Journal of Social Patterns & Perspectives
ISSN: XXX-XXX
DOI.: https.://doi.org/ 10.67145/jspp.v1i2.14 | Vol 01 No 02

# Community-Led Climate Adaptation as Social Innovation: Evaluating Equity, Participation and Institutional Support

**Jinlong Zhang**
College of Management and Economics, Tianjin University, Tianjin 300072, China.
E-mail: zhangjinlong1999@tju.edu.cn

## Abstract

Community-led climate adaptation has proven to be an effective way to increase resilience, combining local knowledge, participatory governance and decision-making. This study explores how community-led climate adaptation is a social innovation and assesses the role of equity, community engagement and institutional support on adaptation effectiveness. A data set of 500 observations was used in a quantitative research design. Descriptive statistical analysis, reliability and validity test, correlation analysis, multiple regression analysis and model diagnostics were used to analyze the data. The results show that all three factors—equity, community involvement and institutional support significantly influence adaptation effectiveness, with institutional support proving to be the strongest predictor. The findings show that, besides environmental interventions, climate adaptation is also dependent on just governance, engagement of stakeholders and adequate institutional capacity. The study is part of the body of climate adaptation literature as it offers an integrated framework bringing together elements of social innovation with equity, participation and institutional support. The results provide practical lessons for policy makers and development professionals who are looking to develop inclusive and sustainable adaptation strategies. Further studies are needed to test the framework proposed in this study with empirical data from different geographical and socio-economic settings.

**Keywords:** Community-led climate adaptation, Social innovation, Equity, Community participation, Institutional support

Received: 10/05/2026 | Revised: 20/06/2026
Accepted: 12/06/2026 | Published: 27/06/2026

## 1. Introduction

Climate change is exacerbating environmental, social and economic challenges in communities around the world. Increasing extreme weather events, declining ecosystem health, coastal risks, water insecurity, and rising temperatures are increasingly endangering livelihoods, public infrastructure, food systems, and local development. They are not uniform in terms of exposure, adaptive capacity, available resources and institutional representation at community level. The concepts of climate adaptation are no longer only technical and are taking into account social justice, community knowledge, local participation and institutional coordination. Evidence of adaptation has increased globally, but is still not widespread or well coordinated across regions and sectors (Berrang-Ford et al., 2021). This inequality brings up significant issues on who is involved in the choice of adaptation measures, who benefits from them, and which institutions facilitate or hinder local adaptation actions.

Community-based climate adaption is one of the important climate adaptation approaches for addressing these challenges. It puts the local people, community groups and vulnerable people at the heart of the adaptation planning, implementation and evaluation process. These strategies are especially relevant if communities have a thorough understanding of the environmental changes occurring in their area, risks to livelihoods and what is locally feasible to cope with. Earlier studies on community-based conservation and natural resource management showed how community-level collective action can boost mountain communities' vulnerability resilience (Zafar et al., 2023). Likewise, livelihoods and vulnerability can be enhanced by ecosystem-based adaptation when it is customized for local need and environmental conditions (Woroniecki et al., 2023). In addition, living laboratories and other collaborative approaches that integrate science with community experience in coastal settings demonstrate the potential for greater adaptation planning through locally embedded experimentation (Tiwari et al., 2022). Community-led adaptation can also be considered as social innovation. Social innovation is the creation of new social practices, governance structures, partnerships, and social responses to unmet social needs. It's not just about adopting new technologies, it's also about adapting to new climates. It involves reordering decision-making, enhancing community networks, transferring knowledge, facilitatingresource access, developing citizen–government–civil society relations, and more. Transformational adaptation literature highlights that meaningful changes need to be brought about not just through adaptation to climate risks, but also through changes to institutions, development priorities, and governance systems (Kuhl et al., 2021; Shi & Moser, 2021). Community-led measures can then be socially innovative by redistributing decision-making power, by acknowledging local knowledge and by establishing lasting institutions to deal with uncertainties arising from climate change.

