

Rethinking Territorial Governance in Mountain Areas: the case Study of the Bibans Massif (Algeria)

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Abstract. This article analyzes the complexity of territorial governance in Algerian mountain areas through a case study of the Bibans massif. It reveals a dynamic of territorial devitalization despite a rich potential, primarily due to a sectoral and centralized management often disconnected from local realities. By mobilizing a combined approach based on the MED/SLA model (Mountain Ecosystem Development/Sustainable Livelihoods Approach) and a multi-level participatory method, this study highlights the persistence of hybrid forms of governance, combining resilient traditional community institutions and local self-organization initiatives. It assesses community resilience dynamics in the face of structural challenges, emphasizing the importance of social capital and vernacular knowledge. The findings advocate for a rethinking of territorial governance, grounded in the recognition and valorization of local capacities for sustainable and inclusive development.

Keywords: Bibans, decentralisation, governance, mountain areas, resilience, participatory approach, sustainable development.

Introduction

Mountain areas are territories that are rich in biodiversity, natural resources, and cultural heritage (both tangible and intangible), yet paradoxically remain among the most marginalized in terms of territorial development. In Algeria, as in many countries of the Southern Mediterranean, these spaces have long been regarded as peripheral in public policies and planning dynamics. The Bibans massif, located in the northeastern part of the country, is an eloquent illustration: despite its agroecological potential and strong territorial identity, it faces progressive devitalization, persistent difficulties in accessing essential services, and governance deemed inefficient.

The history of the Bibans massif has been profoundly shaped by a succession of major shocks: colonization and its land dispossession policies, the war of liberation and its repercussions on social structures, massive rural exodus in the 1970s-1980s, the civil conflict of the 1990s that led to the abandonment of many rural areas, and more recently the effects of climate change and institutional fragmentation. Collectively, these events have disrupted local governance and contributed to the disorganization of community-based natural resource management systems, explaining in part the current structural vulnerability of the massif.

Since the 2000s, Algeria has initiated a series of institutional and territorial reforms, including the promotion of participatory democracy, decentralization, and various local development programs. The aim was to improve the effectiveness of public action and promote the inclusion of marginalized territories. However, despite these efforts, governance

in mountain areas remains largely vertical, compartmentalized, and weakly participatory. Institutional mechanisms struggle to integrate local actors, coordinate across scales of intervention, and promote territorial resilience in response to the multiple vulnerabilities (economic, ecological, social) characterizing these regions.

This situation is not unique to Algeria. While decentralization is often presented as a solution for adapting governance to local specificities, its forms and effectiveness vary widely by context. For example, in the European Alps, decentralization translates into strong autonomy for municipalities and inter-municipal bodies in resource and development management. Conversely, in Latin America, it sometimes aims to recognize indigenous communities' rights to their ancestral lands, with mixed results, often hindered by centralized state structures.

In this context, the present article aims to assess the mechanisms of territorial governance operating in the Bibans massif, with a focus on their capacity to support local resilience dynamics. The adopted approach combines the MED/SLA methodological framework (Mountain Ecosystem Development/Sustainable Livelihoods Approach), focused on sustainable livelihoods in mountain contexts, with a multi-level participatory approach, aimed at capturing interactions among actors, institutions, and resources at various scales. The originality of this contribution lies in articulating these two analytical frameworks to offer a renewed understanding of territorial governance in mountain areas. Through the case study of the Bibans massif, the objective is to identify current levers and obstacles and to outline pathways toward more inclusive, adaptive, and territorially grounded governance.

Territorial Governance: Toward a Plural Reading

Since the 1990s, the notion of territorial governance has emerged as a central analytical framework for understanding collective action dynamics within territories. It refers to a complex mode of coordination among public, private, and associative actors, linking different scales (local, regional, national) in a context of public action reconfiguration (Leloup, Moyart & Pecqueur, 2005). Unlike strictly vertical and hierarchical management, territorial governance relies on negotiation, co-construction, and participation processes. It incorporates the diversity of resources mobilized by local actors—material, institutional, or cognitive—in designing and implementing development policies.

To shed light on the specificities of governance in mountain contexts and the resilience dynamics studied in the Bibans massif, three complementary theoretical approaches appear particularly relevant:

The endogenous approach: This approach emphasizes local resources and community dynamics, highlighting the capacity of territories to generate their own development based on their cultural, historical specificities and know-how. It is essential for rethinking policies in mountain areas, which are often marked by structural marginalization and where autonomy and local innovation can be key levers for sustainable development.

The institutional approach and the governance of commons

Inspired notably by the work of Elinor Ostrom (1990) on Common Pool Resources (CPRs), this approach stresses the importance of formal and informal rules and the communities' ability to collectively manage common resources through adapted institutional arrangements. Ostrom challenged the idea that only the market or the state can effectively manage natural resources, highlighting the capacity of local communities to develop endogenous institutional rules for sustainable management, especially in contexts of strong user interdependence. This approach has universal relevance, as evidenced by various international cases: traditional irrigation systems in the mountains of Nepal rely on strict collective water management (Gautam, 2008; Ostrom et al., 2011), and in the Pyrenees, communal pastures are governed by

customary rules (Galop & Rendu, 2000). These examples illustrate Ostrom's principles: clearly defined rights, internal monitoring, conflict resolution mechanisms, and recognition by external authorities. Applied to the Bibans massif, this lens allows for the analysis of diverse local institutional arrangements (village committees, customary norms, irrigation associations) and their resilience in the face of state centralization pressures or market dynamics. It also highlights the conflicts and cooperation between actors regarding usage rights and control mechanisms, while underlining the challenges of their weak formal recognition in public policies. This approach is especially pertinent in mountain areas where commons (forests, water, pastures) are at the heart of governance issues and where local institutions, even informal, play a crucial role in social and economic regulation.

