

Original Research Article

An Analysis of the Architecture of the Neolithic and Chalcolithic Periods in Kermanshah (A Case Study of Ganj Dareh and Godin Tepe)

Seyedeh Saeideh Mahdavian^{1*}, Elham Andaroodi¹, Pegah Samei Yazdi¹, Mohammad Hassan Talebian¹

1. Department of Architectural Heritage Studies and Conservation, School of Architecture, College of Fine Arts, University of Tehran

Received: 24/05/2025

Accepted: 07/12/2025

Available online: 01/04/2026

Abstract

The Kermanshah region in the Central Zagros, with prominent archaeological sites like Ganj Dareh and Godin Tepe, is considered one of the main centers for the formation of culture and architecture in the prehistoric period of Iran. Despite numerous excavations, the focus of most previous research has been primarily on ceramics and tools, while the physical and spatial analyses of the architecture have received less attention. This shortcoming has prevented a proper understanding of the connection between construction patterns and the social and ritualistic structures of the early communities in this region. This research focuses on Ganj Dareh (Layer D, Late Neolithic PPNB) and Godin Tepe (Period VI, Early Chalcolithic) to identify and compare the architectural patterns, spatial organization, and ritualistic elements in these two sites. The main research questions are: 1) What role did the architectural innovations of Ganj Dareh play in the formation of the physical structures of contemporaneous sites such as Tepe Zagheh, Sang-e Chakhmaq, and Sheikhi Abad? 2) What are the similarities and differences between the architectural pattern of Godin Tepe and other prominent sites of the Chalcolithic period, including Susa III and Tall-e Malyan? The current research is based on pure architectural analysis and spatial organization analysis. The data includes excavation reports, plans, maps, and published visual documents from the studied sites. The research process was conducted in three steps: 1) Collection and documentation of architectural data. 2) Structural, spatial, and physical element analysis. 3) Comparative analysis at the regional scale. In this interpretive approach, each architectural element is examined not as an isolated object, but as a reflection of the spatial and cultural order of the prehistoric society. The findings indicate that Ganj Dareh, with its dense structure, square plans, and contiguous organization, reflects the initial experiences of sedentary settlement and the close intertwining of life and ritual. In contrast, Godin Tepe, with its rectangular spaces, symmetrical doorways, and central depressions, is indicative of a more advanced stage of architectural organization during the Chalcolithic period. These similarities and differences suggest the existence of networks for cultural exchange and the transfer of architectural patterns across the Iranian Plateau, and they solidify Kermanshah's position as one of the centers of architectural innovation in the Central Zagros during prehistory.

Keywords: *Neolithic Period, Chalcolithic Period, Ganj Dareh Tepe, Godin Tepe, Prehistoric Architecture.*

*Corresponding author: +989113391433, Saeideh.Mahdavian@ut.ac.ir

Introduction and Statement of the Problem

Archaeological studies conducted at Neolithic and Chalcolithic sites in the Kermanshah region have revealed the significant importance of this area in understanding the prehistoric societies of Iran. However, most research in this field has focused on cultural aspects, tools, and ceramics, while the architecture and spatial organization of the sites have received less attention. This is even though architectural data is recognized as one of the most crucial resources for understanding the social and symbolic structures of the past. Through the analysis of spatial organization, the type of construction, and the manner of space utilization, this data holds a high capacity for revealing individual, economic, political, and ritualistic relationships in past societies (Rotea et al., 2003). Within this framework, the study of architecture is not merely considered a material remnant, but rather as the objective manifestation of cultural and social mechanisms—an approach that also forms the theoretical basis of the current analysis.

In research conducted on the Neolithic and Chalcolithic sites of Iran (Smith, 1996; Gopnik & Mitchell, 2016; Kleiss, 2018; Young, 1969; Smith, 1974; Desset, 2012), scholars have often sufficed with describing the physical features, and comparative analysis of architectural structures between contemporaneous or related sites is rarely seen. Nevertheless, examining the similarities and differences in architecture across various sites can lead to the identification of shared patterns, innovations, and the extent of mutual cultural influence between regions. In this regard, the present research investigates and analyzes the architectural features of Ganj Dareh and Godin Tepe in the Kangavar Plain and compares them with other examples from Neolithic and Chalcolithic sites in Central and Southwestern Iran. Ganj Dareh belongs to the Neolithic period, and Godin Tepe belongs to the Chalcolithic period. Although these two sites exhibit clear differences in spatial structure and the manner of settlement organization, they have been examined side-by-side in this study due to the importance of each in the process of forming sedentary life in the Central Zagros. This contrasting comparison provides a suitable framework for understanding the trajectory of

fundamental changes in architecture, spatial organization, and ways of life from the initial period of settlement to the era of the formation of institutional structures. Furthermore, the comparison of Godin Tepe with examples such as Tall-e Malyan or Susa, which are considered major centers of the Elamite culture, helps to clarify the structural, spatial, and functional differences among various cultural spheres and their reflection in architecture.

Research Questions

1. What influence did the architectural innovations of Ganj Dareh Tepe have on the formation and evolution of the physical structures of contemporaneous sites in the Neolithic period, such as Tepe Zagheh, Tepe Sang-e Chakhmaq, and Tepe Sheikhabad?
2. What are the similarities and differences between the architectural pattern of Godin Tepe and other prominent sites of the Chalcolithic period, including Susa III and Tall-e Malyan?

Answering these questions can provide a deeper understanding of the architectural trends of prehistoric Iran and clarify the position of the Kermanshah region in the architectural developments of that era.

Literature Review

The region of Western Iran, particularly Kermanshah province, is considered one of the most important fields for prehistoric archaeological studies in Iran. Numerous excavations in this region, particularly at Ganj Dareh and Godin Tepe, have yielded valuable insights into cultural, subsistence, and architectural developments during the Neolithic and Chalcolithic periods.

Ganj Dareh Tepe (Fig. 1, A) was excavated by Philip Smith in the 1960s (Solar Hijri decade 1340s), and five settlement layers were identified there. In his reports, Smith noted the use of plano-convex bricks, thin walls, and contiguous structures, but a comparative analysis with other sites was not carried out (Smith, 1974; Smith, 1997). Regarding Godin Tepe (Fig. 1, B), excavations were conducted by Cuyler Young, which led to the identification of seven cultural periods. The primary focus of Young's



Fig. 1. Panoramic Views of the Studied Archaeological Sites; A) Ganj Dareh Tepe; B) Godin Tepe. Source: Authors.

research was on ceramics and cultural layers, and the architectural description was of secondary importance (Young, 1969; Gopnik & Rothman, 2016). Published studies in the field of architecture in recent years (Table 1) have somewhat compensated for this deficiency and provide a suitable theoretical framework for the current research. The first two articles focus on ritual buildings of the Late Iron Age, and the third article concentrates on Early Bronze Age settlements. The current research connects this chain to the Neolithic period and the beginning of the Chalcolithic period, demonstrating that the roots of some identified concepts, such as the separation of private space (or sanctuary) or the selection of elevated ground, are also visible in the architecture of Ganj Dareh and Godin Tepe. While previous studies present examples from Hamedan, Kurdistan, and West Azerbaijan, the focus of the present article is on Kermanshah, which completes the missing link in the Central Zagros.

The research by Talebian et al. (2022) and Javidnia & Hozhabri (2019) emphasizes sacred and ceremonial spaces, whereas the research by Qorbani et al. (2018) is focused more on plan and materials. The current research, for the first time, integrates the spatial characteristics of Neolithic

settlements with ritualistic indices and demonstrates that before the separation of the domestic-sacred boundary in the Late Iron Age, these concepts were intermingled within the Chalcolithic settlements of Kermanshah.

Generally, previous studies on Median temples, the Ziwiye sanctuary, and the Kura-Araxes settlements have shown that architectural analysis can reveal the social and ritualistic layers of prehistory; however, the Neolithic period of the Zagros has not yet benefited from such an approach. The present study addresses this gap by undertaking a comparative analysis of Ganj Dareh Tepe and Godin Tepe and utilizing the analytical framework of these studies. It provides a continuous model for the evolution of materials, plan geometry, and sacred symbols from the eighth to the sixth millennium BCE. Thus, the significance and necessity of this research become apparent not only in expanding knowledge about the prehistoric architecture of Kermanshah but also in creating a conceptual bridge between the first mud-brick houses and the grand sanctuaries of the Iron Age. The distinguishing feature of the current research lies in its comparative approach to analyzing spatial structures, plan geometry, materials, and ritualistic signs within a broader regional and cultural context.

Table 1. Published Studies on Prehistoric Architecture. Source: Authors.

Source	Period / Target Site	Key Prehistoric Architectural Findings
Talebian et al. (2022)	Late Iron Age / Median Sanctuaries at Nushijan, Zar Bolagh, and Ozbeki	Introduced the “Two-Part Pattern” (Waiting Space - Holy Space) and the separation of the sacred boundary (or harim); showed that the mud-brick structural tradition continued uniformly until the Iron Age.
Javidnia & Hozhabri (2019)	Late Iron Age / Elevated Structure of Ziwiye (Mannaean)	Re-interpreted the building as a ritual sanctuary; emphasized the role of “height” and the pillared hall in conveying sanctity and controlling the view over the surrounding plain.
Ghorbani et al. (2018)	Early Bronze Age / Kura-Araxes Culture Settlements around Lake Urmia	Observed the transition from circular to rectangular plans and their connection to spatio-social organization; identified repeating modules and family units in the architecture of the early 3rd millennium BCE.

Theoretical Framework

The theoretical foundation of this research is based on the intersection of two main traditions in Mesopotamian archaeology: Culture History and Anthropological Archaeology (Matthews, 2003). Since the mid-20th century, prehistoric archaeology shifted from focusing on isolated artifacts and structures to the systematic study of the formation and evolution of human societies. Within this shift, the tradition of Culture History, which originated in Europe in the 19th century (Lyman et al., 1997), still plays a fundamental role in defining the temporal and spatial boundaries of cultures and reconstructing material typologies. Meanwhile, the Anthropological Archaeology approach, inspired by the works of Robert Braidwood and the Iraq-Jarmo Project (Braidwood & Howe, 1960), added a query-driven, interdisciplinary, and human-centered dimension to these studies. These two traditions were complemented in the final decades of the 20th century by the emergence of interpretive trends that emphasize ambiguity, polysemy, and the position of the observer in the process of interpretation (Tringham, 1995; Pollock, 1999). In this framework, architectural analysis is utilized as a platform for understanding the life and social systems of prehistoric societies. As Braidwood emphasizes in the Jarmo Project report, the “archaeology of ideas” requires the simultaneous utilization of all scientific tools and analytical imagination (Braidwood & Howe, 1960, 7–8). Accordingly, the settlement structures at Ganj Dareh and Godin Tepe are considered not as static objects, but as systems that reflect patterns of production, division of labor, and symbolic representations at both the domestic and

collective scales. The house is seen as an analytical unit that plays an active role in the production and reproduction of social relationships. From this perspective, domestic spaces in Neolithic societies are arenas where social, economic, and symbolic forces are embodied on a tangible and material scale (Hole 1995; Pollock 1999, 25). In contemporary archaeology, the study of the past relies on understanding the processes of cultural transformation through material data. This approach views social change and the formation of human life patterns as the result of a network of mutual relationships between humans, environment, climate, and material, and considers any mono-causal or deterministic explanation to be inadequate. Based on this perspective, material data are not passive remnants but active evidence of cultural action that gains meaning within the context of human-environment interaction. Within this framework, architecture is also understood as a cultural act—a sphere where aesthetic, functional, and symbolic decisions are interwoven with environmental and social conditions. Therefore, the analysis of architectural and settlement spaces in this research focuses on understanding the ways through which human societies construct their culture, identity, and settlement patterns within their material context (Matthews, 2003, 67-70). In other words, architecture in its earliest forms is not merely the product of biological necessity, but rather a tool for social representation and organization. This dual bio-symbolic origin makes architecture one of the most fundamental material pieces of evidence in the study of the evolution of human culture. From this point of view, in analyzing the architectural data of the studied tells, the house must be considered not as

a single structure, but as an expression of the life, ritual, and semantic systems of the Neolithic society; a place where settlement, ritual, and community are formed in an inseparable bond, and the physical structure narrates the continuity and evolution of human ways of being in the world.

