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Original Article

Identification and Prioritization of the Dimensions of Local Governance and Social Capital and Their Implications for Rural Resilience to Natural Hazards (Case Study: Ahar Village)

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Abstract
Purpose- This study aims to identify and prioritize the key dimensions of local governance and social capital and to explain their implications for enhancing rural resilience to natural hazards in Ahar Village.
Design/methodology/approach- This applied research adopts a mixed-methods sequential exploratory design. In the qualitative phase, the dimensions of local governance, social capital, and rural resilience were identified through qualitative content analysis. In the quantitative phase, the extracted dimensions and indicators were validated and prioritized using the Delphi technique and statistical analysis. The statistical population consisted of experts in disaster management, geography and rural planning, local governance, social capital, and rural resilience, who were selected through purposive sampling. A total of 24 experts participated in three rounds of the Delphi process. Data were collected through semi-structured interviews and an open-ended questionnaire in the first round, followed by closed-ended questionnaires based on a five-point Likert scale in subsequent rounds. Data were analyzed using mean, standard deviation, and Kendall's coefficient of concordance.
Finding- The findings showed that the three main dimensions' local governance, social capital, and rural resilience ranked first to third, with mean scores of 4.42, 4.31, and 4.18, respectively. Within the local governance dimension, institutional capacity (4.58), preparedness and preventive planning (4.52), and coordination among local institutions (4.46) received the highest priorities. Within the social capital dimension, social trust (4.55), local participation (4.43), and social cohesion and cooperation (4.37) ranked highest. Regarding rural resilience, local community preparedness and adaptability (4.41), social and institutional capacity (4.32), and the ability to recover and maintain village activities after a disaster (4.25) received the highest priorities.
Practical Implications- The findings suggest that strengthening rural resilience requires an integrated approach to local governance and social capital. Policymakers and local authorities should prioritize strengthening institutional capacity, improving disaster preparedness and preventive planning, enhancing coordination among local institutions, and promoting social trust, local participation, social cohesion, and support networks. Developing these capacities simultaneously can improve communities' ability to prepare for, adapt to, respond to, and recover from natural hazards while maintaining essential village activities.
Originality/value- By combining qualitative content analysis with the Delphi technique and statistical prioritization, the study identifies the most influential institutional and social factors underlying rural resilience. The findings highlight the complementary role of institutional capacity and social capital and demonstrate that sustainable resilience-building requires simultaneous attention to governance structures, community participation, social trust, preparedness, and institutional coordination.
Keywords- Local Governance, Social Capital, Rural Resilience, Natural Hazards, Disaster Management, Ahar Village.

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1. Introduction

In recent decades, the increasing frequency and intensity of natural hazards, including floods, earthquakes, droughts, and landslides, have posed a wide range of challenges to rural settlements (Poudel & Shaw, 2024). The greater vulnerability of rural areas to such hazards is influenced not only by their natural and physical characteristics but also by factors such as limited resources, inadequate infrastructure, low institutional capacity, and restricted access to disaster management services and facilities (Marchetti et al., 2025). Accordingly, contemporary disaster management approaches increasingly emphasize reducing vulnerability and strengthening the capacity of local communities to prepare for, adapt to, cope with, and recover from hazardous events (Hart et al., 2025). Within this context, rural resilience has emerged as a key concept in hazard planning and management, focusing on the capacity of local communities to anticipate, withstand, cope with, adapt to, and recover from the consequences of natural hazards (Kang et al., 2026). However, resilience should not be regarded as a fixed or uniform set of capacities that operates similarly across all communities and hazard contexts. Rather, the relevance, effectiveness, and interaction of resilience capacities may vary according to the type and characteristics of hazards, the size and organizational structure of the affected community, and the broader institutional and policy environment in which communities operate.

In this regard, achieving rural resilience cannot be accomplished solely through technical and physical measures; rather, it requires adequate managerial, institutional, and social capacities. Local governance is among the factors that play a significant role in this regard, as local institutions are essential to hazard identification, preventive planning, resource organization, inter-agency coordination, information dissemination, and mobilization of community capacities (Khandokar et al., 2026). The greater the institutional and managerial capacity at the local level, the greater the potential for more effective crisis preparedness and response planning, stronger coordination among responsible organizations, and more rapid responses to community needs (Falsoleiman et al., 2025). However, the contribution of local governance to resilience may depend on the characteristics of the hazard and the scale of the community. For example, the institutional arrangements and coordination mechanisms required to address sudden-onset hazards such as earthquakes may differ from those required to manage slower-onset or recurrent hazards such as droughts. Likewise, the effectiveness of local institutions may vary between smaller communities with relatively dense social relationships and larger communities with more complex organizational structures and a wider range of institutional actors. Therefore, institutional capacity, preparedness and preventive planning, and coordination among local institutions can be regarded as fundamental components of local governance for enhancing the resilience of rural settlements, while their effectiveness should be understood within the specific hazard and community context.

Alongside local governance, social capital constitutes one of the most important endogenous capacities of rural communities for confronting natural hazards (Varshney et al., 2026). Through components such as social trust, participation, cohesion, cooperation, and communication and support networks, social capital facilitates interaction and collaboration among community members and local institutions (Prayoga et al., 2024). The presence of mutual trust and strong social relationships can facilitate the flow of information, increase public participation in disaster management programs, strengthen mutual support, and enhance the community's capacity for a coordinated response under crisis conditions (Qu et al., 2026). Thus, social capital should be understood not only as an independent social capacity but also as a factor that strengthens the effectiveness of local governance and facilitates the implementation of risk-reduction and resilience-enhancement programs (Boyana et al., 2026; Rodriguez et al., 2025). Nevertheless, the contribution of social capital to resilience is also context-dependent. The extent to which social networks, trust, and collective action can be translated into effective disaster responses may depend on the type of hazard, the size and social organization of the community, and the extent to which local social capacities are supported or constrained by formal institutions and external policies.

The importance of the interaction between local governance and social capital becomes more evident when natural hazards are examined at the

local scale. Under such circumstances, formal institutions alone are unable to manage all dimensions of a crisis, making it necessary to draw upon local capacities, indigenous knowledge, social networks, and residents' participation (Chen et al., 2026). Constructive interaction between local institutions and rural communities can foster participatory decision-making, enhance trust, improve coordination, and strengthen community preparedness (Schaffer & Bennett, 2026). Accordingly, rural resilience is the outcome of interactions among a range of institutional and social capacities and cannot be reduced solely to the availability of physical facilities or economic resources. Importantly, these interactions are not necessarily stable over time or across contexts. The relative contribution of different capacities may change depending on the characteristics of the hazard, the demographic and organizational scale of the community, and the external institutional and policy conditions. External policies can, for instance, strengthen local capacities by providing resources, institutional support, disaster-management services, and coordination mechanisms, while inappropriate or insufficient policies may constrain the ability of communities to convert existing social and institutional capacities into effective resilience outcomes. Thus, understanding rural resilience requires attention not only to the presence of particular capacities but also to the conditions under which these capacities interact and become effective.

The village of Ahar is also exposed to various natural hazards due to its geographical location, natural characteristics, and mountainous setting, making the strengthening of local capacities for hazard management particularly important. In such an environment, the level of community preparedness, the capacity of local institutions, the degree of social participation and trust, and the quality of coordination among local actors can play a decisive role in reducing the impacts of hazards and enhancing the village's capacity to recover following a disaster. At the same time, the effectiveness of these capacities should be considered in relation to the specific characteristics of the hazards affecting the community, the scale and structure of the local population, and the institutional and policy environment surrounding the village. Nevertheless, an accurate understanding of the dimensions of local governance and social capital, as well as the relative importance of their respective components in shaping rural resilience, requires a systematic investigation drawing on expert perspectives.

Despite the growing body of research on resilience to natural hazards, a substantial proportion of existing studies has focused on the physical, economic, or infrastructural dimensions of resilience (Chen et al., 2026; Poudel & Shaw, 2024; Jamini & Shabani Hosainabadi, 2025; Hajjarian, 2024; Riahi & Rostamian, 2022), while the simultaneous relationship between local governance capacities and social capital has received comparatively limited integrated attention. Moreover, many studies have examined the factors contributing to resilience without determining their relative priorities. Identifying the components of greater importance can, however, facilitate the targeted allocation of resources and the design of more effective disaster management programs. Accordingly, the present study adopts a mixed-methods approach, combining qualitative content analysis and the Delphi technique, to identify, validate, and prioritize the dimensions of local governance, social capital, and rural resilience, and to elucidate their implications for resilience to natural hazards in Ahar Village. Based on this rationale, the main research question is: What are the most important dimensions and components of local governance and social capital that influence the resilience of Ahar Village, and how can these components be ranked in terms of their relative importance and priority?

The remainder of this article is organized as follows. First, the theoretical foundations and relevant empirical literature on rural resilience, local governance, and social capital are reviewed. Second, the research methodology, including the qualitative content analysis and Delphi technique, is presented. Third, the findings are reported and discussed in relation to the existing literature. Finally, the conclusions, practical implications, and recommendations for enhancing rural resilience are presented.

2. Research Theoretical Literature

2.1. Social Capital Theory: Robert D. Putnam

Social capital theory is one of the important approaches for explaining the role of social relationships, trust, and cooperation in the functioning of communities. Among the various perspectives on social capital, Robert D. Putnam's approach provides an appropriate framework for

explaining the link between social and institutional capacities and their outcomes at the local community level, particularly because of its emphasis on horizontal relationships, civic engagement, mutual trust, and the capacity for collective action (Coleman, 2019). From Putnam's perspective, social capital refers to features of social organization, including networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit (Putnam, 2018: 78). Thus, social capital is not merely a collection of individual relationships; rather, it constitutes a collective resource that enhances a community's capacity to cooperate and address shared problems.

Within Putnam's theory, social trust is one of the most fundamental elements of social capital. Trust enables individuals to engage in reciprocal relationships with greater confidence, reduces the costs of interaction, and increases their willingness to cooperate. Mutual trust also provides a foundation for the development of shared expectations and stable relationships among community members. Under such conditions, individuals perceive participation in collective activities as less costly and more reliable, thereby increasing the likelihood of cooperation (Putnam, 2017).

Another essential element of the theory is social networks. Networks provide the basis for communication, information exchange, resource sharing, and the formation of reciprocal relationships among individuals and groups. Putnam distinguishes between bonding and bridging networks. Bonding networks strengthen cohesion and mutual support among members of a particular group, whereas bridging networks facilitate connections across different groups and provide access to broader resources and opportunities (Putnam, 2018). From this perspective, the existence of diverse and effective networks can enhance a community's capacity to mobilize resources and achieve social coordination. However, the effectiveness of such networks is not necessarily uniform across communities or circumstances. The extent to which bonding and bridging networks contribute to collective action may depend on the size and social organization of the community, the nature of the hazard being addressed, and the community's connections with formal institutions and external sources of support.

Civic and social participation also occupies a central position in Putnam's conceptualization. Participation strengthens social ties, creates experiences of cooperation, and fosters the development of reciprocal norms. Continued involvement in collective affairs gradually enhances trust and the capacity for cooperation, thereby providing a foundation for the formation of enduring social relationships (Putnam, 2020). Accordingly, participation can be both an outcome of social capital and a mechanism through which social capital is reproduced and strengthened.

Norms of cooperation and reciprocity constitute other important components of the theory. In communities where individuals expect their cooperative behavior to be reciprocated by others, their willingness to participate and cooperate increases. Such reciprocal norms orient individual behavior toward collective goals and enhance the potential for collective action (Putnam, 2020).

