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Conceptual Paper

Enhancing Farmers' Adaptive Capacity through Economic, Political, Cultural, and Institutional Sensitivities to Climate Change

Suryani Darham [1], Nik Ahmad Sufian Burhan [1,2,3,*], Mohd Roslan Rosnon [1,3]

[1]Department of Social and Development Sciences, Faculty of Human Ecology, Universiti Putra Malaysia, Selangor, Malaysia
[2]Institute for Social Science Studies, Universiti Putra Malaysia, Selangor, Malaysia
[3]Malaysian Community Development and Planning Association (MyCDA)

[*]Corresponding author: nikahmadsufian@upm.edu.my

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Abstract: This conceptual paper investigates how economic, political, cultural, and institutional responses to climate change shape farm-level adaptive capacity, thereby influencing farmers' resilience to climate shocks. Instead of conducting a systematic literature review, the study combines theoretical and contextual insights to present a multidimensional framework that connects social and institutional sensitivities to adaptive behaviours. Economic sensitivity measures farmers' readiness and ability to manage financial risks through diversification, insurance, and investment in resilient practices. Political sensitivity influences public perceptions of climate action, trust in governance, and the ability of policy frameworks to mobilise resources for adaptation. Cultural sensitivity emphasises the importance of traditional knowledge, indigenous practices, and social cohesion in developing collective resilience in farming communities. Institutional sensitivity emphasises the importance of policies, organisational support systems, and stakeholder engagement in promoting equitable and long-term adaptation strategies. By combining these four dimensions, the framework provides a comprehensive perspective on how farmers perceive, interpret, and respond to climate-related risks. It emphasises that adaptation is not just a technical response, but a socially embedded process influenced by values, governance, and resource availability. The proposed framework serves as a theoretical foundation for future empirical research on climate adaptation and agricultural resilience, as well as for the development of context-sensitive policies.

Keywords: Climate change sensitivity; adaptive capacity; farmers; climate adaptation

Introduction

Climate change impacts pose formidable challenges to natural and human systems, potentially compounding vulnerabilities in various spheres, including economic, political, cultural, and institutional dimensions. In light of this, scholars and policymakers are interested in understanding how these sensitivity dimensions influence adaptive capacity, specifically the ability of individuals, households, and communities to mitigate, adapt to, and recover from the effects of climate change (Adger et al., 2005a; IPCC, 2007). This conceptual paper examines how key concepts are framed for understanding how societies manage the multidimensional impacts of climate change in terms of increasing adaptive capacity in the economic, political, cultural, and institutional domains.

Concerns about economic well-being are central to climate change adaptation discussions, because financial security and stability are required for people and families to effectively respond to economic disruptions caused by climate-related events (Brou & Zeigler Hill, 2020; OECD, 2020). A concept of economic well-being encompasses, in general, the ability in every finance to endure stress, in other words, to plan for unexpected events, as well as the method to have access to sufficient assets upon existing in addition to what is needed in the long run (Stiglitz et al., 2009; Wilmarth, 2021). Understanding how climate change affects economic systems, particularly income, employment, and economic (and other) stability, is critical for building resilience and identifying and implementing adaptive strategies. In this context, economic sensitivity to climate change, or how much climate variability affects farmers' economic systems, is critical for adaptive capacity (IPCC, 2007; Tol, 2009). As a result, economic risks associated with climate change are likely to be understood in communities and among individuals, and precautionary measures such as insurance purchases and investments in resilient infrastructure will be implemented (Henderson et al., 2016).

However, adaptive capacity is the result of not only economic sensitivity but also social, political, and cultural sensitivities, which improve a society's ability to adapt to environmental change. For example, political sensitivity to climate change refers to how people perceive the political system's role in protecting them from climate risks (Barnett & Adger, 2007; Gemenne et al., 2014). Climate action-focused political systems can aid in the development of climate adaptation policies and frameworks that boost adaptive capacity by mobilising resources and encouraging public participation in climate adaptation efforts (Adger et al., 2005b; McCright & Dunlap, 2011). Institutional sensitivity refers to institutions' roles in understanding and responding to climate risks, facilitating appropriate adaptation, and allocating resources to the most vulnerable communities (Gupta et al., 2010; World Bank, 2010).