In archaeological research, architectural data is recognized as one of the most crucial resources for understanding the social and symbolic structures of the past. Through the analysis of spatial organization, construction type, and the manner of space utilization, this data holds a high capacity for revealing individual, economic, political, and ritualistic relationships in past societies (Rotea et al., 2003). Within this framework, the study of architecture is considered not merely a material remnant, but rather as the objective manifestation of cultural and social mechanisms; an approach that also forms the theoretical basis of the current analysis. Consequently, architecture in this research is considered one of the principal pieces of evidence for recognizing the social and cultural structures of prehistoric societies. The physical analysis of residential spaces, from spatial organization to construction technology, enables an understanding of the internal logic of life, ritual, and community in diverse contexts. From this perspective, the house and settlement are not just locations for physical existence, but are arenas for the representation of social relationships, division of labor, and symbolic ties with the environment. Based on this very approach, the architectural analyses of Ganj Dareh and Godin Tepe, and their comparison with other contemporaneous sites, are interpreted as an effort to read this cultural logic from the material structure.

• **Kermanshah, the central zagros, and the selection of the study area**

Given the unique position of the Central Zagros in the prehistoric archaeological studies of Iran, this region has been chosen as the primary focus of the research. The existence of early and diverse settlements, including the oldest known examples of human habitation, doubles the importance of this area. Within this framework, two prominent sites have been investigated: Ganj Dareh

Tepe as a representative of the early village-farming period, and Godin Tepe in the Kangavar Plain, which represents the architecture of the Chalcolithic period. The Kangavar Plain, with valleys in high altitudes, has created a natural wall approximately 160 kilometers long (Fig. 2) (Hole, 2009, 110). This natural location has played an essential role in the formation of settlement networks and the continuity of habitation in the region.

• **Physical studies of selected sites**

- **Ganj Dareh**

Ganj Dareh is a small, conical mound located in a field beside the road from Kermanshah to Harsin, near the village of Gheiswand. This site is situated at an elevation of about 1400 meters above sea level (Fig. 3, A) (Malek Shahmirzadi, 2003, 258). The tepe (mound) is in a valley next to a small river and stands out as a distinct prominence among the surrounding farm fields. Its current size is approximately 1,300 square meters, and the depth of its settlement layers ranges from 7 to 8 meters (Smith, 1997, 49).

- **Site analysis**

Based on field observations, Ganj Dareh Tepe has been divided by erosion into three prominences that form the vertices of a triangle. The distance from the mound to the edge of the road is only about 5 meters, and the base of the hypothetical triangle is positioned parallel to the road. From this base, a sloping path leads to the center of the mound, which, at its lowest point, is about 2 meters higher than the road level. Ganj Dareh is the only Neolithic site in Iran where architectural remains have been excavated, and the only remaining structure is a wall that has collapsed due to rainfall. Aerial photographs show that two massive limestone mountains are situated from the northwest to the southwest and from the northeast to the southeast, and Ganj Dareh served as a passageway between these two mountains (Fig. 3, B). Furthermore, a seasonal spring flows from the north toward the southwest of the site. Today, the surrounding lands of Ganj Dareh are dedicated to onion cultivation, and the small distance between the road and the site places it under serious risk of damage and destruction (Fig. 3, C). Five settlement layers have been identified

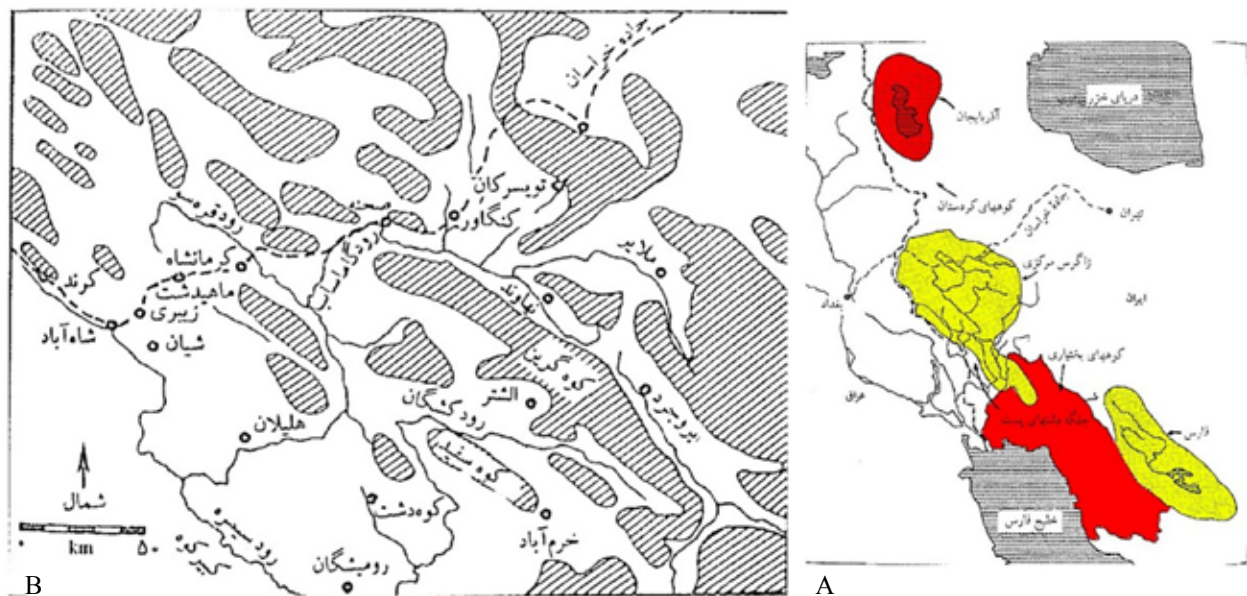


Fig. 2. A) Locations of the Four Main Regions in Western Iran: Lowlands, Azerbaijan, Central Zagros, and the Intermontane Plains of Fars; B) The Central Zagros Region. Source: Hole, 2009, 143- 152.

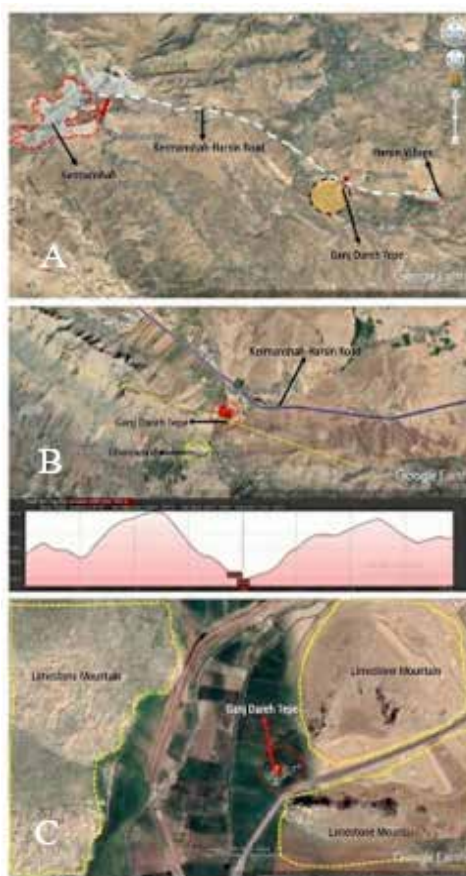


Fig. 3. A) Aerial photograph of the geographical location of Ganj Dareh Tepe; B) Cross-section showing the position of Ganj Dareh Tepe; C) Ganj Dareh surrounded by limestone mountains. Source: <https://earth.google.com/web>

at Ganj Dareh, named with letters of the alphabet from A (the upper layer) to E (the lowest layer), spanning from the surface of the mound down to the virgin soil. Each of these layers possesses specific architectural characteristics and structures that reflect the different phases of habitation at the site. The specifications and features of all five settlement layers are presented in Table 2.

- Analysis of spatial organization and geometry

The primary concentration of construction at Ganj Dareh is observed in Layer D, which indicates a relative stability in the village settlement (Malek Shahmirzadi, 2003, 259). The architecture of this layer is mainly oriented along the southeast to northwest axis, although it lacks a defined geometric order and is affected by repeated rebuilding (Smith, 1997, 54) (Fig. 4, D). The plans are typically quadrangular (four-sided), sometimes irregular, and feature curved corners, establishing a connection between rigid geometric form and functional needs (ibid., 51) (Fig. 4, A & B). The overall layout of the settlement is dense and “contiguous”; there are no courtyards or passageways, and entry to the spaces was likely via the roof (ibid., 51) (Fig. 4, C). In terms of spatial functions, there is evidence of storage areas, a storage bin (lāvak)¹, and large jars (khomreh), which indicate a type of economic organization

Table 2. Specifications of Ganj Dareh Settlement Layers. Source: Authors based on Malek Shahmirzadi, 2003, 259.

Layer	Depth (meters)	Architectural Features
A	From the surface down to approximately 1.5 m	Neolithic walls constructed with red-colored mud-bricks
B	From approximately 2 m to 3 m	Pisé architecture
C	From approximately 3.3 m to 4.9 m	Pisé architecture
D	From approximately 5 m to 6 m	Pisé architecture and Mud-brick architecture
E	From approximately 6 m to 7 m (Virgin Soil level)	Lacks definitive architecture; features hollows about 50 cm deep in the virgin soil.



Fig. 4. A) Main walls of Layer D in the central part of the site. Source: Smith, 1997, 53; B) Probable delineation of the units; C) Absence of a path or alleyway among the structures; D) Southeast to Northwest orientation of the residential units. Source: Authors based on Smith, 1997.

within the settlement. Furthermore, burials in the floors of the rooms, the presence of animal skulls, and symbolic pillars point to the existence of ritualistic layers within the spatial organization (ibid., 58-59).

- Architectural and structural details

The physical structure of Layer D contains evidence of fire and successive reconstructions, which confirms the continuity of habitation at this site (Smith, 1997, 51) (Fig. 5, A). The spatial organization in some houses was more advanced, and even two-story construction has been observed. These spaces were designed with combined residential, workshop, and sleeping functions and were separated from each other by partition walls. To reinforce the walls, auxiliary walls and the filling of chambers

along with exterior plaster were used, which would have increased the stability of the upper floors (ibid., 51-52). The walls were mainly built using the “exposed Pisé technique”, which involved thin layers of mud and fine particles and was plastered on both sides—a specific method for separating spaces (Fig. 5, B). Additionally, openings in the walls were designed in the form of embrasure (mazghal)² and calyplug³ fittings, which likely served functions such as ventilation, lighting, or ritualistic purposes (ibid., 55-58) (Fig. 6, A).