According to Putnam's theory, the interaction among trust, social networks, participation, and norms of reciprocity generates the capacity for collective action (Putnam, 2020). This capacity refers to a community's ability to organize resources, coordinate among its members, foster cooperation, and achieve shared goals (Lin, 2018: 66). Within this framework, social capital can be regarded as a social capacity that strengthens relationships between the community and local institutions and enhances coordination and participation at the local level. Therefore, components such as social trust, local participation, social cohesion and cooperation, and support networks can be considered, within the theoretical framework of Putnam, as key manifestations of social capital and as resources that shape the collective capacity of a community.

Importantly, the relationship between social capital and collective action should not be understood as static or independent of context. Although trust, networks, participation, and reciprocal norms provide an important foundation for collective action, their contribution to resilience may vary according to the characteristics of the hazard, the size and organizational structure of the community, and the broader institutional and policy environment. Different hazards may require different forms of coordination, information exchange, and collective response, thereby altering the relative importance of particular social capacities. Similarly, the structure and effectiveness of social networks may differ between smaller and

larger communities, while external policies, institutional support, and access to formal disaster-management systems can either strengthen or constrain the ability of communities to translate social capital into effective collective action. Accordingly, within the present study, social capital is conceptualized not as a fixed capacity but as a context-dependent resource whose effectiveness emerges through its interaction with local governance, community characteristics, and the hazard environment.

2.2. Research Background

Recent research increasingly conceptualizes rural disaster resilience as a multidimensional and dynamic process rather than as a single outcome or a fixed set of capacities. Rural communities are exposed not only to the direct physical impacts of hazards but also to socioeconomic, spatial, institutional, and livelihood-related conditions that shape their ability to prepare for, respond to, and recover from disasters. Recent evidence from rural China, for example, shows that community resilience encompasses the capacity to anticipate and recognize potential damage, coordinate multiple actors, and mobilize local actions before, during, and after disasters (Li et al., 2024). Similarly, Su et al. (2024) demonstrated that rural community resilience changes over time following disasters and that the trajectory of resilience is influenced by both government intervention and community self-organization. These findings suggest that resilience should be understood as a process emerging from interactions among community capacities, institutional interventions, and changing hazard conditions rather than as a stable attribute of a community.

Importantly, the dynamic nature of resilience also implies that capacities themselves may need to evolve as hazard patterns and local conditions change. Adaptive capacity refers, in this context, to the ability of individuals, communities, and institutions to learn from experience, adjust existing practices, reorganize resources, and develop new responses as environmental and hazard conditions change. Flexibility is a closely related characteristic because it enables existing institutional, social, and organizational arrangements to be modified rather than applied rigidly across different situations. Thus, resilient communities require not only existing capacities for preparedness, response, and recovery, but also the ability to continuously revise and strengthen those capacities. The importance of such evolution is reflected in evidence that rural resilience may follow different trajectories after disasters depending on government intervention, community self-organization, and changing local conditions (Su et al., 2024). Similarly, the adaptive capacity and self-reliance observed in rural communities may depend on their ability to mobilize social networks, innovation, and cultural resources while responding to prolonged or changing pressures (Marchetti et al., 2025). Accordingly, rural resilience can be understood as an ongoing process of learning, adjustment, and capacity development rather than simply the maintenance of a predefined set of capabilities.

A first group of studies emphasizes the importance of the physical and spatial characteristics of rural settlements in shaping disaster vulnerability and response capacity. Falsoleiman et al. (2025), for example, found substantial differences among rural settlements in terms of their spatial distribution, proximity to faults and ephemeral streams, and accessibility to disaster-management centers and transportation infrastructure. Similarly, Jamini & Shabani Hosainabadi, (2025) identified substantial variation in flood susceptibility among rural settlements within the Hawraman cultural landscape, demonstrating that exposure and spatial characteristics can differ considerably even among settlements located within the same broader region. More recently, Xiong et al. (2026) provided field-based evidence from a high-altitude rural village showing that road geometry, intersections, sharp turns, route complexity, and wayfinding conditions can affect evacuation speed and route selection. Taken together, these studies indicate that the effectiveness of preparedness and response capacities cannot be separated from the physical and geographical characteristics of the community in which they operate. They also imply that preparedness and response arrangements need to remain sufficiently flexible to accommodate differences in hazard exposure, accessibility, and changing spatial conditions.

A second body of research highlights the role of socioeconomic and livelihood conditions in shaping disaster vulnerability and preparedness. Liu et al. (2025), based on evidence from farming households in flood-prone areas of rural China, found significant relationships between different forms of livelihood risk and disaster preparedness. Their

findings showed that social, financial, and health-related risks can affect different dimensions of preparedness, indicating that households do not face disaster risk independently of their livelihood conditions. This relationship is further illustrated by Livne et al. (2026), whose study of rural Malawi demonstrated that agricultural land loss can simultaneously function as a symptom, cause, and consequence of disaster vulnerability. Their findings showed that repeated climate-related hazards can interact with existing socioeconomic inequalities and weaken traditional coping mechanisms, while ineffective policies concerning access to resources may reproduce vulnerability over time. These findings reinforce the importance of considering the socioeconomic and livelihood context when examining rural resilience. They further suggest that adaptive capacity depends partly on the ability of households and communities to adjust livelihood strategies and resource use as hazard pressures change over time.

A third group of studies focuses on institutional, managerial, and governance capacities. Evidence from Iran has emphasized the importance of planning, education and extension, laws and regulations, information dissemination, and infrastructure in rural crisis management (Hajjarian, 2024). Riahi and Rostamian (2022) likewise identified substantial differences in disaster-management awareness among rural women across different rural districts, demonstrating that preparedness capacity is not distributed uniformly across rural communities. More recently, Lee et al. (2025) showed that strengthening the capacity of organized citizen-response forces can reduce rural vulnerability and improve disaster-response capacity. Their findings also emphasized collaboration among policymakers, local leaders, and researchers, thereby illustrating the importance of coordination between community-level capacities and formal institutional actors. These findings collectively indicate that rural resilience depends not only on the internal capacities of communities but also on the institutional arrangements through which resources, information, coordination, and emergency support are provided.

From a dynamic perspective, however, effective local governance also requires the capacity to learn and adjust. Planning systems, coordination mechanisms, information flows, and resource-allocation arrangements may need to be revised when the frequency, intensity, timing, or spatial distribution of hazards changes. Governance capacity should therefore not be understood solely as the presence of formal institutions or predefined plans, but also as the ability of local institutions to review experience, incorporate new information, coordinate changing actors, and modify existing strategies. In this sense, institutional flexibility and learning can strengthen the adaptive capacity of rural communities by allowing formal governance arrangements to evolve alongside changing risk conditions.

At the same time, an important strand of the literature emphasizes the role of social relationships, self-organization, and community participation. Rural communities often rely on social networks, mutual assistance, trust, local knowledge, and collective action to cope with disasters, particularly where formal resources are limited. Marchetti et al. (2025) found that rural communities can demonstrate considerable self-reliance and adaptive capacity through strong social networks, innovation, and cultural resources. However, the study also showed that these locally generated capacities may become constrained when communities face prolonged crises, limited resources, or institutional responses that are poorly aligned with local needs. This finding is consistent with the broader argument that social capital can strengthen resilience but cannot necessarily compensate for structural and institutional deficiencies. Similarly, Su et al. (2024) showed that community self-organization becomes increasingly important during longer-term recovery, while government intervention can have a particularly strong influence during disaster relief and reconstruction. Thus, community-based capacities and formal governance should be viewed as complementary rather than mutually exclusive sources of resilience.

The dynamic character of social capital is also important for adaptive capacity. Social networks can provide channels through which communities exchange information, learn from previous disasters, identify emerging risks, and mobilize collective responses. However, networks may need to expand, reorganize, or establish new connections when hazards change or when existing coping arrangements become insufficient. Bridging relationships may be particularly important in such circumstances because they can connect local

groups with external institutions, knowledge, resources, and new forms of support. Accordingly, social capital contributes to resilience not only by facilitating immediate collective action but also by supporting learning, social adjustment, and the renewal of collective capacities over time.

The findings of the existing literature therefore point to an important conceptual relationship among physical exposure, livelihood conditions, local governance, social capital, and rural resilience. Spatial and environmental characteristics determine the nature and intensity of exposure; socioeconomic and livelihood conditions influence the resources available to households and communities; local governance provides institutional coordination, planning, information, and organizational capacity; and social capital facilitates trust, participation, mutual assistance, and collective action. Rural resilience emerges from the interaction of these dimensions rather than from any single component. Recent studies increasingly support this integrated perspective by demonstrating that resilience is shaped simultaneously by community self-organization, government intervention, local stakeholder action, spatial characteristics, and socioeconomic conditions (Su et al., 2024; Li et al., 2024; Lee et al., 2025; Marchetti et al., 2025; Livne et al., 2026).

Building on this integrated perspective, adaptive capacity can be understood as a cross-cutting property of these dimensions rather than as an isolated component. Local governance contributes to adaptive capacity when institutions can learn, coordinate, and revise plans and resource allocations; social capital contributes when networks, trust, and participation enable communities to exchange knowledge, reorganize cooperation, and mobilize resources under changing conditions; and rural resilience is strengthened when these capacities collectively allow communities to adjust while maintaining essential functions. In this sense, flexibility provides an important link between existing capacities and their future development. A community may possess substantial resources and strong institutions at a given point in time, yet resilience depends partly on whether these resources can be reconfigured when the nature of risk changes.

However, despite this growing body of research, the dimensions of rural resilience have often been examined separately. Some studies have primarily focused on spatial exposure and physical vulnerability (Falsoleiman et al., 2025; Jamini & Shabani Hosainabadi, 2025; Xiong et al., 2026), whereas others have emphasized livelihood risk and socioeconomic vulnerability (Liu et al., 2025; Livne et al., 2026). Another group has concentrated on institutional preparedness, crisis management, or formal disaster-response capacity (Hajjarian, 2024; Lee et al., 2025), while studies of community resilience have highlighted social networks, self-organization, participation, and local adaptive capacities (Su et al., 2024; Marchetti et al., 2025). Although these perspectives are complementary, relatively less attention has been given to how local governance and social capital can be conceptualized together as interconnected capacities within a rural resilience framework and, importantly, how these capacities can evolve as hazard conditions change.

This gap is particularly important because local governance and social capital represent two distinct but potentially complementary dimensions of community capacity. Local governance provides organizational structures, planning mechanisms, institutional coordination, information dissemination, and access to formal resources, whereas social capital supports trust, participation, social cohesion, mutual assistance, and collective action. Their interaction may determine how effectively rural communities can mobilize available resources and translate them into preparedness, adaptation, response, and recovery. Importantly, the relationship between these capacities should not be assumed to be uniform across all rural settings or stable over time. The type and characteristics of hazards, the size and organizational structure of communities, the socioeconomic conditions of households, and the institutional and policy environment may shape the ways in which governance and social capital are developed and mobilized. Moreover, as hazard patterns change, these capacities may need to be continuously adjusted through learning, institutional adaptation, social reorganization, and flexible resource mobilization.

Therefore, the existing literature suggests the need for an integrated framework that does not treat local governance, social capital, and rural resilience as isolated or fixed concepts, but instead examines their interconnected roles within a changing disaster context. The present study addresses this gap by using a three-round Delphi process to identify, refine, and prioritize the dimensions and indicators

that experts consider important for rural resilience to natural hazards. By bringing together managerial and institutional capacities with social capacities and resilience-related outcomes, the study seeks to provide a more integrated understanding of the capacity configuration underlying rural resilience. Although the Delphi process does not directly measure the longitudinal evolution of adaptive capacity, the resulting framework can be interpreted as a basis for understanding which capacities may need to be maintained, strengthened, or flexibly adjusted as hazard conditions and community needs change. In this way, the study moves beyond a fragmented treatment of individual risk, preparedness, vulnerability, or resilience indicators and develops a context-sensitive framework linking local management, social capital, adaptive capacity, and rural resilience at the community level (Table 1).

