

# *New evidence of the Pottery Neolithic in the Eastern Mazandaran based on recent archaeological field survey*

Article

Published Version

Creative Commons: Attribution-Noncommercial 4.0

Open Access

Ojaei, S. K. A., Seresti, R. A., Matthews, R. ORCID: <https://orcid.org/0000-0002-8316-4312> and Thornton, C. (2024) New evidence of the Pottery Neolithic in the Eastern Mazandaran based on recent archaeological field survey. Pazhoheshha-ye Bastan Shenasi Iran, 14 (41). pp. 41-67. ISSN 2345-5225 Available at <https://centaur.reading.ac.uk/118587/>

It is advisable to refer to the publisher's version if you intend to cite from the work. See [Guidance on citing](#).

Published version at: [https://nbsh.basu.ac.ir/article\\_5725.html?lang=en](https://nbsh.basu.ac.ir/article_5725.html?lang=en)

Publisher: Bu Ali Sina University

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the [End User Agreement](#).

[www.reading.ac.uk/centaur](http://www.reading.ac.uk/centaur)

**CentAUR**

Central Archive at the University of Reading

Reading's research outputs online



Bu-Ali Sina  
University



Iranian Scientific  
Archaeological  
Association

پژوهش‌های باستان‌شناسی ایران

PAZHOSHESH-HA-YE BASTANSHENASI IRAN

P. ISSN: 2345-5725 & E. ISSN: 2345-5500

Homepage: <https://nbsh.basu.ac.ir/>

Vol. 14, No. 41, Summer 2024

## New Evidence of the Pottery Neolithic in the Eastern Mazandaran Based on Recent Archaeological Field Survey

Seyyed Kamal Asadi Ojaei<sup>1</sup> , Rahmat Abbasnejad Serešti<sup>2</sup> ,  
Roger Matthews<sup>3</sup> , Christopher P. Thornton<sup>4</sup>

<https://dx.doi.org/10.22084/NB.2023.28212.2619>

Received: 2023/08/23; Revised: 2023/11/03; Accepted: 2023/11/09

Type of Article: Research

Pp: 41-67

### Abstract

The issue of Neolithization in the eastern Mazandaran region has once again become an attractive topic for archaeologists and researchers after 70 years of silence. Excavations and field surveys have been carried out during these years to examine various hypotheses for the origins of plant and animal domestication in this important crossroads region. However, despite the clarification of some issues, more questions have been raised that remain unanswered. Past field surveys could not fully represent the Neolithic capacities of eastern Mazandaran. Therefore, a field survey program titled “Investigation and Identification of Neolithic Settlements in the Lowlands and Highlands of Eastern Mazandaran” was proposed. In this field program, two main goals were considered: 1) regional connections between sites in the highlands and plains of eastern Mazandaran; and 2) relations with adjacent regions of Northeastern Iran and South Turkmenistan. The first goal sought to provide evidence of an endogenous transition to Neolithic lifeways, while the second examined possible routes for an exogenous origin. In the survey, 53 sites were investigated and pottery collections from previous excavations and field surveys were also reviewed. The result was the identification of 30 Neolithic sites in both the highlands and plains, which increased the number of Neolithic settlements in eastern Mazandaran to 42 sites. Study of the collected pottery indicates that there is a clear connection between the plains and the highlands, which is likely related to seasonal grazing of herding communities. According to the evidence, inter-regional relations with adjacent regions should be searched not through intermontane valleys, but through the lowland Caspian littoral region, especially the Gorgan Plain, which may argue for a Neolithization process based on exogenous factors.

**Keywords:** Neolithization; Caspian Neolithic Software; Eastern Mazandaran, Cultural Interaction; Djeitun Culture.

1. PhD Student, Department of Archaeology, Faculty of Arts and Architecture, University of Mazandaran, Babolsar, Iran

2. Associate Professor, Department of Archaeology, Faculty of Arts and Architecture, University of Mazandaran, Babolsar, Iran (Corresponding Author)

Email: [r.abbasnejad@umz.ac.ir](mailto:r.abbasnejad@umz.ac.ir)

3. Professor, Department of Archaeology, University of Reading, Reading, UK.

4. Consulting Scholar, Asian Section, University of Pennsylvania Museum, Pennsylvania, USA.

**Citations:** Asadi Ojaei, S. K., Abbasnejad Serešti, R., Matthews, R. & Thornton, P. C., (2024). “New Evidence of the Pottery Neolithic in the Eastern Mazandaran Based on Recent Archaeological Field Survey”. *Pazhoheshha-ye Bastan Shenasi Iran*, 14(41): 41-67. doi: [10.22084/nb.2023.28212.2619](https://dx.doi.org/10.22084/nb.2023.28212.2619)

**Homepage of this Article:** [https://nbsh.basu.ac.ir/article\\_5725.html?lang=en](https://nbsh.basu.ac.ir/article_5725.html?lang=en)

PAZHOSHESH-HA-YE BASTANSHENASI IRAN

Archaeological Researches of Iran

Journal of Department of Archaeology, Faculty of Art and Architecture, Bu-Ali Sina University, Hamadan, Iran.

Publisher: Bu-Ali Sina University. All rights reserved.

© Copyright©2022, The Authors. This open-access article is published under the terms of the Creative Commons.

## Introduction

The history of Neolithic research in eastern Mazandaran goes back to the middle of the 20th century when Carlton Coon excavated Hotu and Kamarband (Belt) caves (Coon, 1951). A noteworthy point in Coon's reports is the gradual emergence in these caves of domesticated goat/sheep after a "Mesolithic" period utilizing native fauna (Coon, 1951); A decade later and during his excavations at Ali Tappeh cave, Charles McBurney reviewed the faunal data from Hotu and Kamarband caves and, contrary to Coon, claimed that these domesticated species appeared suddenly in the Pottery Neolithic (McBurney, 1964; 1968). Coon and McBurney's interpretations of the emergence of domesticated species in eastern Mazandaran have led to the formation of two basic hypotheses for the Neolithization of this region: based on endogenous factors (Ramazanpour et al., 2013; Ramzanpour, 2011; Fazeli Nashli et al., 2016; Leroy et al., 2019) and exogenous factors (Vahdati Nasab and Nikzad, 2015; Nikzad, 2016; Roustaiei, 2013; Roustaiei, 2016). Research into the Neolithization process in eastern Mazandaran has focused mainly on the lowland zone, due to the rich and attractive ecosystem, while the highlands have not been given equivalent attention. Therefore, it is very important to know the intra-regional relations, especially between the plains and the highlands in the Neolithic period to understand food production processes, such as the herding of animals.

Ceramics are the main indicator of regional and inter-regional cultural interaction during the Pottery Neolithic period. Recent re-examination of the pottery assemblages of Hotu and Kamarband caves, stored in the museum of the University of Pennsylvania, indicates that there are no diagnostic sherds of the Djeitun (Sang-e Chakhmaq) culture, found through southern Turkmenistan and northeastern Iran in the late 7th and early 6th millennia BC (Gregg & Thornton, 2012; Thornton, 2013). Instead of this typical inter-regional ceramic type, Thornton confirmed Dyson's earlier assessment that so-called "Caspian Neolithic Software" was the most typical ceramic type in eastern Mazandaran at this time (Voigt & Dyson, 1992). Recent excavations at Touq Tappeh in the Neka Plain of eastern Mazandaran confirmed no diagnostic sherds of Djeitun/Sang-e Chakhmaq type were found (Abbasnejad Serešti, 2020). Thus, if the lowland region was not involved in the broad inter-regional network indicated by this ceramic type, what was the situation of the highland sites of the region? In the field survey reported here, Asadi Ojaei looked specifically for evidence of connections between the eastern Mazandaran region and the Gorgan,



Shahrud, and Bastam Plains of the Iranian Plateau as well as areas further away in northeastern Iran and south Turkmenistan during the Pottery Neolithic.