- Materials and decorations

Architectural finds show that the main materials used at Ganj Dareh were clay, wood, and mud-brick. The preference for these materials over stone (despite the

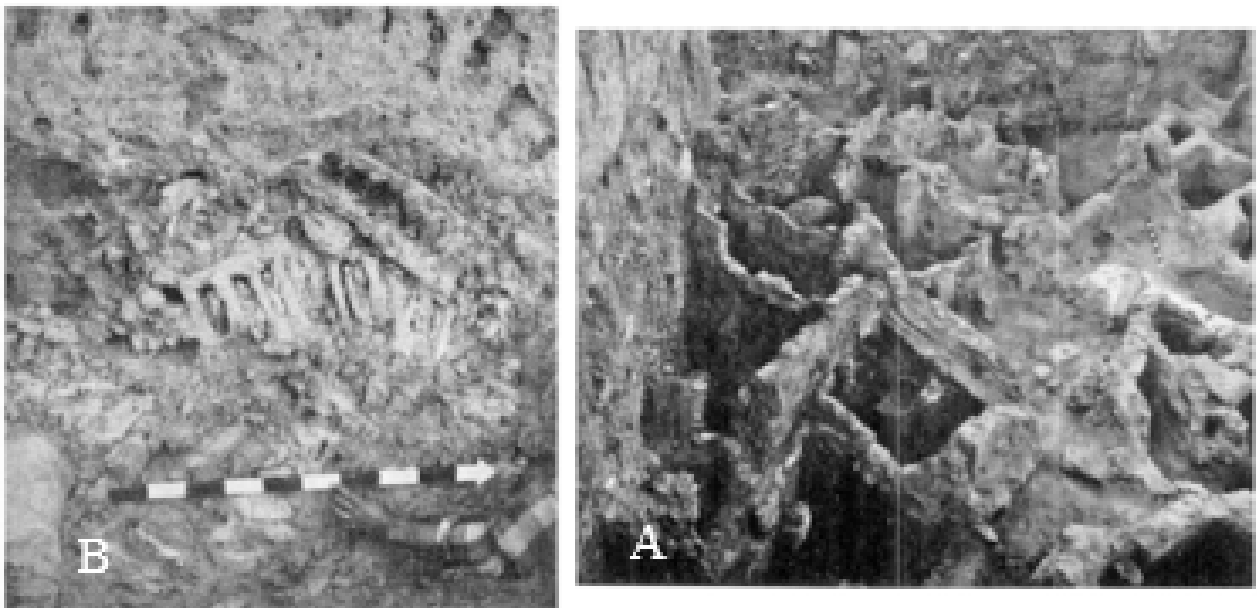


Fig. 5. A) View of Layer D from the 1971 excavation season, showing the main walls and burnt debris; B) Cross-section of the exposed Pisé (Pisé) in the burnt debris of Layer D. Source: Smith, 1986, 53- 56.

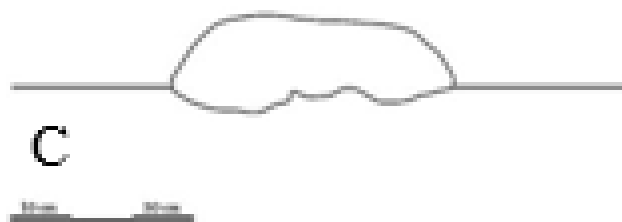
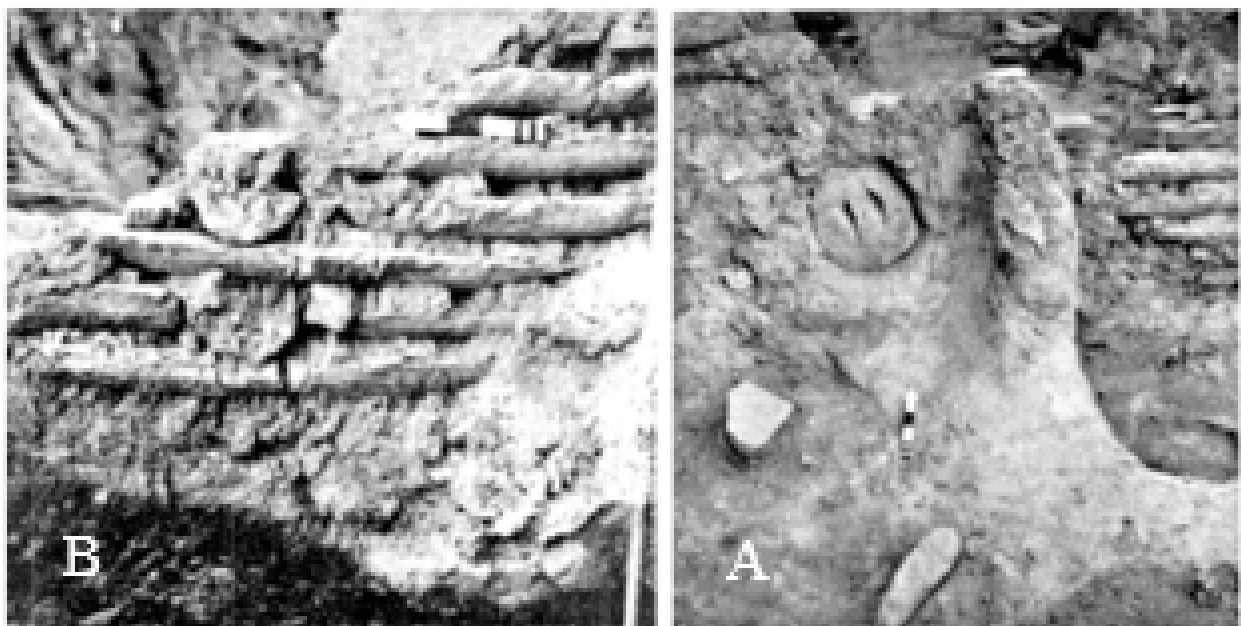


Fig. 6. A) An embrasure in one of the Layer D walls that has been sealed with a clay plug. Source: Smith, 1986, 56; B) Cross-section of a wall constructed with boat-shaped mud-bricks. Source: Smith, 1997, 54; C) Cross-section of a mud-brick recovered from Ganj Dareh. Source: Authors.

abundance of limestone rocks surrounding the site) indicates local traditions and a tendency towards quick construction (Smith, 1997, 50). Among these, the use of delicate, boat-shaped mud-bricks (or zorughi bricks) is one of the most distinctive features (Fig. 6, C). Internal surfaces were mostly covered with mud plaster, and there is no evidence of specific architectural decorations, which suggests an emphasis on functionality and simplicity in the constructions (ibid., 50). Nevertheless, mud-brick manufacturing at Ganj Dareh had reached an advanced level. The boat-shaped bricks were constructed with mechanical interlocking that ensured the structural strength and integrity of the walls (ibid., 54–57) (Fig. 6, B).

- Godin tepe

Godin Tepe, located in the Kangavar Plain in the Central Zagros, is one of the most important archaeological sites in Iran. This tepe (mound) covers an area of approximately 15 hectares and rises 33 meters above the surrounding plain. It is not a natural feature, but rather the result of the accumulation of successive layers of habitation and the remains of human ruins over thousands of years (Gopnik & Mitchell, 2016, 66).

Temporal Analysis and Contextual Setting (Godin Tepe: A geographical and cultural node over time): This site is situated on the southern bank of the northeastern branch of the Gamasiab River, approximately 30 meters above the surrounding plain and 1,400 meters above sea level (Fig. 7, A) (Malek Shahmirzadi, 2003, 276). Its proximity—only one kilometer—to the village of Godin provided inhabitants with access to natural resources and enabled control over communication routes, justifying its selection as a long-term settlement location.

Archaeological excavations indicate that Godin Tepe was located on a major east-west thoroughfare, a route that connected Mesopotamia to the Iranian Plateau and eastern regions via the Zagros Mountains (Gopnik & Mitchell, 2016, 67). The importance of this route was amplified in later periods when it became part of the Silk Road. Its position along the Gamas-iab River also facilitated the transfer of goods, culture, and technology, making Godin Tepe an intermediary point in civilizational

exchanges (ibid., 68). Current field evidence, such as the presence of an Imamzadeh (shrine) attributed to Imamzadeh Baqir and a large cemetery on the eastern and southern slopes, indicates the continuation of the site's sanctity and social function in later periods (Fig. 7, B).

Stratigraphic Structure and Reflection of Cultural Transformations at Godin Tepe: Young's excavations at Godin Tepe continued down to virgin soil, revealing a complex sequence of layers that reflect cultural, social, and technological transformations over several millennia (Gopnik & Mitchell, 2016, 120). The most recent layer, Godin I, belongs to the contemporary era and includes features such as a coffee house and several graves (ibid., 72). In the lower layers, Godin II dates to the early 1st millennium BCE, and Godin III belongs to the 2nd millennium BCE, providing precise ceramic data that allows for the reconstruction of the Bronze Age sequence in Iran (Gopnik & Mitchell, 2016, 121). In the deeper layers, Godin IV represents settlements from the 3rd millennium BCE, while Godin VI and VII belong to the Chalcolithic period in the 6th millennium BCE (Fig. 8). This continuous stratigraphy not only emphasizes the persistence of habitation at the site but also demonstrates the inhabitants' capacity to adapt to climatic, political, and economic changes over time.

Re-evaluation of Godin VI Stratigraphy and Recognition of Cultural Interactions: The initial findings related to Godin VI:1, which were originally published under the title Godin V, were re-evaluated in subsequent research. Young, in 2004, corrected the confusion in the initial classification by re-studying the stratigraphy and presenting a new division for Godin VI. This review clarified that artifacts associated with the Uruk culture, including trays and Beveled Rim Bowls⁴, were situated in the upper part of Layer VI, and not in a separate layer (Gopnik & Mitchell, 2016, 448–449).

Based on this revised division, Godin VI is separated into three phases: Phase VI: 3 represents an indigenous, independent culture before any interaction with Uruk; Phase VI: 2 reveals the first signs of contact with the lowland areas of Mesopotamia; and Phase VI: 1 demonstrates the peak of



Fig. 7. A) Aerial photograph of the geographical location of Godin Tepe; B) Cross-section showing the position of Godin Tepe. Source: <https://earth.google.com/web>.

Uruk cultural influence, in which oval architecture plays a central role (Fig. 9). This final phase is itself divided into two sub-phases, VI:1a and VI:1b, with their distinctions defined by architectural changes. Such an analytical structure, which goes beyond a simple description of the layers, helps in better understanding the cultural processes of the Central Zagros and highlights the position of Godin Tepe as an intermediary point between local cultures and supra-regional civilizations.

- Spatial organization and geometry

The architecture of Phase VI: 1 is characterized by an oval complex with a central courtyard covering an area of approximately 560m². This structure goes beyond the limits of a simple settlement, suggesting more complex functions. The oval wall is actually a later addition to the structure, indicating its gradual growth (Gopnik & Mitchell, 2016, 503- 504). Triangular rooms, such as numbers 1, 5, and 13, were built flush with the perimeter wall, showcasing spatial flexibility.

