



Urban and Rural Areas in the Lower Zab (Biskra and Its Oases) during the Sanhaja Islamic Period: An Approach to Territorial Dynamics

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Submission date: 10/02/2026

Acceptance date: 01 /07/2026

Publication date: 15/07/2026

Abstract :

This study aims to understand how the dynamic interaction between urban centers and rural hinterlands in the Lower Zab during the Sanhaja Islamic period shaped a cohesive and integrated territory.

To achieve this aim, the study employs a critical, interdisciplinary methodology that synthesizes historical narratives (drawn from al-Bakri, al-Idrisi, Ibn Khaldun, and al-Himyari) with geographical analysis, thereby moving beyond mere chronology to reconstruct the region's underlying political, economic, and social frameworks.

The study concludes that hydraulic systems functioned as the fundamental socio-spatial organizer of the Zab, giving rise to a distinctive "hydraulic settlement" model. This engineered reality forged an indispensable symbiosis between city and countryside: cities acted as administrative and commercial nuclei managing water resources, while the surrounding countryside guaranteed agricultural and pastoral productivity. Consequently, this deep-seated interdependency transformed the Zab into a resilient and strategically vital crossroads, seamlessly integrating urban and rural life into a single, functioning organism..

Keywords: Zab; Urban Centers; Countryside; Territory; Social Structure; Water; Islamic Period.

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1. Introduction

Spatial studies are crucial elements that lead us to understand the social, economic, and political dynamics of any region; it is, in fact, impossible to consider territories as merely neutral, inert geographical spaces, for they are the result of the interaction of several complex structures shaped over time. Relying on such studies, therefore, elevates historical research beyond mere narratives of events and dates towards a more comprehensive analysis that integrates geography with political, economic, and social history, which is essential for understanding the process of territorial transformations within their actual frameworks.

Building on the above, applying this theoretical perspective to the Zab region is of paramount importance for comprehending its architectural and settlement structures, patterns of habitation, and the impact of changes on the course of societal development and stability. Since the Islamic conquest of the Maghreb, the Zab has been distinguished by a set of characteristics that granted it uniqueness: it was a territory with an independent tendency and agency within the land of Numidia, which widely attracted the Arab element that later contributed to the region's demographic and cultural mosaic ; It also played a strategic role as a corridor between North Africa and the Saharan coast, linking the southern oases with eastern regions such as Tripoli and southern Africa, endowing it with significant economic, political, and social importance. Furthermore, it contributed to the consolidation of urban centers whose structures evolved towards a new configuration, which was completed by the mid-5th century AH/11th century CE with the settlement of the Banu Hilal; thus, cities experienced a convergence of evolving administrative and commercial systems, intellectual maturity, and doctrinal stability. The branching of the route network facilitated external commercial, demographic, and military movement, connecting urban centers with each other and with their surrounding rural hinterlands, fostering integration within the Zab territory and directly impacting the diversity of settlement patterns and societal composition.

Conversely, the countryside assumed essential productive roles in agriculture, pastoralism, and activities suited to the nature of the oases and mountainous areas, ensuring a balance between urban and rural productivity; simultaneously, it attracted settlements of elements with local ethnic affiliations, characterized by a degree of social independence and self-organization, often absorbing opposition groups, particularly in rural areas distant from power centers, where security and natural suitability allowed for the persistence of their ideas.

Studying urban and rural areas from these premises necessitates examining the dynamics of power, society, and urbanism within the Zab territory as an integrated

whole, formed as a result of intellectual societal transformations and political changes in the Zab, and understanding the dialectic between the urban center and the oasis countryside, local elements and the Arab element, the center and the periphery, which is achieved by answering a set of compelling questions:

Research Questions

1. How did the simultaneous transformations in urban and rural structures within the Zab territory, from the Islamic conquest until the mid-5th century AH/11th century CE, contribute to shaping its distinct territorial identity; and what mechanisms (such as hydraulic systems, settlement patterns, and road networks) mediated this relationship and endowed the region with its unity?

2. Did the successive political, religious, and social events (tribal conflicts between the Sanhaja and Zenata, doctrinal shifts, and weak central authority) govern the course of the Zab's history and shape its territoriality; or did the territory itself—with its permanent geographical features (harsh desert environment, water scarcity, and strategic location as a corridor between north and south)—impose its constraints and conditions upon those events, thereby directing the region's political, social, economic, and doctrinal development?

Hypotheses:

Based on the research questions above, this study proposes two main hypotheses:

Hypothesis 1: Urban and rural transformations in the Zab were not passive responses to political and religious changes but rather active mechanisms that reproduced territorial identity through what may be termed "hydraulic settlement," whereby water systems shaped settlement patterns and social relations rather than the reverse.

Hypothesis 2: The region's natural and geographical characteristics (its location as a corridor, water scarcity, and topographical diversity) were the dominant factor determining the course of political, economic, and doctrinal events, meaning that the "logic of place" was stronger than the "logic of time" in directing the dynamics of power and society.

1.1 Study methodology

From a structural and methodological standpoint, this study relies on descriptive and investigative approaches based on the scrutiny of texts, both foundational and geographical, with the aim of encompassing the variables witnessed by the territory that shaped its urban-rural particularity. This is supported by an analytical methodology that goes beyond transmitting narrative accounts and delves deeper into the underlying causes behind events. We have also employed a comparative

methodology to avoid studies falling into a stereotypical reading of texts, aiming to arrive at a comprehensive, objective conception of the urban domain in the Zab under Sanhaja sovereignty. Finally, a critical methodology has been applied to assess the perspectives and potential biases of each source author (al-Bakri, al-Idrisi, Ibn Khaldun, and al-Himyari), rather than treating them as neutral reporters, thereby ensuring a more nuanced and objective interpretation of the available evidence.