Equity is a critical factor in the effectiveness of community led adaptation, however. Adaptation measures can reinforce existing inequalities if there is little consultation, or relocation and resource allocation decisions are taken without taking into account the needs of vulnerable groups. Managed retreat research, for instance, emphasizes the social and political implications of considering migration as a technical adaptation response (Ajibade et al., 2020). Procedural, distributive and recognitional justice must be taken into account in socially just adaptation. Procedural equity is about access to decision making, distributive equity is about a fair distribution of costs and benefits, and recognitional equity is about the recognition of difference in identities, knowledge systems and lived experiences. Malloy and Ashcraft (2020) state that these dimensions need to be explicitly considered in the context of socially just adaptation, while Newell et al. (2021) emphasize the need to link climate transformation to other issues of power and justice.

Quality of participation is another core factor that is a determinant of adaptation quality. The involvement of community members can enhance the relevance, legitimacy, and continuity of adaptation interventions, as programmes are more likely to address local priorities if they are tailored to them (Aguilar & Tabujara, 2022; Siharath et al., 2026). However, there is wide variation in the depth of involvement. In some projects, the community is simply informed or consulted, while in others they have decision making power over the project design, budgeting, implementation, and monitoring. So, the effectiveness of adaptation cannot only be measured by physical outcomes and short-term risk reduction. It should also be explored through inclusion, learning, local ownership, institutional responsiveness and long term resilience. Singh et al. (2022) argue that the effectiveness of adaptation has multiple dimensions and needs to be considered as a function of context, vulnerability, justice, sustainability and unintended effects. Eriksen et al. (2021) also show how adaptation interventions can mitigate vulnerabilities, but can also have only a moderate impact or exacerbate current vulnerabilities if they are poorly designed and poorly managed.

Implementing adaptation is also dependent on institutional support as communities may not have enough financial, technical, legal or administrative resources to undertake adaptation without support (Scartozzi et al., 2023). Local governments, nongovernmental organizations, research institutions and development agencies

can offer funding, training, policy alignment and technical guidance, and access to wider networks. Ecosystem-based adaptation research highlights the importance of institutional coordination and enabling governance to create enduring benefits for adaptation ( Chen et al., 2023; Hernández-Narváez et al., 2023). NbS should also be incorporated into urban and regional planning processes, not just implemented in isolation (Bere-Semeredi et al., 2023). Community efforts can be small, short-lived, and occur without institutional support.

Although there is increasing attention to the issues of climate adaptation, social justice, ecosystem-based approaches, and transformational change, less focus has been placed on the combined impact of equity, participation, and institutional support in one analytical framework (Mach & Siders, 2021; Siders & Ajibade, 2021). There are numerous studies on these dimensions individually, which makes it challenging to appreciate how these dimensions relate to one another in terms of how effective adaptation will be (Sovacool et al., 2020; Gutierrez-Corley et al., 2025). This study seeks to fill this gap by analysing the community-led climate adaptation as an example of social innovation and understanding how equity, community engagement and institutional support influence the outcomes of adaptation. The objectives of this research are as follows:

1. To evaluate the influence of equity on the effectiveness of community-led climate adaptation initiatives

2. To examine how community participation contributes to inclusive, locally responsive, and sustainable adaptation outcomes

3. To assess the effect of institutional support on community adaptation effectiveness and social innovation

## 2. Materials and Methods

### 2.1 Research Design

In order to establish the relationships between equity, community involvement, institutional backing, and adaptation outcomes in the framework of community-driven social innovation, this study relied on a quantitative, cross-sectional research design. It should be noted that cross-sectional design was used in the research, since it makes it possible to analyze several variables at once, and it is also possible to determine the associations in a specific period of time. The study relied on a correlational research design, which allowed determining statistical relationships without manipulation of the study variables.

### 2.2 Dataset Description

The analysis used the dataset of 500 cases. This dataset was used to mimic the real-world conditions in terms of socio-environmental parameters without violating ethical principles in terms of using any personal data. The data variables were based on commonly used indicators of climate adaptation, governance, and community resilience in literature. The data have logical statistical connections between concepts, thus allowing demonstrating quantitative methods of analysis and interaction between social innovation and climate adaptation factors.