In Phase VI:1a, the physical expansion of the structure is evident; rooms such as 7 and 9 were added to the complex,



Figure 2.8. Overall plan of architecture at Godin Tepe, showing the major site grid and location of each period within the excavation units at the summit of the site

Fig. 8. The sequence of cultural periods at Godin Tepe. Source: Gopnik, 2011, 35.

and portions of the corridor were converted into open spaces, likely used for keeping livestock or as temporary storage (Fig. 10, A) (Gopnik & Mitchell, 2016, 505–506). The main entrance was solely through Room 4, a clear indicator of access control and monitoring of entry and exit (Desset, 2012, 4).

Functional analysis of the spaces also suggests a precise division of labor: Room 3 served an administrative function as a sealed archive; Room 5 was likely the guards' quarters or a cooking space; and the northern areas, such as Rooms 14, 19, and 20, were designed for specialized activities. Among these, Room 18, which was isolated from the central courtyard and had restricted access, likely held a managerial or ritualistic role (Gopnik & Mitchell, 2016, 521–522).

- Architectural and structural details

Evidence such as wooden beams found in Room

22 suggests that the ceilings were constructed as flat roofs (Desset, 2012, 4). The considerable thickness of the perimeter walls of Rooms 4, 17, 19, 20, and 23 strengthens the possibility of an upper story or terrace. The narrow wall of Room 15 has also been identified as the potential base for the staircase leading to the upper floor (Gopnik & Mitchell, 2016, 526). Such evidence indicates the presence of spatial hierarchy and vertical movement within the architectural organization of Godin Tepe.

- Materials and ornamentation

In rooms such as 2, 6, 18, and 22, regular niches are visible, which served both a functional and decorative purpose (Desset, 2012, 4; Gopnik & Mitchell, 2016, 506–507). Rectangular hearths were also placed symmetrically and centrally within the space, especially in pairs of rooms like 5–6 and 17–20. This organized arrangement points

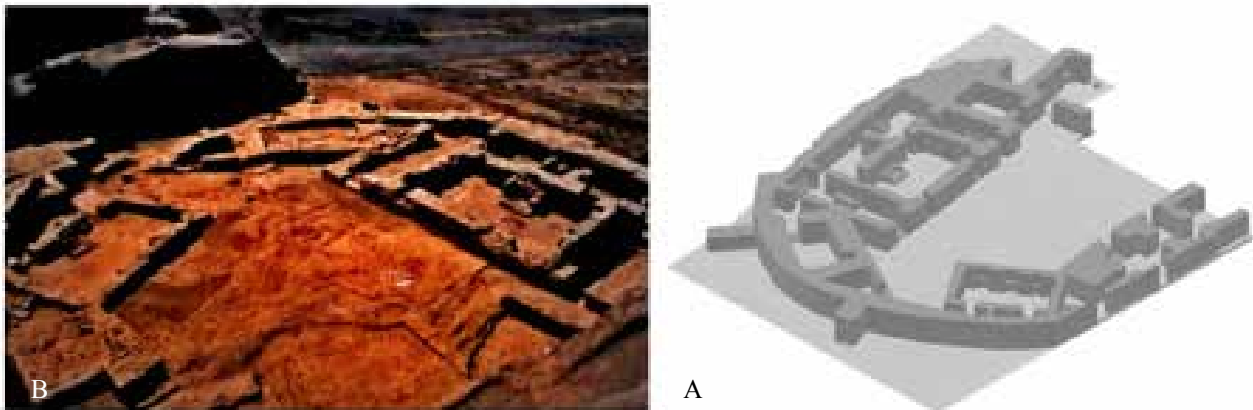


Fig. 9. A) Three-dimensional plan of the oval structure from Godin VI:1 phase. Source: Gopnik & Mitchell, 2016, 451; B) The oval enclosure at Godin VI. Source: Gopnik & Mitchell, 2016, 68.

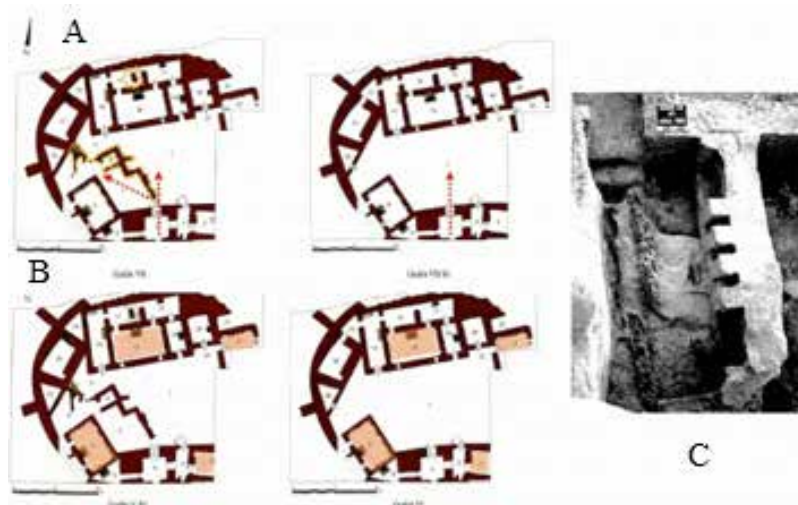


Fig. 10. A) Comparison of Godin VI:1a and VI:1b; B) Rooms containing niches in VI:1a and VI:1b. Source: Gopnik & Rothman, 2016, 93-94; C) Wall niches and remains of burnt wooden beams on the floor. Source: Gopnik, 2016, 511.

to precise planning for heating and cooking. Furthermore, the variation in the type of hearths indicates that some spaces were designed primarily for heating (such as Rooms 17–19) and others for cooking (such as Rooms 5–6) (Gopnik & Mitchell, 2016, 507).

Research Methodology

Based on the framework proposed by Collis (1999), which Matthews (2003) reinterpreted as the fundamental structure for archaeological research, every study is defined at three levels: Objective, Data, and Analytical Method (Table 3). In this study, the focus is on the Neolithic and Chalcolithic (Copper-Stone) architecture of the Central Zagros, where domestic spaces are analyzed as a reflection of past social and cultural order. The research data include excavation reports, plans, maps, and visual documents related to Ganj Dareh (Layer D) and Godin Tepe (Period VI), as well as contemporary examples from Central and Southwestern Iran. The research method is based on pure architectural analysis and spatial organization analysis. In this approach, the form, organization, and spatial relationships at micro and macro scales are described and compared to extract hypothetical models of spatial organization and the physical logic of the structures. This analysis focuses on identifying the relationships between architectural components, geometry, orientation, materials, and ritualistic mechanisms, and aims to reveal the intrinsic

meanings of the spaces within their own structure, without imposing modern concepts.

In the analysis of prehistoric architectural data, interpretations are rarely certain, and every structure or spatial arrangement can carry multiple meanings. Therefore, this research utilizes an approach that, in the words of Ruth Tringham (1995, 97), can be called “controlled multivocality⁵⁹”, meaning that the ambiguities of the data are neither eliminated nor expanded freely, but are instead contained and evaluated within a framework based on material evidence, stratigraphy, and typological comparisons. This approach aims to preserve the possibility of various interpretations without falling into the trap of relativism; thus, any functional or symbolic hypothesis regarding the spaces is only accepted if it is consistent with the structural and contextual evidence of the site.

Discussion

- Description of architectural findings

To compare and analyze the architectural characteristics of Ganj Dareh and Godin Tepe, Tables 4 & 5 provide a summary of the data for each cultural layer. In Ganj Dareh, construction diversity is evident, particularly from Layer D, where the fabric of a small village took shape and features such as pisé walls, embrasure, clay plug, and a combination of natural materials like mudbrick, mud, wood, reed, and cobble were employed. In the upper layers (A, B, and C), only simpler remains of walls and hearths are visible, while

Table 3. Methodological Framework of the Research. Source: Authors.

Title	Description
Subject of Study	Neolithic and Chalcolithic architecture in the Central Zagros, focusing on Ganj Dareh (Layer D) and Godin Tepe (Period VI)
Methodological Model	Pure Architectural Analysis and Spatial Organization Analysis
Objective	Re-evaluation and comparison of structural patterns, spatial organization, and ritualistic elements in prehistoric architecture
Nature of Method	Analytical-Interpretive with flexibility toward data differences and architectural scales
Tools and Data	Excavation reports, architectural plans and maps, visual data, and comparative documents from contemporary sites
Implementation Process	1. Documentation of architectural and spatial data 2. Structural and spatial analysis of physical elements 3. Comparative analysis at the regional scale
Analytical Axes	Geographical context and strategic location, spatial pattern and settlement organization, construction technology and materials, doorways, hearths, and ritualistic signs
Analytical Output	Identification of spatial and physical patterns of habitation

Table 4. Description of Architectural Findings at Ganj Dareh. Source: Authors.

Layer	Era	Architectural Findings	Building Type	Building Components	Ornamentation	Materials	Other Findings
A	Late 8th Millennium to Early 7th Millennium BCE	Remains of walls	-	-	Lacking coloring or ornamentation	Reddish mudbricks, mud, and wood	Several simple hearths
B	Late 8th Millennium to Early 7th Millennium BCE	Remains of walls	-	-	Lacking coloring or ornamentation	Mud, mudbricks, and wood	-
C	Late 8th Millennium to Early 7th Millennium BCE	Remains of walls	-	-	Lacking coloring or ornamentation	Mud, mudbricks, and wood	-
D	Late 8th Millennium to Early 7th Millennium BCE	Small village, Remains of Pisé walls with NW-SE orientation, Presence of embrasure and caly plug in some walls, Mud sheets used to partition different areas, storage bin (1m high, 35-73cm wide, 5cm thick)	Residential houses and workshops	Horizontal beams and small supports, Walls 30 to 40 cm thick, Internal and external props	Lacking coloring or ornamentation	Ceilings made of beams, wooden branches, and mud plaster, Poles made of poplar, willow, matting, or reeds, props made of mudbrick and mud, Some walls made of unhewn cobble, Some walls made of plano-convex mudbricks 50 to 90 cm long, Some walls made of exposed pisé 5 to 6 cm thick	-
E	Late 8th Millennium to Early 7th Millennium BCE	Lacking any architectural remains	-	-	Lacking coloring or ornamentation	-	Hearth pits, stone, charcoal, wood

Table 5. Description of Architectural Findings at Godin Tepe. Source: Authors.

Layer	Era	Architectural Findings	Building Type	Building Components	Ornamentation	Materials	Other Findings
V	3500–2900 BCE	A complex of rooms, courtyards, and storage spaces, generally regular square or rectangular shapes, with some non-geometric forms. Remains of the surrounding oval enclosure wall, the widest part measuring 1.5 meters across.	Residential houses and public buildings	Wall-mounted heaters, Hearth, Niche, Doorway, Window, Wall	Niches in the walls and white lime plaster coating	Raw mudbrick in walls and door sills, pisé walls, Lime plaster on walls, Mud plaster on the main courtyard floor	Stone blades, Beads made of shell or clay, Female figurines, Bronze needle, Tablets, and cylinder seals
VI	5000–3500 BCE	Remains of walls	-	-	-	Pisé walls	Flint blades, Copper needle or awl
VII	5500–5000 BCE	-	-	-	-	Pisé walls, Stone for foundations	Two long, quadrilateral blades, Flint blades

Layer E lacks structures and merely retains evidence of fire-making and human activity.