**Objectives, Questions, and Hypotheses:** This study investigates the regional context and interactions between lowlands and highlands in the eastern Mazandaran in relation to animal herding by examining previously documented and newly discovered Neolithic sites. Furthermore, the research seeks to understand the inter-regional connections involving eastern Mazandaran, Gorgan Plain, Shahrud and Bastam plains, northeastern Iran, and south Turkmenistan with respect to the Neolithization process and external influences. The primary focus of this paper is to explore the relationship between highland and low-lying plain sites in eastern Mazandaran, as well as the links between eastern Mazandaran and adjacent regions during the Neolithic period and the initiation of Neolithization. In doing so, the question is as follows: What is the relationship between the sites of the highlands and low-lying plains in eastern Mazandaran, as well as between the eastern Mazandaran and the adjacent regions, during the Neolithic and when the Neolithization process began? Field surveys, identification of pottery Neolithic sites, and comparison of pottery assemblages reveal a direct correlation between highlands and low-lying plains on a regional scale. However, investigating inter-regional interactions through the comparative analysis of pottery assemblages presents significant challenges.

**Research Methods:** This article employs two distinct and yet complementary methods. Firstly, it utilizes the description and analysis of the field survey data of the Neolithic sites in the highlands and eastern plains of Mazandaran (Lab analysis). The field survey itself was conducted in 2020. Additionally, it includes a review of pottery assemblages from previous excavations and field surveys. Secondly, it incorporates the library analysis of published studies from the Neolithic period in the eastern Mazandaran and adjacent regions.

## Research Background

Archaeological surveys and excavations that have been carried out in this region so far have shown that human habitation has been going on since at least the Epi-Paleolithic period. Excavations at Hotu and Kamarband caves (Coon, 1951, 1952) and their re-excavations in recent years (Fazeli Nashli, 1401a; 1401b), as well as excavations at Ali Tappeh cave (McBurny, 1968), Komishan cave (Vahdati-Nasab, 2009), Tappeh Abbasi (Abbasnejad

Serešti, 2009), Tappeh Saad (Mahfrouzi, 2009), Tappeh Terkam (Mahfrouzi, 2010), Qale' Pey (Mahfrouzi, 2010), Komishani open site (Fazeli Nashli, 2017), Touq Tappeh (Abbasnejad Serešti, 2020) and Tappeh Valiki (Nemati Loujandi, 1400; Abbasnejad Serešti and Nemati Loujandi, 1401) indicate a sequence of human settlements from the Epi-Paleolithic to the present era in eastern Mazandaran. During previous archeological field survey, some significant Neolithic sites such as Tappeh Komishani, Narges Ketī, Touq Tappeh, and Tappeh Chehaldin were identified and introduced (Mahfrouzi, 2000; 2003). In the Mazandaran archaeological atlas program, the eastern region of Mazandaran was investigated and several other Neolithic sites were identified (Mousavi Kouhpar, 2006). Although these field surveys were comprehensive, the findings were not described, classified, and analyzed within the framework of specific archaeological periods.

Another field study in the region that led to the identification of 14 Neolithic sites in the Behshahr and Neka plains, including Tappeh Swasari, Tappeh Jenn Ketī, and Tappeh Veliki, was carried out by Hosein Ramezanpour for his master's thesis (Ramezanpour, 2012; Ramezanpour et al., 2014). His survey focused on the analysis of the settlement pattern of these sites and did not pay much attention to broader interactions and pottery types of the pottery Neolithic.

### The Eastern Mazandaran Region

Due to the existence of two natural conditions, the Caspian Sea and the Alborz mountains, special ecosystems and environments have formed in the eastern Mazandaran. The Alborz mountain has prevented the wet weather and cumulonimbus from crossing the northern slopes to the southern slopes, causing different climates to emerge in these two regions. In general, the climate of the region is influenced by the latitude, Alborz mountains, sea level, distance from the sea, local and regional winds, climate fronts entering from northern and western regions, and dense forest (Faraji, 2016: 1119). In the eastern region of Mazandaran, like all the regions on the southern edge of the Caspian Sea, there is rain almost all year round; But usually the amount of precipitation is more in autumn and winter. Autumn rains are intense and continuous and spring rains are more regular, and scattered showers. The highest rainfall is in the months of March and April and the lowest in July and August. The rainfall on the coastal shores is more than in the mountain areas and rainfall peaks mostly at altitudes between 900-1500m asl (Alijani, 1997: 165); the average rainfall is 815mm (1200 to 1300mm in the plains areas). This climate has

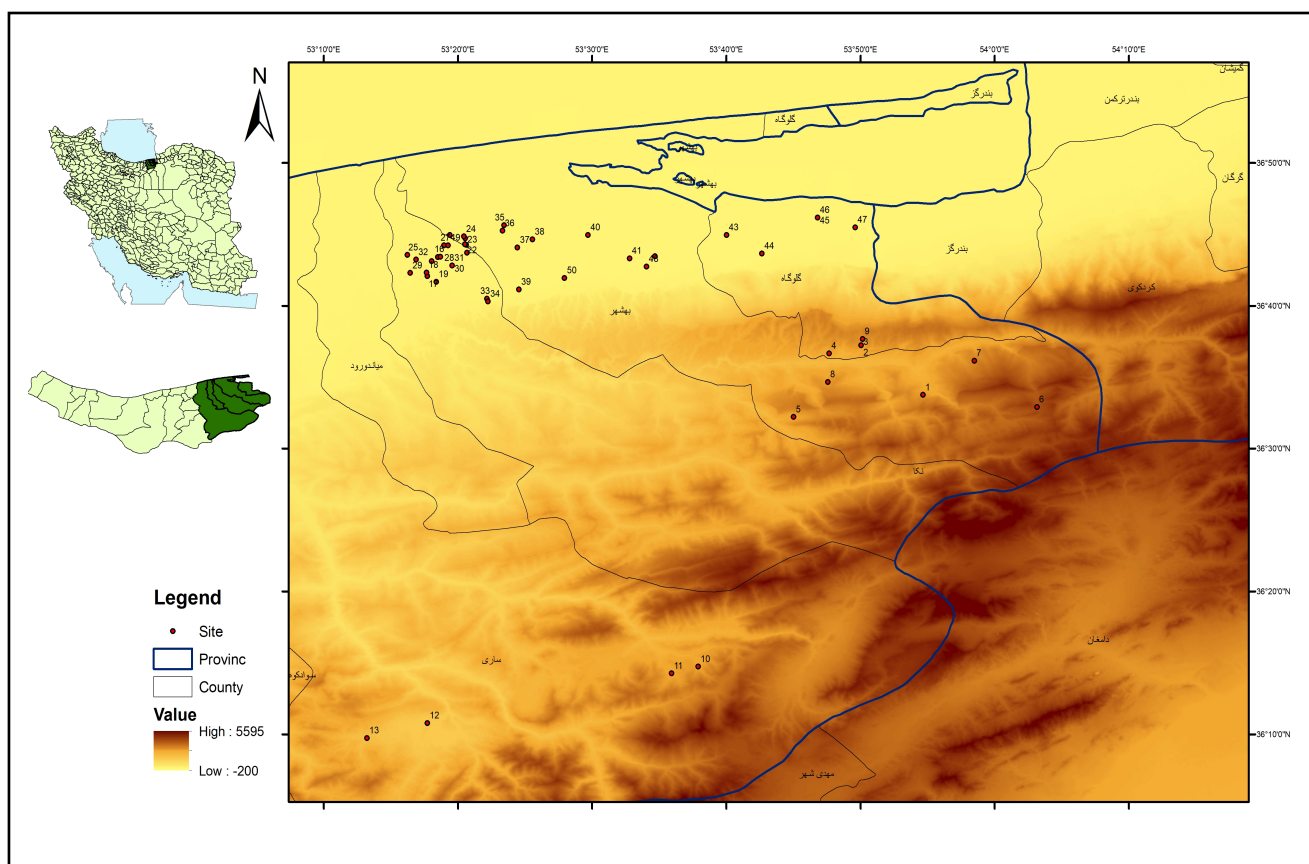
Map 1: All the investigated sites, including:

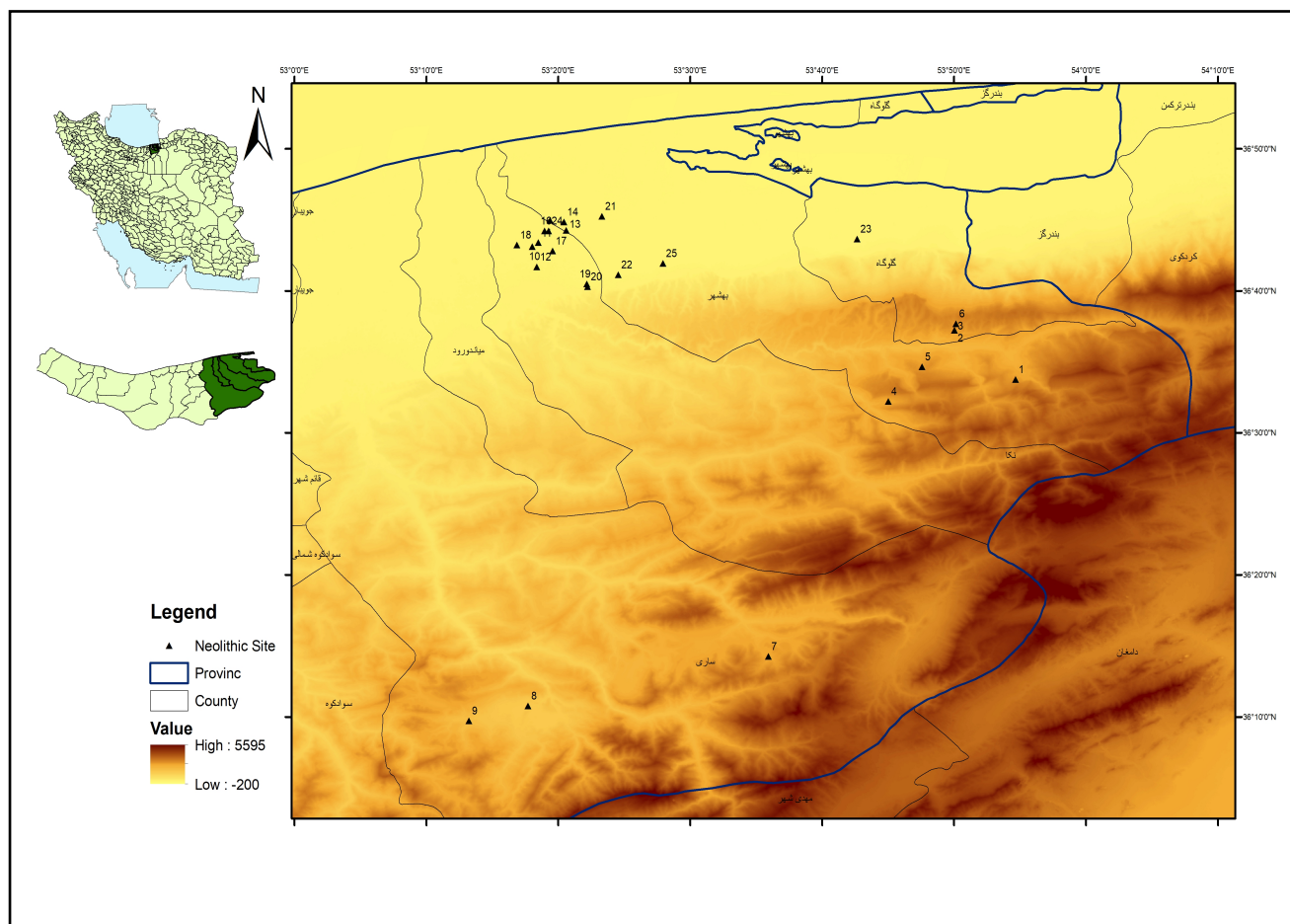
1) Estarm 2) Kiasar 3) Din Tappeh Nyala 4) Cheheldin Eward 5) Samchool 6) Sorkh Geriveh 7) Arzet 8) Shah Tappeh Gornam; 9) Tappeh Mosayeb Mahalle 10) Din Kuti Thanur 11) Terkam 12) Qale' Pey 13) Tappeh Saad; Qoul Tappeh 14) Rabi Tappeh 15) Kal Zaman Tappeh 16) Mousavi Tappeh 17) Khargoush Tappeh; 18) Khezr Tappeh; 19) Marendin; 20) Muzaffar Tappeh; Sultan Chahar Berar; 21) Chopan Mahalle; 22) Tappeh Zare; 23) Tappeh Mirzaei I; 24) Tappeh Mirzaei II; 25) Babr Tappeh; 26) Garjin Tappeh; 27) Tappeh Tamesh; 28) Tappeh Kash; 29) Tappeh Haj Musa; 30) Seyyed Qasim; 31) Narges Ket; 32) NaierAbad; 33) Tappeh Abbasi; 34) Komishani open site and Komishan cave 35) Swasari 36) Sorkh Din 37) Chehldin Hossein Abad 38) Shoqal Tappeh 39) Yaqut Tappeh 40) Annab Tappeh 41) Namayan Tappeh 42) Musa Khan 43) Tappeh Fakhi 44) Din Tappeh Lemarask 45) Tappeh Graudin 46) Shekar Tappeh; 47) MohammadQoli Sekander 48) Doros Tappeh 50) Shisharkash 51) Tappeh Kash Kohestan (Author, 2023). ▼

turned the study region into a very rich ecosystem and environment in terms of plant and animal species, as well as marine and raw resources, which have been very attractive and desirable for human communities to live in since long ago.

### The Archaeological Field Survey of Neolithic Sites, 2021

In the current field program, 53 sites were recorded and investigated; 15 sites in the highlands and 38 sites in the plains. It has been mentioned above that some sites were investigated before, but since the surface materials and findings were not classified in terms of archaeological periods, materials (mostly pottery) were gathered from the surface of these sites for comparative and analytical studies. Most sites displayed material from multiple periods. 41 sites contain cultural materials from the Neolithic period, while 37 sites belong to the Chalcolithic period, 7 sites belong to the Bronze-Iron ages, and 5 sites to the Historical-Islamic periods. One of the important successes of this field survey program has been the identification of new Neolithic sites, including 10 sites in the highlands and 20 sites in the plains, which are introduced for the first time (Map 1 & 2). Most of the sites of the Neolithic period are located in the southern lowlands





near Nekarud and its surroundings areas in the Neka plain, But the relative dearth of sites in the highlands is related to the difficulty of field surveys in those areas, and completing the field survey program will lead to the identification of more Neolithic sites in those areas.

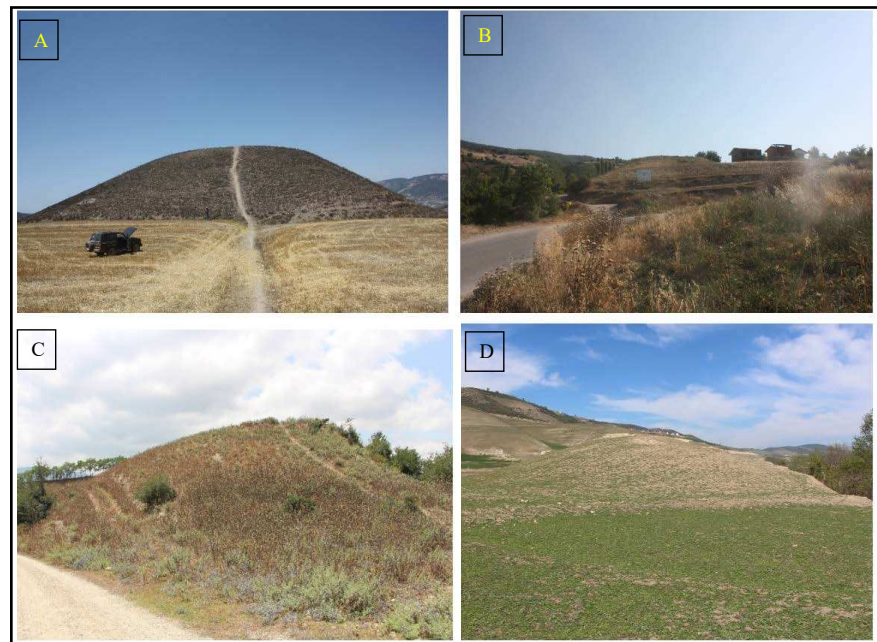
### Pottery Neolithic in the Highlands of Eastern Mazandaran

Ten of the 15 sites located in the highlands belong to the Neolithic period; they are: Estarem, Kiasar, Din Tappeh Niala, Samchool, Shah Tappeh Gornam, Mosayeb Mahalle, Terkam, Qale'Pey, Tappeh Saad, and Qoul Tappeh (Fig. 1). These sites are located at altitudes between 700 and 1900m and in the inter-mountain plains and shallow valleys of the northern Alborz mountains. The most eastern sites (Map 2, No. 1 to 6) are located at higher altitudes between 1000 and 1900m, while the western sites (Map 2, No. 7 to 9) are located at altitudes between 700 and 1250m.