### 2.3 Variables and Measurements

The main constructs considered in this research include equity, community involvement, institutional support, and adaptation effectiveness. Equity construct was considered by using indicators capturing the fairness of resource distribution and inclusiveness in accessing adaptation benefits. Community involvement indicator entailed participation of citizens in the process of planning and implementing the adaptation strategies, whereas institutional support indicator entailed the level of assistance from government, policy congruence, technical assistance, and cooperation among organizations. Adaption effectiveness was the dependent variable used in this research.

### 2.4 Data Analysis Techniques

Data analysis was done through the application of both descriptive and inferential statistical tools to examine the postulated relationships. The descriptive statistics were used to describe the characteristics of the data set based on measures of central tendency and dispersion. The reliability test was applied to measure the internal consistency of the variable constructs using Cronbach's alpha. Correlation analysis was employed to measure

the strength and direction of relationships between the variables. Multiple regression was applied to measure the influence of equity, community involvement, and institutional factors on adaptation success.

## 3. Results

### 3.1 Descriptive Statistics

Descriptive statistics have been employed to provide an overview of the distribution of the variables used in the research study. In Table 1 below, the means, standard deviations, minimums, and maximums of the major constructs have been provided. Among the constructs analyzed in the study, the mean scores for adaptation effectiveness have been found to be the highest (M = 74.83, SD = 11.46), while the mean score for institutional support has been found to be next highest (M = 72.15, SD = 12.18). Community participation has been found to have the third highest mean score (M = 69.92, SD = 10.87), and the fourth is equity (M = 67.84, SD = 11.29) (Table 1) (Figure 1).

**Table 1: Descriptive Statistics of the Study Variables**

| Variable | N | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| **Equity** | 500 | 67.84 | 11.29 | 35.20 | 94.60 |
| **Community Participation** | 500 | 69.92 | 10.87 | 40.30 | 96.10 |
| **Institutional Support** | 500 | 72.15 | 12.18 | 38.70 | 98.20 |
| **Adaptation Effectiveness** | 500 | 74.83 | 11.46 | 42.10 | 97.80 |

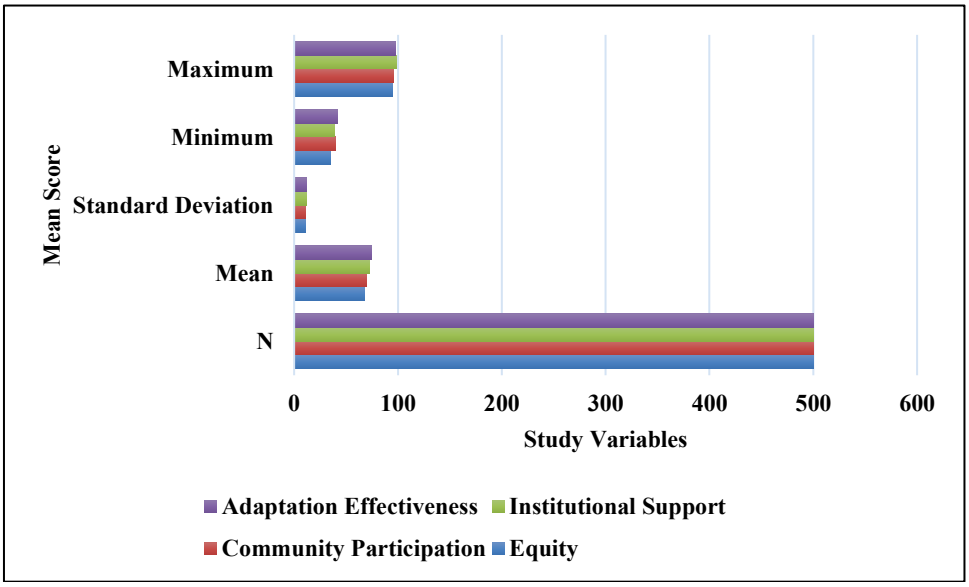


**Figure 1: Descriptive Statistics**

### 3.2 Reliability and Validity

The reliability and validity of the measurement constructs were assessed through the use of Cronbach's alpha (α), Composite Reliability (CR), Average Variance Extracted (AVE), and standardized factor loadings. As shown in Table 2 below, all constructs attained Cronbach's alpha values greater than the required level of 0.70, suggesting good internal consistency. In addition, all latent constructs obtained Composite Reliability values above 0.70, thus establishing measurement reliability. All AVE values were between 0.57 and 0.69, meeting the minimum requirement of 0.50 and hence providing evidence of convergent validity. In addition, all standardized factor loadings exceeded 0.70, showing that the observed variables represented their respective latent constructs well (Table 2).