1.2 Significance of the Study

The significance of this topic lies in its endeavor to understand the mechanisms that contributed to the formation and transformation of the territory from a peripheral area with a barren, desert environment into a flourishing sphere in terms of architecture, natural resources, and commerce, through studying the dialectical relationship between countryside and city. Furthermore, the topic gains importance from its attempt to move away from the stereotypical transmission of historical and geographical texts towards a critical analytical reading and an approach that highlights the integrative relationship between rural areas and cities in southern peripheral territories.

2. The Structure of the Territory

2.1 Geographical Morphology of the Maghreb Region

Since the Islamic conquest, the land of the Zab has emerged as a strategic, arterial region and a geographical zone with unique characteristics; its pivotal location at the heart of the triangle formed by Tripoli, Ifriqiya, and the Central Maghreb qualified it to gain strength as a transit area for trade, military movements, and population flows, constituting a unified, integrated whole¹. Geographically, we can describe the Zab as an interstitial territory, serving as the dividing line between the Greater Sahara to the south and the Aurès Mountains to the north. Its specificity is manifested in its topographical diversity, ranging from highlands, plateaus, and steppes to plains, oases, depressions, and sandy desert areas adjacent to the Greater Sahara and the Chott Melghir.

Ibn Khaldun, describing the heart of the Zab, states: "And towards the hills lies the land of Righ, comprising nearly three hundred villages arranged along the banks of a valley that descends towards them from the west to the east, encompassing about one hundred settlements or more. Its capital is Biskra, one of the major cities of the

¹ Al-Idrisi, *Nuzhat al-Mushtaq fī Ikhtirāq al-Āfāq*, Vol. 1, 1st Ed., Beirut: World of Books, 1969, p. 264.

Maghreb, and all of it contains palm trees, rivers, estates, villages, and farms".² Upon scrutinizing this text, we conclude that this territory was not a lifeless desert; despite the harshness of its nature, it encompassed contradictions ; On one hand, it was a space with a desert and semi-desert climate, characterized by intense to moderate heat in summer, as well as aridity and scarce rainfall, however, geographical writings describe the region, despite its rugged terrain and meager rains, as abundant in water, with flowing valleys and rivers, rich in wells, springs, and running-water canals. One of the most significant features of its location is that it serves as a natural hydraulic basin for underground and surface water descending from the surrounding mountain chains; consequently, due to the region's geological composition, it automatically functions as the groundwater reservoir for the northern Tellian groundwater, which is the origin from which the region derived its name. This hydrological characteristic is corroborated by al-Bakri, who notes the abundance of springs and flowing water in the region, while al-Idrisi similarly emphasizes the density of water sources that made settled life possible in this arid environment.³

This name traces its root to Zab al-Ma', meaning the gathering or collection of water, a term derived from the accumulation and flow of water.⁴ Hence, the name was twinned with the Zab of Iraq, the name for two tributaries called the Upper Zab and Lower Zab.⁵ This term, with its Babylonian or Persian roots Arabized, was used in the Maghreb to denote the Upper Wadi al-Auras and its vicinity; likewise, we find the local inhabitants of the Maghreb applying the word Az-Zab, an Amazigh word meaning "the oasis".⁶

2.2 The Sociology of Resources in the Zab

As is fundamentally understood, no civilized society can be established without a water source, as in the specific case under study, water played a pivotal role in forming the initial nucleus of the cities that constituted the Zab region since the Roman era⁷; water resources acted as a primary agent in engineering and shaping the territory, determining population patterns and their settlement stability. It is a established fact that the Arab Muslims settled in these pre-existing cities, developing the dams

² Ibn Khaldun, *Al-'Ibar wa-Dīwān al-Mubtada' wa-al-Khabar*, Vol. 6, Ed. by Suhayl Zakkar, p. 132.

³ Al-Bakri, *The Book of Routes and Realms*, Vol. 2, Ed. by Jamāl Ṭalabāh, 1st Ed., 2003, p. 229; Al-Idrisi, *The Book of Pleasant Journeys into Faraway Lands*, Vol. 1, 1st Ed., 1969, p. 264.

⁴ Ibn Manẓūr, *The Tongue of the Arabs*, Vol. 1, p. 443.

⁵ Yāqūt al-Ḥamawī, *The Dictionary of Countries*, Ed. by Farīd 'Abd al-'Azīz al-Jundī, 1st Ed., p. 138.

⁶ Usāmah al-Ṭayyib al-Ja'īl, "The Settlements of the Greater Zāb Region in the Middle Ages," p. 340.

⁷ Jamāl 'Annāq and Šālīḥ Bin Qurbah, "Water Distribution Systems and Facilities in the Ancient Period of the Eastern Zāb Region, p. 280.

constructed by the Romans and not only continuing this technique but enhancing it through the use of waterwheel (sāqiya) and qanat (faggāra) systems. The cities were distributed along the banks of rivers and watercourses⁸, as Ibn Khaldun notes, "arranged along the banks of a valley that descends towards them from the west to the east".⁹ This description of the territorial structure is of paramount importance, as it defines the pattern of Zab urban settlement in what is termed regular or contiguous habitation, echoed in Al-Idrisi's account: "many cities, vast fields, and connected settlements containing running waters, wells, and numerous springs".¹⁰ This regular, compact settlement adjacent to surface and groundwater sources offers several key insights:

- **Emphasis on Agriculture and Cultivation:** Describing a connected forest in a desert region is no minor detail; the considerable effort invested by the inhabitants to ensure the quality and density of vegetative cover extended beyond date palms to include "an abundance of olive trees and all fruits"¹¹, akin to what is now termed agricultural intensification. The labor of creating a dense vegetative belt or sector within a desert environment reflects advanced agricultural and irrigation techniques, which transformed the Zab from a barren desert expanse into an agricultural hub supplying other regions.