In contrast, Godin Tepe, especially in Periods V and VI, displays a more complex and organized architecture. In Godin V, a regular assemblage of rooms and courtyards was built within an enclosed structure featuring an oval wall, and elements such as heating installations (bokhari), hearths, niches, and windows are observable. The use of white lime plaster along with raw mudbrick and pisé indicates an engineered and structured approach to the architecture of this period. The older layers (VI and VII) have simpler remains, consisting mostly of Pisé walls and stone materials, but artifacts such as flint blades and metal tools like needles and awls suggest specialized activities by the inhabitants.

• **Comparative analysis of Ganj Dareh and Godin Tepe**

- **Geographical context and strategic position**

Ganj Dareh is situated in a small, enclosed valley among high elevations and primarily served a local function. This geographical location suggests that the settlement had an introverted character and a self-sufficient functionality. In contrast, Godin Tepe is located on a historic thoroughfare, and its access to extensive communication networks highlights its role as a cultural, economic, and even military intermediary on a trans-regional scale.

- **Spatial pattern and settlement organization**

The spatial organization at Ganj Dareh is simple and compact; the plans are constructed in a “contiguous” and introverted manner, with no evidence of streets or central courtyards. This pattern suggests a semi-communal lifestyle, energy efficiency, and an emphasis on security. In contrast, Godin Tepe has a multi-layered and more complex structure that reflects continuous architectural and functional transformations over thousands of years. The presence of organized public spaces at this site indicates the emergence of political power and organizational structures.

- **Construction technology and materials**

In Ganj Dareh, the ceilings were simpler, and there is no evidence of regular beam placement, while in Godin Tepe,

wooden beams were used to construct flat roofs, a method appropriate for the region’s arid climate. The walls in Ganj Dareh are thinner and suitable for single-story structures, but the significant thickness of some walls at Godin Tepe strengthens the possibility of upper floors or terraces. Furthermore, the lack of evidence for vertical access elements in Ganj Dareh suggests a simple and horizontal spatial organization, whereas the narrow wall in Room 15 of Godin Tepe likely indicates the presence of some type of staircase for vertical movement within the space.

- **Ritual and cultural aspect**

Ganj Dareh shows clear signs of a link between biological and ritual function; burials in the room floors, the placement of animal skulls, and ritual niches all reflect an integrated worldview bridging death and life. The presence of an Imamzadeh (a shrine) and a contemporary cemetery on the slopes of Godin Tepe indicates that the sanctity of the location was maintained in later periods, but ritual evidence in the prehistoric layers of this site has been less reported.

- **Chronological structure and continuity of habitation**

Settlement at Ganj Dareh was more temporary and short-lived, identifiable in five distinct layers, with the greatest concentration observed in Layer D. This situation suggests a pattern based on trial and error in the experience of settlement. However, Godin Tepe is the result of the accumulation of several thousand years of continuous habitation and contains more diverse cultural layers, which demonstrates its central and enduring position in regional developments.

Generally, Ganj Dareh can be considered a reflection of a pristine village settlement founded on family cohesion, an experimental spatial organization, and the simultaneous integration of biological and ritual functions. In contrast, Godin Tepe reveals the position of a regional center that developed over time with trans-regional functions and an evolving, multi-layered structure.

• **Comparative Analysis of Ganj Dareh with Contemporary Examples**

Based on the architectural review of Ganj Dareh and Godin Tepe, this section analyzes their physical similarities and differences with other contemporary sites. The selected sites

include Sheikhi Abad, Sang-e Chakhmaq, and Tepe Zagheh, which have been chosen as hallmark examples from the Neolithic period to the beginning of the Chalcolithic era in central and western Iran.

Sheikhabad, located in Kortavij, Sahneh, and belonging to the aceramic Neolithic period, is known for its dual structures (residential and ritual buildings) and walls with significant thickness, measuring 30 to 60 centimeters (Mohammadifar et al., 2011). Tepe Sialk (likely a better match for “Sangan Chaqmaq” in the broader context, or using the direct translation of the cited source) near Shahroud, with its two mounds and several settlement phases, incorporates features such as large mudbrick houses, painted floors, and ritual hearths (Tsuneki, 2014). Similarly, in Tepe Zagheh in the Qazvin Plain, excavations have revealed 17 settlement layers, showing the construction of houses using mudbrick and pisé, domical roofs (chapoleh), and painted wall decorations (Malek Shahmirzadi, 2003).

In this comparative study, indices such as the type of wall construction, flooring, ornamentation, plan geometry, unit orientation, entrance doorways, buttresses, hearths, and ritual evidence have been selected as the main comparison criteria. These criteria not only represent the key physical and functional aspects of Neolithic and Chalcolithic settlements but also enable the analysis of the construction technology, spatial organization, social structure, and symbolic beliefs of these communities. Consequently, each of these components, in addition to reflecting local environmental conditions and resources, creates a basis for examining the cultural similarities and distinctions among the studied sites.

- Wall construction and materials

The thickness of the walls in Ganj Dareh is typically between 30 to 40 centimeters, which often corresponds to the width of a single mudbrick (Smith, 1997). These dimensions are narrower compared to other sites; for instance, wall thickness reaches 60 centimeters in Sheikhi Abad and up to 100 centimeters in Sang-e Chakhmaq. Tepe Zagheh also shows remarkable variability in mudbrick dimensions, ranging from small sizes of 12× 35 to large examples of 25× 80

(Adibzadeh et al., 2005, 6; Malek Shahmirzadi, 2003, 326).

Regarding materials, although pisé was used in all these sites, Ganj Dareh exhibits a unique feature: the use of untrimmed cobble combined with mud plaster and the application of plano-convex mudbricks (Smith, 1997). In contrast, Tepe Zagheh used mudbricks mixed with plant fibers, and in Sang-e Chakhmaq, only simple mud was employed for construction (Adibzadeh et al., 2005, 6 - 40).

- Flooring and materials

The floors of Ganj Dareh are generally covered with a mud plaster/coating (Smith, 1997, 50). This contrasts with Sheikhi Abad and Sang-e Chakhmaq, where a simpler method was used and the floors were constructed with rammed earth (Mohammadifar et al., 2011, 14; Adibzadeh et al., 2005, 6). In Tepe Zagheh, a mixed approach is observed, where a combination of rammed earth and mud plaster was used (Adibzadeh et al., 2005, 40). These differences indicate the selection of materials based on available resources and the distinct functional needs of the communities at each site.

- Ornamentation

No significant ornamentation is observed on the surfaces at Ganj Dareh (Smith, 1997, 50). This simplicity is in stark contrast to sites like Sang-e Chakhmaq and Tepe Zagheh. In Sang-e Chakhmaq, the floors were coated with red paint (Adibzadeh et al., 2006, 6), and in Tepe Zagheh, geometric motifs and painted pottery were used to decorate the walls (Malek Shahmirzadi, 2003, 326). This difference indicates that aesthetics and symbolism held varying significance in these sites and were likely related to the distinct cultural and social functions of each community.

- Geometry and orientation of architectural units

The building units at Ganj Dareh are primarily constructed along a Southeast–Northwest axis; a pattern that is also repeated in Sheikhi Abad and Tepe Zagheh (Smith, 1997, 51; Mohammadifar, 2011, 14). In contrast, construction at Sang-e Chakhmaq is mostly oriented along a North–South axis (Adibzadeh et al., 2005, 6) (Fig. 11). From a geometric perspective, rectangular plans are dominant in all sites, but Ganj Dareh shows greater variability. The presence of trapezoidal and irregular plans alongside the usual

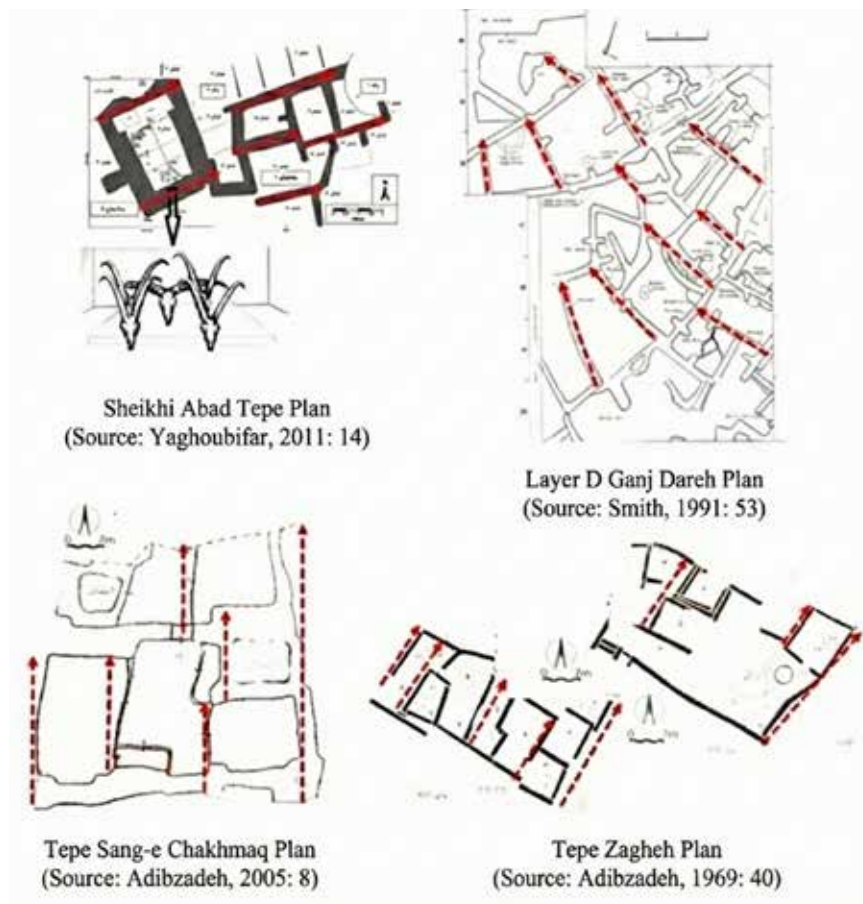


Fig. 11. Map and orientation of architectural structures in comparative examples. Source: Authors.

rectangular plans indicates greater flexibility and creativity in the design of the spaces (Smith, 1997, 51; Klaus, 2018, 41).

- Entrance

One of the prominent features of Ganj Dareh architecture is the “contiguous” pattern, lacking external pathways (streets), which resembles architectural traditions in Anatolia (Smith, 1997, 51). In this pattern, the residential units are designed such that direct access from the outside is impossible, and entry into the space likely occurred through the roof; a similar pattern is also observed in Sheikhi Abad (Mohammadifar et al., 2011, 14). In contrast, the architecture at Sang-e Chakhmaq and Tepe Zagheh is based on defined entrance doorways; these doorways featured complete architectural components like stone door sockets (Adibzadeh et al., 2005, 8- 40). These differences likely reflect a distinction in the social structure and the concept of privacy among the communities under study.

- Ritual practices

Ganj Dareh has clear evidence of ritual elements in its architecture. The discovery of wild sheep skulls inside niches and clay columns in this site indicates the presence of sacred symbols within the living spaces (Smith, 1997, 59). In Sheikhi, independent ritual spaces have also been identified, containing animal skeletons accompanied by ochre coloring (Mohammadifar et al., 2011, 14). Similarly, at Sang-e Chakhmaq, altars with hearths have been discovered in some settlement phases (Adibzadeh et al., 2005, 6). Overall, these findings demonstrate the central place of symbolic and ritual elements in the architecture and spatial organization of Neolithic settlements (Fig. 12).