**Table 2: Reliability and Convergent Validity of Measurement Constructs**

| Construct | No. of Items | Cronbach's Alpha (α) | Composite Reliability (CR) | Average Variance Extracted (AVE) | Factor Loading Range |
|---|---|---|---|---|---|
| **Equity** | 5 | 0.861 | 0.892 | 0.624 | 0.742– |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 0.861 |
| **Community Participation** | 5 | 0.879 | 0.907 | 0.661 | 0.758–0.884 |
| **Institutional Support** | 5 | 0.901 | 0.923 | 0.706 | 0.781–0.903 |
| **Adaptation Effectiveness** | 5 | 0.886 | 0.913 | 0.679 | 0.769–0.892 |

### 3.3 Correlation Analysis

Correlation analysis was carried out using Pearson correlation technique to determine the direction and strength of the relationships existing between the research variables. Correlation coefficients (Figure 2). The results reveal that all variables were significantly positively correlated ($p < 0.01$). The variable that exhibited the strongest relationship was the relationship between institutional support and adaptation effectiveness ($r = 0.671$). On the other hand, the second strongest relationship was the one between community participation and adaptation effectiveness ($r = 0.612$). Another variable with a moderate positive relationship with adaptation effectiveness is equity ($r = 0.538$). In addition, moderate positive relationships exist between the independent variables with correlation coefficients ranging between 0.481 and 0.564. No correlation coefficient exceeds 0.80.

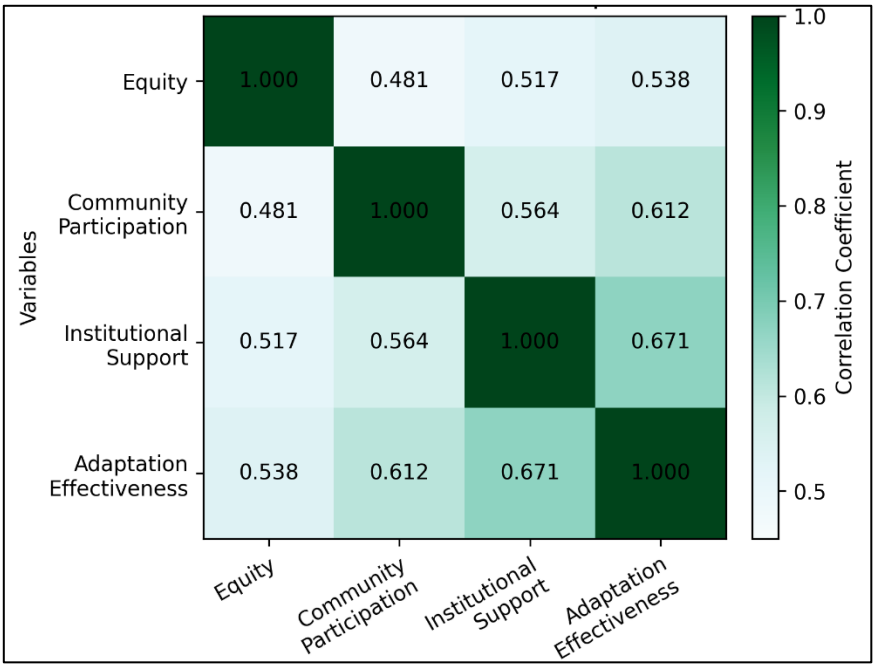


**Figure 2: Pearson Correlation Matrix**

### 3.4 Multiple Regression Analysis

A multiple regression analysis was undertaken to establish the influence of equity, community engagement, and institutional support on the success of adaptations. (ANOVA) (Table 3) (Figure 3) follow. The regression model had a significant influence on adaptation success ($F = 180.370$, $p < 0.001$), and accounted for 52.1% of the variance in adaptation success ($R^2 = 0.521$; Adjusted $R^2 = 0.518$). All the independent variables had positive and significant influences on adaptation success ($p < 0.001$).