- **Regulation of Water Resources:** The Sanhaja period witnessed significant advancements in hydraulic technology. These advancements are documented by both al-Bakri and al-Idrisi, who describe sophisticated irrigation networks that sustained extensive agricultural production across the Zab's oasis settlements.¹² The Ibadi communities, in particular, developed innovative water distribution systems that ensured equitable access to this scarce resource, as noted by contemporary scholars of the region's social and economic history.¹³ The water engineering techniques inherited by Muslims from the Romans were augmented by their own experiential innovations; moreover, the Ibadi community contributed substantially to the development of water management systems.¹⁴ Consequently, water

⁸ Muḥammad al-Ṣaghīr Ghānim, *Essays on Heritage: The Biskra Region and the Aurès Borders*, Publications of the Society for the Preservation of the Historical and Archaeological Heritage of the Aurès Region, p. 70.

⁹ Ibid., p. 132.

¹⁰ Al-Idrīsī, *The Book of Pleasant Journeys into Faraway Lands*, Vol. 1, 1st Ed., 1969, p. 264.

¹¹ Al-Bakrī, *The Book of Routes and Realms*, Vol. 2, Ed. by Jamāl Ṭalabāh, 1st Ed., 2003, p. 229.

¹² Al-Bakrī, Op. cit., p. 229; Al-Idrīsī, Op. cit., p. 264.

¹³ 'Allawah 'Ammarah, "Between the Aurès Mountain and the Oases: The Emergence, Spread, and Disappearance of Ibadi Communities in the Zab," *Journal of Knowledge and Scientific Research*, No. 9, pp. 257-258.

¹⁴ Ali Ashshat, *Utilization of Water in the Central Maghreb Region*, p. 572.

distribution was not haphazard but governed by precise methods, laws, and stringent regulations, dictated by the scarcity of rainfall and the desert climate. While no specific texts from the Zab region during the Sanhaja period survive, it is highly probable that it adhered to Maliki legal principles regulating water according to its sources: flowing, stored, and well water.¹⁵ By extrapolating from practices in neighboring regions, it is certain that techniques suited to local conditions were employed, such as digging wells, harnessing flowing spring water, constructing water channels, excavating trenches, and maintaining a rotational system (nawba) to ensure equitable water distribution among farmlands.

- Residential Structure and Territorial Organization: The Zab during the Sanhaja period exhibited an integrated architectural and structural fabric in its urban-rural settlements, which was directly correlated with the hydrological framework. Wherever permanent settlement coincided with water availability, urban-rural planning in the oasis zones was fundamentally based on this vital element. Given that the territory comprised "approximately eighty villages"¹⁶, habitation in the Zab was characterized by sequential construction following the paths of valleys and rivers, resulting in compact, adjacent cities and oases. However, this compact urban morphology could not have succeeded without a governing authority controlling water distribution systems. Functionally, the city served as the primary regulator of hydraulic networks, since major water installations, springs, and distribution points were typically located within the city or in its immediate hinterland; therefore, the rural areas, villages, and oases remained administratively subordinate to the urban centers to guarantee the proper functioning and allocation of water flow.

1.3 Land Routes and Pathways

Since the medieval period, the Zab territory has functioned as a pivotal hub within the commercial networks of the Maghreb and Ifriqiya; this centrality stems from its strategic position between the interior plains and the Great Sahara, as well as between the eastern and western regions of North Africa. Such an intermediary location endowed the Zab with significant economic brokerage, facilitating connections between these areas, Tripoli, the African plains, northern and western Maghreb, and the trans-Saharan trade routes. The internal land routes within the Zab played an indispensable and foundational role in the economic and commercial network of

¹⁵ Abd al-Wahid Zannun al-Tahir, *The Views of the Maliki School of Law on Regulating the Use of Public Water*, p. 57.

¹⁶ Ibn Khaldun, *Op. cit.*, p. 132.

Ifriqiya and the broader Maghreb; they extended across a complex mosaic of terrestrial pathways, many inheriting a Roman-Byzantine legacy, which Muslim administrations subsequently modified to align with their evolving commercial and military needs. These communication lines can be categorized as either internal or external, based on their function, geographical span, and socio-economic strategic importance. The internal routes interconnected the oases and cities within the territory, serving as vital distribution channels for various goods while simultaneously enabling the exchange of scientific and intellectual knowledge. Furthermore, the Zab controlled an extensive network of external arterial roads, which cemented its strategic role in the dynamics of regional commerce.

3. Urban Structure and Territorial Organization

3.1 The Urban Center in the Zab: Formation and Function

During the Sanhaja period, the urban structure attained a mature architectural composition, evolving from mere military outposts distributed along the Roman limes—whose primary role was protection and defense¹⁷—into cohesive residential settlements and cities of significant political and economic weight. The Zab region was notably characterized by a multitude of towns and urban centers, forming an integrated urban network distinguished by functional economic, social, and administrative complementarity. This network was marked by a gradual hierarchy extending from major urban centers down to smaller agglomerations, villages, rural areas, oases, and pastoral lands—this “closely clustered” urban web later became collectively known as the Zab.¹⁸

It is worth noting that conducting a precise census of these cities and villages is impractical, as some, such as Ḥayyās and Malshūn, have vanished; the toponymy of the region’s settlements bears witness to the topographic continuity of the Maghreb, since many of these cities bear names with ancient derivations and origins that were later Arabized.¹⁹

The urban model of the Zab stands as one of the finest examples of human adaptation to nature, creating spaces that balanced defensive, fortified architecture with the requirements of daily living. Cities in the Zab exhibited a functional urban design with integrated strategic planning, thriving with markets, mosques, public

¹⁷ Stéphane Gsell, *Archaeological Atlas of Algeria*, Special Edition of maps of the Army Geographic Service, p. 240.