The network approach

Developed among others by Jessop (1998) and extended in works on innovation territories, this perspective analyzes horizontal interactions between actors and the formation of local coalitions. It reveals the complexity of actor games in territorial governance, involving cooperation, competition, and power asymmetries, and shows how the structure of networks can influence access to resources and collective action capacity.

Beyond these approaches, understanding territorial governance in rural and mountain areas is inseparable from the analysis of three fundamental concepts: decentralization, social capital, and territorial resilience.

Decentralization

Understood as the transfer of competences and resources from the central state to territorial levels, decentralization is a necessary but not sufficient condition for effective governance. As many studies have pointed out, its success largely depends on the capacity of local actors to appropriate the mechanisms, develop suitable territorial engineering, and establish productive links between the different levels of action (top-down and bottom-up approaches).

Social capital

According to Fukuyama (1995), social capital encompasses the norms, networks, and trust relationships that promote cooperation among community members. In mountain territories, often marked by high relational density and proximity-based solidarities, social capital can be a powerful lever for strengthening collective action and participatory governance, provided it does not translate into exclusionary or closed dynamics. This aligns with Robert Chambers' (1983) analysis, for whom the sustainability of rural livelihoods depends on the empowerment of local populations, their ability to "put the last first" in public policies, and their access to productive resources, knowledge, and institutional recognition.

Territorial resilience and active ruralities according to Van der Ploeg

This concept refers to a territory's ability to absorb shocks, adapt to changes (ecological, economic, social), and rebound by relying on its own resources (Chambers, 1983; Van der Ploeg, 2008). In *The New Peasantries* (2008), Jan Douwe van der Ploeg offers a critical view of standardized rural development, emphasizing the capacity of rural communities to generate alternative development paths rooted in local practices and activity diversification. He refers to "active peasantries" to describe actors capable of creating economic and social reproduction strategies in the face of market uncertainties or dominant agricultural policies. Applied to mountain territories, this view offers relevant insights into territorial resilience: it involves not only adapting to constraints but also fostering social innovation, institutional reorganization,

and resource reappropriation. It values hybrid activity forms (pluriactivity, short circuits, solidarity tourism, agroecology), often overlooked by conventional development frameworks, and underscores the contentious dimension of resilience related to power relations, exclusion processes, or institutional dependencies. It calls for changes in governance practices that promote collective learning and support the long-term sustainability of communities and their environment. It calls for a transformation of governance modes to foster collective learning and socio-ecological system sustainability.

This plural theoretical framework allows for an understanding of mountain territorial governance not as a single or prescriptive model but as a complex, situated process shaped by institutional injunctions, local practices, and adaptation logics. It opens the way to an approach combining the analysis of formal and informal institutions, social dynamics (notably through social capital and networks), and the evaluation of resilience capacities in the face of the specific challenges of mountain territories. These dimensions will serve as an analytical grid for interpreting our field results.

Methodology

Justification of Study Areas and Characteristics of Survey Respondents

The selection of the four villages studied in the Bibans massif was based on their representativeness according to several criteria: (i) their geographic location at different altitudes (foothills, intermediate zone, and high slopes), enabling the integration of contrasting agro-ecological contexts; (ii) their degree of accessibility to infrastructure and services (roads, markets, schools), to capture diverse situations of isolation; (iii) their differentiated socio-economic profiles, reflecting communities both heavily oriented toward subsistence agriculture and others more engaged in emigration and monetary transfers. This selection aimed to cover a broad spectrum of living conditions and local dynamics within the massif.

Regarding the respondents, the sample was designed to represent the main categories of actors involved in local governance. The 60 semi-structured interviews included: (i) farmers and livestock breeders (men and women, young and older); (ii) association leaders and members of the *Tadjemâath*; (iii) local elected officials and municipal administrative staff; and (iv) some merchants and diaspora members temporarily returned to the village.

The age range of respondents spanned from 25 to over 70 years, with a gender balance of 60% men and 40% women. This diversity aimed to reduce representation biases and reflect the plurality of voices within local communities.

General Approach and Analytical Framework

The methodological approach adopted in this research is based on in-depth qualitative analysis and an interpretive stance. It aims to capture the rationales and action logics of local, institutional, and community actors in the Bibans massif while accounting for territorial dynamics and governance practices.

The analytical framework of this study draws on a dual complementary approach:

The MED/SLA model (Mountain Ecosystem Development/Sustainable Livelihoods Approach): This framework allows for the assessment of the vulnerability and resilience of mountain communities by analyzing their livelihoods through five types of capital: natural, human, social, financial, and physical. It guided data collection on resources and local adaptation strategies.

To operationalize the Sustainable Livelihoods Approach (SLA)/Moyens d'Existence Durables (MED) framework (natural, human, social, financial, and physical capital), we adopted a **mixed-method, reproducible, and triangulated approach**:

Definition of local indicators per capital: For each capital, we established context-specific indicators (examples):

- *Natural capital:* Access to permanent water sources, quality/extent of local forests, presence of non-timber forest resources.
- *Human capital:* Adult literacy rate, access to healthcare, mobilized professional skills (e.g., local craftsmanship, agricultural techniques).
- *Social capital:* Density of active associations, frequency of traditional cooperation mechanisms (e.g., *twiza*, *Tadjemâath*), qualitatively assessed inter-household trust level.
- *Financial capital:* Access to formal/informal credit, level of migrant remittances, existence of collective savings.
- *Physical capital:* Quality of access roads, coverage of infrastructure (schools, water points, storage facilities), condition of agricultural equipment.