Cultural sensitivity to climate change emphasises the importance of incorporating traditional knowledge and cultural practices in adaptation strategies. Local and indigenous communities can offer important viewpoints on environmental change, assisting in the development and improvement of adaptation measures. To improve resilience, cultural values and social cohesion must be preserved, as communities with cultural bonds tend to band together to face climate challenges and exchange resources and support (Pelling & High, 2005). Recent studies highlight that poor contingency planning, ineffective agricultural policy implementation, and growing climate variability significantly undermine food security and rural resilience, thereby necessitating integrated and context-sensitive adaptation strategies (Boboye & Dorasamy, 2025; Lasisi et al., 2025; Dyke et al., 2020).

This conceptual paper examines how these various dimensions, particularly economic, political, cultural, and institutional sensitivity, influence adaptive capacity and thus how societies respond to the growing threat of climate change. This investigation demonstrates that the development of farmers' awareness and the consequences of sensitivities in multiple dimensions (economic, political, cultural, and institutional) promote effective climate adaptation strategies in agricultural communities. While this study does not employ systematic data extraction or empirical methods, it builds its conceptual framework through an interpretive synthesis of scholarly literature and theoretical models relevant to climate adaptation.

Methodology

This study takes a conceptual approach to investigating the sociopolitical and institutional factors that influence farmers' adaptive capacity in the face of climate change. It is not intended to be a systematic literature review (SLR) and thus does not adhere to a strict methodological protocol for data extraction, coding, or thematic analysis. Instead, it creates a conceptual framework based on interpretive synthesis, allowing for the integration of various theoretical perspectives from climate change adaptation, social vulnerability, and resilience studies to form a coherent analytical foundation. This approach is based on the belief that conceptual frameworks can act as organisational tools for mapping relationships between constructs, particularly when studying complex socio-environmental systems (Jabareen, 2009).

The central premise of this research is that adaptive capacity is influenced not only by external climate exposure but also by internal socio-institutional sensibilities that shape how individuals and communities perceive, prioritise, and respond to risk. These sensitivities serve as a bridge between environmental hazards

and social responses, elucidating why certain farming systems exhibit greater adaptability and resilience compared toothers. Four key dimensions, namely economic, political, cultural, and institutional sensitivity, are identified as critical, interdependent determinants of adaptive behaviour at the farm level. Importantly, these dimensions are not treated as discrete or isolated; rather, they are interdependent, resulting in cumulative effects that can either enable adaptive responses or increase vulnerability.

Each domain is assessed for its unique contribution to climate resilience, using insights from development studies, political ecology, environmental sociology, and institutional theory. By situating adaptive capacity within larger social and governance systems, the study positions adaptation as a socially embedded process rather than a purely technical response to environmental change. This is consistent with the interpretive research tradition, which emphasises the importance of considering meaning, context, and agency when analysing adaptive responses (Yanow, 2013). Thus, trust in institutions, political structures, and cultural practices, in addition to resource and information access, influences farmers' decisions. Recognising these interactions emphasises the importance of investigating sensitivities together, as their combined effects frequently influence the success or failure of adaptation strategies.

By organising the analysis around these four sensitivities, the framework provides a foundation for conceptual exploration, comparative theorising, and potential empirical testing. It enables researchers and policymakers to investigate how vulnerabilities and adaptive capacities emerge within specific contexts, as well as identify broader patterns that can inform cross-regional comparisons. Furthermore, the model emphasises the importance of viewing adaptation as a capacity developed over time, shaped by historical trajectories, governance arrangements, and changing socioeconomic conditions, rather than just a response to external shocks. Dixon-Woods et al. (2005) argue that interpretive synthesis is particularly well-suited to this purpose because it integrates various types of evidence to generate novel theoretical insights rather than simply aggregating findings.