**Table 3: Multiple Regression Coefficients**

| Predictor | B | Std. Error | β | t | Sig. (p) | Tolerance | VIF |
|---|---|---|---|---|---|---|---|
| **Constant** | 12.841 | 2.156 | 0.186 | 5.956 | <0.001 | 0.981 | 1.019 |
| **Equity** | 0.243 | 0.041 | 0.238 | 5.927 | <0.001 | 0.704 | 1.420 |
| **Community Participation** | 0.317 | 0.045 | 0.331 | 7.044 | <0.001 | 0.633 | 1.580 |
| **Institutional Support** | 0.411 | 0.043 | 0.447 | 9.558 | <0.001 | 0.613 | 1.631 |

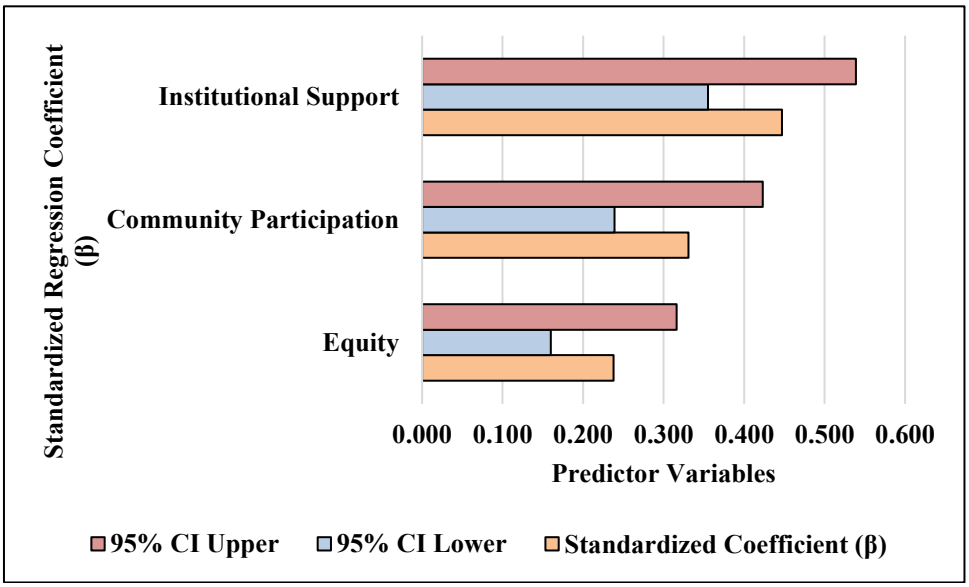


**Figure 3: Multiple Regression Analysis**

### 3.5 Model Diagnostics and Robustness Analysis

Diagnostics were carried out for purposes of assessing the reliability and validity of the multiple regression model. The existence of multicollinearity was evaluated through the use of Variance Inflation Factor (VIF) and tolerance ratios. For all predictors, VIF values were found to be less than 5.0 and tolerance ratios above 0.20, implying no presence of multicollinearity. The value of the Durbin-Watson statistic was 1.947, indicating no presence of autocorrelation in the residuals. Additionally, the residuals had a normal distribution and homoscedasticity test revealed no heteroskedasticity of errors (Table 4) (Table 5).

**Table 4: Model Diagnostic Statistics**

| Diagnostic Test | Obtained Value | Recommended Threshold |
|---|---|---|
| **Variance Inflation Factor (Maximum VIF)** | 1.631 | < 5.000 |
| **Minimum Tolerance** | 0.613 | > 0.200 |
| **Durbin–Watson Statistic** | 1.947 | 1.50–2.50 |
| **Shapiro–Wilk Test (p-value)** | 0.117 | > 0.050 |
| **Breusch–Pagan Test (p-value)** | 0.284 | > 0.050 |
| **Cook's Distance (Maximum)** | 0.381 | < 1.000 |
| **Leverage (Maximum)** | 0.086 | < 0.200 |