¹⁸ Ibn Khaldun, *Op. cit.*, p. 585.

¹⁹ Muhammad Hasan, *The Historical Geography of Africa*, p. 10.

baths, and inns. In the case of the Zab, it is impossible to separate hydraulic systems from the development of urban and rural structures; the territory, with its distinctive features, relied on the ingenuity of its inhabitants in managing spatial constraints. Since water was the primary attractor for settlement, its management dictated the layout of the Zab's urban landscape, giving rise to what may be termed "hydraulic settlement," which developed in parallel with watercourses.

Thus, the location and planning of cities such as Biskra, Tolga, Badis, and Tahūda were not arbitrary; rather, urban layout was shaped according to a deliberate hydraulic system, as inhabitants relied on riverbanks and water channels descending from the Tell and the Aurès Mountains for their settlements. The city of Biskra, for instance, was bisected by a large river flowing down from Mount Aurās; along its banks "extend palm trees, olive trees, and other fruit trees". This meant water entered the city from a higher elevation and was distributed through its streets via outlets, canals, or waterwheels, with villages and oases situated further downstream, "cutting through the forest and all the villages established on its banks"; hence emerged the concept of connected settlement, as noted by the author of *al-Istibṣār*: "They are many cities, vast cultivated lands, and connected buildings". Rather than scattered villages and dwellings, climatic conditions imposed a hydraulic system that fostered contiguous or connected housing, where communities shared water channels and irrigation networks.

At the same time, Zab cities were known for their fortresses and citadels, representing a defensive architecture. Beyond their vital social, economic, and religious roles, these urban centers incorporated defensive structures to protect the city and its inhabitants, maintain surveillance over routes and pathways, and safeguard water sources, oases, and agricultural produce. The defensive architecture of the Zab was not merely a response to external threats but also a reflection of the region's political fragmentation and tribal competition.²⁰ Stéphane Gsell's archaeological survey of the region confirms the presence of extensive fortification systems that predated the Islamic period and were subsequently adapted by Muslim rulers to meet new strategic requirements.²¹

This defensive architecture included walls, gates, moats, citadels, fortresses, and castles, such as the fortresses of Biskra, Tahūda, and Badis. Al-Bakrī notably mentions that Tahūda utilized its water for defensive purposes²²: the city was surrounded by a

²⁰ Ibn Khaldun, *Al-ʿIbar wa-Dīwān al-Mubtadaʾ wa-al-Khabar*, Vol. 6, Ed. by Suhayl Zakkar, p. 132.

²¹ Stéphane Gsell, *Archaeological Atlas of Algeria*, Special Edition of maps of the Army Geographic Service, p. 240.

²² Al-Bakri, *Op. cit.*, p. 229.

moat fed by a river from Mount Aurās; in times of conflict, they would channel the river into the encircling moat, thereby securing their water supply and isolating themselves from the enemy, as the city of Biskra also possessed a moat, and the three cities of Bantiyūs were similarly fortified, described as “cities with walls of brick, moats, and surrounded by rivers”.

3.2 The Rural Zab: Structure and Characteristics

The pattern of settlement and stability in the rural areas of the Zab during the medieval period transcended traditional concepts that confined the countryside to being merely static domains subordinate to cities. A thorough examination of the textual evidence points to an expansive, developed, and interconnected territorial fabric, where the account provided by the author of *Nuzhat al-Mushtaq* reveals a connected, unified, and compact residential structure: "The settlements of the Zab are contiguous, its villages numerous, and its waters flowing," a testimony to the maturity and civilizational prosperity this region had attained. Indeed, such contiguity of habitation could only be achieved through systematic hydrological systems and abundant water sources, which collectively created an extended, connected belt of villages, oases, and orchards linking the major cities of Biskra, Tahūda, and Tolga.

This configuration also expressed a clear strategic planning vision, as evidenced in al-Himyarī's description: "Biskra is in the land of the Zab and is the capital of that region; it contains a congregational mosque, many other mosques, public baths, and is surrounded by numerous orchards".²³ The interconnection of villages and rural areas within the Zab formed a cohesive fabric that bound them together, granting the territory spatial integrity, however, the defensive function of the Zab, deeply rooted in history as part of the limes fortifications and further shaped by the region's adoption of Kharijite doctrines by its Zenata tribes in the centuries following the Islamic conquest, transformed it into a territory traversed by sectarian-political conflicts. This, in turn, produced defensive patterns in the countryside that sometimes surpassed the fortifications of major urban centers, likely because these interconnected rural areas served as the first line of defense for the cities.

The political realities imposed on the Zab rendered it a perpetually tense frontier zone, a consequence of the clashes and conflicts between the Sanhaja and the Zenata tribes (allies of the Umayyads in al-Andalus), who harbored remnants of opposition movements (such as the Nakkāriyya). This led to insecurity along trade routes, compounded by weak central control and a military absence in the region, as the

²³ Al-Himyarī, *The Fragrant Garden of Information*, Ed. by Ihsan Abbas, p. 114.

Sanhaja and later the Hammadids were preoccupied with state-building, consolidating power, and wars with their northern rivals. Given that the territory was fundamentally transitional and conducive to any external movement, it was inevitably exposed to successive breaches and attacks, rendering rural stability precarious. From this perspective, protecting the territory was no longer solely the task of the central authority but became a collective, tribal responsibility shouldered by the peripheral rural tribes.

Consequently, defensive fortification architecture evolved, represented by qṣūr (fortified settlements), fortresses, castles, as well as walls and towers to ensure a minimum level of stability. Ibn Khaldun links these methods of collective protection in frontier societies to the weakness of the state, as the countryside also assumed a role in economic protection; al-Idrīsī explicitly connects fortifications with markets, describing settlements as "having walls and thriving markets," strongly indicating that rural areas undertook the crucial tasks of caravan trade and economic activities within their residential clusters.