- Buttresses

In Ganj Dareh, buttresses were primarily constructed as internal reinforcing structures or supplementary walls (Smith, 1997, 51–52). In Sheikhi Abad and Sang-e

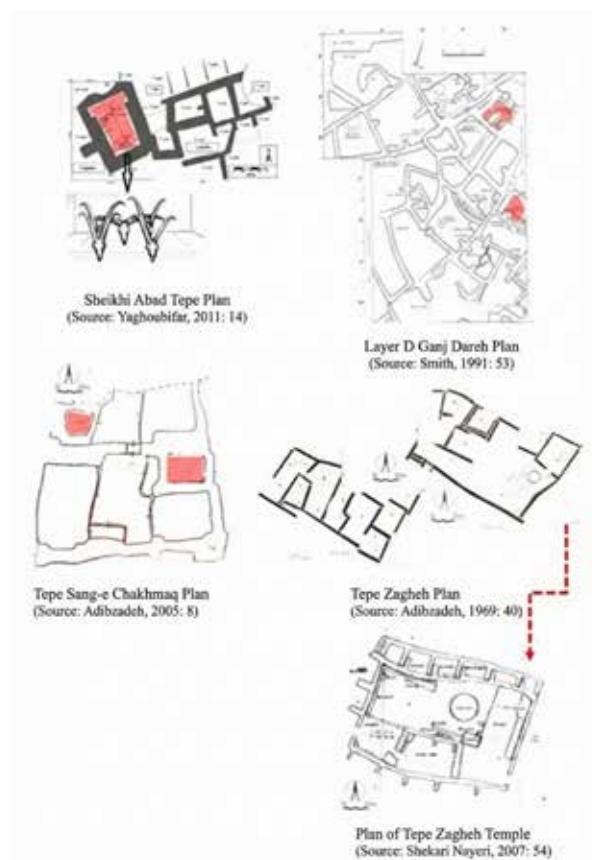


Fig. 12. Location of rooms with ritual function. Source: Authors.

Chakhmaq, buttresses with a rectangular form and a defined location were also identified, playing an essential role in the stability of the structures. In Tepe Zagheh, these elements mostly appear as external buttresses attached to the room walls (Mohammadifar et al., 2011, 15). The presence of buttresses in all these sites indicates the structural awareness and advanced engineering of the inhabitants and their efforts to increase architectural stability (Fig. 13).

- Hearth

One noteworthy aspect of Ganj Dareh is the absence of hearths in the plan of Layer D, a situation that is also observed at Sheikhi Abad. By contrast, large hearths with ritual functions have been uncovered at Sang-e Chakhmaq, and evidence of bread-baking hearths has been identified at Tepe Zagheh (Smith, 1997, 49; Adibzadeh et al., 2005, 8, 39). These differences raise questions regarding the use of interior spaces and suggest the possibility that cooking activities at Ganj Dareh and Sheikh-e Abad were relegated to more open or communal areas.

Finally, for ease of reference, Table 6 presents a comparative analysis of the principal architectural indicators across the sites examined, shown separately.

• Comparative analysis of godin Tepe with contemporary examples

To assess the physical and spatial position of Godin Tepe within the architectural context of the late fourth millennium BC, two prominent sites, Tall-e Malyan and Susa III, have been selected as comparative examples. These two sites, located in Fars and Khuzestan provinces, respectively, are considered important centers for the formation of the Elamite culture, and their architectural data allow for a precise comparison with Godin Tepe. Examining the similarities and differences among these three sites is important not only for understanding construction methods but also for re-evaluating the networks of cultural exchange and spatial organization patterns in southwestern Iran.

Tall-e Malyan (Anshan) is located 46 kilometers north of Shiraz and is recognized as the largest Proto-Elamite city in

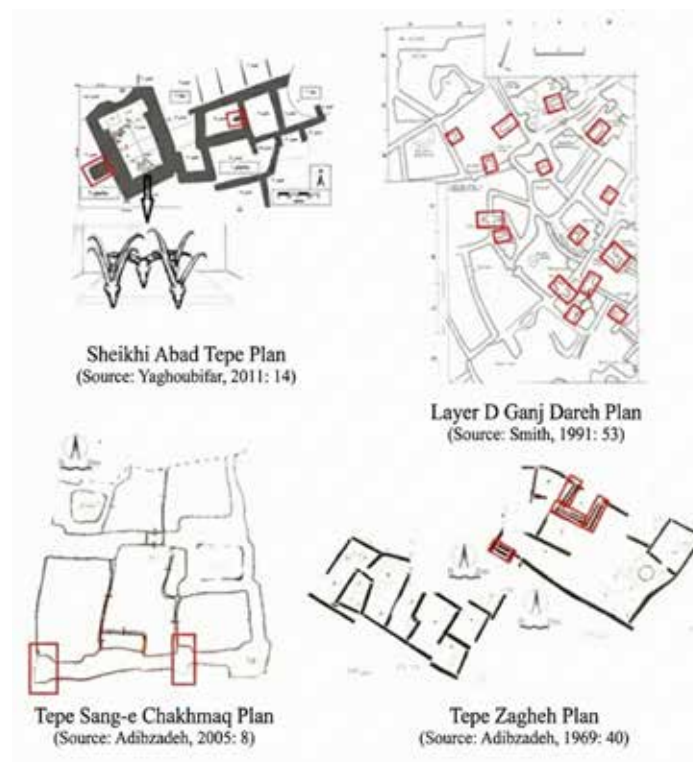


Fig. 13. Location of buttresses in the Neolithic period. Source: Authors.

the Marvdasht Plain. Its extent is comparable to centers like Susa and even Sumerian cities (Andaroodi et al., 2020, 57). Susa III, which includes Layers 14 to 17 of the Susa ancient complex, belongs to the late fourth and early third millennium BC (Desset, 2012). Archaeological evidence indicates that during this period, Tall-e Malyan and Susa had extensive cultural and organizational relations with one another (Khanipour et al., 2014, 42).

For the comparative analysis, three main indicators have been selected: “Plan Geometry,” “Building Materials,” “Spatial Organization with a Central Wall,” and “Central Hearth.” These components, which are considered fundamental elements of prehistoric architecture, not only cover the technical aspects of construction but also reflect the worldview and lifestyles of the studied societies. The selection of these axes was based on the highest structural commonality in the excavated data and the potential for a precise comparison between Godin Tepe and the two other prominent sites, Tal-e Malyan and Susa III. Within these three axes, one can better identify and analyze

homomorphisms, differences, and contexts of mutual influence.

- Plan Geometry

The plans at Godin Tepe are a combination of rooms, storage areas, and courtyards with square, rectangular, and sometimes irregular shapes, which created a diverse yet functional structure (Adibzadeh et al., 2005, 80). In Susa III, the common pattern consists of narrow, elongated rectangular rooms, and the residential complexes are organized via courtyards or open spaces containing ovens and kilns (Perrot & Dollfus, 1997, 52; Le Brun, 2020, 105). Tall-e Malyan also displays a dense, organic fabric composed of rectangular and polygonal spaces and narrow corridors. The connection between these spaces was often established through central courtyards and passageways, and the walls in some areas are joined at irregular angles (Sumner, 2003, 23–27).

- Materials

In Godin Tepe, the main materials included mud-brick and pisé, and the courtyard floors were covered with mud plaster (Adibzadeh et al., 2005, 80). In Susa

Table 6. Comparative Study of Tepe Ganj Dareh and Studied Contemporary Sites. Source: Authors.

	Ganj Dareh	Sheikhi Abad	Sang-e Chakhmaq	Tepe Zagheh
Wall	- Small thickness compared to walls in most Neolithic sites. - Layer D walls with a thickness of 30 to 40 cm (the width of one mud-brick).	Thickness between 30 to 60 cm.	Thickness 50 to 100 cm.	Walls constructed of mud-bricks with dimensions of 35x12 to 80x25 cm.
Floor	Mud plaster	Rammed Earth	Rammed Earth	Combined mud plaster and rammed earth.
Material	- Pisé - Some walls have undressed cobble plastered on both sides. - Plano-convex mud-bricks.	Pisé walls.	- Pisé walls - Clay	- Pisé walls. - Mud-bricks made from a mix of clay, grit, and chopped vegetable matter.
Ornamentation	Surfaces lacking painting or decoration.	-	Red patches on the floor.	Wall surfaces with ochre clay or colored materials (red, yellow, black, white).
Geometry	- Layer D lacks a circular plan. - Layer D is quadrangular and largely rectangular or trapezoidal, some with very irregular plans. - The junction of two walls lacks corners and is curved.	Excavated rooms are regular and angular.	Building geometry is in the form of irregular rectangles/squares	Irregular rectangles/squares geometry
Orientation	Rooms in the settlement Layer D are oriented Southeast-Northwest.	Room orientation Southwest-Northeast.	North-South	Northeast-Southwest.
Entrance	- Structures are compact and lack alleys or streets. - Lacks a central courtyard and open area. - Lacks a discernible doorway; access likely from the roof.	Lacking any entrance.	Each space has 2 entrances with widths ranging from 70 cm to 1.2 m.	Each unit has a separate entrance.
Buttresses	Construction of supplementary walls to reinforce weak walls.	Buttresses with a thickness of 22 cm and a length of 34 cm.	The rectangular Buttress	Walls that are attached to the exterior of the rooms.
Hearth	- Layer A and Layer E contain remains of a large number of small and large hearths. - Layer D lacks any evidence of a hearth.	Lacking the hearth.	Hearths measuring 1.2 x 1 m on a platform next to the wall of the central room, near the stairs.	- A type of hearth for baking bread, shaped like a low platform of multiple layers of mud and grit in the courtyard. - A mud-brick hearth inside the room.
Ritual	- A pair of wild sheep skulls installed in a subterranean niche, reminiscent of a shrine. - A strange clay column with stones on top, suggesting complex notions beyond its form.	Placement of the skeletons of four wild goat heads and one wild sheep at the end of the space, with ochre coloring used on their teeth.	Two rooms feature an altar and a fireplace in Phases III, IV, and V.	No specific symbol was found.

III, mud-brick was the predominant material used, and some surfaces were covered with ochre clay (Perrot & Dollfus, 1997, 52; Le Brun, 2020, 105). Tall-e Malyan, however, shows a higher level of technology: the walls were constructed with baked brick and gypsum mortar, the foundations were made of cobble and mud-brick, and the floors were covered

with plaster and clay. Wooden beams were also used for the roof (Desset, 2012, 9–10; Sumner, 2003).

- Spatial organization centered on a central wall

A common feature among Godin Tepe, Tall-e Malyan, and Susa III is the presence of a rectangular room featuring a longitudinal wall in the center. In the middle of this central wall, a rectangular platform

or a functional recess/alcove was constructed, flanked by two symmetrical entrances on either side (Desset, 2012, 10–12). This structure, observed in the plans of all three sites, reflects spatial symmetry and purposeful organization, and it would have provided dual access to the central space.

- Central hearth and ritual function

The central platform or recesses constructed in the central wall were often associated with a hearth or clay ovens. In Godin Tepe, this rectangular platform was built into a thick wall, flanked by doorways on both sides that connected the lateral spaces to the central section (Gopnik & Mitchell, 2016, 507). A similar pattern with a central hearth has also been identified at Tall-e Malyan.