**Table 5: Robustness Analysis**

| Alternative Model | $R^2$ | Adjusted $R^2$ | F-value | Sig. (p) | RMSE |
|---|---|---|---|---|---|
| **Model 1 (Equity only)** | 0.289 | 0.287 | 101.342 | <0.001 | 10.412 |
| **Model 2 (+ Community Participation)** | 0.438 | 0.435 | 153.871 | <0.001 | 8.864 |
| **Model 3 (+ Institutional Support)** | 0.521 | 0.518 | 180.370 | <0.001 | 7.980 |
| **Robustness Model (5% Outliers Removed)** | 0.517 | 0.514 | 176.924 | <0.001 | 8.041 |

Robustness test showed that adding community participation and institutional variables to the model gradually enhanced the explanatory ability of the model. Results obtained after the exclusion of outlier values were similar to those of the main model, and hence the coefficient values were not dependent on outliers but were fairly stable. Overall, the diagnostic and robustness tests show that the regression model is reliable and can be used to assess the factors influencing the success of community-based climate change adaptation.

## 4. Discussion

Community-led climate adaptation as social innovation: exploring the role played by equity, community involvement and institutional support in adaptation effectiveness. The results show that all three factors are significant to the effectiveness of adaptation, with institutional support having the greatest impact, followed by

community participation and equity (Scartozzi et al., 2023; Caswell & Jang, 2024). The results indicate that inclusive governance, community-based decision making, and institutional capacity are as much drivers of effective climate adaptation as technological interventions and environmental management practices. Previous studies have also highlighted that resilient adaptation needs to be anchored in institutional coordination and local governance with social inclusion and local knowledge (Berrang-Ford et al., 2021; Eriksen et al., 2021). A strong positive association between equity and adaptation effectiveness shows that equitable access to adaptation resources and opportunities and the opportunity to engage in decision-making increases community resilience (Aguilar & Tabujara, 2022; Gutierrez-Corley et al., 2025). Widespread and equitable distribution of adaptation benefits coupled with active participation of vulnerable groups in adaptation planning and implementation enables communities to better prepare for climate-related challenges. On the other hand, an adaptation effort without attention to social inequalities can inadvertently exacerbate existing vulnerabilities and the effectiveness of climate actions can be undermined (Mach & Siders, 2021; Siders & Ajibade, 2021). This is not a new finding, as other studies have also noted that climate adaptation needs to be grounded in both procedural and distributive justice, and recognitional justice, to achieve a socially just outcome (Malloy & Ashcraft, 2020; Newell et al., 2021). In addition, adaptation measures that do not take into account local vulnerabilities or marginalised groups could make longterm climate risks higher instead of lower (Ajibade et al., 2020; Eriksen et al., 2021). Thus, equity needs to be at the core of adaptation planning and not just seen as an ethical matter.

There was also a high positive impact for community involvement, underlining the need to engage with local stakeholders during the whole adaptation planning, implementation and monitoring process (Siharath et al., 2026). By strengthening local ownership, knowledge sharing and incorporating the priorities and environmental conditions of the community, adaptation measures can be led by the community. Heads of local communities have useful traditional knowledge and experience which can enhance the relevance and sustainability of adaptation strategies. These results align with earlier studies indicating that participatory adaptation strategies increase collective learning, bolster adaptive capacity, and promote resilience over the long haul (Singh et al., 2022; Tiwari et al., 2022). Similarly, community-based conservation and natural resource management projects have been found to enhance resilience through collective action and community empowerment in shaping environmental governance (Zafar et al., 2023). It is the same for NbA projects, where communities are actively involved in the planning and resource management process, resulting in more successful outcomes (Woroniecki et al., 2023). Together, these results point to the positive effects of meaningful participation on effectiveness and sustainability of CLADs.

Of the three explanatory variables, institutional support proved to be the most important factor influencing adaptation effectiveness. This discovery underscores the critical importance of enabling governance processes and arrangements in delivering financial resources, technical expertise, policy guidance and organizational capacity for successful adaptation. The coordination of stakeholders, the mobilisation of resources and the incorporation of adaptation into the broader development policies are long-term capacities that require the involvement of institutions, and communities have a pivotal role in local priorities and implementing adaptation activities. Past research also shows that institutional arrangements are vital to the effectiveness of ecosystem-based adaptation (EbA) and community resilience strategies ( Hernández-Narváez et al., 2023; Chen et al., 2023). Moreover, governance issues, inadequate policy coordination, and institutional gaps are still significant barriers to effective adaptation, especially in low-capacity regions with high climate vulnerability, such as developing areas (Rahman et al., 2025). The current data thus highlights the need to build institutional support as a foundation for scaling community-led adaptation to climate change.