Table 1. Comparison of Previous Studies and Distinction from the Present Study

Study	Year	Main Focus / Findings	Distinction from the Present Study
Xiong et al., "Emergency Behavior Management of Rural Residents in Response to Disasters: A Field Study of High-Altitude Villages in Sichuan, China"	2026	Examined how environmental and physical characteristics of rural settlements, including route complexity, intersections, irregular routes, and wayfinding conditions, influence residents' movement speed, hesitation, and evacuation-route selection.	Focuses primarily on emergency behavior and the physical characteristics of evacuation routes. In contrast, the present study develops a broader capacity configuration for rural resilience, integrating institutional, managerial, social, and adaptive capacities through a structured expert-consensus process.
Livne et al., "Root Causes of Disaster Vulnerability: Loss of Subsistence Agricultural Land in Rural Malawi"	2026	Demonstrated how agricultural land loss and degradation interact with socioeconomic inequalities and climate-related hazards to reinforce cycles of rural vulnerability.	Examines land access, inequality, and livelihood-based vulnerability. The present study moves beyond a specific livelihood mechanism by systematically identifying and prioritizing institutional, social, and resilience-related capacities within a common rural resilience framework.
Liu et al., "Does livelihood risk matter in disaster preparedness? Insights from flood risk areas of rural China?"	2025	Investigated relationships between livelihood risks and disaster preparedness among farming households, showing that social, financial, and health-related risks are associated with different dimensions of preparedness.	Uses farming households and livelihood risk as the primary analytical focus. The present study adopts a community-level capacity perspective and uses Delphi to identify and prioritize interconnected institutional, social, adaptive, and resilience capacities rather than testing the effect of a specific livelihood-risk construct.
Marchetti et al., "The resilience paradox: Rural self-reliance and the limits of disaster recovery"	2025	Showed that social networks, innovation, and cultural resources can strengthen rural self-reliance and adaptive capacity, while prolonged crises and inadequate institutional support can constrain recovery.	Provides important evidence on social networks, self-reliance, and adaptive capacity, but does not systematically develop and prioritize a broader configuration of institutional and social capacities. The present study explicitly integrates these capacities and establishes their relative importance through three rounds of Delphi consensus.
Lee et al., "Evaluating the disaster response capacity of the Korean citizen corps in rural areas: A System Dynamics–GIS approach"	2025	Examined the capacity of organized citizen-response forces and showed that strengthening volunteer capacity and cooperation among policymakers, local leaders, and researchers can improve rural disaster response.	Focuses on a specific organized volunteer-response mechanism and its implications for disaster response. The present study addresses a wider configuration of capacities, including governance, coordination, trust, participation, social cohesion, adaptability, and recovery, and systematically prioritizes them rather than modeling one response mechanism.
Jamini & Shabani Hosainabadi, "Analysis of Flood Susceptibility in Rural Settlements	2025	Identified substantial variation in flood susceptibility among rural settlements and highlighted the importance of spatial and	Concentrates on hazard susceptibility and spatial exposure. The present study does not primarily assess hazard zoning or physical susceptibility; instead, it examines the

Study	Year	Main Focus / Findings	Distinction from the Present Study
within the Hawraman Cultural Landscape"		environmental characteristics in determining exposure.	capacities through which rural communities can prepare for, adapt to, respond to, and recover from hazards.
Falsoleiman et al., "Location and Vulnerability of Rural Settlements in Zirkouh County"	2025	Demonstrated that settlement distribution, proximity to hazard-prone areas, disaster-management centers, and transportation infrastructure contribute to differences in rural vulnerability.	Emphasizes spatial location and physical vulnerability. The present study addresses a different analytical question by identifying and prioritizing social, institutional, managerial, and adaptive capacities that can shape rural resilience across changing risk conditions.
Li et al.	2024	Showed that rural community resilience involves anticipating and recognizing potential damage, coordinating multiple actors, and mobilizing local action before, during, and after disasters.	Provides evidence for the multidimensional nature of community resilience, but does not develop a systematic expert-based prioritization of the interconnected capacity dimensions. The present study operationalizes this broader perspective through a multi-round Delphi process.
Su et al.	2024	Demonstrated that rural community resilience can follow different trajectories following disasters and that government intervention and community self-organization influence these trajectories.	Highlights the dynamic interaction between government intervention and community self-organization, but primarily examines resilience trajectories rather than systematically identifying and prioritizing the underlying capacity configuration. The present study provides an expert-informed framework of capacities that can support such future longitudinal investigation.
Hajjarian, "Analysis of Effective Components in Crisis Management in Rural Areas from the Perspective of Experts"	2024	Identified planning, education and extension, laws and regulations, information dissemination, and infrastructure as important components of rural crisis management.	Although it also uses an expert-oriented perspective, the focus is on crisis-management components rather than an integrated rural resilience framework. The present study extends the analytical scope by connecting institutional and managerial capacities with social capital, adaptive capacity, and resilience-related capacities, and by systematically refining and prioritizing indicators through a three-round Delphi process.
Riahi & Rostamian, "Assessing the Awareness of Rural Women about the Components of Natural Disaster Crisis Management (Case Study: Damghan City)"	2022	Assessed rural women's awareness of disaster-management components across the pre-disaster, response, and post-disaster stages and identified differences among rural districts.	Focuses on awareness among a specific population group rural women and across disaster-management stages. The present study takes a broader community-level perspective and seeks to identify and prioritize the interconnected institutional, social, adaptive, and resilience capacities underlying rural resilience.

The review of previous studies indicates that the existing literature has generated valuable knowledge about individual aspects of disaster vulnerability, preparedness, response capacity, institutional management, social networks, livelihood conditions, and rural resilience. However, the present review also shows that these dimensions have frequently been examined within separate analytical frameworks or with a focus on particular hazards, population groups, spatial conditions, or organizational capacities. The research gap addressed in the present study is therefore not the absence of studies on local governance, social capital, or rural resilience, but the limited systematic integration and prioritization of these related capacities within a common rural resilience framework.

This study addresses this gap through a three-round Delphi process involving experts with relevant academic, institutional, managerial, and professional experience. Rather than testing causal relationships among local governance, social capital, and rural resilience, the study identifies, refines, validates, and prioritizes the dimensions and indicators considered important by the expert panel. Its principal contribution therefore lies in developing a prioritized and context-sensitive configuration of capacities that integrates local governance, social capital, and resilience-related components.

This approach distinguishes the present study from previous research in three principal respects. First, it brings together managerial and institutional capacities, social capacities, and resilience-related capacities within a single analytical framework. Second, it focuses on the systematic identification and refinement of indicators rather than examining only a predefined set of variables or a single aspect of disaster vulnerability. Third, it uses a multi-round expert-consensus process to determine the relative importance and priority of the identified capacities. The resulting framework should consequently be interpreted as an exploratory and expert-informed representation of the capacities considered relevant to rural resilience, rather than as a statistically validated causal model.

Within this framework, the study identifies institutional capacity, preparedness and preventive planning, coordination among local institutions, social trust, local participation, social cohesion and cooperation, social support networks, preparedness and adaptability, social and institutional capacity, and recovery-related capacities as interconnected components of the broader capacity configuration associated with rural resilience. By organizing and prioritizing these capacities within the context of Ahar Village, the study provides a context-sensitive basis for understanding which managerial, institutional, and social capacities may warrant particular attention in efforts to strengthen rural resilience to natural hazards. Future field-based research can build on this framework to empirically examine the relationships among these capacities and their actual effects on resilience outcomes.

3. Research Methodology

3.1 Geographical Scope of the Research

Ahar Village is located in Rudbar-e Qasran Rural District, Rudbar-e Qasran District, Shemiranat County, Tehran Province, Iran. The village is situated at approximately 35°56′10″ N and 51°27′40″ E and lies within the mountainous landscape of the central Alborz range. According to the 2016 national census, Ahar had a population of 583 inhabitants. The village is located approximately 23 km northwest of Gholamduak (Golabdak) and occupies a strategically distinctive position at the intersection of two mountain valleys. One valley extends toward Dehtangeh and the Zargeh Pass, while the other extends toward the agricultural and orchard areas of Shokrab, the Shokrab waterfall and river system, Mount Tochal, and the boundary of Shemshak and Shahrestanak areas. This geomorphological setting has strongly influenced the spatial organization, accessibility, natural-resource base, and livelihood structure of the village.

The physical environment of Ahar is characterized by mountainous slopes, narrow valleys, perennial or seasonal watercourses, agricultural lands, and extensive orchards. The presence of rivers and surface-water resources has contributed to the ecological productivity of the surrounding landscape and has historically supported agricultural and horticultural activities. The village is particularly known for its orchards, where cherries, sour cherries, pears, and apples are among the principal cultivated crops. Accordingly, horticulture constitutes an important component of the local livelihood system and contributes to the economic and spatial identity of the settlement. The combination of mountain topography, water resources, agricultural land, and orchard systems also makes the village environmentally distinctive within the rural settlements of the Rudbar-e Qasran region.

From a demographic perspective, Ahar represents a relatively small rural community. Census data indicate changes in its population over time, with 702 inhabitants recorded in the 2006 census and 583 inhabitants in 2016. These figures should be interpreted within the context of a mountainous rural settlement that is also exposed to seasonal fluctuations in population and activity. The relatively small permanent population is particularly relevant to the analysis of rural resilience because the scale of the community may influence the organization of social networks, access to local services, participation in collective

action, and the capacity of local institutions to mobilize resources during emergencies.

Ahar also possesses a distinctive cultural and historical identity. Local residents speak the Tajrishi dialect, which is associated with the Persian–Mazanderani linguistic continuum. Historical and archaeological remains in and around the village further indicate the long-standing settlement history of the area. Among the notable historical features is the Qalʿeh Dokhtar (Dokhtar Fortress/Fire Temple) complex, which is associated with the Sasanian period and subsequent historical periods. The Shokrab area also contains historical and religious sites, contributing to the cultural landscape and local identity of the settlement. These cultural characteristics are relevant to the present study because community identity, local attachment, and historically established social relations can constitute important contextual conditions for collective action and the mobilization of social capital in rural communities.

The environmental characteristics of Ahar are also important from a disaster-risk perspective. The village is embedded within a mountainous terrain and is intersected by river channels and valley systems. Consequently, its physical setting creates exposure to a range of natural-hazard processes, particularly hydro-meteorological and slope-related hazards. The presence of watercourses and settlement and agricultural activities within a confined mountainous environment makes the management of flood-related processes and river corridors an important local concern, while steep slopes and mountainous access routes can increase exposure to rockfall and other slope-related hazards. Evidence of such exposure is also reflected in documented rockfall incidents in the Ahar area, including a reported rockfall accident in the mountainous area of Ahar in 2023. These characteristics indicate that the village should not be viewed merely as a geographically bounded settlement, but as a rural socio-environmental system in which livelihoods, infrastructure, natural resources, and settlement patterns are closely interconnected with the surrounding hazard environment.

The village also has an identifiable local institutional structure. As a rural settlement within the administrative system of Rudbar-e Qasran, Ahar is governed at the local level through the village council and the rural municipality (Dehyari), which operate within the broader administrative and governmental structure of Shemiranat County and Rudbar-e Qasran District. Available local administrative information indicates that the village council and Dehyari are involved in addressing issues related to infrastructure maintenance, road and access management, public services, environmental concerns, and the regulation of development within the village. Recent local administrative inspections have, for example, addressed issues including unauthorized construction within the rural boundary, improvement of village access routes, and unsafe excavation in the settlement area. These observations demonstrate that local governance in Ahar operates within a complex environment involving infrastructure management, land-use regulation, environmental pressures, and disaster-related safety concerns.