The study of pottery has shown that the Neolithic sites located in the highlands can be sorted into western and eastern parts in terms of pottery traditions. In the eastern part, where the sites of Estarem, Kiasar, Din

▲ Map 2. The location of Newly recorded Neolithic sites: 1) Estarem; 2) Kiasar; 3) Din Tappeh Niala; 4) Samchool; 5) Shah Tappeh Gornam; 6) Tappeh Mosayeb Mahalle; 7) Terkam; 8) Qale'Pey; 9) Tappeh Saad; Qoul Tappeh; 10) Rabi Tappeh; 11) Kal Zaman Tappeh; Mousavi Tappeh; 12) Marendin; 13) Chopan Mahalle; 14) Tappeh Mirzai II; 15) Garjin Tappeh; 16) Tappeh Tamesh; 17) Tappeh Kash; 18) NaierAbad; 19) Tappeh Abbasi; 20) Komishani open site and Komishan cave; 21) Sorkh Din; 22) Yaqut Tappeh; 23) Tappeh Fakhi 24) Din Tappeh Lemarask 25) Shisharkash 26) Tappeh Kash Kohestan (Author, 2023).

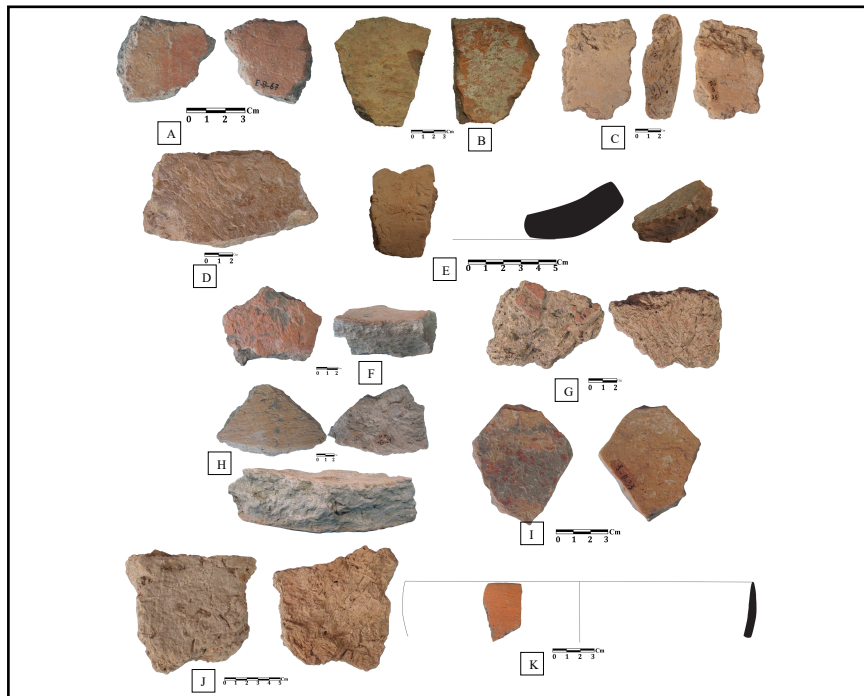




**Fig. 1: Surveyed Sites in the highlands: A) Eštareh; B) Kiasar; C) Qale'Pey; D) Qoul Tappeh (Author, 2023). ►**

Tappeh Niala, Samchool, Shah Tappeh Gornam, and Mosayeb Mahalle are located, Neolithic potteries are simple and, in most cases, their slip has been lost (Fig. 2). These potteries are thick, have a chaff temper, and very high porosity. Creamy-white and brown thick slip, poor firing with dark core, and use of coarse chaff temper in Eštareh (Fig. 2, A-B), Kiasar (Fig. 2, D-E), and Mosayeb Mahalle (Fig. 2, G-H) potteries show the most similarity with Caspian Neolithic Software (the CNS). The Neolithic potteries of Din Tappeh Niala are made by the slab construction method. Two Neolithic sherds (Fig. 2, I-K) were identified at Samchool, one of which (Fig. 2, I) has a “Decorative Outer Slip” (DOS) on its body as decoration. At Sorkh Geriveh, the pottery sherd has lost its slip, and its very large chaff temper is the only indicator that can be cited for possibly attributing it to the Neolithic period (Fig. 2, J).

Contrary to the fact that the sites located in the western part of the highlands, such as Qale'Pey, Tappeh Saad, Terkam, and Qoul Tappeh, are further away from the eastern plains (Naka and Behshahr), they show more similarity in terms of pottery assemblage. Terkam, Tappeh Saad, and Qale'Pey were previously excavated although the Neolithic ceramics have never been properly analyzed. Neolithic pottery from Terkam (Fig. 3, A) is of much better quality than other sherds in this group. It contains a very fine chaff temper that is well mixed with clay and has almost no porosity; this sherd's thick orange slip has similarities to the CNS. From the filed survey, Neolithic potteries from Tappeh Saad show all the features of the CNS, except for the thick slip that was lost (Fig. 3, B, C). However, in



◀ Fig. 2: Neolithic potsherds recovered from the Eastern Part of the Highlands: Starem (A, B); Shah Tappeh Gornam (C); Kiasar (D, E); Din Tappeh Niala (F); Mosayeb Mahalle (G, H); Samchool (I, K); Sorkh Griveh (J) (Author, 2023).

Site	Fragment No.	Description
Estarem	Figure 2-A	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.2 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Estarem	Figure 2-B	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
S. T. Gornam	Figure 2-C	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.5 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
Kiasar	Figure 2-D	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.4 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Kiasar	Figure 2-E	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.8 cm); Porosity (High); Inside-Outside Slip (Thick-Thin); Decoration Method-Place-Motif (None)
Niala	Figure 2-F	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.1 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Mosayeb Mahalle	Figure 2-G	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.8 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Mosayeb Mahalle	Figure 2-H	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.2 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (None)
Samchool	Figure 2-I	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (DOS -Outside- DOS)
Sorkh Griveh	Figure 2-J	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (2.8 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Samchool	Figure 2-K	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.1 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)

◀ Table 1: Description of Sherds Represented in Figure 2 (Author, 2023).

revisiting pottery assemblage from the excavation of the site, few Neolithic sherds were identified. In one sherd, the characteristic features of the CNS, including a thick cream-colored slip and a red-brown band can be seen on its rim (Fig. 3, C). Unfortunately, due to the incompleteness of the rim, it was not possible to stance and draw it. Qoul Tappeh is the only new Neolithic site in the region, which is located 200m south of Tappeh Saad. Its Neolithic pottery shows strong similarities with the ones from the Neka and Behshahr plains. Pottery with thick cream-colored and brown slips, coarse and fine chaff temper, high thickness, and poor firing are their common characteristics. In the pottery of this site, both DOS and complex geometric motifs are used as decorations (Fig. 3, E, F, H).

In the excavation report of Qale'Pey, there is no mention of Neolithic pottery, but during the surface survey of this site in 2011, a few Neolithic pottery sherds were collected (Qasemi Gorji, 2016: 44). One sherd (Fig. 3, G) has a rim with a diameter of more than 30cm, and the maximum thickness of its body is more than 2.5cm. The decoration of this piece is a combination of DOS (a weak layer) and geometric motifs including raised parallel bands bordering downward-facing painted triangles in black color; this type of Neolithic pottery has not been reported in any site in the eastern Mazandaran, although it may relate to the single painted vase found at Rashak III cave (Vahdati Nasab et al., 2013). However, its thick cream-colored slip and coarse chaff temper are very similar to the CNS pottery-making method (Fig. 3, G). During the field survey of the site, some significant sherds of the Neolithic period have been collected. These sherds are very similar to the CNS ones; The use of a color band (Fig. 3, I) and painted geometric motifs similar to ladder motifs (Fig. 3, D) are among the important features of these sherds, that connect them with the recently excavated sites of Touq Tappeh (Abbasnejad Serešti, 2020) and Tappeh Valiki (Abbasnejad Serešti and Nemati Loujendi, 2021) in the Neka plain, 60 kilometers north-east of Qoul Tappeh.