Data sources: Each indicator was documented through: (i) Household surveys/local questionnaires (quantitative/qualitative axis), (ii) Semi-structured interviews and focus groups for validation and deeper insights, (iii) Participatory mapping workshops, and (iv) Official documents (PCD, project reports).

The 60 semi-structured interviews were used to construct and validate the indicator list with key stakeholders, while the household survey (conducted across 4 compared villages) provided quantitative data for items.

Scoring system (1–5) and attribution procedure: Each indicator was rated on an ordinal scale from 1 (very low) to 5 (high/optimal):

- Quantitative scores (e.g., % of households with permanent water access) were converted to 1–5 scores using predefined thresholds (see methodological appendix: conversion table).
- Qualitative data (e.g., trust level, quality of local institutions) were coded by two independent evaluators based on a criteria grid (described in the appendix). In case of disagreement (>1 point), a third reader arbitrated after discussion.
- Indicator scores were averaged to produce a village-level score per capital. These scores inform the pentagon diagrams (Figure 4).

A multi-level participatory approach: Inspired by works on territorial governance (notably Leloup, Jessop, Ostrom), this approach enabled the identification and analysis of interactions between actors and institutions across various scales (village, commune, wilaya, State), highlighting power dynamics, cooperation, and conflict.

Study Area: The Bibans Massif

The Bibans massif, located at the junction of the wilayas of Bordj Bou Arreridj, Béjaïa, Bouira, and M'sila, represents a particularly relevant case for analyzing territorial governance in a mountain context. This territory is characterized by:

- Strong ecological heterogeneity (forests, cultivated slopes, pastoral zones), offering a diversity of natural resources.
- Marked socio-economic diversity (family farming, rural exodus and return migration, emergence of associative initiatives).
- Historical marginalization in terms of infrastructure and public services, underlining development challenges.
- Richness in local forms of social organization (Tadjemâath, village associations), which constitute a potential foundation for governance.

The study focuses on the commune of Ighil Ali.



Figure 1. Study area (Source: Wikipedia and google Earth)

Data Collection Tools and Techniques

Data were collected between 2019 and 2020 through a multi-source, multi-actor system, to triangulate information and grasp the complexity of the field:

Semi-structured interviews (n=60): Sixty interviews were conducted with a diverse range of actors: institutional representatives (local authorities, technical services for agriculture, water, forests, and environment, development program agents), association leaders, farmers, young entrepreneurs, and former members of the Tadjemâath. These interviews captured their perceptions, experiences, and views on territorial issues and governance dynamics.

Focus groups: Four focus groups were organized in different localities of the massif. These sessions fostered co-construction of territorial diagnoses with field actors, enabling collective exploration of issues, resources, and potential solutions envisioned by communities.

Participatory mapping: Participatory workshops mapped resources, vulnerabilities, and local governance circuits using simple visual tools (mental maps, diagrams). This method visualized local representations of the territory and spatial interdependencies.

Document analysis: An in-depth analysis of official documents was conducted, including communal development plans (PCD), national programming documents (PNDA, PDS), and evaluation reports of rural development projects. This complemented field data by providing contextual frameworks and information on public policies.

Data Analysis

The qualitative data collected were processed using a three-level thematic analysis based on the theoretical approaches outlined:

- **Capitalization and interpretation of actor perceptions:** Identifying representations, narratives, and action logics concerning territorial issues, challenges faced, and governance dynamics.
- **Identification and characterization of governance mechanisms:** Detecting formal and informal arrangements, coordination mechanisms, and conflict situations among actors regarding territorial management.
- **Evaluation of resilience capacities:** Focusing on local adaptation strategies in response to shocks and changes (e.g., pluriactivity, community mutual aid, social and institutional innovations).

This overall analysis sought to cross-reference actor rationales with structural constraints (institutional, environmental, political) to derive actionable insights for more inclusive, adaptive, and sustainable territorial governance in the Bibans massif.

Results

Territorial Diagnosis: A High-Potential Massif Undergoing Devitalization

To reflect the territorial evolution of the massif, a historical transect (see Figure 2) was created through a participatory process. It retraces the major social, environmental, and economic disruptions that have shaped the landscape and local usage systems. This transect makes it possible to visualize phases of development, stagnation, or regression and to identify the continuities in community adaptation strategies.