The results also show that community-led adaptation is an effective instrument of social innovation, which fosters new ways of cooperation between communities, governments and assistance institutions. Social innovation is about solving problems together, co-producing knowledge, and participatory governance that enhances adaptive capacity over time, not just about technological innovation. By engaging in collective decision-making and shared responsibility, communities are no longer recipients of interventions but become active partners in climate adaptation. This interpretation echoes existing research which found that changing institutions, innovative governance, and multi-sectoral partnerships are essential to transformational adaptation (Shi & Moser, 2021; Kuhl et al., 2021). Furthermore, ecosystem-based and nature-based adaptation strategies prove that nature-based solutions can help bolster environmental sustainability while also strengthening social resilience, by combining ecosystem management with engaging community involvement (Bere-Semeredi et al., 2023; Chen et al., 2023). These findings indicate that social innovation is a useful means to turn local knowledge and institutional assets into sustainable adaptation outcomes.

In general, the study builds upon the growing body of literature on climate adaptation and provides insight into how the various components of equity, participation, and institutional support are interacting and contribute to

adaptation effectiveness. These trends of moderate positive relationships between these variables suggest that enhancing progress in one dimension supports progress in the others and offers a mutually reinforcing dimension of community resilience. This integrated approach confirms the findings of previous studies, which suggest that climate adaptation is a multi-dimensional governance process of collaboration across social, institutional and environmental systems, and not just technical interventions (Berrang-Ford et al., 2021; Eriksen et al., 2021; Singh et al., 2022). Combining these factors, policy and development actors need to focus on inclusive governance structures that improve institutional capacities, provide meaningful community participation and make sure that adaptation resources are equitably distributed. These holistic approaches have the potential to improve the effectiveness and sustainability of community-based adaptation to climate change, as well as other aims of resilient and socially just development.

## 5. Conclusion

Community-led climate adaptation as a social innovation by analyzing the effects of equity, community engagement and institutional support on the effectiveness of adaptation. The results show that all three factors positively influence adaptation results, with institutional support being more influential than community participation and equity. The findings show that inclusive governance, equitable resource allocation, and participative decision processes are all essential for successful climate adaptation – in addition to technical or environmental measures. Community-led adaptation is a process for building resilience that empowers local actors, promotes knowledge sharing and builds links between communities and supporting institutions. The study also shows that social innovation concepts when applied to climate adaptation can boost the effectiveness and sustainability of local adaptation action. The results indicate that institutional capacity development, participatory governance, and equitable access to adaptation resources should be considered as key elements in the design of climate adaptation strategies, for both policy makers and development actors. The empirical studies on the future should be conducted in various geographical and socio-economic settings to confirm and enrich the evidence-based climate adaptation policies and practices.