At the same time, the institutional context of Ahar extends beyond the village-level council and Dehyari. Local governance and disaster management are embedded within the administrative hierarchy of Rudbar-e Qasran District and Shemiranat County, while emergency response and disaster-risk management also involve relevant governmental and emergency-management organizations. The interaction between village-level institutions and higher-level administrative and emergency structures is therefore an important contextual feature when considering the capacity of the community to prepare for, respond to, and recover from natural hazards. In this respect, local governance should be understood not simply as an internal village institution, but as part of a multilevel institutional system through which resources, information, coordination, and external support can be mobilized.

Taken together, the geographical, demographic, socioeconomic, environmental, cultural, and institutional characteristics of Ahar provide a specific context for examining rural resilience to natural hazards. The village combines a relatively small permanent population, a livelihood system strongly associated with horticulture and natural resources, a mountainous and river-influenced physical environment, a distinctive historical and cultural identity, and an institutional structure involving village-level governance within a broader administrative system. These characteristics make Ahar a relevant case for investigating how local

governance, social capital, and rural resilience may be conceptually related and prioritized by experts. Importantly, the present study does not interpret the characteristics described in this section as direct measurements of residents' perceptions or as evidence of causal relationships among local governance, social capital, and resilience. Rather, they provide the geographical, socioeconomic, environmental, and institutional context within which the three-round Delphi process was conducted and the identified dimensions and indicators were interpreted.

3.2. Methodology

The present study is applied in terms of its purpose and adopts a mixed-methods approach with a sequential exploratory design. The research process was conducted in two qualitative and quantitative phases. In the first phase, qualitative content analysis was used to identify and extract the dimensions of local governance, social capital, and the components of rural resilience to natural hazards. Data for this phase were collected through semi-structured interviews and an open-ended questionnaire administered to experts. In the second phase, the findings obtained from the qualitative analysis served as the basis for developing a closed-ended Delphi questionnaire. The identified dimensions and indicators were subsequently evaluated, validated, and prioritized by experts through three rounds of the Delphi process. In the Delphi questionnaire, the importance of the identified dimensions and indicators was assessed using a five-point Likert scale. Finally, the quantitative data were analyzed using the mean, standard deviation, and Kendall's coefficient of concordance to determine the relative importance and priority of the dimensions and indicators and the degree of agreement among the experts. Thus, the findings from the qualitative phase provided the basis for the quantitative phase, while the Delphi results were used for the final validation and prioritization of the dimensions of local governance, social capital, and rural resilience.

a. Study Population and Sampling Method- The study population for the Delphi process consisted of experts in disaster management, geography and rural planning, local governance, social capital, and rural settlement resilience. The expert panel included faculty members and researchers in relevant fields, specialists from executive agencies involved in disaster management and rural development, local managers, and professionals specializing in disaster management and rural resilience. Purposive sampling was employed to select experts based on their relevant academic knowledge and professional experience, research or executive experience related to rural communities and natural hazard management, familiarity with local governance, social capital, and rural resilience, and their ability to provide informed judgments and participate effectively throughout the Delphi process.

The institutional context of the case study was also considered in interpreting the Delphi findings. At the village level, Ahar is administered through its Village Islamic Council and Dehyari (rural municipality), which constitute the principal local governance structures responsible for representing local interests and supporting the management of village affairs, public services, infrastructure, development, and local administrative issues. The Village Islamic Council consists of six elected members, while the Dehyari operates as the executive administrative body at the village level within the broader administrative structure of Rudbar-e Qasran District and Shemiranat County. These local institutions were not treated as a separate survey population and were not assumed to represent the perceptions of village residents. Rather, their role was considered as part of the institutional and governance context within which local capacities for disaster preparedness, coordination, response, and recovery are organized. Selection for the Delphi panel was based on relevant expertise and professional experience rather than residence in the study village. This approach was adopted because the purpose of the Delphi process was to obtain informed expert judgments on the dimensions and indicators of rural resilience, rather than to survey the perceptions or experiences of village residents. Accordingly, the presence of the Village Islamic Council and Dehyari in the study context should not be interpreted as evidence that the study directly measured residents' perceptions or the actual performance of these institutions.

In total, 24 experts participated in all three Delphi rounds. Their continued participation across the successive rounds enabled the reassessment of initial judgments in light of group feedback and facilitated the convergence of expert opinions toward an appropriate level of consensus regarding the identified dimensions and indicators. The panel

therefore represented a range of academic, institutional, managerial, and professional perspectives relevant to local governance, social capital, disaster management, and rural resilience. The Delphi findings were subsequently interpreted in light of the geographical, socioeconomic, environmental, and institutional characteristics of Ahar described in Section 2.4 (Table 2).

Table 2. Demographic Characteristics of the Expert Panel

No.	Variable	Category	Frequency	Percentage
1	Gender	Male	18	75.0
		Female	6	25.0
2	Age	30–40 years	5	20.8
		40–50 years	9	37.5
		50–60 years	8	33.3
		Over 60 years	2	8.3
3	Educational attainment	Master's degree	8	33.3
		PhD	16	66.7
4	Professional experience	10–15 years	6	25.0
		16–20 years	9	38.9
		More than 21 years	9	37.5
5	Organizational affiliation	Universities and academic research centers	10	41.7
		Executive agencies related to disaster management and rural development	9	37.5
		Local managers and specialists in disaster management and resilience	5	20.8

b. Data Collection Instruments- Two main instruments were used for data collection: semi-structured interviews and a Delphi questionnaire. In the first phase, semi-structured interviews and an open-ended questionnaire were administered to experts to identify the dimensions of local governance, social capital, and the components of rural resilience to natural hazards. The questions focused on issues such as institutional and managerial capacities, preparedness and preventive planning, coordination among local institutions, social trust, local participation, social cohesion and cooperation, support networks, preparedness and adaptation of the local community, social and institutional capacity, and the capacity to recover and maintain village activities following a disaster.

Based on the findings of the qualitative phase, a closed-ended Delphi questionnaire was developed. In this questionnaire, experts assessed the importance of the identified dimensions and indicators using a five-point Likert scale ranging from “Very Low = 1” to “Very High = 5.” The Delphi process was conducted in three rounds. In the first round, the closed-ended questionnaire was distributed to the experts, who evaluated the importance of the identified dimensions and indicators. In the second round, the results of the previous round were provided to the experts, who reconsidered their assessments in light of the feedback received. In the third round, the results of the second round were presented, and the experts' final assessments of the importance and priority of the dimensions and indicators were obtained. At the end of the process, the level of agreement among the experts and the final priorities of the study dimensions and indicators were determined. Accordingly, the findings from the qualitative phase formed the basis for developing the quantitative instrument, and the data obtained from the three Delphi rounds were used for the final validation and prioritization of the findings.

c. Data Analysis- Data analysis was conducted in two qualitative and quantitative components in accordance with the sequential exploratory mixed-methods design. In the qualitative component, the transcripts of the semi-structured interviews were analyzed using qualitative content analysis following transcription and repeated review. First, initial concepts and codes were extracted from the data. The similar codes were then organized into related categories based on conceptual similarity. Finally, the resulting categories were classified into the principal dimensions of local governance, social capital, and rural resilience. Information obtained from the open-ended questionnaire was also incorporated into the process of identifying and

refining the initial dimensions and indicators. Following the review and refinement of the preliminary framework, the identified dimensions and indicators were prepared for inclusion in the Delphi phase.

In the quantitative component, the data obtained from the closed-ended Delphi questionnaires were analyzed using the mean and standard deviation. The importance and priority of the dimensions and indicators were determined based on their mean scores. In addition, Kendall's coefficient of concordance (W) was used to assess the degree of agreement and consistency among the experts' judgments. Kendall's coefficient of concordance measures the degree of agreement among the rankings provided by multiple experts and ranges from zero to one, with higher values indicating greater agreement among the experts. In the present study, a Kendall's W value greater than 0.70 was considered the criterion for achieving an acceptable level of consensus among the experts. The formula for calculating Kendall's coefficient of concordance is presented below:

$$W = \frac{12S}{m^2 (n^3 - n)}$$

where:

W = Kendall's coefficient of concordance;

S = sum of squared deviations of the rank sums;

m = number of experts;

n = number of indicators.

d. Validity and Reliability of the Qualitative and Quantitative Findings- To enhance the credibility and trustworthiness of the qualitative data, the processes of data collection and analysis were conducted systematically and sequentially. Following the transcription and repeated examination of the semi-structured interviews, initial concepts and codes were extracted, and similar codes were organized into related categories based on conceptual similarity. The preliminary coding and categorization of concepts were subsequently reviewed, and the information obtained from the qualitative content analysis and the open-ended questionnaire was used to develop the initial framework of the study dimensions and indicators. Accordingly, the framework derived from the qualitative phase was reviewed and refined before serving as the basis for designing the closed-ended Delphi questionnaire.

In the quantitative component, the identified dimensions and indicators were validated and prioritized using the Delphi technique over three rounds. In each round, the questionnaire was administered to the experts, who assessed the importance of the dimensions and indicators using a five-point Likert scale. The results of each round were used for review and reassessment in the subsequent round in order to examine the convergence of expert judgments regarding the study dimensions and indicators. For the analysis of the quantitative data, the mean and standard deviation were calculated to determine the importance and priority of the dimensions and indicators, while Kendall's coefficient of concordance was used to assess the degree of agreement and consistency among the experts' judgments. In the present study, a Kendall's W value greater than 0.70 was considered the criterion for achieving an acceptable level of consensus among the experts. On this basis, the continuation or termination of the Delphi process was determined.

4. Findings

4.1. Results of the First Delphi Round: Identification and Extraction of Indicators

In the first phase of the study, qualitative data were collected from 24 experts through semi-structured interviews and open-ended questionnaires to identify the dimensions and indicators associated with local governance, social capital, and rural resilience to natural hazards. The participating experts were selected purposively from among specialists and scholars in disaster management, geography and rural planning, local governance, social capital, and rural settlement resilience.

At this stage, the experts were asked to identify and describe the most important capacities, mechanisms, and components associated with local governance, social capital, and rural resilience to natural hazards. Following data collection, the interview transcripts and open-ended responses were read and reviewed several times, and initial concepts relevant to the research topic were extracted. Subsequently, the initial codes were organized into subcategories based on conceptual similarity, and the resulting categories were ultimately classified into the three principal dimensions of the study: local governance, social capital, and rural resilience.

The results of the qualitative content analysis indicated that local governance constitutes a

fundamental dimension of the capacity of rural settlements to confront natural hazards. This dimension emphasizes the managerial and institutional capacities available at the local level for prevention, preparedness, coordination, response, and post-disaster management. The identified components included institutional capacity; preparedness and preventive planning; coordination among local institutions; planning and organization of local resources; local decision-making and rapid response capacity; access to and management of resources during crises; training and enhancement of local managers' preparedness; local communication and information dissemination during crises; and the participation of local institutions in disaster management. Overall, nine indicators were extracted to operationalize the local governance dimension.

The second dimension was social capital. The qualitative findings indicated that social relationships, mutual trust, participation, cohesion, and the capacity for cooperation among residents and local institutions constitute important elements of a village's social capacity to confront natural hazards. Accordingly, social trust, local participation, social cohesion and cooperation, local support networks, social relationships and ties, sense of belonging and collective responsibility, information and experience exchange among residents, and mutual support during crises were identified as the principal indicators of this dimension. In total, eight indicators were extracted to assess social capital.