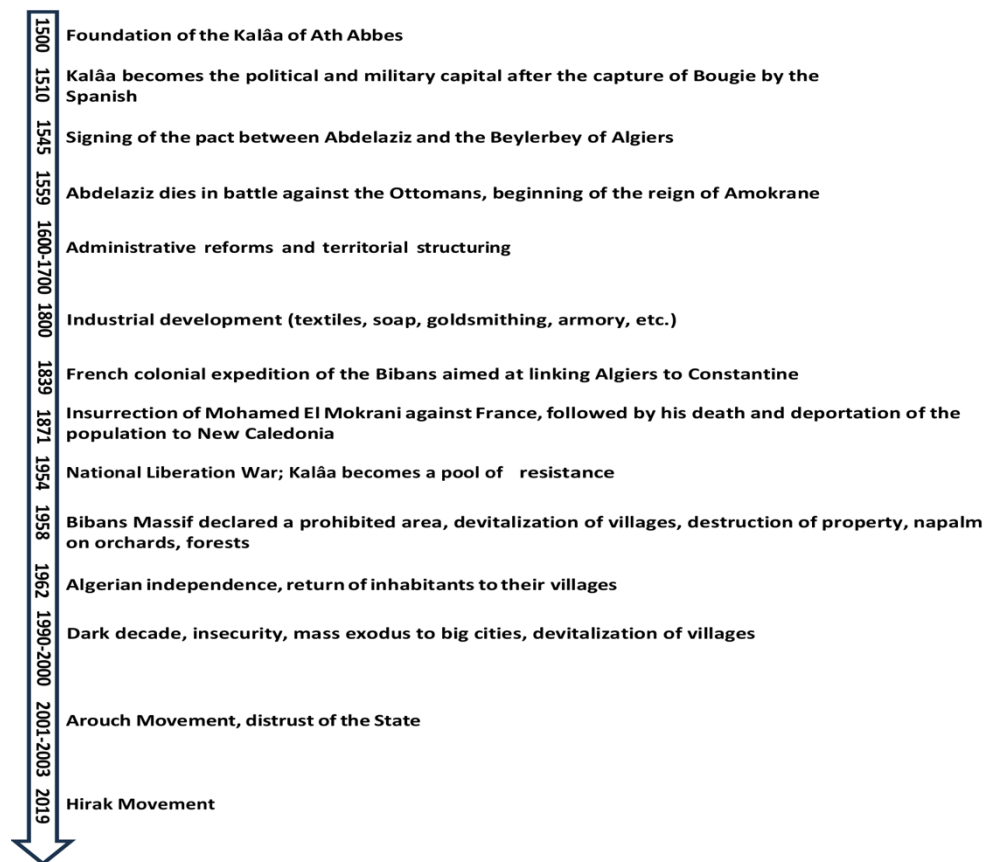


Figure 2. Historical transect for Bibans massif

The Bibans massif displays contrasting physical and human characteristics. While its natural resources (water, forests, agroecological diversity) make it a strategic area, these assets remain largely underutilized due to the lack of coordinated public investment. Moreover, the massif suffers from a critical lack of knowledge about its natural resources. No comprehensive inventory of local biodiversity, flora, fauna, non-timber forest products, has been undertaken. This absence of data not only impedes sustainable resource exploitation but also hinders the ecotouristic valorization of the territory. The weak assessment of ecosystem services contributes to their insufficient integration into local policies, widening the gap between the region's natural potential and current development trajectories.

Findings from interviews and participatory maps reveal:

- Strong spatial fragmentation of services (health, education, transport), with difficult access for high-altitude villages;
- Dysfunctional service management and maintenance. Respondents reported: "*There is a school, but it only partially functions. A single teacher handles several grades,*" while municipal headquarters infrastructure is "*poorly maintained or lacking qualified staff in essential services.*" These observations support the argument that governance issues directly affect service quality and accessibility.
- Constrained mobility, characterized by youth outmigration and dependence on remittance flows;
- Low economic diversification, based on subsistence agriculture with minimal public support;
- Gradual loss of local know-how, especially regarding natural resource management and crafts, due to the marginalization of traditional community bodies.
- Emerging Signs of Dynamism (Potential Elements)

Despite this concerning situation, several weak signals of revitalization are emerging: development of youth-led micro-agricultural projects, associative initiatives for water or waste management, and increasing use of digital tools to promote local products.

Institutional Governance: Fragmentation and Limits of Decentralization

Analysis of institutional mechanisms reveals fragmented territorial governance, often shaped by competing logics among public actors, local communities, and individual initiatives:

- The municipal level is frequently under-equipped in terms of human and technical resources. Local elected officials often find themselves in a conflicted position, caught between top-down mandates and strong community expectations.
- Deconcentrated state services (agriculture, forestry, environment, water) operate according to sectoral logic, rarely coordinated and disconnected from local dynamics.

This fragmented governance is further exacerbated by the absence of consultation platforms at the massif scale. Each concerned wilaya and commune (Bouira, Béjaïa, Bordj Bou Arreridj, M'Sila) acts in isolation, lacking inter-wilaya and inter-municipal coordination mechanisms. The absence of common ecological and territorial planning tools prevents the consideration of transversal issues such as integrated resource management or climate change resilience.

This institutional landscape gives rise to hybrid governance forms, combining informal arrangements, opportunistic participation which refers to the strategy of local actors navigating between systems. Communities or associations may engage with formal institutions only when it is strictly necessary to obtain resources or authorization (e.g., applying for a grant for a local project), while otherwise relying on their own informal networks and rules to get things done. This creates a dual system where formal mechanisms are used instrumentally rather than as a genuine framework for collaboration., and formal mechanisms poorly suited to the mountain

context. Communities are not involved in decision-making regarding their development and lack real influence capacity.

These observations are summarized in the typology below (Figure 3), which categorizes governance forms in the Bibans massif, highlighting areas of overlap, tension, or complementarity.