In Susa III, the same design is observed with a central platform and symmetrical doorways in the middle of the wall (Figs. 14 to 17); furthermore, in some examples, small niches and recesses were built into the lateral walls for storing items.

- Homomorphism of spatial patterns across different cultural spheres

The examination of the shared spatial pattern in the three sites of Godin Tepe, Tall-e Malyan, and Susa III indicates that similar designs were prevalent in three different cultural regions (Central Zagros, Fars, and Khuzestan) during the late fourth millennium BC. This spatial homomorphism can be seen as an indication of the existence of cultural connections, adoption of shared models, or even a

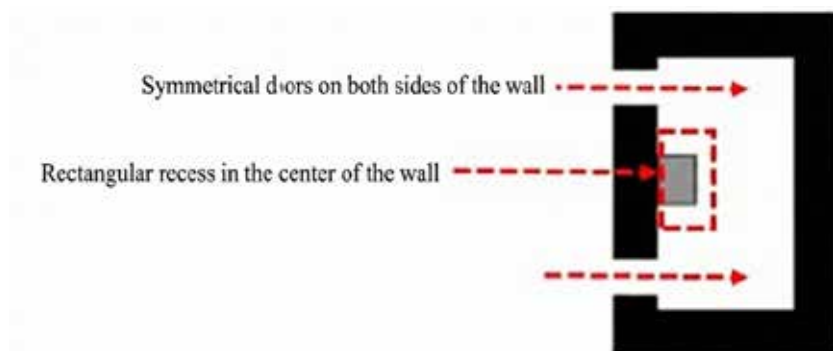


Fig. 14. Plan Design Pattern in the Fourth Millennium BC. Source: Desset, 2012, 1.

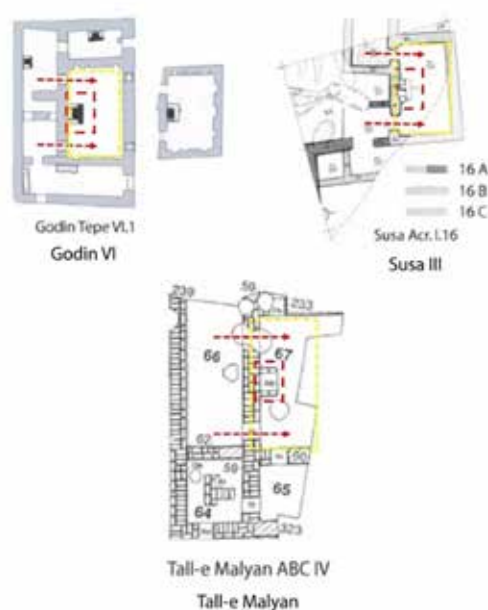


Fig. 15. Identical Design Pattern in Susa III, Godin VI, and Tall-e Malyan. Source: Desset, 2012, 14.

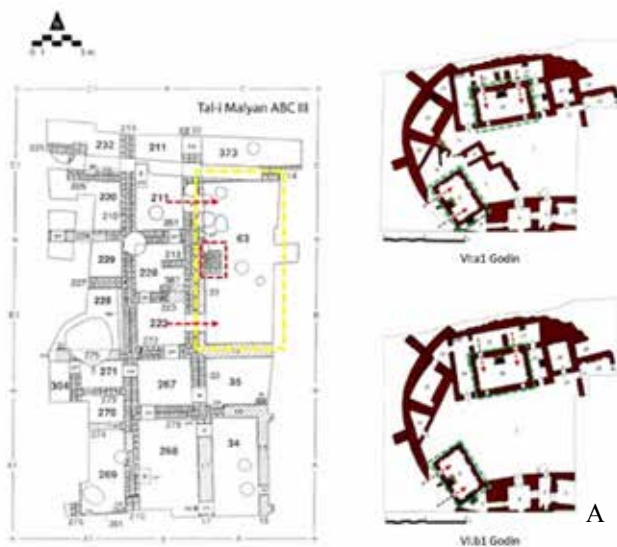


Fig. 16. A) Identical Design Pattern in the Fourth Millennium BC at Godin Tepe. Source: Gopnik, 2011, 93-94; B) Identical Design Pattern in the Fourth Millennium BC at Tepe Malyan. Source: Desset, 2012, 9.

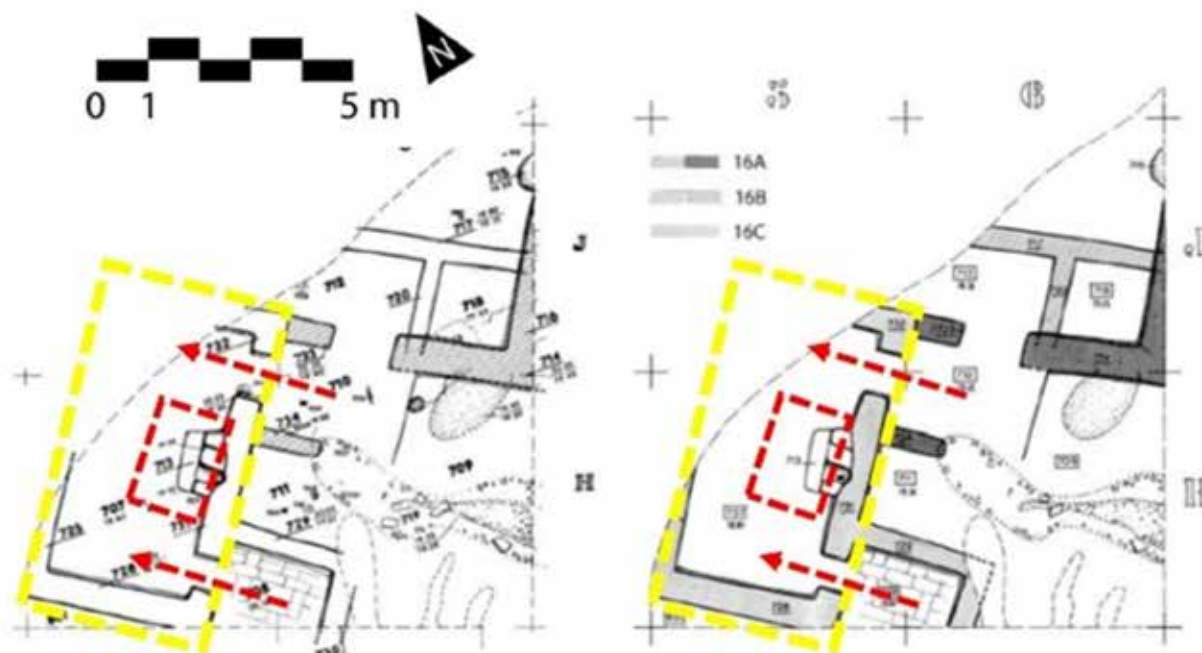


Fig. 17. Identical Design Pattern in the Fourth Millennium BC at Susa II. Source: Desset, 2012, 9.

commonality in foundational beliefs and rituals. Such patterns persisted in later centuries and were reiterated in diverse forms within more complex architectures, but their roots must be sought in the formation of the earliest residential-ritual structures of this period. Following this discussion, Table 7 comparatively analyzes the architectural and spatial characteristics of these three sites based on the analytical components.

Conclusion

The Kermanshah region, with prominent sites such as Ganj Dareh and Godin Tepe, holds an outstanding position in the understanding of Iran's prehistoric cultures and architectural patterns. The physical and spatial analysis of these two sites indicates that, although both are located in the Central Zagros, they reflect two distinct types of human settlement.

Table 7. Comparative Analysis of Godin Tepe, Susa III, and Tal-e Malyan from the Perspective of Spatial Organization, Materials, and Plan Geometry. Source: Authors.

Analytical Component	Godin Tepe	Susa III	Tall-e Malyan (Anshan)
Plan Geometry	<ul style="list-style-type: none"> - Rooms with square, rectangular, and sometimes non-geometric shapes. - Combination of regular and irregular spaces. - Layout determined by topographical conditions. 	<ul style="list-style-type: none"> - Narrow and regular rectangular rooms. - Open spaces between residential blocks. - Indications of cultural changes in architectural levels. 	<ul style="list-style-type: none"> - Dense and organic structure. - Combination of rectangular, polygonal spaces, and narrow corridors. - Connection of spaces with irregular angles.
Building Materials	<ul style="list-style-type: none"> - Walls made of mud-brick and pisé. - Courtyard floors with mud plaster 	<ul style="list-style-type: none"> - Mud-brick is the main material. - Use of ochre clay for internal coating in some sections. 	<ul style="list-style-type: none"> - Walls made of baked brick with plaster mortar. - Foundations built with cobble and mud-brick. - Flooring is a combination of plaster and clay. - Roof constructed with wooden beams.
Spatial Organization (Hearth & Central Wall)	<ul style="list-style-type: none"> - Rectangular room with a long, thick wall. - Rectangular recess in the center of the wall. - Two symmetrical entrances on either side of the hearth. - Central room connected to lateral spaces. 	<ul style="list-style-type: none"> - Central wall with a central hearth. - Symmetrical doorways on both sides of the hearth. - Presence of functional niches and recesses in the walls. 	<ul style="list-style-type: none"> - Similar design with a central hearth and symmetrical doorways. - Entrance to the central space via a courtyard or corridor. - Hearth used for ritual, heating, or cooking purposes.
Comparative Conclusion	<ul style="list-style-type: none"> - Spatial commonality with contemporary Elamite sites. - Indicates cultural relations and the transfer of patterns in the Zagros and the southern plateau. 	<ul style="list-style-type: none"> - Confirmation of design commonalities with other Elamite centers. - Sign of widespread regional connections. 	<ul style="list-style-type: none"> - Adherence to a shared architectural pattern. - Reflects the integration of functional and ritual uses in spatial design.

Ganj Dareh, as a Neolithic settlement, with a compact structure and introverted spatial organization, was primarily based on meeting basic biological needs. The lack of clear geometric order in its architecture, the use of simple, local materials, and the close link between residential and ritual functions establish this site as a fundamental model of the earliest prehistoric villages. In contrast, Godin Tepe, with its dense layers, organized architecture, and evidence of multi-millennial continuous occupation, represents a stable center whose cultural and religious function, in addition to its physical and economic roles, persisted into later historical periods. Thus, Ganj Dareh is considered a symbol of the first experiences of sedentarism, while Godin Tepe is the manifestation of maturity and intercultural continuity on the Iranian Plateau. Together, these two sites illuminate the path of development for settlement and architecture, from simple village life to complex institutional structures.

The answer to the first research question revealed that some architectural features of Ganj Dareh, particularly in Layer D, exhibit similarities with contemporary sites such as Tepe

Zagheh, Tepe Sang-e Chakhmaq, and Sheikhi Abad. The use of plano-convex bricks, quadrilateral or trapezoidal plans, and the “contiguous” spatial pattern indicates the existence of shared architectural currents, which may result from regional patterning, climatic conditions, or cultural interactions. In response to the second question, the comparison of Godin Tepe with sites like Susa III and Tall-e Malyan revealed a shared architectural pattern common during the Chalcolithic period, characterized by elements such as rectangular rooms, symmetrical doorways, and wall recesses. These homologies point to cultural exchanges and the transfer of technical knowledge through the commercial and communication networks of that era (Table 8). In total, the findings of this research highlight the position of Kermanshah as one of the centers of architectural innovation during the prehistoric period, a region that played a significant role in the transmission and localization of architectural patterns to other parts of the Iranian Plateau. Such results can help in better understanding the architectural and cultural developments of the Neolithic

Table 8. The Comparison Results of Tepe Ganj Dareh with Contemporary Sites. Source: Authors.