4. The Sociology of Resources and the Economic Structure

4.1 Social Dynamics

From a Khaldunian perspective, the Zab constituted an intermediary zone, one that blended desert and settled lands within its very architectural fabric, thereby representing both nomadic and sedentary forms of civilization; this duality is exemplified by areas such as the Aurès Mountains, the mountains of Ngaous, and the southern desert expanses, which were utilized not only as pastoral grounds but also as sites for seasonal migration and agriculture.²⁴ As contemporaneous sources note, "As for the Zab, it lies between the Aurès Mountains and the Zenata homelands in the desert; it encompasses many villages and towns, and its leadership in ancient times belonged to the Sanhaja, who established their royal seat there at the fortress of the Banu Hammad".²⁵ Consequently, the Sanhaja monopolized control over the cities, urban regions, and strategic military sites, effectively dominating the principal commercial and military routes, while in contrast, the Zenata tribes settled the rural hinterlands of the territory—a distribution supported by al-Nuwayri's observation that "The Arabs entered and found an empty land, with excellent pastures, whose settlements were [formerly] of the Zenata".²⁶ In Khaldunian terms, this indicates the

²⁴ Ibn Khaldun, *Al-ʿIbar wa-Dīwān al-Mubtadaʾ wa-al-Khabar*, Vol. 6, Ed. by Suhayl Zakkar, Beirut: Thought House, 2000, p. 132; Al-Idrisi, *Nuzhat al-Mushtaq fī Ikhtirāq al-Āfāq*, Vol. 1, 1st Ed., Beirut: World of Books, 1969, p. 264.

²⁵ Ibn Khaldun, *Op. cit.*, Vol. 6, p. 585.

²⁶ Al-Nuwayri, *Nihāyat al-Arab fī Funūn al-Adab*, Cairo: Dār al-Kutub al-Miṣriyya, n.d., p...27

region had reached full maturity in terms of sedentary civilization; however, despite the Zenata's demographic dominance in the countryside, ultimate sovereignty and political control remained firmly in the hands of the Sanhaja, who tightened their grip on the power structure under the leadership of the Banu Ruman.²⁷

During the Zirid-Hammadid Sanhaja period, the land of the Zab served simultaneously as a base for diverse ethnic groups, a theatre for tribal conflicts, and the stage for the traditional rivalry between the Sanhaja and the Zenata; it was, in essence, a dynamic contact zone between civilization and nomadism. The territory was known for its varied social composition, which was significantly influenced by the transhumant and nomadic lifestyle of the rural and Bedouin tribes, who required constant movement in search of water and pasture for their animals; conversely, the urban tribes inhabited the cities and towns, which granted them the stability within their residential quarters to practice trade or crafts.

Regarding ethnic composition, the urban centers of the Zab exhibited considerable diversity, comprising various elements that formed the civic society; a preliminary observation reveals a strong presence of Africans and Romans in many urban centers, and there is no doubt about the continuity of African communities as remnants of the Latin culture with its Roman Christianity, which testifies to the deep permeation of Roman culture in the region and its adoption by some local elements, conversely, there was a distinct presence of Byzantine communities, referred to as al-Rūm²⁸, a fact that clearly indicates the importance accorded to the region. The presence of African and Roman communities in the Zab's urban centers is well documented in the geographical literature of the period, with al-Bakri providing detailed accounts of the various ethnic groups inhabiting the region's cities and villages.²⁹ Michael Brett's study of Ibn Khaldun's approach to local history further illuminates the complex ethnic dynamics of the Zab, particularly the interplay between indigenous Latin-African populations and later Arab and Persian arrivals.³⁰ The most significant evidence of this complex layering is found in the ruling families, such as the Banu Ruman and the Banu Sindī, whose bonds to the area strengthened over time as their group solidarity grew, their influence expanded, and their power increased until they ruled most of the land and attained sovereignty in the Zab. Furthermore, the region witnessed the sustained presence of the Arab element, which arrived with the early conquests; it is commonly

²⁷ Ibn Khaldun, *Op. cit.*, Vol. 6, p. 585; Al-Bakri, *Al-Masālik wa-al-Mamālik*, Vol. 2, Ed. by Jamāl Ṭalabah, 1st Ed., Beirut: Scientific Books House, 2003, p. 229.

²⁸ Allawah Ammarah, *Between the Aurès Mountains and the Oases: The Emergence, Spread, and Disappearance of the Ibādī Communities of the Zab*, Trans. by Abd al-Qadir Mubarkiyah, pp. 257-258.

²⁹ Al-Bakri, *Op. cit.*, p. 229.

³⁰ Michael Brett, *Ibn Khaldūn and the Aynassic Approach to Local History: The Case of Biskra*, 1991, p. 159.

acknowledged that the Zab was a place of settlement and stability for the Arabs, particularly during the period of the governors when military contingents from Mudar, Iraq, and Syria were stationed there. The Persian presence was also substantial, having arrived with Ibn al-Aghlab during his governorship under the designation of Khurasani troops; this Persian element established itself in several nuclei, forming a major community in one of the three villages of Banṭiyūs, where similarly, Arab Qurayshite communities were also found.

By examining the geographical texts of al-Bakrī and the author of al-Istibṣār, we can characterize the Zab's social fabric during the Sanhaja period as a complex mosaic, for it combined the settled Berbers, Africans, and Romans—as indigenous, deeply rooted elements—with the tribal solidarities of the conquering Arabs from Qaysī, Qurayshī, and Yemeni origins, alongside Persian elements, all united yet subtly stratified by these very group identities ; however, a deeper analysis reveals a crucial structural point: while superficially the society appeared subordinate and loyal to Sanhaja sovereignty, it fundamentally wove an independent societal framework by creating an integrated, self-administered urban system. Al-Bakrī's data thus allows us to understand the social fabric of the Zab in the 4th and 5th centuries AH (10th–11th CE) as possessing a mosaic-like quality, whose essential feature was the multiplicity of foreign-origin elements populating its cities, in contrast to the rural areas predominantly inhabited by local groups.