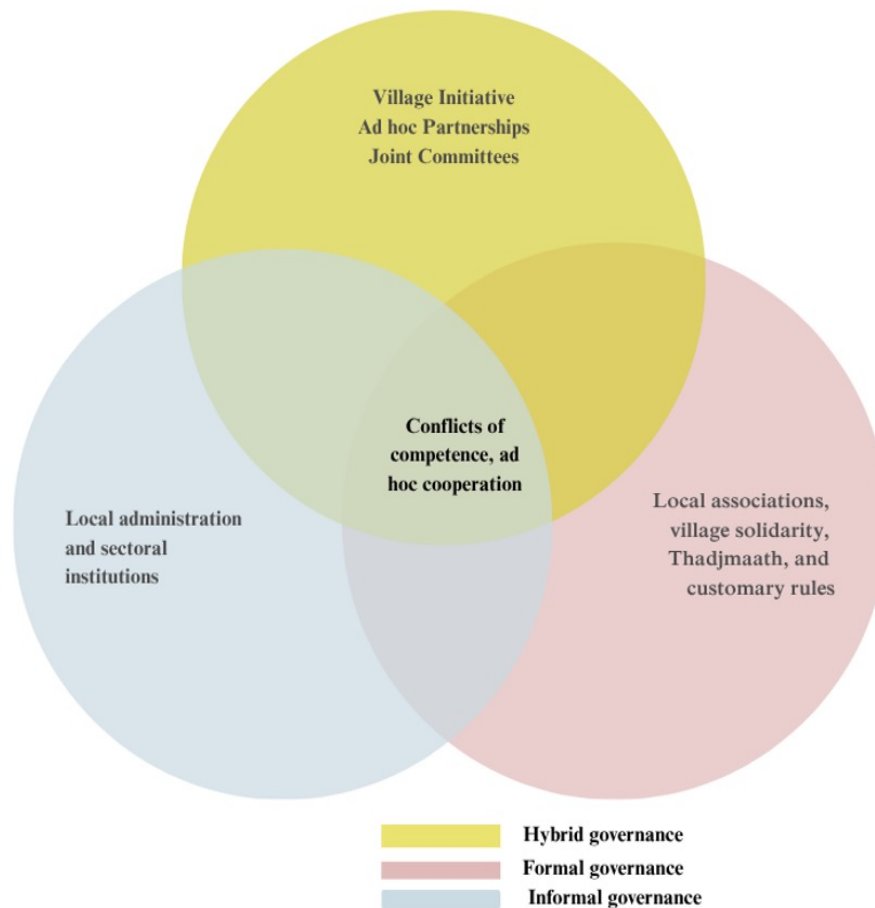


Figure 3. Typologie of forms of governance in the Bibans massif

Contributions from Field Surveys: Perceptions and Local Governance Dynamics

The in-depth analysis of the 60 semi-structured interviews shows that these forms of hybrid governance are complex, multifaceted, and situated along a spectrum between functionality and fragility.

Our findings suggest that such mechanisms are primarily reactive and temporary responses to institutional voids, rather than stable, long-term arrangements. They emerge out of necessity to address immediate failures in public service delivery, such as water access or road maintenance. The community-led construction of a water tower in Tazla illustrates a functional yet precarious solution: while it effectively resolved a pressing water shortage, its sustainability is undermined by dependence on volunteerism, limited technical capacity for maintenance, and the absence of state recognition or financial support.

These arrangements also operate in an inherently conflictual space. On one hand, they embody empowerment and local resilience; on the other, they signal a de facto withdrawal of

the state, fostering frustration among communities that perceive themselves as performing responsibilities that should rightfully fall under public authority. This paradox reveals how effective self-organization can inadvertently entrench institutional neglect, as authorities may come to rely on informal fixes rather than addressing structural deficiencies.

Consequently, while these hybrid mechanisms demonstrate short-term effectiveness and a remarkable capacity for self-organization, they should not be romanticized as a normative model. Their stability remains conditional, vulnerable to leadership fatigue, shifts in community dynamics, or resource scarcity. Their long-term functionality depends on their capacity to transition from purely reactive responses to arrangements that benefit from a measure of formal recognition and institutional support, without losing their community-driven character. This analysis therefore calls for a more contextualized and critical reading of territorial dynamics—one that acknowledges the ingenuity of local responses while also underscoring their structural vulnerabilities and the enduring power asymmetries within which they are embedded.

Resilience of Traditional Community Institutions

Contrary to the hypothesis of their gradual disappearance, field data reveal a symbolic and functional resilience of traditional community institutions such as the Tadjemâath in certain villages. Although their formal institutional structure may have disappeared in many localities, their "spirit" endures. Some respondents note that even in the absence of a formal Tadjemâath, community consultation continues after Friday prayers, at the request of associations or community members. These observations highlight the persistence of strong local social capital, based on local practices and networks.

Emergence of Local Self-Organization Mechanisms and Associative Initiatives

In the face of the institutional shortcomings described above, the surveys highlight the emergence of local self-organization mechanisms and new associative initiatives. These dynamics illustrate the concept of "territorial resilience" and the "active peasantries" described by Van der Ploeg, highlighting the capacity for social innovation in response to institutional failures.

Village associations and committees take charge of actions such as clean-up campaigns or the repair of water supply pipes. The case of the village of Tazla is particularly striking: in the absence of action from municipal or water services, the local association built a water tower, repaired the pump, and connected two water sources, thus ensuring 24-hour access to drinking water. Similarly, local rural development projects (PPDR) were initiated through the Bibans Massif Sustainable Development Association (ADDMB), without initial institutional involvement, and were successfully implemented thanks to interventions at the local, regional, and national levels. These concrete examples demonstrate the ability of communities to mobilize their social capital to directly address local needs outside of formal institutional channels. These self-organization initiatives concretely demonstrate territorial resilience and the capacity of "active peasantries" to generate endogenous development strategies, thus compensating for the failures of public services and institutional neglect.