The third identified dimension was rural resilience, referring to the capacity of rural communities to prepare for, confront, adapt to, recover from, and maintain their functioning in the face of the consequences of natural hazards. According to the experts' perspectives, local community preparedness and adaptation, social and institutional capacity, the capacity to recover and maintain village activities following a disaster, the ability to cope with hazard impacts, flexibility and adaptation to new conditions, the capacity to reconstruct and restore local resources, and the continuity of essential village services and functions constituted the principal components of this dimension. Overall, seven indicators were extracted to operationalize rural resilience.

The third identified dimension was rural resilience, referring to the capacity of rural communities to prepare for, confront, adapt to, recover from, and maintain their functioning in the face of the consequences of natural hazards. According to the experts' perspectives, local community preparedness and adaptation, social and institutional capacity, the capacity to recover and maintain village activities following a disaster, the ability to cope with hazard impacts, flexibility and adaptation to new conditions, the capacity to reconstruct and restore local resources, and the continuity of essential village services and functions constituted the principal components of this dimension. Overall, seven indicators were extracted to operationalize rural resilience. These findings also suggest that the relevance and effectiveness of such capacities should be understood in relation to the conditions under which rural communities encounter and respond to natural hazards, rather than as uniformly applicable capacities across all contexts.

Accordingly, the first phase of the study resulted in the identification of three principal dimensions and 24 indicators: nine indicators for local governance, eight for social capital, and seven for rural resilience. These indicators formed the basis for designing the closed-ended questionnaire for the second Delphi round, in which their importance was assessed from the experts' perspectives (Table 3).

Table 3. Dimensions and Indicators Identified in the First Phase of the Study

Dimension	Indicators	Number
Local governance	Institutional capacity; preparedness and preventive planning; coordination among local institutions; planning and organization of local resources; local decision-making and rapid response capacity; access to and management of resources during crises; training and enhancement of local managers' preparedness; local communication and information dissemination during crises; participation of local institutions in disaster management	9
Social capital	Social trust; local participation; social cohesion and cooperation; local support networks; social relationships and ties; sense of belonging and collective responsibility; information and experience exchange among residents; mutual support during crises	8
Rural resilience	Local community preparedness and adaptation; social and institutional capacity; capacity to recover and maintain village activities following a disaster; ability to cope with hazard impacts; flexibility and adaptation to new conditions; capacity to reconstruct and restore local resources; continuity of essential village services and functions	7

Overall, the findings of the first phase indicate that, from the experts' perspective, rural resilience to natural hazards is a multidimensional phenomenon conceptually associated with a range of managerial, institutional, social, and functional capacities. Accordingly, local governance, social capital, and rural resilience were identified as the preliminary framework of the study. It should be emphasized that the findings at this stage represent solely the qualitative analysis of experts' perspectives and do not indicate the relative importance, priority, or causal relationships among the dimensions and indicators. The extracted indicators were subsequently evaluated in terms of importance, convergence, and priority during the subsequent Delphi rounds.

4.2. Results of the Second Delphi Round: Assessing the Importance and Screening the Indicators

In the second Delphi round, based on the findings obtained from the qualitative content analysis in the first phase, a closed-ended questionnaire comprising 24 indicators across the three dimensions of local governance, social capital, and rural resilience was developed and administered to the 24 members of the expert panel. The experts assessed the importance of each indicator using a five-point Likert scale ranging from "Very Low" to "Very High."

The purpose of this round was to assess the importance of the extracted indicators, examine the dispersion of expert judgments, and screen the indicators according to predetermined criteria. Accordingly, the mean, standard deviation, and coefficient of variation (CV) were calculated for each indicator. In addition, the internal consistency reliability of the questionnaire was assessed using Cronbach's alpha. The Cronbach's alpha coefficient for the entire questionnaire was 0.89. The corresponding values for the local governance, social capital, and rural resilience dimensions were 0.88, 0.86, and 0.84, respectively. These values indicate satisfactory internal consistency among the items and an acceptable level of measurement reliability.

According to the predetermined criteria, indicators with a mean importance score below 3.50 or a coefficient of variation above 0.30 were to be excluded from the subsequent Delphi process. The results showed that the mean scores of all 24 indicators exceeded the threshold of 3.50, while the coefficient of variation for all indicators was below 0.30. Therefore, none of the indicators was excluded at this stage.

At the level of the principal dimensions, local governance ranked first with a mean score of 4.42, followed by social capital with a mean of 4.31 and rural resilience with a mean of 4.18. Thus, all three dimensions were assessed by the experts as highly important.

Within the local governance dimension, institutional capacity received the highest mean score (4.58) with a standard deviation of 0.42. It was followed by preparedness and preventive planning (mean = 4.52; SD = 0.46) and coordination among local institutions (mean = 4.46; SD = 0.49). These findings indicate that, among managerial capacities, adequate institutional capacity, preventive planning, and coordination among local institutions were perceived as particularly important.

Within the social capital dimension, social trust ranked first, with a mean score of 4.55 and a standard deviation of 0.45. Local participation (mean = 4.43; SD = 0.52) and social cohesion and cooperation (mean = 4.37; SD = 0.55) ranked second and third, respectively. This finding indicates that, from the experts' perspective, trust, participation, and social cooperation constitute the most important social capacities associated with rural communities' ability to confront natural hazards.

Within the rural resilience dimension, local community preparedness and adaptation received the highest importance rating, with a mean score of 4.41 and a standard deviation of 0.53. Social and institutional capacity (mean = 4.32; SD = 0.57) and the capacity to recover and maintain village activities following a disaster (mean = 4.25; SD = 0.61) ranked second and third, respectively (Table 4).

Table 4. Results of the Assessment of Indicator Importance in the Second Delphi Round

Rank	Dimension / Indicator	Mean	Standard Deviation	Coefficient of Variation
	Local governance	4.42	0.49	0.11
1	Institutional capacity	4.58	0.42	0.09
2	Preparedness and preventive planning	4.52	0.46	0.10
3	Coordination among local institutions	4.46	0.49	0.11

Rank	Dimension / Indicator	Mean	Standard Deviation	Coefficient of Variation
4	Planning and organization of local resources	4.39	0.56	0.13
5	Local decision-making and rapid response capacity	4.34	0.59	0.14
6	Access to and management of resources during crises	4.29	0.63	0.15
7	Training and enhancement of local managers' preparedness	4.24	0.65	0.15
8	Local communication and information dissemination during crises	4.20	0.69	0.16
9	Participation of local institutions in disaster management	4.16	0.72	0.17
	Social capital	4.31	0.56	0.15
10	Social trust	4.55	0.45	0.10
11	Local participation	4.43	0.52	0.12
12	Social cohesion and cooperation	4.37	0.55	0.13
13	Local support networks	4.30	0.60	0.14
14	Social relationships and ties	4.26	0.62	0.15
15	Sense of belonging and collective responsibility	4.21	0.66	0.16
16	Information and experience exchange among residents	4.17	0.69	0.17
17	Mutual support during crises	4.14	0.71	0.17
	Rural resilience	4.18	0.61	0.15
18	Local community preparedness and adaptation	4.41	0.53	0.12
19	Social and institutional capacity	4.32	0.57	0.13
20	Capacity to recover and maintain village activities following a disaster	4.25	0.61	0.14
21	Ability to cope with hazard impacts	4.19	0.65	0.16
22	Flexibility and adaptation to new conditions	4.15	0.67	0.16
23	Capacity to reconstruct and restore local resources	4.09	0.72	0.18
24	Continuity of essential village services and functions	4.05	0.78	0.19

As shown in Table 4, all indicators have mean scores above 3.50 and coefficients of variation below 0.30. The lowest coefficient of variation was observed for institutional capacity (0.09), while the highest was recorded for continuity of essential village services and functions (0.19). Therefore, dispersion in the experts' assessments of indicator importance was limited, and all indicators met the acceptance criteria for the second Delphi round. Within the local governance dimension, the three highest-ranked indicators were institutional capacity, preparedness and preventive planning, and coordination among local institutions. Within the social capital dimension, social trust, local participation, and social cohesion and cooperation received the highest mean scores. Within the rural resilience dimension, local community preparedness and adaptation, social and institutional capacity, and the capacity to recover and maintain village activities following a disaster ranked highest (Table 5).

Table 5. Results of Indicator Screening at the End of the Second Delphi Round

Indicator Screening Status	Number
Number of indicators extracted in the first phase	24
Indicators with mean scores above 3.50	24
Indicators with coefficient of variation below 0.30	24
Indicators excluded	0
Indicators advanced to the third Delphi round	24

As shown in Table 5, all 24 indicators identified in the first phase met the acceptance criteria of the second Delphi round. Consequently, no indicators were excluded, and the initial structure of the study was carried forward unchanged to the third Delphi round. Thus, nine local governance indicators, eight social capital indicators, and seven rural resilience

indicators were retained for final evaluation in the third round.

4.3. Results of the Third Delphi Round: Achieving Expert Consensus

In the third Delphi round, the results of the second round, including the mean scores and ranking of the indicators, were provided to the panel members. This enabled the experts to review the group feedback and, if necessary, reconsider their evaluations. The primary objective of this round was to assess the degree of convergence among the experts' views and to achieve final consensus regarding the importance and priority of the research indicators. Since all 24 indicators had met the acceptance criteria in the second round, none of the indicators was eliminated in the third round. To assess the degree of agreement among the experts, Kendall's coefficient of concordance was employed. This coefficient ranges from zero to one, with higher values indicating greater agreement among the evaluators' rankings. In the present study, a value greater than 0.70 was considered an acceptable level of agreement. The results showed that Kendall's coefficient of concordance at the end of the third round was 0.81, indicating a high level of agreement among the experts regarding the ranking of the research indicators (Table 6).

Table 6. Results of Kendall's Coefficient of Concordance Test

Statistical Indicator	Value
Number of experts (N)	24
Number of final indicators (K)	24
Kendall's coefficient of concordance (W)	0.81
Chi-square (χ^2)	447.12
Degrees of freedom (df)	23
Significance level (Sig.)	0.000

The chi-square statistic was 447.12, with 23 degrees of freedom. The significance level of the test was reported as 0.000, which is lower than the 0.05 significance threshold. Therefore, the null hypothesis of no statistically significant agreement among the experts' rankings is rejected, indicating that the observed level of agreement is statistically significant. Furthermore, the value of W = 0.81 exceeds the predetermined acceptable agreement level of 0.70. Accordingly, the panel of 24 experts achieved a high level of consensus in ranking the research indicators. This finding confirms the stability of the framework developed through the qualitative and quantitative stages of the study. Consequently, all 24 indicators were retained in the final research framework, and the Delphi process was concluded without eliminating any indicator.

4.*4. Comparison of Indicator Rankings across the Second and Third Delphi Rounds*

To examine the stability of the results and the extent of changes in the experts' priorities following the provision of statistical feedback, the rankings of the indicators with the highest mean importance scores were compared between the second and third Delphi rounds. As shown in Table 7, the overall structure of priorities remained relatively stable across the two rounds, and the statistical feedback did not result in substantial changes in the ordering of the main indicators. Institutional capacity and social trust remained in the highest positions, while preparedness and preventive planning, inter-institutional coordination, and local participation also remained among the highest-priority indicators (Table 7).

Table 7. Comparison of the Rankings of the Ten Most Important Indicators across the Second and Third Delphi Rounds

No.	Indicator	Rank in Round 2	Rank in Round 3	Change in Rank
1	Institutional capacity	1	1	0
2	Social trust	2	2	0
3	Preparedness and preventive planning	3	3	0
4	Local participation	5	4	+1
5	Coordination among local institutions	4	5	−1
6	Preparedness and adaptability of the local community	7	6	+1

No.	Indicator	Rank in Round 2	Rank in Round 3	Change in Rank
7	Social cohesion and cooperation	6	7	−1
8	Social and institutional capacity	8	8	0
9	Capacity for recovery and continuity of village activities after a disaster	9	9	0
10	Support networks	10	10	0

Note: Of the 24 final indicators, only the ten indicators with the highest mean importance scores in the second Delphi round are reported in this table.