### **Pottery Neolithic in the Lowlands of Eastern Mazandaran**

Out of 53 sites located in the Eastern Mazandaran, 38 are located in the Neka and Behshahr plains. 30 sites are related to the Neolithic period, of which 20 sites have been identified and introduced as Neolithic sites for the first time (Fig. 4). No Neolithic material has been found at 8 sites. As stated, due to the lack of proper introduction and analysis of materials, especially potteries and their role in regional and inter-regional communication, previously identified sites were also subjected to field revisited, and the



◀ Fig. 3: Neolithic Pottery of the Western Part of the Highlands: A) Terkam (Mahfrouzi 2009; drawing and photo by Asadi Ojaei); B, C) Tappeh Saad (sherd C from the Mahfrouzi excavation, 2008; photo by Asadi Ojaei); E, F, H) Qoul Tappeh; D, G, I) Qale'Pey (sherd G from Ghasemi Gurji's survey, 2013; photo and drawing by Asadi Ojaei).

Site	Fragment No.	Description
Terkam	Figure. 3-A	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Tappeh Saad	Figure. 3-B	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.8 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
Tappeh Saad	Figure. 3-C	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.1 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Band)
Qale'Pey	Figure. 3-D	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.8 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Outside-Ladder?)
Qoul Tappeh	Figure. 3-E	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (2 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (DOS -Outside- DOS)
Qoul Tappeh	Figure. 3-F	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (2.1 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (Geometric-Outside-parallel Lines)
Qale'Pey	Figure. 3-G	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (3.1 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric, DOS-Outside-Color Band, Filled Triangles)
Qoul Tappeh	Figure. 3-H	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (2.8 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (None)
Qale'Pey	Figure. 3-I	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.6 cm); Porosity (Medium); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Band)

◀ Table 2: Description of Sherds Represented in Figure. 3 (Author, 2023).





**Fig. 4: Surveyed Sites in the Lowlands: A) Marendin B) Tappeh Garjin C) Tappeh Mirzaei II D) Tappeh Sorkh Din (Author, 2023). ►**

surface findings, especially the potteries, have been reviewed and analyzed.

Rabi Tappeh, Mousavi Tappeh, Kal Zaman Tappeh, Marendin Tappeh, Chopan Mahalle, Tappeh Mirzaei II, Garjin Tappeh, Shisharkash Tappeh, Tamesh Tappeh, Tappeh Kash, Tappeh Haj Musa, Tappeh NaierAbad, Tappeh Abbasi, Tappeh Sorkh Din, Yaqut Tappeh, Tappeh Kash Kohestan, and Din Tappeh Lemrask are the sites that were identified and introduced as new Neolithic settlements (Fig. 5). Note that Tappeh Komishani and Komishan cave, which were introduced in previous studies only as Mesolithic and Pre-Pottery Neolithic, were surveyed, and Neolithic ceramics were collected from their surface in the current program (Fig. 5, F, J). Tappeh Fakhi in the Galugah plain, which has not received much attention in previous field programs, is another site that holds great promise for Neolithic studies in the lowlands (Fig. 6). Seyyed Qasim, Sultan Chahar Berar, Swasari, Annab Tappeh, Muzaffar Tappeh, and Narges Ketī were subjected to field revisiting (Fig 7).

The pottery in the plain mostly shows the characteristics of the CNS, which Matson (1951) and Dyson (1991) previously described with characteristics such as thick slip, coarse chaff temper, poor firing, high porosity, a thick body, and mostly deep bowl forms with a concave wall and a rounded rim. The excavations of Touq Tappeh and Tappeh Valiki have also led to the discovery of many such ceramics. The slips of the potsherds are in a range of thick cream (Fig. 5, A, B, G, H), red, reddish brown, dark brown or chocolate (Fig.5, K, O, M), and light olive (Fig.5, C, J). Poor pottery making, low-quality slips, and environmental factors caused the slips of some sherds to be destroyed. Chaff temper is one of the



other characteristics of the Neolithic pottery of this region, which can be divided into different types from coarse to fine (Fig. 5, E, M). The current field survey has also shown that in the production of some Neolithic sherds, mineral temper (Fig. 5, B, I) or crushed shells (Fig. 5, N) were also used; of course, a small amount of chaff temper is still observed in these sherds. The pottery from the plain is also classified in terms of firing quality in a range of complete, medium, and incomplete. Incomplete firing, often related to sherds with chaff temper (Fig. 5, A, C, E, F, G, K, L, M, N, O) and complete firing (Fig. 5, B, D, H, I, J) belongs to sherds with the

▲ Fig. 5. Neolithic Pottery of the newly found Sites in the Eastern Mazandaran: Rabi Tappeh (A, D); Marendin (B, C); Tappeh Garjin (E); Chopan Mahalle (G); Shisharkash (H); Tappeh Komishani (F); Din Tappeh Lemarask (I) Komishan Cave (J); Tappeh Sorkh Din (K); Yaqut Tappeh (L); Tappeh Kash Kohestan (M, N); Mousavi Tappeh (O) (Author, 2023).

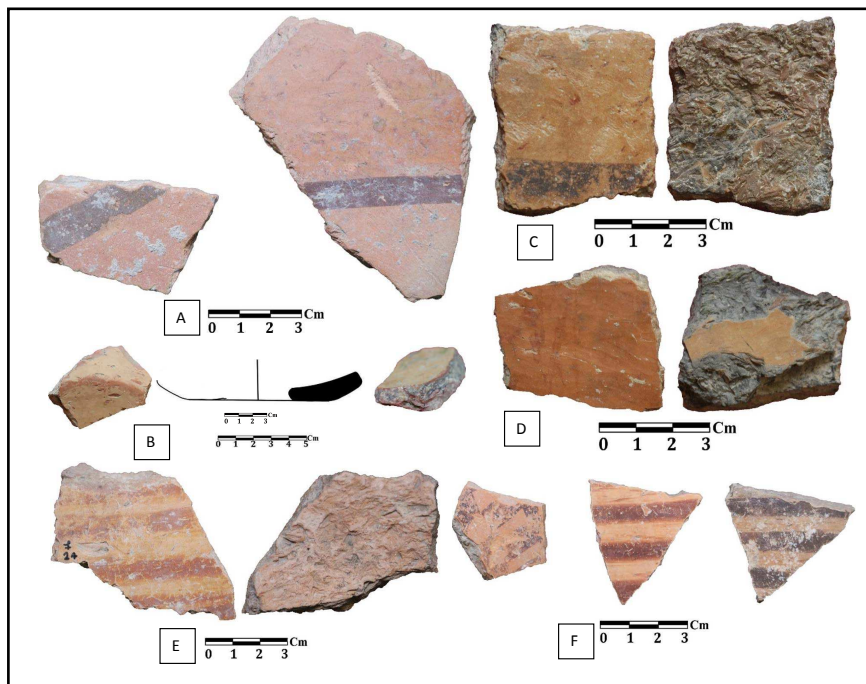
**Table 3: Description of Sherds Represented in Figure. 5 (Author, 2023). ►**

Site	Fragment No.	Description
Rabi Tappeh	Figure. 5-A	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thin); Decoration Method-Place-Motif (None)
Marendin	Figure. 5-B	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (0.8 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (DOS-Outside- DOS)
Marendin	Figure. 5-C	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.2 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Rabi Tappeh	Figure. 5-D	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.8 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (DOS-Outside-DOS)
Garjin	Figure. 5-E	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.2 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (None)
Tappeh Komishani	Figure. 5-F	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.5 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
Chopan Mahalle	Figure. 5-G	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.7 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Shisharkash	Figure. 5-H	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.9 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Lembrask	Figure. 5-I	Making Method (Handmade); Firing (Medium); Temper (Shell-Mineral); Thickness (1.2 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Komishan Cave	Figure. 5-J	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Bands)
Sorkh Din	Figure. 5-K	Making Method (Handmade); Firing (Incomplete); Temper (Mineral); Thickness (2.2 cm); Porosity (High); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (None)
Yaqut Tappeh	Figure. 5-L	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.2 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
T.K. Asiabsar	Figure. 5-M	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (3.8 cm); Porosity (High); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (None)
T.K. Asiabsar	Figure. 5-N	Making Method (Handmade); Firing (Medium); Temper (Shell-Mineral); Thickness (0.7 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Mousavi Tappeh	Figure. 5-O	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (2.5 cm); Porosity (Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (DOS -Inside, Outside- DOS)

mineral temper (with small amount of chaff). Although the CNS is known for being thick and coarse (Fig. 3, K, M), in this field survey, some sherds had thicknesses between 3mm and 5mm (Fig. 5, B, N).