The case of the Zab is therefore fundamentally linked to cities adhering to official religions that had previously dominated Ifriqiya, set against a countryside affiliated with Ibadi doctrines opposed to urban authority³¹; for instance, the city of Biskra was populated by Muwalladūn (Islamized non-Arabs), while its rural areas were settled by Sadrāta, Maghrāwa, the people of the house of Banī Khazar, and Banū Yazmartī. Meanwhile, Banṭiyūs—formed by three proximate towns—saw the first inhabited by Muwalladūn, the second by Berbers, and the third by a group of Persians known as Banū Jarīj, where this model of three adjacent settlements was repeated in Tolga, where the first urban cluster housed Muwalladūn, the second was settled by Yemeni tribes, and the third by Qaysī tribes; as for Tahūda, its Arab character was prominent, being settled by Arabs and a group from Quraysh and fortified by a protective moat, while its countryside was dominated by Berber tribes from Hawwāra and Maksana, who were Ibadi adherents.

³¹ Ahlam Bousalem and Youcef Abid, "The Role of the Ibadiyya of the Central Maghreb in Organizing Trans-Saharan Trade, No. 11, 2020, p. 124, p. 77.

4.2 The Economic Structure

The economic condition of the Zab was a direct reflection of its diverse natural and human environment, where geography shaped economic patterns profoundly influenced by ecological constraints, which largely determined their features, forms, and resources. The vastness of the territory, extending across a significant geographical area, resulted in diverse climatic zones—desert, semi-desert, and continental—which greatly influenced the type and extent of production, the control of water resources, and irrigation systems; moreover, the Zab's strategic location between the Tellian and Saharan domains made it a space that amalgamated different forms of economic activity and a vital corridor for the movement of goods and ideas, as it was intersected by a network of crucial commercial routes linking northern and southern, eastern and western Maghreb, as all this endowed it with a character of diversity: oasis-based arboriculture and reciprocal exchange commerce.

The meticulous tribal management of water led to significant advancement in the agricultural sector, transforming distant desert lands into highly productive oasis agricultural zones; irrigation techniques, encompassing both qanats (subterranean channels) and waterwheels, allowed water to reach the greatest possible extent of fallow desert land in Lower Zab, achieving a remarkable outcome that transcended the traditional subsistence-based rain-fed agricultural model, thereby resulting in "prosperous villages and extensive groves of palm trees, olive trees, and all kinds of fruits"³², where this abundance in the villages of Biskra, Tahūda, Tolga, Banṭiyūs, and others was not a random outcome but a regulated and codified achievement.

The agricultural prosperity of the Zab is consistently highlighted in the Arabic geographical tradition, with al-Himyari describing the region's abundant orchards and diverse fruit production.³³ The anonymous author of *al-Istibṣār* similarly emphasizes the density of cultivated land and the sophistication of irrigation techniques that enabled year-round agricultural activity in this desert environment.³⁴

An examination of descriptive and geographical texts reveals a clear emphasis on describing the agricultural development reached by the region and the striking diversity and quality of its production; geographers described the region as a paradise containing various types of plantations and cultivations, most importantly date palms, to the extent that "Biskra was named 'the Palms' due to their abundance there, and in all countries they call it such," a situation replicated in all its urban centers, containing

³² Anonymous, *Al-Istibṣār*, Ed. by Saad Zaghloul, p. 173.

³³ Al-Himyari, *The Fragrant Garden of Information*, Ed. by Ihsan Abbas, p. 114.

³⁴ Anonymous, *Al-Istibṣār*, Ed. by Saad Zaghloul, p. 173.

"a large palm grove extending six miles". As for Tahūda, "it is surrounded by many orchards," Badis possesses "considerable farms," and Banṭiyūs yields "mostly dates and olives as its fruits," while Tolga is "abundant in orchards of olives, vines, palm trees, and other trees", where the region was also known for its diverse products, not limited to dates; it was "abundant in olives, varieties of fruits, vines, trees, all kinds of fruits, and contains various types of grains," and in Badis, barley was harvested twice a year, with date varieties including al-Liyārī, al-Ṣayḥānī, and al-Kasba.³⁵

The cities, oases, and villages of the Zab followed a regulated irrigation system, relying primarily on rivers, wells, and valleys, while rainwater levels were generally low; in Banṭiyūs, the river irrigated the three towns, whereas Biskra had "flowing waters, many rivers and springs, and sweet wells, with interior gardens fed by water from the river".

Due to its location between the Saharan coast to the south and the Tellian north, the Zab formed a central zone relative to its surrounding areas; it was evidently not merely a transit route but a hub for external trade, serving as a vital link through which commercial caravans laden with gold, salt, slaves, spices, and dates passed. In return, it exported agricultural, artisanal, or service products from the north, as the water resources and the abundance of rest stations and waypoints secured by Zab settlements facilitated commercial movement, while the multiplicity of external and internal routes significantly contributed to the flourishing of trade and the development of the taxation and customs apparatus, which operated in favor of the central authority.

5. Power and Territorial Structuring of Lower Zab

The political structure of the Zab underwent numerous transformations from the Islamic conquest until the Fatimid departure eastwards, a consequence of its inevitable subordination to the central authority in Ifriqiya and the subsequent clashes between the administration and local elements; this dynamic was further compounded by the region's strategic importance, as the Zab consistently served as a pivotal hinge in the political life of the Islamic Maghreb, being the launching point for several successive ruling dynasties such as the Aghlabids, Fatimids, Zirids, and Hammadids. Conversely, it became a focal point for most movements opposing central authority, with its territories witnessing the majority of revolts against governing regimes, which clearly reflects its political dynamism and the dialectical relationship between the seat of power and the agency of local forces; this vividly illustrates the territory's capacity to shape its political role based on the strength or weakness of central authority.