Finally, this conceptual framework serves as a foundation for future academic research and policy innovation. Researchers can theorise and operationalise adaptive capacity in future research using this lens. Policymakers and practitioners highlight priority areas for targeted intervention, emphasising the importance of integrated strategies that recognise the interconnectedness of economic, political, cultural, and institutional dimensions. By incorporating adaptation into these sensitivities, the framework facilitates the development of more contextually grounded and socially responsive policies for climate-vulnerable agricultural systems.

The Findings and Discussion

1. Defining Climate Change Sensitivity

The term "climate change sensitivity" refers to the extent to which natural and social systems react to the effects of climate change. According to Marshall et al. (2010), this sensitivity is a fundamental concept that is included in the framework of climate adaptation that is presented by the International Union for Conservation of Nature (IUCN). These sensitivities are rooted in the economic, political, cultural, and institutional domains, and they frequently interact with one another. As a result, they either amplify or buffer the effects of climate exposure on individuals and locations (Fenton et al., 2007; Marshall et al., 2010). This level of sensitivity is especially pronounced for communities that are dependent on natural resources that may be impacted by climate change. This underscores the importance of considering local community vulnerability factors in the design of climate adaptation strategies (Marshall et al., 2007). Ultimately, climate sensitivity serves as an indicator not only of environmental conditions but also of social factors that impact the ability of communities at risk from climate change to adapt and thrive.

The degree to which a social system is sensitive to climate change varies considerably across different dimensions, both in terms of its depth and its breadth. According to the Intergovernmental Panel on Climate Change (IPCC) in 2007 and the World Bank in 2010, economic sensitivity is determined by the effects of climate on incomes, employment, and economic stability. These effects shape both the costs of adaptation and the potential improvements in productivity. Political sensitivity, on the other hand, is defined with regard to the public's perception of political will and effectiveness in climate action; as a result, it has the potential to

influence both adaptive and mitigation actions (Adger et al., 2013b; McCright & Dunlap, 2011). Recognising the impacts of climate change through indigenous ways of life and social organization is an essential component of cultural sensitivity, which paves the way for adaptation practices (Crate & Nuttall, 2016; Hulme, 2015). Institutional sensitivity, on the other hand, refers to the manner in which various stakeholders evaluate the capability of organisations to manage climate risks, compliance, and adaptation as they occur (Ostrom et al. 2010; World Bank 2010). In conjunction with one another, these aspects shed light on the complex relationship that exists between climate change and vulnerability.

2. Climate Change Sensitivity and The Development of Adaptive Capacity

Climate change presents several of complex issues that require people and societies to strengthen their ability to cope. However, these capacities vary in their sensitivity to economic, political, cultural, and institutional factors. Knowing how these areas can improve adaptive capacity is important for developing mitigation strategies to reduce the effects of climate change. This section discusses how each domain (institutional, political, cultural, and economic sensitivity) improves an individual's ability to respond to climate change.

The Impact of Economic Sensitivity to Climate Change on Adaptive Capacity

The degree to which an economy is aware of and prepared to confront the consequences of climate change is referred to as its economic sensitivity to climate change. The adaptive capacity is increased as a result of this sensitivity (Figure 1), which, among other things, encourages early budgeting and preparedness by investing in measures that build resilience. As an illustration, individuals, particularly farmers or businesses, who are aware that climate change may result in financial losses may choose to purchase insurance policies, seek alternative sources of income, or implement environmentally responsible farming practices (Adger, 2000; Smit & Wandel, 2006). The understanding of economic risks is also the driving force behind the development of new financial products. These products include climate bonds and green investments, both of which include contributions to adaptation measures (Henderson et al., 2016).