Generally, two types of decoration methods were identified in the CNS of eastern Mazandaran plains: DOS and painted geometric patterns. Also, based on the motifs, three groups can be introduced:

1) The first group is ladder motifs that were executed horizontally near the rim of the wares and are local and specific to the sites of the eastern Mazandaran region (Table 6). In terms of technical characteristics, this



◀ Fig. 6: Neolithic Pottery of Tappeh Fakhi, Galulah Plain (Author, 2023).

Site	Fragment No.	Description
Tappeh Fakhi	Figure. 6-A	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.1 cm); Porosity (Medium); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Band)
Tappeh Fakhi	Figure. 6-B	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Tappeh Fakhi	Figure. 6-C	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Band)
Tappeh Fakhi	Figure. 6-D	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.6 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Tappeh Fakhi	Figure. 6-E	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (None-Thick); Decoration Method-Place-Motif (Geometric-Outside-Shady)
Tappeh Fakhi	Figure. 6-F	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.7 cm); Porosity Low); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Outside-Shady)
Tappeh Fakhi	Figure. 6-A	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.1 cm); Porosity (Medium); Inside-Outside Slip (Thin-Thick); Decoration Method-Place-Motif (Geometric-Outside-Color Band)

◀ Table 4: Description of Sherds Represented in Figure. 6 (Author, 2023).

pottery has no difference from the ones from the second group which will be explained below. It seems that the ladder motif is specific to lowland plains pottery (Fig. 7, A) as so far this motif has not been reported in the highlands nor even in the Neolithic sites located at the southern end of the plains, such as the Hotu and Kamarband caves. It is worth mentioning that only one sherd suspected to be a ladder motif has been seen in the highlands, at Qale'Pey (Fig. 3, D).



2) The second group is regional pottery or the CNS. Their motifs are single and multiple horizontal, vertical, and diagonal color bands drawn on the body or the rim of the potteries (Fig.5, J; Fig. 7, B, C, E). The DOS is also one of the characteristics of the pottery of this group in the plains; which has also been seen in the highlands (Fig. 5, D, O; Fig. 7, D, H) (Tables 7 and 8).

3) The third group is inter-regional potteries (Table 9). The motifs of this group are the so-called shady (Zeighami, 2009: 101) or fading motifs (Malek Shahmirzadi, 1980). These motifs are drawn in the form of parallel-colored lines and filled in between them with pale lines of the same color spectrum. Such motifs are common in the Pottery Neolithic sites of Northeastern Iran, including Sang-e Chakhmaq, Kalateh Khan and Deh-Kheir (Roustaei et al., 2015: 588, Fig. 10; Roustaei, 2016: 28, fig. 7),

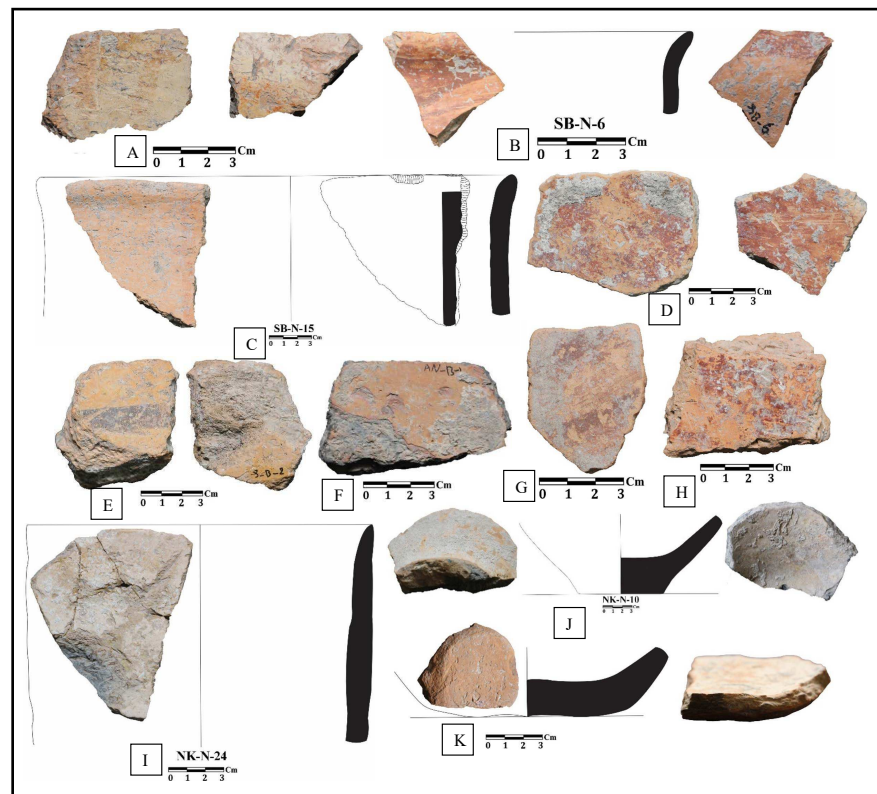


Fig. 7: Neolithic Pottery of the Lowlands from the Revisiting of Previous Surveyed Sites: Seyyed Qasim (A); Sultan Chahar Barar (B, C, D); Swasari (E); Annab Tappeh (F); Muzaffar Tappeh (G); Narges Ket (H, I, J, K) (Author, 2023). ►

Pookardvall (Zeighami, 2018: 101), Yarim Tappeh (Roustaei, 2016: fig. 3), Aq Tappeh (Malek Shahmirzadi & Nokandeh, 2000: 195, Fig. 3), Qaleh Khan (Garazhian et al., 2014: 43-44, Table 7, 8), as well as at Djeitun sites of Southern Turkmenistan (Coolidge, 2005). Currently, shady-fading motifs have been observed in the pottery collection of Tappeh Fakhri (Fig. 6), Muzaffar Tappeh (Fig. 7, G), and Tappeh Valiki (Abbasnejda Serešti et al., 2022) in the lowland Eastern Mazandaran plains.

Site	Fragment No.	Description
Seyyed Qasim	Figure. 7-A	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.4 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Outside-Ladder)
Soltan Chahar Barar	Figure. 7-B	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric-Inside, Outside-Color Bands)
Soltan Chahar Barar	Figure. 7-C	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.5 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (Geometric- Outside-Color Band)
Soltan Chahar Barar	Figure. 7-D	Making Method (Handmade); Firing (Incomplete); Temper (Chaff-Mineral); Thickness (1.4 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (DOS-Outside-DOS)
Swasari	Figure. 7-E	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (3.1 cm); Porosity (High); Inside-Outside Slip (None-Thick); Decoration Method-Place-Motif (Geometric- Outside-Color Band)
Annab Tappeh	Figure. 7-F	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.3 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Muzaffar Tappeh	Figure. 7-G	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (0.9 cm); Porosity (Medium); Inside-Outside Slip (Thin-Thin); Decoration Method-Place-Motif (Geometric-Outside-Shady)
Narges Ketī	Figure. 7-H	Making Method (Handmade); Firing (Medium); Temper (Chaff-Mineral); Thickness (1.1 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (DOS-Outside-DOS)
Narges Ketī	Figure. 7-I	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.8 cm); Porosity (Medium); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Narges Ketī	Figure. 7-J	Making Method (Handmade); Firing (Incomplete); Temper (Chaff); Thickness (1.5 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)
Narges Ketī	Figure. 7-K	Making Method (Handmade); Firing (Medium); Temper (Chaff); Thickness (1.7 cm); Porosity (High); Inside-Outside Slip (Thick-Thick); Decoration Method-Place-Motif (None)

◀ Table 5: Description of Sherds Represented in Figure. 7 (Author, 2023).