Ganj Dareh Comparison (with Tepe Sheikhabad, Tepe Zagheh, and Tepe Sang-e Chakhmaq)		Godin Tepe Comparison (with Susa III and Tall-e Malyan)	
Similarities	Differences	Similarities	Differences
Pisé wall	Differences in the building's orientation	Mudbrick wall	Wooden beams are only used in Tall-e Malyan
Usage of quadrilateral geometry	A separate ritual space from the residential section at Tepe Zagheh and the presence of a fire pit at Tepe Sang-e Chakhmaq	quadrilateral geometry	-
A specific orientation in the buildings of each site	Difference in the wall junctions	Stone is used for the foundation at Tall-e Malyan and Godin Tepe	-
Use of sheep skulls at Tepe Sheikhi Abad and Ganj Dareh as a symbol in the ritual space	Differences in the form and structure of buttresses	Presence of an identical design pattern in the Fourth Millennium BC	-
Usage of buttresses to reinforce walls	-	-	-

and Chalcolithic periods and serve as a basis for broader research in the future. Therefore, it is suggested that more archaeological excavations and comparative studies be carried out, focusing on the physical analysis of prehistoric sites across Iran, to further illuminate the unknown dimensions of cultural and structural interactions within this civilizational expanse. Following this, the results obtained from the analysis of the architectural features of Ganj Dareh and Godin Tepe, and their comparison with other contemporary sites, are presented.

Endnotes

1. A large, circular, ceramic vessel observed in architecture and archaeological findings, particularly in Neolithic sites. This vessel was used for preparing and kneading bread dough or for the storage of food materials.
2. A small and narrow wall opening
3. A clay piece for closing and sealing the embrasure (mazghals).
4. It is one of the most distinctive pottery types of the Uruk period (second half of the 4th millennium BC) in Mesopotamia and the Iranian Plateau. These small, coarse, and mass-produced vessels were made with an out-turned rim and have been found in various sites ranging from Susa to Tepe Yahya. Various theories have been proposed regarding their function: ranging from bread molds and ration bowls for laborers to ritual vessels and containers for votive offerings (Ghaedi, Yousefi Zoshk, & Sodaei, 2024).
5. controlled multivocality

References list

- Adibzadeh, B., Razjouyan, M., Mostafavi, F., & Riazi, M. (2005). آثار خانه در ایران از نوسنگی تا ساسان [The House Remains in Iran from Neolithic to Sassanid]. Urban Development and Revitalization Organization Publications. [in Persian].
- Andaroodi, E., Talebian, M. H., & Mohtasham, A. (2020). Examining the architecture of the proto-Elamite and Elamite periods

according to Tall-e-Malyan as ancient city of Anshan in Fars. *Journal of Fine Arts: Architecture & Urban Planning*, 25(1), 55- 66. <https://doi.org/10.22059/jfaup.2020.280559.672263>.

- Braidwood, R. J., & Howe, B. (1960) *Prehistoric Investigations in Iraqi Kurdistan* (Studies in Ancient Oriental Civilizations 31). University of Chicago Press.
- Collis, J. (1999). The nature of archaeological evidence, In G. Barker (ed.), *Companion Encyclopedia of Archaeology* (pp. 81- 127). Routledge.
- Desset, F. (2012). An architectural pattern in late fourth-millennium BC Western Iran: A new link between Susa, Tall-e Malyan, and Godin Tepe. *Iran*, 52(1), 1–18. <https://doi.org/10.108005786967.2014.11834/734>.
- Ghaedi, A. M., Yousefi Zoshk, R., & Sodaei, B. (2025). The Function of Bevelled-Rim Bowls: Insights from the Warka Vase. *Parseh J Archaeol Stud*, 8(30), 63- 85. <https://doi.org/10.61882/PJAS.8.30.63>.
- Ghorbani, H. R., Zanganeh, L., & Zarei, A. (2018). معماری و سازماندهی فضایی-اجتماعی فرهنگ کورا-ارس در دو سوی دریاچه ارومیه (مطالعه موردی: یانیک تپه، هفتان تپه، گوی تپه) [Architecture and Socio-spatial Organization of Kura-Araxes Culture on Both Sides of Lake Urmia (Case Study: Yanik Tepe, Haftavan Tepe, Goy Tepe)]. *Journal of Historical Sociology*, 10(2), 155-197. [in Persian]. https://journals.modares.ac.ir/article_22932.html.
- Gopnik, H., & Mitchell, R. (2016). *On the high road : the history of Godin Tepe, Iran* (M. A. Mirqaderi & H. Sabouri, Trans.). Center for the Great Islamic Encyclopedia, Center for Iranian and Islamic Research. (Original work published 1960).
- Hole, F. (1995). Assessing the past through anthropological archaeology, In J. M. Sasson (ed.) *Civilizations of the Ancient Near East*. Scribner, 2715–27.
- Hole, F. (2009). *The archaeology of western Iran: settlement and society from prehistory to the Islamic conquest* (Z. Basti, Trans.). Mehr Publications. (Original work published 1931).
- Javidnia H., & Hozhabri, A. (2020). Discovered Architecture in Tepe Ziviyeh; Castle or Sanctuary in the First Millennium B.C. in Western of

- Iran. *Parseh J Archaeol Stud*, 3(10), 51- 67. <https://doi.org/20.1001.1.26455048.1398.3.10.3.7>.
- Javidnia, H., & Hozhabri, A. (2019). معماری بنای مکشوف در تپه زیویه: قلعه یا [Architecture of the Discovered Building in Ziwiye Tepe: A Castle or a Temple in the First Millennium BC (West Iran)]. *Parseh Journal of Archaeological Studies*, 3(10), 51-67 <https://doi.org/20.1001.1.26455048.1398.3.10.3.7>.
 - Khanipour, M., Naseri, R., Khosravi, S., Zeraatpisheh, M., & Emadi, H. (2014). تبیین فرهنگ‌های هزاره سوم پیش از میلاد حوضه رود کر براساس کاوش تل مرودشت گپ‌کناره. *Journal of Archaeological Studies*, 6(2), 39- 58. [in Persian]. <https://doi.org/10.22059/jarcs.2015.54171>.
 - Kleiss, W. (2018). *Geschichte der Architektur Irans* (S. Khaljnia, Trans.). Cultural Heritage and Tourism Research Institute. (Original work published 2015).
 - Le Brun, A. (2020). The Susa III period: Architecture and material culture, In J.-P. Delougaz (ed.), *Susa and Elamite architecture* (pp. 99–112). CNRS.
 - Lyman, R. L., O'Brien, M. J., & Dunnell, R. C. (1997) *The Rise and Fall of Culture History*. Plenum Press.
 - Malek Shahmirzadi, S. (2003). [Iran in Prehistory]. Research Deputy of Cultural Heritage Organization. [in Persian].
 - Matthews, R. (2003). *The archaeology of Mesopotamia: Theories and approaches*. Routledge.
 - Mohammadifar, Y., Matthews, R., Matthews, W., & Motarjem, A. (2011). گزارش مقدماتی کاوش تپه (CZAP): پروژه باستان‌شناسی زاگرس مرکزی و تپه‌جانی اسلام‌آباد غرب [Central Zagros Archaeological Project (CZAP): Preliminary Report on Excavations at Tepe Sheikh-e Abad Sahneh and Tepe Jani Islamabad-e Gharb]. *Name-ye Bastan Shenasi*, 1(1), 9- 30. [in Persian]. https://nbsh.basu.ac.ir/article_317.html?lang=fa.
 - Perrot, G., & Dollfus, G. (1997). *Suse et le Sud -Ouest de l'Iran: l'histoire et l'archeologie* [Susa and Southwestern Iran: History and Archaeology] (H. Eqbal, Trans). University Publishing Center.
 - Pollock, S. (1999) *Ancient Mesopotamia*. Cambridge University Press.
 - Rotea, R. B., Borrazás, P. M., & Vila, X. M. A. (2003). Archaeology of Architecture: theory, methodology and analysis from Landscape Archaeology, In X. M. A. Vila, R. B. Rotea, & P. M. Borrazás (Eds.), *Archaeotecture: Archaeology of Architecture* (pp. 17–39). BAR Publishing.
 - Smith, P. E. L. (1974). Architectural remains of the Neolithic Ganj Dareh. *Iran*, 12, 23–40.
 - Smith, P. E. L. (1986). Palaeolithic archaeology in Iran, In W. L. Hanaway Jr. & B. Spooner (eds.), *American Institute of Iranian Studies monographs* (Occasional Paper 13). University Museum.
 - Smith, P. E. L. (1997). Architectural innovation and experimentation at Ganj Dareh, Iran (K. Abdi, Trans.). *World Archeology*, 21(3), 323-335. (Original work published 1991).
 - Sumner, W. M. (2003). Early urbanization on the Iranian Plateau: The case of Tal-i Malyan, In D. Potts (ed.), *The archaeology of Elam* (pp. 22–45). Cambridge University Press.
 - Talebian, M. H., Malekzadeh, M., & Taheri, A. (2023). assessment of the architectural concept of places of worship during the Medes era in Noushijan Tappe, Zarbolagh and Tappe Ozbaki. *Journal of Fine Arts: Architecture and Urban Planning*, 27(3), 59- 72. <https://doi.org/10.22059/jfaup.2023.346055.672789>.
 - Tangrams. (n.d.). *Tangrams website*. Retrieved May 14, 2025, from <https://www.tangrams.github.io>
 - Tringham, R. (1995). Archaeological houses, households, housework and the home, In D. N. Benjamin (ed.), *The Home: Words, Interpretations, Meanings, and Environments*, Aldershot: Avebury, 79–107 <https://short-url.org/1keGg>.
 - Tsuneki, A. (2014). *The site of Tappeh Sang-e Chakhmaq. In The first farming village in Northeast Iran and Turan: Tappeh Sang-e Chakhmaq and beyond* (Symposium, Tsukuba, 10–11 Feb 2014) (pp. 5–6). University of Tsukuba.
 - Young, T. Cuyler J. (1969). Excavation at Godin Tepe: First progress report. *Art and Archaeology, Royal Ontario Museum, Occasional Paper 17*, 1–2. <http://hdl.handle.net/1140188930/>.

COPYRIGHTS

Copyright for this article is retained by the author(s), with publication rights granted to journal of Art and Civilization of the Orient. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>).



HOW TO CITE THIS ARTICLE

Mahdavian, S. S., Andaroodi, E., Samei Yazdi, P., & Talebian, M. H. (2026). An Analysis of the Architecture of the Neolithic and Chalcolithic Periods in Kermanshah (A Case Study of Ganj Dareh and Godin Tepe). *Journal of Art & Civilization of the Orient*, 14(51), 46–69.

DOI: [10.22034/jaco.2026.524244.1477](https://doi.org/10.22034/jaco.2026.524244.1477)

URL: https://www.jaco-sj.com/article_238418.html?lang=en