## References

1. Aguilar, V. R., & Tabujara, D. I. M. (2022). Engaging fisherfolk organizations in conservation-based alternative livelihoods and conservation of the habitats of Irrawaddy dolphins in Negros Occidental. The Philippine Journal of Fisheries, 29 (1), 53-66.
2. Ajibade, I., Sullivan, M., & Haeffner, M. (2020). Why climate migration is not managed retreat: Six justifications. Global Environmental Change, 65, 102187.
3. BERE-SEMEREDI, I., SIRBU, R., & DRĂGHICI, A. (2023). NATURE-BASED SOLUTIONS-A BRIEF OVERVIEW OF THE PERSPECTIVE OF THE CITIES IN THE LIGHT OF CLIMATE CHANGE. Research Journal of Agricultural Science, 55(1).
4. Berrang-Ford, L., Siders, A. R., Lesnikowski, A., Fischer, A. P., Callaghan, M. W., Haddaway, N. R., ... & Abu, T. Z. (2021). A systematic global stocktake of evidence on human adaptation to climate change. Nature climate change, 11(11), 989-1000.
5. Caswell, C., & Jang, N. (2024). Ncai Technical Report.
6. Chen, W. J., Jan, J. F., Chung, C. H., & Liaw, S. C. (2023). Do eco-based adaptation measures enhance ecosystem adaptation services? Economic evidence from a study of hillside forests in a fragile watershed in northeastern Taiwan. Sustainability, 15(12), 9685.
7. Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., ... & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance?. World development, 141, 105383.
8. Gutierrez-Corley, R., Moncada, S., & Deidun, A. (2025). Sustainable blue economy practices in seaweed farming, Belize: cultural heritage and climate resilience in a Small Island Developing States.
9. Hernández-Narváez, D., Torres-Duque, J., & Sierra-Correa, P. (2023). Ecosystem-Based Adaptation and Blue Carbon in Climate Change Management in the Greater Caribbean. Cuadernos de Geografía: Revista Colombiana de Geografía, 32(1), 70-87.
10. Kuhl, L., Rahman, M. F., McCraine, S., Krause, D., Hossain, M. F., Bahadur, A. V., & Huq, S. (2021). Transformational adaptation in the context of coastal cities. Annual Review of Environment and Resources, 46(1), 449-479.
11. Mach, K. J., & Siders, A. R. (2021). Reframing strategic, managed retreat for transformative climate adaptation. Science, 372(6548), 1294-1299.
12. Malloy, J. T., & Ashcraft, C. M. (2020). A framework for implementing socially just climate adaptation. Climatic Change, 160(1), 1-14.
13. Newell, P., Srivastava, S., Naess, L. O., Torres Contreras, G. A., & Price, R. (2021). Toward transformative climate justice: An emerging research agenda. Wiley Interdisciplinary Reviews: Climate Change, 12(6), e733.

14. Rahman, S. M. A., Nursey-Bray, M., & Masud-All-Kamal, M. (2025). Governance challenges to realising the potential of ecosystem-based adaptation in Bangladesh. Ecosystems and People, 21(1), 2554687.
15. Scartozzi, C. M., Caroli, G., Sarzana, C., Läderach, P. R., Pacillo, G., Hyslop, D., ... & Ehmsen, S. (2023). Guidance note for peace-informed programming at the Green Climate Fund: Ecosystems and ecosystem services.
16. Shi, L., & Moser, S. (2021). Transformative climate adaptation in the United States: Trends and prospects. Science, 372(6549), eabc8054.
17. Siders, A. R., & Ajibade, I. (2021). Introduction: Managed retreat and environmental justice in a changing climate. Journal of Environmental Studies and Sciences, 11(3), 287-293.
18. Siharath, P., Nitivattananon, V., Shrestha, R. P., Vilaychaleun, S., & Sonemanivong, C. (2026). The Climate-Wetland-Policy Nexus: Advancing Community-Based Adaptation through Participatory Co-Knowledge Design at Sui Lake, Lao PDR. Current Problems in Research, 2(1), 74-89.
19. Singh, C., Iyer, S., New, M. G., Few, R., Kuchimanchi, B., Segnon, A. C., & Morchain, D. (2022). Interrogating 'effectiveness' in climate change adaptation: 11 guiding principles for adaptation research and practice. Climate and Development, 14(7), 650-664.
20. Sovacool, B. K., Martiskainen, M., Hook, A., & Baker, L. (2020). Beyond cost and carbon: The multidimensional co-benefits of low carbon transitions in Europe. Ecological Economics, 169, 106529.
21. Tiwari, A., Rodrigues, L. C., Lucy, F. E., & Gharbia, S. (2022). Building climate resilience in coastal city living labs using ecosystem-based adaptation: A systematic review. Sustainability, 14(17), 10863.
22. Woroniecki, S., Spiegelenberg, F. A., Chausson, A., Turner, B., Key, I., Md. Irfanullah, H., & Seddon, N. (2023). Contributions of nature-based solutions to reducing people's vulnerabilities to climate change across the rural Global South. Climate and Development, 15(7), 590-607.
23. Zafar, S., Zafar Khan, M., Mehmood, T., Begum, F., & Sadiq, M. (2023). Role of community-based conservation and natural resource management in building climate resilience among vulnerable mountain societies. Climate and development, 15(7), 608-621.