As shown in Table 7, most of the major indicators either maintained their rankings or shifted by only one position. The greatest stability was observed for institutional capacity, social trust, and preparedness and preventive planning, which remained in the first through third positions in both rounds. In the third round, coordination among local institutions moved up from fifth to fourth place, while local participation moved from fourth to fifth place. In addition, preparedness and adaptability of the local community improved by one position, whereas social cohesion and cooperation declined by one position. The remaining indicators among the top ten retained their original positions.

Overall, these limited changes indicate that the provision of statistical feedback did not lead to a substantial reconsideration of the experts' priority structure. Therefore, the results of the second round demonstrated an appropriate level of stability, while the third round primarily contributed to confirming and consolidating expert consensus.

4.5. Analysis of the Importance of the Main Dimensions

Following the stabilization of the indicators through the Delphi process, the relative importance of the three main dimensions of the study local governance, social capital, and rural resilience was compared. The mean importance of each dimension was calculated based on the mean scores of the indicators belonging to that dimension.

The first-place ranking of local governance indicates that, within the study framework and from the experts' perspective, institutional and managerial capacity was considered the most important foundation for effective responses to natural hazards. The second-place ranking of social capital highlights the importance of trust, participation, and social cooperation. Finally, the third-place ranking of rural resilience reflects the importance of community-level outcomes and functional capacities in terms of preparedness, adaptation, and post-disaster recovery. These rankings should not, however, be interpreted as indicating that the relative contribution of these capacities is fixed across all hazard and community contexts. Rather, their practical importance may vary according to the characteristics of the hazard, the organizational and social structure of the community, and the institutional and policy environment in which local capacities are mobilized (Table 8).

Table 8. Mean Importance of the Main Dimensions of the Study

Main Dimension	Number of Indicators	Mean Importance (out of 5)	Final Rank	Most Important Components
Local governance	9	4.42	1	Institutional capacity; preparedness and preventive planning; coordination among local institutions
Social capital	8	4.31	2	Social trust; local participation; social cohesion and cooperation
Rural resilience	7	4.18	3	Preparedness and adaptability of the local community; social and institutional capacity; capacity for recovery and continuity of activities
Total	24	—	—	—

Note: The mean importance of each dimension was calculated based on the mean scores of the indicators associated with that dimension in the third Delphi round.

The results presented in Table 8 show that the differences among the mean scores of the three dimensions are relatively limited, and all three dimensions obtained mean scores above 4.

Accordingly, all three dimensions were considered highly important by the experts, and none can be excluded from the conceptual framework of the study.

The first-place ranking of local governance indicates that the experts considered institutional and managerial capacity to be the most important foundation for effective responses to natural hazards within the study framework. The second-place ranking of social capital highlights the importance of trust, participation, and social cooperation. Finally, the third-place ranking of rural resilience reflects the importance of community-level outcomes and functional capacities in terms of preparedness, adaptation, and post-disaster recovery.

Given the exploratory nature of the study and the use of the Delphi technique, this ranking represents the perceived importance and priority of the indicators from the experts' perspective and, by itself, does not constitute evidence of causal relationships among local governance, social capital, and rural resilience.

4.6. Stability of the Indicator Structure across the Delphi Rounds

One of the important findings of the study is the stability of the number of indicators throughout the three Delphi rounds. As the results demonstrate, none of the 24 indicators identified during the qualitative stage was eliminated in the second round, and all indicators were retained in the third round as well.

In this regard, the complete stability in the number of indicators across the three rounds suggests that the initial framework derived from the qualitative stage possessed an appropriate level of adequacy from the experts' perspective. No indicator was eliminated because of low importance or excessive dispersion in the experts' views. This finding, together with the Kendall's coefficient of concordance of 0.81, indicates that the conceptual structure and indicators identified in the first stage were successfully validated through the quantitative Delphi process.

Accordingly, the final research framework consisted of three dimensions' local governance, social capital, and rural resilience and a total of 24 indicators (Table 9).

Table 9. Distribution of the Research Indicators across the Delphi Rounds

Dimension	Round 1	Round 2 (After Elimination)	Round 3 (Final)
Local governance	9	9	9
Social capital	8	8	8
Rural resilience	7	7	7
Total	24	24	24

4.7. Final Ranking of the Research Indicators and Components

The results presented in Table 10 show that institutional capacity and social trust received the highest importance among the final indicators, followed by indicators related to preparedness and preventive planning, institutional coordination, and local participation. The presence of indicators from all three dimensions among the highest-ranked positions indicates that, from the experts' perspective, rural resilience does not result from attention to a single component; rather, it requires a combination of managerial, social, and resilience-related capacities.

The results presented in Table 4-8 show that all three dimensions of the study are represented among the indicators with the highest importance. The three indicators of institutional capacity, social trust, and preparedness and preventive planning occupy the highest positions. Therefore, from the experts' perspective, a framework for strengthening rural resilience is not limited to a single category of factors but encompasses a combination of managerial, social, and functional capacities.

Furthermore, the simultaneous presence of local governance and social capital indicators among the highest-ranked positions demonstrates the importance of both institutional and social capacities. At the same time, the indicators associated with rural resilience show that these capacities can be manifested at the functional level of the community through preparedness, adaptability, and the capacity to recover and maintain continuity of activities. The relative contribution of these capacities, however, should not be regarded as uniform across all settings. Their

effectiveness may depend on the type and characteristics of the hazard, the size and organizational structure of the community, and the extent to which external institutions and policies provide resources, coordination, and support. These contextual conditions provide an important basis for interpreting the priorities identified through the Delphi process.

However, since these findings are based on expert assessments within the framework of the Delphi technique, the reported ranking should be interpreted as an indication of the perceived importance and priority of the indicators, rather than as empirical evidence establishing causal relationships among local governance, social capital, and rural resilience. Similarly, the present Delphi results do not directly test the moderating effects of hazard type, community size, or external policy conditions; rather, these factors are incorporated into the conceptual interpretation of how the identified capacities may operate across contexts (Table 10).

Table 10. Final Ranking of the Indicators with the Highest Importance

No.	Key Indicator	Mean Importance (out of 5)	Final Rank	Main Dimension
1	Institutional capacity	4.58	1	Local governance
2	Social trust	4.55	2	Social capital
3	Preparedness and preventive planning	4.52	3	Local governance
4	Coordination among local institutions	4.46	4	Local governance
5	Local participation	4.43	5	Social capital
6	Preparedness and adaptability of the local community	4.41	6	Rural resilience
7	Social cohesion and cooperation	4.37	7	Social capital
8	Social and institutional capacity	4.32	8	Rural resilience
9	Capacity for recovery and continuity of village activities after a disaster	4.25	9	Rural resilience
10	Social support networks	4.22	10	Social capital

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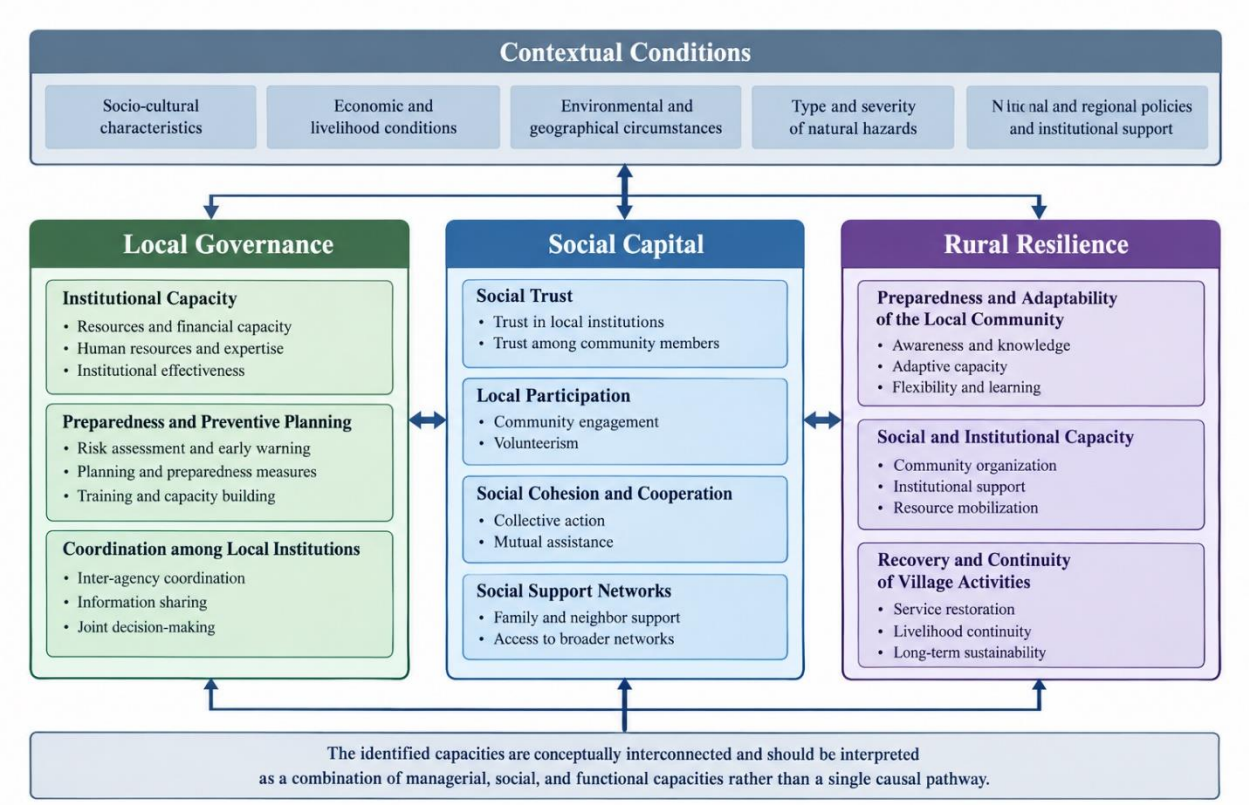

Figure 1. Conceptual Framework Developed from the Delphi Findings: Local Governance, Social Capital, and Rural Resilience in the Context of Natural Hazards

The conceptual framework presented in Figure 1 summarizes the dimensions and indicators identified, refined, and prioritized through the three-round Delphi process. It provides an interpretive representation of the conceptual relationships among local governance, social capital, and rural resilience within the context of the study. The framework is based on expert assessments and the supporting literature and is intended to illustrate the perceived importance and conceptual interconnectedness of the identified dimensions rather than empirically validated causal relationships.

Within this framework, local governance, represented by institutional capacity, preparedness and preventive planning, and coordination among local institutions, received the highest overall priority among the main dimensions according to the experts' assessments. These indicators therefore represent the managerial and institutional capacities considered particularly important by the participating experts for addressing natural hazards and strengthening the conditions associated with rural resilience. This prioritization should be interpreted as reflecting expert judgment regarding relative importance and should not be regarded as empirical evidence of a direct causal effect of local governance on rural resilience.

Alongside local governance, social capital, represented by social trust, local participation, social cohesion and cooperation, and social support networks, was identified as an important set of social capacities. According to the expert assessments and the theoretical literature, these capacities are conceptually relevant to collective action, information exchange, resource mobilization, cooperation, and mutual support under crisis conditions. Within the conceptual framework, social capital is therefore interpreted as being conceptually interconnected with the capacities associated with rural resilience, particularly preparedness, adaptability, and recovery. However, the nature, direction, and magnitude of these relationships were not empirically tested in the present study.