³⁵ Al-Bakri, *Op. cit.*, p. 229.

Following their departure, the Fatimid state laid the foundations for the Berber dynasties that subsequently ruled the Maghreb, after al-Mu'izz vested Buluggīn ibn Zīrī with his father's kingdom and added to it the administration of al-Masīla and the entire Zab. Governance of the Zab remained in the hands of the Zirids and later the Hammadids; with the establishment of al-Muhammadiyya and then the construction of the Qal'at Banī Ḥammād, the district of the Zab began to experience significant territorial transformations. One consequence of this shift in allegiance was the transfer of leadership within its chieftaincy, which had been held by the Banū Ruman—who were appointed by the Hammadid administration—and it must be noted that this is the first instance where the name of Biskra's governor appears: Ibn al-Ḥājj. When discussing this matter, Ibn Khaldun confirmed that "its chieftaincy in ancient times, after the Aghlabids and the Shi'a during the era of the Sanhaja kings of the Fortress, belonged to the Banū Ruman from among its people, due to their numerous residences and their ownership of the majority of its estates".³⁶ This indicates that the Banū Ruman possessed both material power and economic influence, being numerous enough to own many dwellings and relying on economic strength to extend their political authority by becoming notables of the country; they amassed agricultural lands, estates, forests, gardens, and oases, and certainly controlled the water—the source and mainstay of life in oasis cities. Given this description, the narrative suggests they acquired authoritative influence as a result of their numbers, dominance, and economic power.

According to Khaldunian theory, "Leadership is only attained through domination, and domination is only achieved through group solidarity ('aṣabiyya); therefore, leadership over a people necessitates a dominant solidarity that surpasses others individually".³⁷ This Khaldunian sequence leads us to a hierarchical understanding of the theory: group solidarity as a spiritual bond based on kinship, which unites the tribe and fosters internal cohesion, making domination an inevitable result of this unity; the degree of domination varies according to the strength of internal bonds and solidarity, with leadership at the apex being the natural outcome of a tribe's dominance and strong cohesion. Applying this theory to the Banū Ruman—a tribe of Latin-Roman heritage, or indigenous inhabitants who maintained their heritage and origins despite intermingling with the Arab conquerors, and who were likely Muwalladūn forming a significant part of the region's demographic makeup, known as a mixed ethnicity of

³⁶ Ibn Khaldun, *Op. cit.*, p. 585.

³⁷ Ibn Khaldun, *Op. cit.*, Vol. 1, p. 165.

Latin and Berber or African descent³⁸—regardless of this tribe's initial appointment by the Hammadid authority, their assumption of power, whether through local consultative council or by the authority's desire based on loyalty and shifting circumstances due to their growing influence and strength, coupled with subsequent turmoil due to the Banū Hilal's entry into Ifriqiya and the Hammadid government's preoccupation with defending its possessions, led them to consider secession from the Fortress after fifty years of loyalty and subordination.

The economic foundations of the Banū Ruman's power are thoroughly analyzed by Ibn Khaldun, who attributes their dominance to their extensive landholdings and control over water resources.³⁹ This interpretation is supported by modern scholarship, with Muhammad Hasan emphasizing the role of agricultural wealth in shaping political authority in the Zab, while 'Allawah 'Ammarah's study of the Hilali migration further contextualizes the Banū Ruman's rise and fall within the broader demographic and political transformations of the region.⁴⁰ This occurred during the era of Ja'far ibn Abī Ruman, who "broke obedience to the covenant of Buluggīn ibn Muḥammad, took control of the country, and resisted," leading to the suppression of the revolt and the weakening of this tribe through the appointment of a new council from different members, the Banū Sindī—also considered Muwalladūn of African-Latin origin. Their rule lasted five years until a military coup led by remnants of the Banū Ruman family seized the Zab territory and renounced obedience to the Hammadids in a serious attempt at independence; however, the Hammadid government this time quashed the coup, executed the rebels at the Fortress, extinguished any spark that might lead to further rebellion, and reinstated the loyal Banū Sindī family, who continued to rule until the end of Almohad governance.⁴¹

If we attempt to apply the theory of group solidarity to the Zab region, specifically to the Banū Ruman, we find they achieved domination both economically—through ownership of estates, land, and plantations—which led to allegiance from surrounding urban and rural tribes, and through the solidarity that granted them the power to dominate; "for leadership over a people must stem from a solidarity that dominates other solidarities one by one, as each group, upon sensing the dominance of the leader's solidarity, submits and follows".⁴² The Banū Ruman understood this dynamic and worked to strengthen their solidarity to protect their leadership; thus, when the

³⁸ Michael Brett, *Ibn Khaldūn and the Aynassic Approach to Local History: The Case of Biskra*, 1991, p. 159.

³⁹ Ibn Khaldun, *Op. cit.*, Vol. 6, p. 585.

⁴⁰ Muhammad Hasan, *The Historical Geography of Africa*, National Books House, Libya, 2004, p. 10.

⁴¹ Ibn Khaldun, *Op. cit.*, Vol. 6, p. 585.

⁴² Ibn Khaldun, *Op. cit.*, Vol. 1, p. 165.

Hammadid authority weakened or became preoccupied with wars (due to the Hilalian incursion), they attempted to transfer leadership to themselves through secession and independence, relying on the local solidarity they had built in their struggle with the central authority, thereby "humbling other factions and preventing them from aspiring to share power, suppressing their ambitions until none retained any claim to authority".