Demands for Governance Improvement and Disconnection from Planning

However, this self-organization is accompanied by strong expectations toward public authorities. Members of associations call for "*recognition of associations as full partners in local governance, not just as tools used when needed.*" Communities seek direct dialogue, as expressed by a resident of Tiniri: "*Authorities need to turn to us, come see how we live... and listen to us.*" A member of the Belayel community adds, "*We are the ones who know what we need.*"

The federative project proposed by ADDMB 15 years ago, which aimed to develop a strategic site in Bordj Bouni for young entrepreneurs, was "*rejected by authorities at all levels, fearing it would lead to village depopulation.*" These observations confirm that planning mechanisms are often disconnected from village realities. As one elected official noted, the PCDs "*do not take into account high-altitude and remote villages*" and that priorities must be "*revised with the residents themselves.*"

This reinforces the need to rethink territorial governance on a more inclusive basis, one that values local knowledge, vernacular practices, and community initiatives as legitimate resources for development. The strong expectations for participation and recognition of local knowledge reflect a desire for more inclusive and adaptive governance, diverging from top-down and centralized planning approaches.

Resilience Dynamics and Adaptation Logics

Despite structural limitations, the massif's communities deploy adaptation strategies that reflect differentiated territorial resilience. Analysis of interviews and discussion groups reveals three main types of dynamics:

- Community social resilience: the maintenance of mutual aid practices (twiza), village and inter-village solidarity, and mobilization during crises (water shortages, forest fires, commemorative or religious ceremonies).
- Economic resilience through diversification: development of small-scale artisanal activities, transformation of agricultural products, and return of qualified migrants investing in local projects.

To analyze and visualize the livelihood base and resilience capacities of households in the massif, we used the MED/SLA model, one of whose key tools is the capital pentagon. As an illustration, a pentagon (Figure 4) was developed based on a household survey conducted in four contrasting villages of the massif. As formalized by Scoones (1998) in the Sustainable Livelihoods Approach, this pentagon visualizes the relative distribution and community access to five types of capital: natural, human, social, financial, and physical. The length of each axis, measured from the center, indicates the relative availability or mobilization (score from 1: low to 5: high) of the capital in the village concerned, thus providing a synthetic view of the strengths and weaknesses of local livelihoods.

The scores assigned to each type of capital (from 1, low, to 5, high) in the livelihoods pentagon (Figure 4) result from a qualitative aggregation of data from interviews and focus groups. For each village, a consensual assessment was carried out by the researchers based on predefined criteria: for example, the density of associations and the frequency of informal mutual aid for social capital; the condition of roads, schools, and water systems for physical capital. Although qualitative, this method allows for a systematic and revealing comparison of territorial disparities.

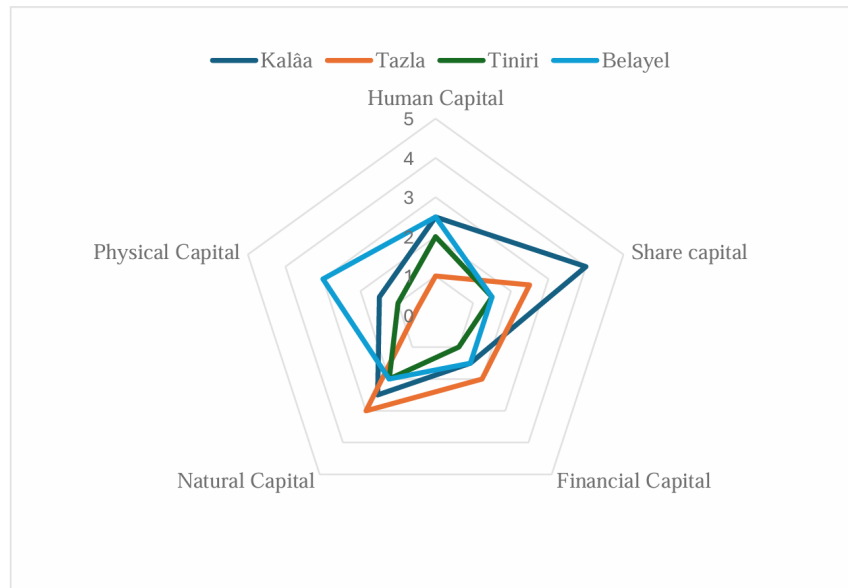


Figure 4. Pentagon of the assets of the four villages

The qualitative nature of our approach and the size of our sample do not allow for a robust statistical analysis of standard deviations. This limitation is offset by the depth of the qualitative data collected, which allows us to understand the contextual reasons behind these scores. Future studies combining qualitative and quantitative methods on a larger sample could refine this analysis.

The results reveal strong inter-village heterogeneity: for example, some villages (Kalâa and Tazla) present dense and mobilizing social capital but limited physical capital, while others have better infrastructure yet suffer from weak community cohesion. These imbalances illustrate that a territory's resilience is far from uniform; it depends on the specific combination and the ability to mobilize these various forms of capital (Chambers, 1983). These differentiations explain the diverse resilience trajectories observed in the field.

- Organizational resilience: the formation of informal collectives around projects (spring management, rural road restoration), and the emergence of local leaders able to mediate between institutions and communities.

However, these dynamics remain fragile. The lack of legal recognition of certain practices, the complexity of inherited land tenure regimes (notably indivisible ownership that prevents land investment), and the absence of legal instruments in emerging sectors such as ecotourism or non-timber forest products hinder their structuring and sustainability, due to a lack of stable institutional support, suitable funding, and formal recognition in planning mechanisms. Nonetheless, they illustrate the potential for renewed governance based on valuing local resources, improved multi-level coordination, and recognition of grassroots organizational forms.