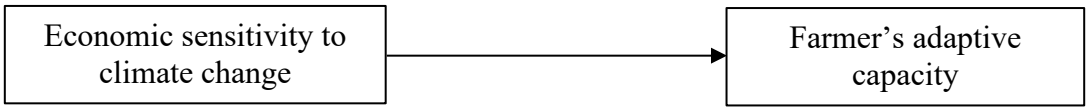

Figure 1. Climate Change’s Economic Sensitivity Affects Farmers' Adaptive Capacity

In addition, economic sensitivity contributes to the development of a culture of risk within communities and industries in relation to the economy. According to Pelling and High (2005), this culture encourages the development of technologies and practices that can reduce the risks associated with climate variability. For example, the use of drought-resistant crops in farming or the construction of energy-efficient homes in urban areas are examples of such practices and technologies. Therefore, economic resilience ought to be considered as a goalr to assist individuals and organisations in preparing for and coping with climate change, thereby increasing their capacity for adaptation (Tol et al., 2008).

This particular form of economic sensitivity also results in cooperation and integration among the key players, which include governments, businesses, and non-governmental organisations. This partnership is essential for the acquisition of resources and knowledge, both of which are essential in the process of developing effective adaptation measures (Agrawal, 2010). By way of illustration, public-private partnerships have the potential to assist in the construction of infrastructures that contribute to the fight against climate change and enhance the community's ability to adapt to changing conditions. These infrastructures may include flood defences or water management systems (Sovacool et al., 2015).

The Impact of Political Sensitivity to Climate Change on Adaptive Capacity

Political sensitivity to climate change refers to an individual's or group's perception of the role that politics plays in addressing climate change. This sensitivity increases adaptive potential (Figure 2), for example, by

mobilising political activism and calling for stronger climate policies and measures (O'Brien et al., 2010). If people believe their politicians are concerned about climate change, they are more likely to support measures that strengthen the community's defences, such as community-based adaptation projects or policy changes (Adger et al., 2005a, 2005b).

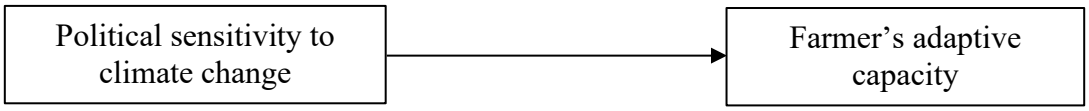

Figure 2. Climate Change's Political Sensitivity Affects Farmers' Adaptive Capacity

The distribution of resources is also impacted by political concerns, and the effectiveness of political systems is an essential factor in the management of climate change risks. An increased understanding of the role that politics plays in the process of adapting to climate change, improved coordination between political entities, and the formulation of a distinct political vision for climate change adaptation are all things that need to be accomplished (Pelling, 2010). According to Naess et al. (2005), political leadership and good governance are essential components in the process of formulating and in the administration of policies that contribute to the protection of those who are socially deprived and to the promotion of sustainable development.

In addition, political sensitivity encourages accountability and transparency in the governance of climate change responsibilities. When people and communities are aware of the political aspects of climate change adaptation, they are in a greater position to exert pressure on their respective governments to either take action or refrain from taking it (Bulkeley & Betsill, 2013; Bulkeley & Newell, 2010). Such awareness can be of assistance in the process of bringing about the necessary improvements in the implementation of policies and ensuring that adaptation measures are both effective and equitable (Ayers & Forsyth, 2009). Therefore, political sensitivity contributes to the discovery of a strategy that is more suitable and tolerant in relation to climate change, and as a result, it enhances the capacity of society to adjust to the effects of climate change (Pelling, 2010).

The Impact of Cultural Sensitivity to Climate Change on Adaptive Capacity

Cultural sensitivity to climate change is a term that is commonly used to refer to the process of analysing the different ways in which climate variability impacts cultural practices, values, and identities. As a result of this sensitivity, adaptive capacity is increased (Figure 3), for example, by encouraging the incorporation of traditional practices and knowledge into adaptation strategies (Adger et al., 2013a). Turner and Clifton (2009) proposed that indigenous and local people frequently possess valuable understandings of their environment and from their earlier experiences, which can assist and enrich the adaptation processes that are currently taking place.