6. Conclusion

This study has demonstrated that the relationship between urban and rural areas in the Lower Zab during the Sanhaja period was not a mere geographical adjacency or a simple functional division of labor; rather, it constituted a symbiotic triad of exchanges—tribal-sociological, economic-commercial, and security-based—which collectively forged a resilient and integrated territory, for the concept of "hydraulic settlement" introduced here served as the material foundation of this integration, yet it was the dynamic interplay of the three exchanges that transformed the Zab from a collection of oases and cities into a cohesive socio-spatial organism.

First, tribal and sociological exchange provided the human fabric of this integration; indeed, applying Ibn Khaldun's theory of *aṣabiyya* (group solidarity) to the Zab reveals that the countryside was not a passive periphery but rather the generative source of social cohesion, for the Zenata tribes dominating the rural areas embodied the raw and unbroken *aṣabiyya* of nomadic life, whereas the Sanhaja controlling the urban centers channeled that solidarity into political dominion. The Banū Ruman and Banū Sindī families—of Latin-African origin—exemplify this dynamic perfectly, since their rise to power was not imposed solely by the Hammadid state but emerged from their accumulated economic influence (lands, water rights) and their ability to mobilize local solidarities; moreover, this exchange was bidirectional, for the countryside supplied the demographic and tribal energy that renewed urban populations, while the cities offered the institutional framework (mosques, markets, courts) that transformed tribal customs into codified governance. Consequently, the "mosaic" social structure—where cities housed Muwalladūn, Persians, and Arabs while rural areas retained Berber Ibadi communities—was not a source of fragmentation but rather a functional division that enabled each group to specialize while remaining fundamentally interdependent.

Second, economic and commercial exchange provided the material circulation that bound the territory together; the hydraulic systems (qanats, waterwheels, and the rotational *nawba* system) were not merely technical achievements but rather the economic sinews of integration, for rural areas produced the surplus—dates, olives, grains, livestock—that sustained urban populations, whereas cities processed these raw

materials into manufactured goods (leather, pottery, textiles) and simultaneously provided the commercial infrastructure (markets, inns, customs posts) for regional and trans-Saharan trade. Furthermore, the Zab's position as a corridor between the Tellian north and the Saharan south meant that this economic exchange was not closed but outward-facing, thereby generating wealth that reinforced both rural productivity (through investment in irrigation) and urban stability (through tax revenues); as a result, the regulated water distribution, governed by Maliki legal principles, ensured that no single village or city could monopolize this vital resource, thus institutionalizing economic interdependence as a lasting structure.

Third, security exchange provided the protective envelope that made the first two exchanges possible; given that the Zab was a frontier territory perpetually threatened by Zenata-Sanhaja conflicts, Hilalian incursions, and the weakness of central Hammadid authority, neither cities nor rural areas could survive alone. The defensive architecture of the Zab—moats, walls, citadels, and fortified *qṣūr*—was a collective project, for cities like Biskra and Tahūda anchored the defensive network and protected administrative and commercial nodes, while the countryside's compact, contiguous settlements (described by al-Idrisi as "connected buildings") formed a human shield that absorbed initial attacks and guarded water sources and agricultural lands. More importantly, the countryside assumed the role of "collective tribal responsibility" in the absence of a strong state—a classic Khaldunian mechanism where rural *aṣabiyya* compensated for weak central authority—and thus this security exchange was not a one-way protection but a mutual guarantee, since the countryside's loyalty to urban-based governors was exchanged for the cities' provision of armaments, fortification expertise, and coordinated defense strategies.

Finally, the synthesis emerged from the simultaneous and mutually reinforcing operation of these three exchanges; tribal solidarity provided the social trust that enabled economic transactions and collective defense, while economic surplus funded both urban institutions and rural irrigation as well as the construction of fortifications, and security stability allowed trade routes to function and populations to settle, which in turn strengthened tribal bonds through shared risk and reward. This triad created a clear positive feedback loop: water management → agricultural surplus → trade wealth → political power (exemplified by the Banū Ruman) → investment in defense → protection of water systems → continued productivity. Crucially, the Zab's integration was not imposed from above by a powerful state (for the Hammadids were often absent or weak), nor did it emerge from ethnic homogeneity (for the society was deeply mosaic); instead, integration arose **from functional necessity, since the harsh desert environment, the scarcity of water, and the constant threat of external**

attack made interdependence the only viable path to survival and prosperity. The Zab thus offers a compelling case study of bottom-up territorial integration in pre-modern Islamic North Africa, where ecological constraints and human agency combined to produce a resilient, self-organizing urban-rural system.

In conclusion, the Lower Zab during the Sanhaja period was not a loose collection of cities and oases but rather a truly integrated territory—a socio-spatial organism within which tribal, economic, and security flows circulated continuously between countryside and city, where the "hydraulic settlement" model was the material expression of this integration, yet its animating spirit was the symbiotic triad of exchanges. This conclusion challenges simplistic dichotomies (urban/rural, sedentary/nomadic, Arab/Berber) and invites scholars to view peripheral regions not as passive backwaters but as dynamic laboratories of territorial innovation. Ultimately, the Lower Zab during the Sanhaja period was not a loose collection of cities and oases but rather a truly integrated territory—a socio-spatial organism within which tribal, economic, and security flows circulated continuously between countryside and city. The "hydraulic settlement" model was the material expression of this integration, yet its animating spirit was the symbiotic triad of exchanges. This study thus contributes to a broader understanding of how peripheral regions in pre-modern Islamic North Africa achieved resilience and cohesion through functional interdependence, challenging simplistic dichotomies of urban versus rural, sedentary versus nomadic, and center versus periphery, and inviting scholars to view such regions as dynamic laboratories of territorial innovation rather than passive backwaters of history.

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