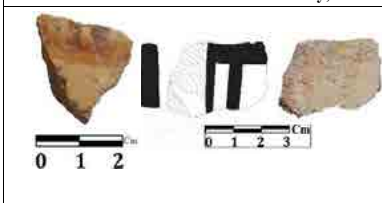


## Analysis of the Neolithic Period in Eastern Mazandaran

One of the aims of this paper is to analyze and explain the process of Neolithization based on the comparative study of survey and excavation data, especially pottery assemblages, in the eastern Mazandaran region. As discussed previously, scholars of this region have for decades debated whether different aspects of Neolithic lifeways developed endogenously or were influenced or brought exogenously. Diffusion and migration models have a great role in the exogenous hypothesis, while the role of local and indigenous communities in creating the Neolithic lifestyle is prominent in the endogenous hypothesis.





Recent field surveys of Neolithic settlements in the lowland and highland plains of eastern Mazandaran have contributed new data regarding regional and inter-regional connections. In this field program, two questions and goals were considered:

- 1) What data can be used to study the intra-regional interactions between the lowlands and the highlands of eastern Mazandaran?
- 2) What was the relationship between sites of the eastern Mazandaran

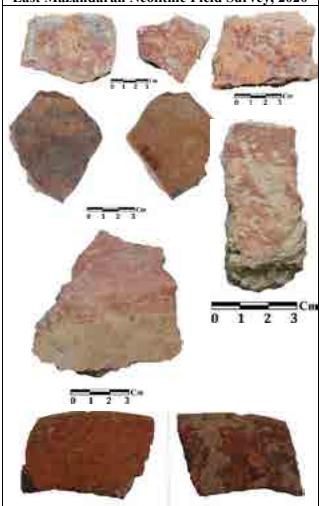


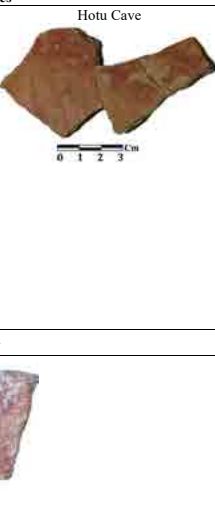

**Table 6: Comparable Table of Local Motif (Author, 2023). ►**

East Mazandaran Neolithic Field Survey, 2020	Comparable Sites	
	Tappeh Valiki	Touq Tappeh
		

**Table 7: Comparable Table of Regional Band Motif (Author, 2023). ►**

East Mazandaran Neolithic Field Survey, 2020	Comparable Sites		
	Tappeh Valiki	Touq Tappeh	Hotu Cave
			


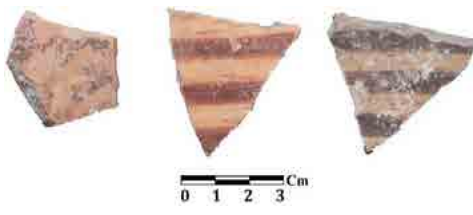








**Table 8: Comparable Table of Regional DOS (Author, 2023). ►**

East Mazandaran Neolithic Field Survey, 2020	Comparable Sites		
	Tappeh Valiki	Touq Tappeh	Hotu Cave
			
	Tappeh Abbasi		
			

region and the adjacent regions, such as Gorgan Plain, Shahrud and Bastam Plain, northeastern Iran, and south Turkmenistan, during the pottery Neolithic?

Now, let's imagine that the Neolithic and food production package has entered the eastern Mazandaran from the adjacent regions and sites such as Sang-e Chakhmaq or Djeitun. If so, the possibility should not be kept out of view that some cultural materials, especially pottery, have also entered this region along with these imported packages of food production. Moreover, these packages must have entered through two routes: first, through the Gorgan Plain, of which eastern Mazandaran is a natural extension; and second, through the mountainous plains and valleys located between the

Table 9: Comparable Table of Inter-Regional Shady-Fading (Author, 2023). ▼

East Mazandaran Neolithic Field Survey, 2020	Comparable Sites		
	Tappeh Valiki	Touq Tappeh	Yarim Tappeh
  			
	Aq Tappeh		Pookervall
			
	Deh Kheir	Sang-e Chakhmaq	
			

southern and northern slopes of Alborz.

In none of the Neolithic sites identified in the highlands of eastern Mazandaran, do the pottery assemblages indicate a connection with the southern Alborz sites in the Bastam and Shahroud plains. All the Neolithic ceramics of the highlands are of the CNS type, as found and reported in the lowland sites beginning with Hotu and Kamarband caves. This indicates an intra-regional connection between the highlands and the lowlands, which may be related to the formation of pastoralist herding patterns. This issue requires extensive excavation in highland sites, accurate dating of the layers, and accurate recording and description of the findings, as well as



interdisciplinary studies, which, unfortunately, has not been the case in the excavations carried out in Terkam, Qale'Pey, and Tappeh Saad.

Currently, pottery similar to the Djeitun/Sang-e Chakhmaq type has been obtained only in Tappeh Fakhi, Muzaffar Tappeh, and Tappeh Valiki, all three located in the lowlands. In this regard, although the shady-fading motifs do not have the known standard on the pottery of adjacent regions, they can be considered as the main indicator for a comparative study at the inter-regional level. However, it is necessary to mention two points. First of all, aside from the sites of Tappeh Fakhi and Muzaffar Tappeh, we can only refer to two sherds with a shady-fading pattern, out of 81 painted pottery of 1247 Neolithic sherds, discovered from the excavation of Tappeh Valiki (Abbasnejad Serešti and Nemati Loujendi, 2021: 281) which indicates a poor inter-regional connection from the point of view of pottery traditions. Secondly, the earliest date of the Pottery Neolithic in eastern Mazandaran is 6600-6400 BC (Asadi Ojaei et al., in press), which is currently older than all of the sites in the adjacent regions, including the layers in Djeitun/Sang-e Chakhmaq that contain shady-fading sherds (Table 10). Therefore, currently, the ceramic data not only does not help to analyze the exogenous process in the field of Neolithization in the eastern Mazandaran region but also sometimes causes confusion. An example from regions far away from the studied region in this paper may help to understand the discussion better. The shady-fading type of Neolithic pottery has similarities with the types found in Western Asia, especially in the Neolithic sites of Syria (Fig. 8). In the sites of Tell Sabi Abyad and Tell Seker Al-Aheimar, which have the oldest pottery of Western Asia dated to 6900-6700 BC, sherds very



**Fig. 8: Comparison of Sherds from Eastern Mazandaran and Syria: A) Tappeh Fakhi B) Tell Seker Al-Aheimar C) Qale'Pey D) Tell Sabi Abyad (Author, 2023). ►**

Table 10: Comparing the earliest estimated dates of PPN and PN sites of eastern Mazandaran and adjacent regions (Author, 2023). ▼

Region	Eastern Mazandaran (Hotu & Kamarband)	Eastern Mazandaran (Valiki & Touq)	Southern Alborz (Sang-e Chakhmaq)	Gorgan Plain (Pookerdvall)	Northeastern Iran (Qale Khan)	Turkmenistan (Djeitun)
Period						
Pre-Pottery Neolithic	8000-7500 BC	-----	7100 BC	-----	-----	-----
Pottery Neolithic	6600-6400 BC	Mid 7 <sup>th</sup> Millennium BC	6200 BC	Late 7 <sup>th</sup> and early 6 <sup>th</sup> Millennium BC	5800 BC	6100 BC

similar to shady-fading types have been found (Nieuwenhuyse, 2017: 18, fig. 3.4; Le Mièrè, 2017: 12, fig. 2.6). However, despite these similarities, the cultural interactions between these regions are hard to interpret.