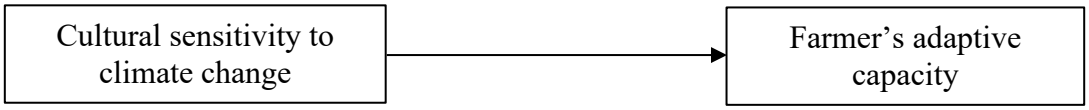

Figure 3. Climate Change's Cultural Sensitivity Affects Farmers' Adaptive Capacity

Additionally, cultural sensitivity fosters solidarity and unity, both of which are essential for the transforming organizational and communal structures. People who are aware of the role that culture plays in climate change are more likely to band together to combat the effects of climate change, according to an argument that was presented by Adger (2006). Social capital and community cohesion are the systems that enable individuals to share resources, information, and support with one another, particularly in the context of climate change (Pelling & High, 2005). These characteristics are especially important in the context of climate change. By taking this approach, both individuals and communities are able to become more resilient, which puts them in a better position to confront the effects of climate change (Tompkins & Adger, 2004).

Furthermore, cultural sensitivity guarantees the preservation and modification of cultural properties are preserved and modified in response to climate change. As a result, cultural assets can assist cultural communities in developing strategies for preserving their culture (Cruikshank, 2001). This approach not only preserves cultural assets but also strengthens people's feelings of belonging to a specific territory, which is important for their psychological stability and health (O'Brien et al., 2009). In this case, cultural sensitivity improves adaptive capacity by ensuring that adaptation measures are culturally appropriate and thus easily accepted by affected societies (Adger et al. 2013).

The Impact of Institutional Sensitivity to Climate Change on Adaptive Capacity

Institutional sensitivity to climate change refers to how an individual or community perceives institutions' ability to address climate risks and support adaptation. This sensitivity improves adaptive capacity (Figure 4), for example, by increasing trust in institutional arrangements to address climate change issues (Adger et al., 2005a, 2005b). When people believe that the government, non-governmental organisations, and international organisations are effectively mitigating climate change risks, they will have faith in the institutions' efforts to adapt (Gupta et al. 2010).

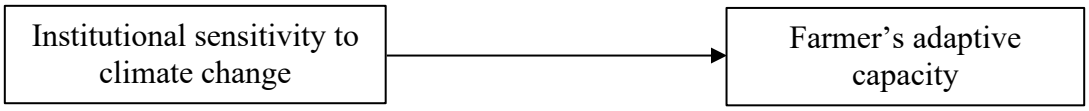

Figure 4. Climate Change's Institutional Sensitivity Affects Farmers' Adaptive Capacity

Institutional sensitivity informs the formulation and implementation of policies and programs that improve resilience to climate extremes. Knowledge of institutional roles and responsibilities increases the likelihood that different sectors and levels of government will collaborate in developing more effective and comprehensive adaptation policies and plans (Agrawal, 2010). Organisations that are aware of climate risks are more likely to allocate resources to the adaptation process, invest in R&D, and create environments that foster innovation and adaptive management (Eakin & Lemos, 2006).

Furthermore, institutional sensitivity promotes the involvement of various knowledge systems in adaptation planning and decision-making processes. Recognising the importance of institutional diversity and integration means that the adaptation measures adopt place can meet the needs of all stakeholders, including the most vulnerable groups in society (Folke et al., 2005). This approach is critical for increasing the legitimacy and effectiveness of adaptation policies so that they can easily achieve their intended goals and objectives and are not easily reversed in the future (Smit & Wandel, 2006). Such institutions could help people cope with climate change by promoting values like trust, collaboration, and stakeholder participation. This is because it will help communities identify, prevent, mitigate, and deal with the effects of climate change (Adger et al., 2005a, 2005b).

3. Conceptual Framework: Sensitivities Influencing Farmers' Adaptive Capacity

The framework proposed in this paper (see Figure 5) conceptualises how four interconnected sensitivities, namely economic, political, cultural, and institutional, influence farmers' adaptive capacity in responding to climate change. These sensitivities represent distinct but interconnected dimensions through which farmers perceive and interpret climate risks. Each sensitivity contributes to adaptive capacity in a distinct way, and their interactions produce combined effects that influence overall adaptation outcomes.