The rural resilience dimension includes capacities related to local community preparedness and adaptability, social and institutional capacity, and

the capacity for recovery and continuity of village activities following a disaster. The framework presents these components as important resilience-related capacities identified through expert consensus. Their placement within the framework should not be interpreted as indicating that they are statistically determined by, or are direct outcomes of, local governance and social capital. Rather, the framework provides a conceptual organization of the capacities that experts considered important within the broader context of rural resilience.

In addition, contextual conditions, including socio-cultural characteristics, economic and livelihood conditions, environmental and geographical circumstances, the type and severity of natural hazards, and national and regional policies and institutional support, may influence how the identified capacities are developed, mobilized, and maintained. These contextual conditions are not modeled as statistically tested moderating variables. Instead, they provide the contextual basis for interpreting how the identified capacities may operate differently across rural communities and hazard settings.

The framework should also be understood as context-dependent and dynamic rather than as a fixed configuration of universally applicable relationships. The relative importance and practical functioning of institutional and social capacities may change as hazard conditions, community needs, available resources, and institutional arrangements evolve. Similarly, preparedness, coordination, cooperation, and recovery capacities may require continuous learning, revision, and adaptation over time. The present Delphi study does not empirically examine these longitudinal processes; however, the framework provides an analytical basis for identifying capacities that may require continuous strengthening and adaptation.

Accordingly, the conceptual framework suggests that, from the perspective of the participating experts, strengthening rural resilience may require coordinated attention to managerial and institutional capacities, social capacities, and the contextual conditions within which these capacities operate. It should be emphasized, however, that the framework reflects expert consensus regarding the relative importance and conceptual interconnectedness of the identified dimensions and does not constitute a statistically validated structural model. The direction, strength, and causal nature of the relationships illustrated in Figure 1 were not tested through statistical techniques such as structural equation modeling, regression analysis, or path analysis. Therefore, the relationships illustrated in Figure 1 should not be interpreted as definitive causal relationships but rather as an exploratory and context-sensitive conceptual representation that can provide a basis for future empirical testing.

5-Discussion and Conclusion

The increasing occurrence of natural hazards and the growing vulnerability of rural settlements have highlighted the importance of managerial, institutional, and social capacities in disaster management and in supporting rural communities in preparing for, responding to, adapting to, and recovering from hazardous events. In this context, local governance and social capital represent important dimensions that may contribute to the organization and mobilization of community capacities. Although previous studies have examined risk, preparedness, vulnerability, response, and resilience from different perspectives, relatively less attention has been given to the systematic identification and prioritization of local governance, social capital, and resilience-related capacities within an integrated rural context. Therefore, the present study employed a mixed-methods approach and a three-round Delphi process to identify, refine, validate, and prioritize the dimensions and indicators that experts considered important for rural resilience to natural hazards in the context of Ahar Village.

The results of the three-round Delphi process indicated that, from the perspective of the expert panel, rural resilience to natural hazards can be conceptualized through three interconnected dimensions: local governance, social capital, and rural resilience. A total of 24 indicators were identified and retained across these dimensions, comprising 9 indicators related to local governance, 8 related to social capital, and 7 related to rural resilience. The Kendall's coefficient of concordance of 0.81, with a statistically significant level of agreement, indicated a high degree of convergence among the experts regarding the importance and priority of the identified indicators. Accordingly, the framework developed through the Delphi process provides a coherent representation of the capacities that the participating experts considered particularly relevant within the scope of the present study.

Based on the expert assessments, local governance, with a mean importance score of 4.42, was ranked as the highest-priority dimension within the framework developed in this study. Institutional capacity, preparedness and preventive planning, and coordination among local institutions received particularly high rankings among the indicators associated with this dimension. These results suggest that, from the experts' perspective, institutional arrangements, advance planning, and coordination mechanisms represent particularly important components for organizing local capacities in the context of natural hazards. Accordingly, the findings highlight the importance of considering disaster management not only in relation to post-disaster response but also in relation to preparedness, planning, institutional coordination, communication, information dissemination, resource organization, and the participation of relevant local institutions. However, these findings should be interpreted as reflecting the perceived importance assigned to these capacities by the expert panel rather than as empirical evidence demonstrating their causal effects on rural resilience.

Social capital was ranked as the second-priority dimension, with a mean importance score of 4.31. Social trust, local participation, and social cohesion and cooperation were identified as the highest-priority indicators within this dimension. From a conceptual perspective, trust among residents and between the local community and local institutions may facilitate cooperation, information exchange, participation in preventive activities, and the acceptance of collective decisions. Similarly, participation, cohesion, and cooperation may support the mobilization of local resources, mutual assistance, and collective responses to the needs of vulnerable groups. Within the framework developed in the present study, social capital is therefore interpreted as an important social capacity that may complement institutional and managerial arrangements. At the same time, these capacities should not be understood as fixed or static resources. Their practical relevance may depend on the ability of social relationships and community networks to learn from previous experiences, exchange information, reorganize patterns of cooperation, and mobilize different forms of support as hazard conditions and community needs change.

Rural resilience was ranked as the third-priority dimension, with a mean importance score of 4.18. Despite its third-place ranking, the relatively high mean score indicates that the experts assigned considerable importance to resilience-related capacities. Within this dimension, preparedness and adaptability of the local community, social and institutional capacity, and the capacity for recovery and continuity of village activities after a disaster received the highest priorities. These findings suggest that, within the expert-derived framework, rural resilience should not be understood solely in terms of post-disaster reconstruction. Rather, it encompasses preparedness before hazardous events, adaptation to changing conditions, the availability and mobilization of social and institutional capacities, and the ability to maintain or restore essential village activities following a disaster.

The emphasis placed on local community preparedness and adaptability also suggests that resilience-related capacities should be interpreted as dynamic rather than static. Maintaining resilience may involve learning from previous hazardous events, revising preparedness and response arrangements, reorganizing available resources, and adapting institutional and social arrangements to changing conditions. Nevertheless, the present study did not empirically measure these processes over time. Therefore, the dynamic interpretation of resilience presented here should be understood as a conceptual interpretation of the capacities identified through the Delphi process rather than as a longitudinal empirical finding.

The final Delphi ranking showed that institutional capacity, social trust, and preparedness and preventive planning received the highest priorities among the identified indicators. These were followed by coordination among local institutions, local participation, preparedness and adaptability of the local community, social cohesion and cooperation, social and institutional capacity, and the capacity for recovery and continuity of village activities after a disaster. The presence of indicators associated with all three dimensions among the highest-ranked positions suggests that, according to the expert panel, the consideration of rural resilience involves a combination of institutional, managerial, social, and functional capacities. Importantly, these rankings represent the perceived importance and priority of the indicators according to the participating experts and should not be interpreted

as evidence of the relative causal effects of these indicators on rural resilience.

The findings of the present study can be conceptually compared with previous domestic and international research. In domestic studies, the emphasis placed by Hajjarian (2024), Riahi and Rostamian (2022), Falsoleiman et al. (2025), and Jamini & Shabani Hosainabadi, (2025) on planning, education, information dissemination, preparedness, spatial conditions, and disaster-management capacities is broadly consistent with several of the capacities identified and prioritized in the present study. Similarly, international studies, including those of Li et al. (2024), Marchetti et al. (2025), Liu et al. (2025), and Xiong et al. (2026) have drawn attention to local cooperation, social networks, self-reliance, household preparedness, environmental conditions, livelihood vulnerability, and access to resources. The present study likewise identified local participation, institutional coordination, social trust, social cohesion and cooperation, support networks, and social and institutional capacity as important elements within the expert-derived framework. However, unlike studies designed to empirically examine relationships among observed variables, the present research focused primarily on identifying and prioritizing relevant dimensions and indicators through expert consensus.

The principal contribution of the present study lies in the development of an integrated, context-sensitive framework based on the systematic identification and prioritization of capacities through a mixed-methods approach and a three-round Delphi process. The identification of 24 indicators across the three dimensions provides an organized representation of the institutional, managerial, social, and resilience-related capacities considered important by the participating experts within the context of the study. From a theoretical perspective, the study brings local governance, social capital, and rural resilience-related capacities together within a single conceptual framework. Institutional capacity, preparedness and preventive planning, and coordination among local institutions were identified as prominent components of local governance. Social trust, local participation, social cohesion and cooperation, and support networks represented important components of social capital. Preparedness and adaptability of the local community, social and institutional capacity, and the capacity for recovery and continuity of village activities represented the principal resilience-related capacities identified by the expert panel.

These dimensions should not, however, be interpreted as forming a statistically validated causal model. The Delphi process used in this study was designed to obtain, refine, and prioritize informed expert judgments rather than to test causal relationships among variables. Consequently, the conceptual connections among local governance, social capital, and rural resilience presented in the study reflect their conceptual interconnectedness and the priorities identified through expert consensus. They do not constitute empirical evidence demonstrating that one dimension directly causes, predicts, mediates, or determines another.

Furthermore, the identified priorities should not be assumed to apply uniformly across all rural communities or hazard contexts. The practical relevance of particular capacities may vary according to the characteristics and severity of natural hazards, geographical and environmental conditions, community size and organizational structure, socioeconomic and livelihood conditions, and the broader institutional and policy environment. The effectiveness of local governance and social capital may also depend on the capacity of communities and institutions to learn from experience, revise plans and coordination mechanisms, reorganize resources, exchange information, and adapt collective arrangements as risks and community needs evolve. In this sense, flexibility, learning, and adaptation can be regarded as important cross-cutting characteristics for interpreting the capacities identified in the present framework. It should also be emphasized that the present study does not directly measure the actual performance of local institutions, the perceptions and experiences of all village residents, or the longitudinal evolution of community capacities. Nor does it employ statistical methods such as structural equation modeling, regression analysis, or path analysis to test causal relationships among local governance, social capital, and rural resilience. Therefore, the framework should be regarded as an expert-based, conceptual, and interpretive framework rather than as a statistically validated causal model.

Future research can build upon the findings of the present study by collecting field-based data from rural residents, members of local councils, Dehyari

officials, and other relevant local stakeholders. Such research could examine the extent to which the capacities identified through the Delphi process are present and operational within rural communities. In addition, longitudinal studies could investigate how these capacities change in response to repeated hazards and changing environmental and socioeconomic conditions. The proposed conceptual connections could also be empirically examined using appropriate quantitative approaches, including structural equation modeling, regression analysis, or path analysis, where suitable data and research designs are available. Overall, the framework developed in this study provides a basis for understanding rural resilience as a context-dependent, multidimensional, and evolving process. Its primary value lies in identifying and prioritizing a set of institutional, managerial, social, and resilience-related capacities through expert consensus. Accordingly, the findings should be used as a basis for conceptual interpretation, context-sensitive planning, and future empirical investigation rather than as definitive evidence of universal or causal relationships among local governance, social capital, and rural resilience.