These findings reinforce the relevance of the MED/SLA framework in capturing forms of territorial resilience often invisible in top-down analyses. They also show that changes in territorial governance in mountain areas must rely on the recognition of 'living institutions,' whether formal or informal, and on the empowerment of local capacities for public policy development.

Discussion

Link between governance structures and local dynamics

The results indicate that municipal governance structures play a dual role in the development of local initiatives. In some instances, a lack of coordination and administrative burdens have impeded the progress of community projects, especially in terms of accessing subsidies or gaining official recognition for community activities. On the other hand, in a village where the municipality simplified the registration process for an association and offered minimal logistical support (such as providing a meeting room and referring to a microfinance program), the local initiative was able to thrive and attract additional partners. This comparison underscores that, even in an institutional environment characterized by centralization and limited resources, the attitude of municipal actors significantly influences the success or failure of local projects.

This observation illustrates a central causal mechanism: when municipal structures adopt a blocking posture, communities rely almost exclusively on traditional institutions (such as Tadjemâath and solidarity networks) to compensate for these deficiencies. On the other hand, when municipalities, even in a limited way, collaborate with communities, they strengthen the visibility, legitimacy, and sometimes the sustainability of initiatives. Thus, territorial governance appears as a game of multi-level interactions where local resilience depends not only on community resources but also on the institutional openness of local authorities.

Territorial Devitalization in the Bibans: Beyond Classical Factors

The results of our initial diagnosis of the Bibans massif confirm a dynamic of territorial devitalization. However, our study nuances the conventional explanation of this phenomenon. Unlike other contexts where devitalization is often attributed to the depletion of natural resources or demographic aging (Debarbieux & Rudaz, 2010; Perlik, 2011), the situation in the Bibans appears more closely linked to historical socio-cultural disruptions. These, amplified by successive shocks (colonization, war of liberation, rural exodus, the “Black Decade”), have profoundly affected social cohesion and the capacities for local collective action. This finding highlights the importance of a historical and sociological reading of territorial vulnerabilities, complementing purely economic or environmental approaches.

The Paradoxes of Governance: Between Persistent Centralism and Local Resilience

Our observations underscore the paradoxes of governance in the massif. Institutionally, despite decentralization reforms launched since the 2000s, the persistent historical anchoring of centralism in administrative and political mindsets (Lefèvre, 2003; Loughlin, 2007) has led to fragmented territorial governance. Deconcentrated state services often operate in a sectoral and poorly coordinated manner, as evidenced by the lack of synergy between the different wilayas and communes of the massif. This fragmentation is exacerbated by the absence of consultation platforms at the massif level and the lack of shared ecological and territorial planning tools (Pecqueur, 2000; Vanier, 2008). This situation reflects a broader trend in how the state reshapes its territorial role, through exceptional spaces and targeted delegations, which generate incomplete and asymmetrical multi-level governance (Brenner, 2004).

Yet, this failure of formal institutional frameworks stands in sharp contrast to the governance dynamics observed in the field, particularly through our surveys. The symbolic and functional resilience of traditional community institutions such as the Tadjemâath, even without formal recognition, demonstrates the persistence of strong local social capital (Fukuyama, 1995). Community discussions after Friday prayers or the ability of associations

to initiate local management actions (e.g., cleanup operations, water pipe repairs in Tazla) concretely illustrate the communities' self-organization capacity. These practices, based on implicit rules and proximity networks, ensure more effective and contextually appropriate management of certain local resources, corroborating Elinor Ostrom's (1990) findings on the sustainable management of commons by communities.

Active Communities and Public Service Deficiencies

Our interview analyses reveal acute perceptions of dysfunctions in public services. Beyond mere spatial fragmentation, testimonies point to problems of management and maintenance, such as schools "*operating only partially*" or infrastructure being "*poorly maintained*" due to a lack of qualified personnel. These observations support Scott's (1998) critique of the disconnect between "*major modernization policies*" and field realities. The neglect of local knowledge and actual needs by top-down planning processes leads to evident inefficiencies in essential service delivery. These testimonials underscore the crucial importance of service management and maintenance for perceived effectiveness, directly questioning the quality of local infrastructure governance.

In response to these institutional shortcomings, the emergence of local self-organization mechanisms, such as the rural development projects (PPDR) initiated by the ADDMB, is a tangible sign of territorial resilience. These initiatives align with Jan Douwe van der Ploeg's (2008) notion of "active peasantries." They demonstrate rural communities' capacity to develop alternative forms of development rooted in their local practices and activity diversification, even in the absence of initial institutional support. This capacity for social innovation and resource reappropriation, highlighted by Chambers (1983) as the empowerment of local populations and their access to knowledge and institutional recognition, effectively compensates for the failures of formal institutions and the lack of responsiveness from authorities.

Toward Inclusive Governance: Recognition and Scale Articulation

The strong expectations expressed by local actors for recognition of associations as full partners and the desire for direct dialogue with authorities clearly indicate an aspiration for more inclusive governance. The rejection of the federative project proposed by ADDMB for Bordj Bouni, despite its strategic relevance, illustrates the persistent disconnect between centralized planning frameworks (e.g., PCDs "that fail to consider high-altitude and remote villages") and local realities. This gap underscores the importance of "situated knowledge" and vernacular practices that Chambers (1983) and Scott (1998) call to be recognized and valued.

