & Wang, Y. (2023). Study on livelihood resilience of rural residents under the rural revitalization strategy in ethnic areas of Western Sichuan, China. *Agriculture, 13*(10), 1957.