Recommendations

1. Strengthening institutional capacity and the managerial capabilities of local institutions: Given that "institutional capacity" achieved the highest rank among the indicators examined in the study, strengthening the operational capacity of the village administration, the Village Islamic Council, and other local institutions should be prioritized. Training local managers, clearly defining responsibilities, providing adequate resources, and enhancing decision-making capacity under crisis conditions can contribute to more effective disaster management. Furthermore, establishing a clear structure for organizing resources and preventive actions can improve the effectiveness of disaster management at the village level.
2. Developing a comprehensive disaster preparedness and prevention plan: Given the high ranking of "preparedness and preventive planning," a comprehensive plan should be developed for hazard identification, the identification of vulnerable areas, evacuation routes, safe locations, information dissemination procedures, and emergency response mechanisms. This plan should be prepared with the participation of local institutions and residents and should be periodically reviewed and practiced so that preparedness can be translated from the planning level into practical action. Simultaneous consideration of different hazard scenarios and the needs of vulnerable groups is also essential.
3. Strengthening social trust and local community participation: Given that "social trust" was the second-highest-ranked indicator, establishing transparent and continuous communication between local institutions and residents should be prioritized. Involving residents in hazard identification, preventive planning, decision-making, and the implementation of disaster management measures can enhance mutual trust and a sense of collective responsibility. Utilizing the capacities of trusted community members, local groups, and volunteers can also strengthen meaningful community participation in the disaster management process.
4. Establishing a coordination mechanism among local institutions: Given the high ranking of "coordination among local institutions," a specific mechanism for cooperation among the village administration, Village Islamic Council, service-providing agencies, emergency response organizations, and other relevant institutions is essential. Clearly defining the responsibilities of each institution, establishing clear channels for information exchange, and holding coordination meetings before disasters occur can help prevent duplication of efforts and delays in response. Such coordination should be structured in a way that maintains communication between the local community and formal institutions throughout all stages of disaster management.
5. Strengthening social cohesion and local support networks: Given the importance of "social cohesion and cooperation," "local participation," and "support networks" in the findings, the existing capacities embedded in neighborhood relations, kinship networks, and social groups should be organized for disaster management. Identifying households and individuals in need of support and establishing mutual-aid networks can enhance the community's capacity to cope with disasters. In addition to the response phase, these networks can play an effective role in supporting affected individuals, restoring village activities, and maintaining social life after a disaster.

Research Limitations

Despite the contributions of the present study, several limitations should be acknowledged. The

findings were derived from the perspectives of 24 experts using the Delphi method and therefore represent the perceived importance and priority of the indicators from the experts' viewpoints. Consequently, generalizing these findings to other villages or regions requires further investigation. Moreover, given the exploratory nature of the study, the relationships among local management, social capital, and rural resilience have not been established as definitive causal relationships. Future studies are therefore recommended to employ quantitative methods, resident surveys, structural equation modeling, or other empirical approaches to examine the relationships between managerial and social capacities and the components of resilience. Comparative studies across different villages exposed to different types of hazards could also contribute to the validation, refinement, and generalizability of the proposed framework.

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Author Contributions

The authors contributed equally to the development and preparation of this research.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the authorship or publication of this article.

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Original Article

شناسایی و اولویت‌بندی ابعاد حکمروایی محلی و سرمایه اجتماعی و دلالت‌های آن‌ها برای تاب‌آوری روستایی در برابر مخاطرات طبیعی (مطالعه موردی: روستای آهار)

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چکیده مبسوط

۱. مقدمه

افزایش وقوع و شدت مخاطرات طبیعی، سکونتگاه‌های روستایی را با چالش‌های متعدد مواجه کرده است. آسیب‌پذیری این سکونتگاه‌ها علاوه بر ویژگی‌های محیطی و کالبدی، به محدودیت منابع، ظرفیت نهادی، کیفیت برنامه‌ریزی و میزان مشارکت اجتماعی وابسته است. ازاین‌رو، تاب‌آوری روستایی مستلزم تقویت ظرفیت‌های آمادگی، سازگاری، مقابله و بازیابی در کنار توجه به زیرساخت‌های فیزیکی است. حکمروایی محلی از طریق برنامه‌ریزی پیشگیرانه، سازمان‌دهی منابع و هماهنگی نهادی و سرمایه اجتماعی از طریق اعتماد، مشارکت و همکاری، در این زمینه اهمیت دارند. با وجود مطالعات متعدد درباره آسیب‌پذیری و مدیریت مخاطرات، ادغام نظام‌مند این ابعاد و تعیین اولویت مؤلفه‌های آن‌ها کمتر مورد توجه قرار گرفته است. پژوهش حاضر با هدف شناسایی و اولویت‌بندی ابعاد و مؤلفه‌های حکمروایی محلی، سرمایه اجتماعی و تاب‌آوری روستایی در برابر مخاطرات طبیعی، در روستای آهار انجام شده است.

۲. مبانی نظری تحقیق

مبانی نظری پژوهش بر ارتباط مفهومی میان حکمروایی محلی، سرمایه اجتماعی و تاب‌آوری روستایی استوار است. بر اساس نظریه سرمایه اجتماعی پاتنام، اعتماد، شبکه‌های اجتماعی، مشارکت مدنی و هنجارهای همکاری، زمینه‌ساز هماهنگی و اقدام جمعی هستند و می‌توانند تبادل اطلاعات، بسیج منابع و حمایت متقابل را تسهیل کنند. حکمروایی محلی نیز از طریق ظرفیت نهادی و مدیریتی، آمادگی و برنامه‌ریزی پیشگیرانه، هماهنگی سازمانی و مدیریت منابع، زمینه سازمان‌دهی اقدامات مقابله با مخاطرات را فراهم می‌کند. تاب‌آوری روستایی به توانایی جامعه برای آمادگی، مقابله، سازگاری، بازیابی و تداوم فعالیت‌های ضروری اشاره دارد. در این چارچوب، ویژگی‌های اجتماعی و فرهنگی، شرایط اقتصادی و معیشتی، محیط جغرافیایی، نوع و شدت مخاطرات و حمایت‌های نهادی، از شرایط زمینه‌ای مؤثر بر عملکرد این ظرفیت‌ها محسوب می‌شوند.

۳. روش تحقیق

پژوهش حاضر از نظر هدف، کاربردی و از نظر رویکرد، دارای روش آمیخته اکتشافی متوالی است که در دو مرحله کیفی و کمی اجرا شده است. محدوده مکانی پژوهش، روستای آهار در دهستان رودبار قصران، شهرستان شمیرانات، استان تهران است؛ روستایی کوهستانی با جمعیت ۵۸۳ نفر بر اساس سرشماری سال ۱۳۹۵ که شرایط جغرافیایی و محیطی آن، بررسی ظرفیت‌های مرتبط با مدیریت مخاطرات طبیعی را اهمیت می‌بخشد. در مرحله کیفی، داده‌ها از طریق مصاحبه‌های نیمه‌ساختاریافته و پرسش‌نامه‌های باز از خبرگان گردآوری و با استفاده از تحلیل محتوای کیفی بررسی شدند. سپس، مفاهیم و کدهای استخراج‌شده در قالب سه بُعد اصلی و مؤلفه‌های متناظر سازمان‌دهی شدند. در مرحله کمی، تکنیک دلفی در سه دور به کار گرفته شد. جامعه مشارکت‌کنندگان را خبرگان حوزه‌های مدیریت بحران، جغرافیا و برنامه‌ریزی روستایی، حکمروایی محلی، سرمایه اجتماعی و تاب‌آوری سکونتگاه‌های روستایی تشکیل دادند که با روش نمونه‌گیری هدفمند انتخاب شدند. در مجموع، ۲۴ خبره در هر سه دور دلفی مشارکت کردند. اهمیت مؤلفه‌ها با استفاده از مقیاس پنج‌درجه‌ای لیکرت ارزیابی شد و میانگین، انحراف معیار و ضریب توافق کندال برای تحلیل داده‌ها و تعیین اولویت‌ها و میزان توافق خبرگان به کار رفت. همچنین، در دور دوم، پایایی درونی پرسش‌نامه با استفاده از آلفای کرونباخ بررسی شد.

۴. یافته‌های تحقیق

تحلیل محتوای کیفی به شناسایی ۲۴ مؤلفه در سه بُعد شامل حکمروایی محلی با ۹ مؤلفه، سرمایه اجتماعی با ۸ مؤلفه و تاب‌آوری

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روستایی با ۷ مؤلفه انجامید. در دور دوم دلفی، همه مؤلفه‌ها میانگین اهمیت بیشتر از ۳٫۵۰ و ضریب تغییرات کمتر از ۰٫۳۰ داشتند؛ بنابراین، هیچ مؤلفه‌ای حذف نشد. آلفای کرونباخ کل پرسش‌نامه ۰٫۸۹ بود. در رتبه‌بندی ابعاد اصلی، حکمروایی محلی با میانگین ۴٫۴۲، سرمایه اجتماعی با ۴٫۳۱ و تاب‌آوری روستایی با ۴٫۱۸ به‌ترتیب در جایگاه‌های اول تا سوم قرار گرفتند. در بُعد حکمروایی محلی، ظرفیت نهادی (۴٫۵۸)، آمادگی و برنامه‌ریزی پیشگیرانه (۴٫۵۲) و هماهنگی میان نهادهای محلی (۴٫۴۶) بالاترین اولویت را داشتند. در بُعد سرمایه اجتماعی، اعتماد اجتماعی (۴٫۵۵)، مشارکت محلی (۴٫۴۳) و انسجام و همکاری اجتماعی (۴٫۳۷) رتبه‌های نخست را کسب کردند. در بُعد تاب‌آوری روستایی نیز آمادگی و سازگاری جامعه محلی (۴٫۴۱)، ظرفیت اجتماعی و نهادی (۴٫۳۲) و توانایی بازیابی و تداوم فعالیت‌های روستا پس از بحران (۴٫۲۵) در اولویت بودند. در رتبه‌بندی نهایی، ظرفیت نهادی، اعتماد اجتماعی و آمادگی و برنامه‌ریزی پیشگیرانه سه مؤلفه نخست بودند. ضریب توافق کندال در دور سوم ۰٫۸۱ به دست آمد که نشان‌دهنده توافق بالای خبرگان در رتبه‌بندی مؤلفه‌هاست.

۵. بحث و نتیجه‌گیری

نتایج نشان می‌دهد که از دیدگاه خبرگان، تقویت تاب‌آوری روستایی مستلزم توجه هم‌زمان به ظرفیت‌های نهادی و مدیریتی، توانمندی‌های اجتماعی و قابلیت‌های آمادگی، سازگاری و بازیابی است. اولویت بالاتر حکمروایی محلی بر اهمیت ظرفیت نهادی، برنامه‌ریزی پیشگیرانه و هماهنگی سازمانی تأکید دارد؛ درحالی‌که جایگاه سرمایه اجتماعی، نقش اعتماد، مشارکت، انسجام و همکاری را در اقدامات جمعی برجسته می‌کند. این یافته‌ها از نظر مفهومی با مطالعات پیشین درباره اهمیت آمادگی، برنامه‌ریزی، هماهنگی نهادی و شبکه‌های اجتماعی در مدیریت مخاطرات همسو هستند. سهم اصلی پژوهش، ادغام و اولویت‌بندی این ظرفیت‌ها در چارچوبی مشترک و متناسب با زمینه روستای آهار است. بر این اساس، تقویت توان مدیریتی نهادهای محلی، تدوین و بازنگری برنامه‌های پیشگیری و آمادگی، ایجاد سازوکارهای هماهنگی میان نهادهای مسئول، افزایش مشارکت ساکنان و توسعه شبکه‌های حمایت متقابل پیشنهاد می‌شود. بااین‌حال، رتبه‌بندی‌ها بیانگر اهمیت ادراک‌شده مؤلفه‌ها از دیدگاه خبرگان هستند و روابط علّی میان ابعاد را اثبات نمی‌کنند. همچنین، نتایج مستقیماً بیانگر دیدگاه همه ساکنان یا عملکرد واقعی نهادهای محلی نیستند. بنابراین، انجام مطالعات میدانی با مشارکت ساکنان و مدیران محلی، پژوهش‌های تطبیقی و بررسی‌های طولی برای آزمون تجربی روابط مفهومی و ارزیابی قابلیت تعمیم چارچوب پیشنهادی ضروری است.

واژگان کلیدی: حکمروایی محلی، سرمایه اجتماعی، تاب‌آوری روستایی، مخاطرات طبیعی، مدیریت بحران، روستای آهار.

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