The MED/SLA methodological approach, by capitalizing on perceptions and adaptation strategies, further confirms the relevance of the MED/SLA framework in capturing these ofteninvisible forms of territorial resilience in top-down analyses. The dynamics observed in the Bibans massif thus call for institutional recognition of local governance forms and a rethinking of territorial public policies. This reconfiguration should be based on listening to communities, effective multi-level coordination, and the valorization of endogenous potential and local "living institutions." This is a critical challenge for building sustainable revitalization trajectories in mountain territories.

Our findings align with several observations from recent literature on mountain governance and MENA dynamics: first, the coexistence of centralized formal governance and resilient local informal arrangements is frequently reported (e.g., global studies on mountain governance and recent reviews), confirming the relevance of analyzing the "hybrid forms" observed in the Bibans. For instance, recent work highlights the difficulty for central authorities to effectively integrate local rights and institutions into territorial plans, leading to de facto governance arrangements driven by civil society and vernacular institutions (Tucker et al., 2021; MRI, 2021).

Furthermore, specialized literature shows that place-based or local valorization policies (e.g., forest projects, integrated water resource management) enhance resilience only when they explicitly involve communities and secure resource access, an observation consistent with our recommendations on institutional recognition of associations and land tenure security. These conclusions emerge from comparative analyses and reviews of recent mountain governance studies, which call for co-governance mechanisms and better articulation across scales (local/intra-regional/state) (Sala et al., 2024).

Finally, case studies in North Africa (e.g., basin analyses and research on the Atlas Mountains and traditional irrigation systems) reveal similar trajectories: fragmented services, increasing climate pressures, and growing reliance on remittances and migration, factors that shape communities' capacities to mobilize their capitals. Our findings in the Bibans thus align with this broader diagnostic and reinforce the call for adaptive, contextualized, and co-constructed territorial policies (Kchikech, 2024).

Conclusion

Our study of the Bibans massif highlights the structural and institutional tensions that hinder the emergence of effective territorial governance in Algerian mountain areas. Despite reforms aimed at decentralization and local development, governance in these territories remains largely dominated by top-down, sectoral, and weakly participatory logics. This observation reveals a state of "inoperative governance" (Le Galès, 2002), incapable of adapting to the ecological, social, and economic specificities of mountainous contexts.

This situation echoes challenges faced in other mountainous regions worldwide. While the European Alps have developed diverse forms of decentralization granting significant autonomy to local authorities (Debarbieux & Rudaz, 2010; Corrado et al., 2014), experiences in Latin America, particularly in the Andean region (Bolivia, Ecuador, Peru), show more mixed outcomes. Despite the formal recognition of local community rights, these contexts often confront clientelism, implicit recentralization, and jurisdictional conflicts (Larson & Soto, 2008; Bretón, 2008; Van Cott, 2005). Such international comparisons confirm that the difficulties experienced in Algeria are not isolated but reflect structural tensions common to mountainous areas, while underscoring the need for context-specific governance models.

Nevertheless, beyond these constraints, our results demonstrate the existence of significant resilience dynamics driven by the local communities themselves. These manifest through the persistence of traditional institutions such as the Tadjemâath, the emergence of self-organization mechanisms in response to deficiencies in public services, and the mobilization of vernacular knowledge and solidarity practices. These hybrid forms of governance, often invisible or poorly recognized by formal frameworks (Provan & Kenis, 2008), are nonetheless essential for producing contextualized solutions and enhancing territorial resilience.

The originality of this research lies first in its empirical contribution to a scarcely documented field in the international scientific literature: the Bibans massif in Algeria. By filling this gap, the study provides novel insights into the territorial dynamics of mountainous zones in the Maghreb, where development policies have long overlooked local specificities (Bessaoud, 2019; Bedrani, Chehat&Bessaoud, 2009).

Secondly, it is distinguished by the innovative integration of theoretical frameworks rarely combined: the Sustainable Livelihoods Approach (SLA/MED) to assess the capitals and vulnerabilities of mountain communities; Elinor Ostrom's (1990) institutional analysis of common-pool resources to understand collective management; and Jan Douwe van der Ploeg's (2008) concept of "active peasantries" to capture endogenous strategies of innovation and resistance. This combination enabled a move beyond sectoral readings towards a more holistic understanding of local governance dynamics.

Finally, situated within a South-South comparative perspective, this study calls for the re-territorialization of development policies. The findings indicate that any attempt to re-found territorial governance in mountain areas must rely on the recognition of endogenous institutions, securing land tenure rights, integrating ecosystem services into planning, and valorizing local resources. This entails privileging a differentiated development model based on territorial projects, multi-level consultation, and recognition of hybrid governance forms already in operation. While rooted in the case of the Bibans massif, these lessons provide useful perspectives for other marginalized territories facing similar dynamics in mountainous regions of the South.

Beyond this observation, this study calls for concrete mechanisms for renewed governance:

1. Formal recognition of hybrid institutions: The state could establish a legal status for 'village initiative collectives', giving them a flexible legal personality to manage funds and sign agreements, without integrating them into the administration, thus preserving their autonomy.
2. Creation of an Economic Interest Group (EIG) for the Bibans Massif: In order to overcome the division between wilayas and municipalities, an EIG could be established to bring together stakeholders from the four wilayas involved. This group would be tasked with developing a Massif Development Plan, and a special inter-wilaya competition fund could be allocated for this purpose.
3. Integration of vernacular knowledge into planning: The procedures for developing PCDs (Communal Development Plans) could be modified to make a participatory diagnostic phase mandatory upstream. This phase would involve associations and village assemblies, rather than only taking place after the fact.

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