The framework is based on the understanding that adaptation is determined not only by environmental exposure, but also by how societies perceive, evaluate, and respond to climate-related threats via their social, economic, and governance systems (Adger et al., 2005a; IPCC, 2007). Farmers' adaptive responses are thus viewed as the result of dynamic interactions among available resources, institutional structures, cultural norms, and political contexts. This conceptualisation is consistent with broader theoretical insights from social

vulnerability and resilience research, which emphasise that adaptive capacity is dependent on both structural opportunities and individual or community-level decision-making.

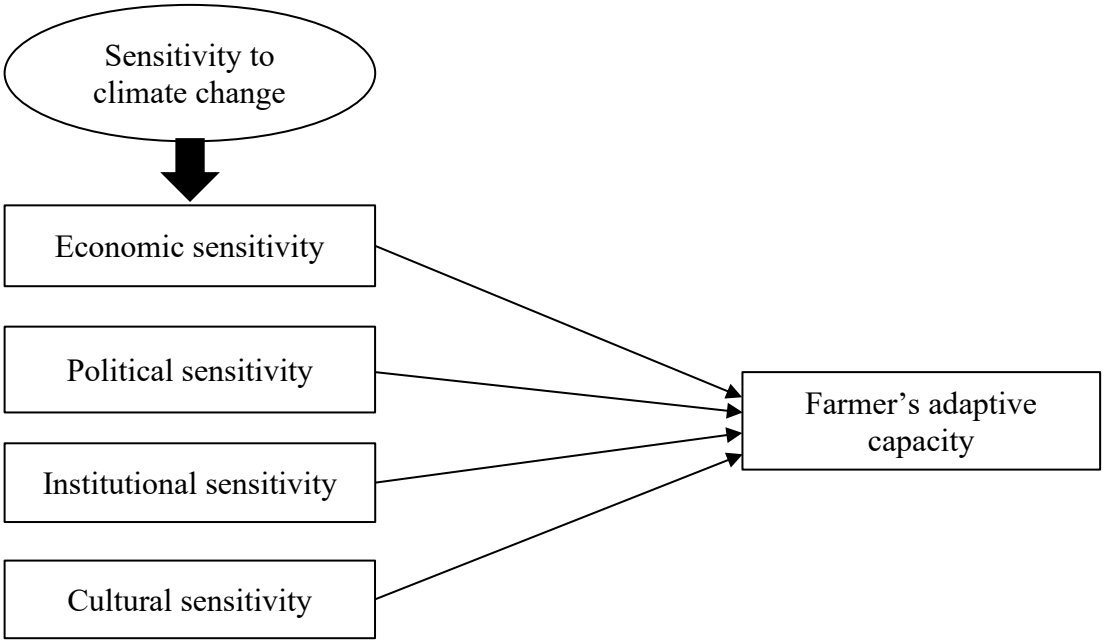

Figure 5. Dimensions of Climate Sensitivity Influencing Farmers' Adaptive Capacity

By combining these four sensitivities, the framework emphasises the multidimensionality of adaptation. Economic sensitivity refers to the ability of farmers to manage financial risks and invest in adaptive practices. Political sensitivity refers to how governance and policy environments influence perceptions of fairness, legitimacy, and participation in adaptation planning. Cultural sensitivity examines the role of shared knowledge, values, and practices in shaping collective responses to environmental stressors. Institutional sensitivity refers to the extent to which formal and informal systems provide the structures, resources, and trust required for successful adaptation. While each of these dimension's functions independently, their combined impact is most significant, as interactions between them can amplify strengths or expose critical vulnerabilities.

This integrated framework enables the model to be used as a conceptual tool for comprehending the complexities of adaptation in agricultural systems. It serves as a structured foundation for future empirical studies, allowing researchers to investigate how these sensitivities vary across contexts and how they interact to determine adaptive behaviours. At the same time, it provides a useful resource for policymakers and practitioners looking to develop interventions that boost resilience. Identifying leverage points within and across these domains allows decision-makers to better target strategies that reduce vulnerabilities, foster collaboration, and promote long-term adaptation pathways.

The framework emphasises that improving farmers' adaptive capacity necessitates a thorough understanding of the complex social and institutional contexts in which adaptation occurs. It moves away from one-dimensional explanations and instead views adaptation as a process shaped by intersecting factors that reflect both individual capabilities and broader systemic conditions.

Discussion

This conceptual study emphasises the importance of economic, political, cultural, and institutional sensitivity in determining how individuals and communities adapt to the growing difficulties of climate change. These sensitivities influence not just the ability to respond to climate hazards, but also the tactics used to conceptualise and conduct adaptive activities.

Economically, communities that are aware of the financial consequences of climate change are more likely to take proactive steps such as early investments in resilience and the creation of tools such as green investments and climate bonds. This readiness promotes a culture of risk management and intersectoral collaboration. However, economic discrepancies create considerable impediments. Many marginalised farmers lack the means and institutional support needed to take advantage of these financing instruments, showing a persistent disparity in fair adaptation.

On the political front, strong leadership and consistent policies are critical for driving climate-resilient initiatives. Political leadership and will are critical for scaling up adaptation initiatives, but they are frequently hampered by politicisation and fragmented governance. Conflicting ideologies and pledges that are not followed by action can stymie significant progress, undermining the ability of political systems to foster adaptive capability.

The cultural dimension emphasises the role of indigenous knowledge and traditional practices in shaping adaptive responses. Communities with a strong cultural identity frequently demonstrate stronger cohesion and collective action in the face of environmental change. However, while these practices can improve resilience, they may not always keep up with the fast shifts caused by climate change. To be effective, adaptation must combine traditional wisdom with scientific breakthroughs to generate solutions that are both respectful of cultural heritage and responsive to emerging threats.

Equally important is the institutional dimension, which determines how well adaptation plans are designed and implemented. Trustworthy, inclusive institutions that can clearly assign roles tend to promote cooperation, informed decision-making, and long-term community engagement. However, when institutions are fragmented, poorly coordinated, or under-resourced, they risk undermining the same adaptive techniques they are supposed to promote.

Ultimately, successful climate adaptation relies on the intersection and integration of these sensitivity. To integrate these sensitivities, inclusive, cross-sector adaptation techniques are required, as well as attention to local circumstances. Policymakers and practitioners can respond to climate change concerns more holistically and effectively by recognising and addressing each domain's distinct contributions and limits.

Conclusion

This paper has proposed a conceptual framework that integrates economic, political, cultural, and institutional sensitivities to explain how farmers adapt to climate change. These sensitivities shape farmers' ability to perceive risk, mobilize resources, and adopt effective responses. Every one of these contributes in its own special way to the way in which individuals and societies react to the dangers posed by climate change. While political sensitivity is the driving force behind policy action and resource allocation, financial mechanisms of economic preparedness are responsible for their creation of resilience. Cultural sensitivity increases the likelihood that adaptation strategies developed by affected communities will be accepted and put into action. This is due to the fact that these strategies are founded on the local knowledge and practices. In order to achieve effective and equitable adaptation outcomes, the institutional structure that is provided by institutional sensitivity serves as the structural backbone for coordinated action within the institution.

This framework is intended to guide future research and policy formulation by emphasizing that effective adaptation strategies must be grounded in a nuanced understanding of social systems, not just environmental exposure. Nevertheless, bringing these different domains together to effectively collaborate is a difficult task. Economic inequalities, political fragmentation, cultural misalignments, and institutional weaknesses are all factors that have the potential to undermine adaptation efforts. In response to this, policies regarding climate adaptation need to be comprehensive and all-encompassing, involving collaboration across different sectors and putting an emphasis on vulnerable populations. To ensure that communities are prepared for the effects of climate change as they occur, it is imperative that future research focus on determining the most effective means by which these sensitivities can be incorporated into practical adaptation strategies.

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