Recently, studies conducted on animal remains resulting from the re-excavation of Hotu cave, provide new information about the exploitation of animals such as goats and sheep. De Groone and colleagues state that at the beginning of the Pre-Pottery Neolithic (Early Neolithic), a significant change occurs in terms of subsistence; Gazelle decreased from 64% in the Mesolithic to 0% in the Neolithic period, and goats and sheep increased from 4% in the Mesolithic to 72% in the Pre-Pottery Neolithic and 78.1% in the pottery Neolithic. Although the remains of goats and sheep in this collection are not domesticated and are wild species, their kill-off patterns indicate pre-domestication management, which has already been reported in the Central Zagros during the Late Pre-Pottery Neolithic and the Pottery Neolithic (de Groene et al., 2023). On the other hand, the use of secondary products such as fat and milk has been confirmed through isotopic examinations from the pottery of Hotu and Kamarband caves by Michael Gregg and Gregg Slater (Gregg & Slater, 2012). Therefore, the new zooarchaeology data from Hotu Cave, evidence of animals' secondary product from potteries, and the connections between Pottery Neolithic sites of plains and highlands are the reasons that the eastern Mazandaran might be one of the centers where the Neolithization process, the emergence of domesticated species, and food production took place locally and endogenously.

There is a geographical gap (Hezar Jarib Neka) between the eastern highlands (Baheshahr) and the western highlands (Dodangeh and Farim in Sari), in which there is a gap in our knowledge of the Neolithic period. Moreover, the midlands, which are mainly located in forested areas and connect the highlands and lowlands, have not been subjected to a comprehensive and detailed study of the Neolithic period. The only sites with Mesolithic and Neolithic periods that have been discovered in the midlands are the Shoupari cave in the Mehraban-Rood region of Behshahr, and the Sekileh cave, 8km south of Komishan cave (200m asl). Therefore,

there are sites in the midlands that filled the gap between the highlands and the lowlands and perhaps, made this meandrous path more tolerable for possible herders of the Neolithic period. Thus, it is necessary to carefully survey the midland and highland regions and to identify and examine their possible Neolithic settlements.

## Conclusion

Field investigations alone cannot answer archeological questions but are the beginnings of work that will be completed with various interdisciplinary studies and bring us one step closer to the answer. The 2021 field survey of Neolithic settlements in the lowlands and highlands of eastern Mazandaran led us to a few conclusions. First, the status of the Neolithic period and the distribution of the sites located in the eastern highlands of Mazandaran; during the field survey, 10 sites in the highlands (1300m asl) were found that belong to the pottery Neolithic. These sites are located in the inter-mountain plains, which are now suitable for agriculture such as wheat, barley, and rapeseed. Second, the connection between the sites in the highlands and lowlands; by comparing and analyzing the pottery collected from the sites of the two regions, as mentioned above, strong connections are observed. Also, finding traces of the use of secondary products, as well as the evidence of the management of wild species of goats and sheep in Hotu Cave can strengthen the issue of seasonal grazing at least in the Pottery Neolithic. Third, inter-regional connection between eastern Mazandaran and adjacent sites; to investigate this issue, two routes have been considered; pottery sherds from the two sites of Tappeh Fakhi and Muzaffar Tappeh (along with few sherds from the excavation of Tappeh Valiki), based on Djeitun/Sang-e Chakhmaq pottery types, indicate a possible connection with the Djeitun culture through the Gorgan Plain. Fourth, a rapid increase in the number of sites in the Pottery Neolithic; during the Pre-pottery Neolithic there are only 4 sites known in the region; however, in the Pottery Neolithic there are 41 sites. This increase can be observed in other adjacent regions as well. Paleo-climate data of the mid-7th millennium BC indicate improvements in climate and turning the land from swamplands to a forest environment that would be very pleasant for inhabitation. Also, based on the inter-regional connection, we may be witnessing a migration from adjacent regions to eastern Mazandaran due to an increase in population.

Despite the results obtained from this field survey, better and more reliable data for a better understanding of the Neolithization process

can only be obtained through stratigraphic excavations. The process of formation of sites and their changes over time, dating samples, plant and animal remains, paleo-climatic data, and pottery and lithic assemblages and their development process are among the data that we need to understand the Neolithization process and reaching the Neolithic lifestyle in the eastern Mazandaran. These data should be collected and studied not only from the lowlands but also from the midlands and highlands sites.

### Acknowledgment

Financial resources for the field survey of Neolithic settlements in the eastern of Mazandaran were provided by the University of Mazandaran and from the research grant of the supervisor, Dr. Rahmat Abbasnejad Serešti. Therefore, appreciation is given to the relevant employees. We are grateful to the Research Institute of Cultural Heritage and Tourism and the Research Institute of Archeology for issuing the permission letter for this program. The unhesitating and sincere cooperation of the employees of the Cultural Heritage, Tourism, and Crafts Organization of Mazandaran is sincerely appreciated. Also, special thanks to Mr. Hossein Nemati Lojandi, Sirolah Ghasemi Gorji, Omid Tousi, and Hadi Amirkhanlou who cooperated and supported in identifying and visiting the sites.

### Observation Contribution

The first author has been conducting fieldwork and together with the second author, they have recorded, analyzed and written first draft of the article. The third and fourth authors also evaluated, revised and edited the article, as well as corrected the English language of the article. It is worth to mention that the field survey program, and the current article obtained from that, are part of the PhD thesis of the first author (Seyyed Kamal Asadi Ojaei).

### Conflict of Interest

The University of Mazandaran requested the fieldwork permit from the Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran, which was then carried out by Seyyed Kamal Asadi Ojaei. Subsequently, the license was issued by the Research Institute of Cultural Heritage and Tourism (Research Institute of Archeology).

The financial support for this program was provided by the research grant of the corresponding author of the current article.

## References

- Abbasnejad Serešti, R. & Nemati Loujendi, H., (2022). "Excavation at the Neolithic site of Tappeh Valiki, Neka". Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (Unpublished) (in Persian).
- Abbasnejad Serešti, R. (2020). "Excavation at the Neolithic site of Touq Tappeh, Neka". Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (Unpublished) (in Persian).
- Abbasnejad Serešti, R., (2009). "Excavation Report of Tappeh Abbasi Khanehsar, Neka". Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (Unpublished) (in Persian).
- Alijani, B., (1997). *Iran's Climate*. Third edition, Tehran: Payam Noor Publications (in Persian).
- Asadi Ojaei, S. K., (2023). "Archaeological Field Survey of Neolithic Settlements in Highlands and Lowlands of Eastern Mazandaran". Cultural Heritage Organization of Mazandaran (Unpublished) (in Persian).
- Asadi Ojaei, S. K., Abbasnejad Serešti, R., Thornton, Ch. P. & Matthews, R., (2024). "A Reflection on Neolithization in the Plains of Behshahr and Neka in Eastern Mazandaran, Iran". *Journal of Archaeological Research in Asia*, 39: 1-17. <https://doi.org/10.1016/j.ara.2024.100522>
- Coolidge, J., (2005). *Southern Turkmenistan in the Neolithic, a petrographic case study*. BAR International Series 1423. <https://doi.org/10.30861/9781841718620>
- Coon, C. S., (1951). *Cave Explorations in Iran 1949*, Museum Monographs, the University Museum, University of Pennsylvania, Philadelphia.
- Coon, C. S., (1952). "Excavations in Hotu cave, Iran, 1951, a preliminary report". *Proceedings of the American Philosophical Society*, 96/3: 231-249.
- Dyson, R. H., (1991). "Ceramics I. The Neolithic Period through the Bronze Age in Northeastern and North-Central Persia". *Encyclopaedia Iranica*, 5 (3): 266-275. <https://iranicaonline.org/articles/ceramics-i>
- de Groene, D., Fazeli Nashli, H. & Matthews, R., (2023). "The Epipalaeolithic-Neolithic transition in north-eastern Iran: Zooarchaeological evidence from the southern shores of the Caspian Sea". *Antiquity*, 1-16. Doi: <https://doi.org/10.15184/aqy.2023.37>.
- Faraji, A.-R., (1987). *Complete geography of Iran*. Tehran: Scientific and Cultural Publications.
- Fazeli Nashli, H., (2017). "Report of excavation at Komishani open-air site". Cultural Heritage Organization of Mazandaran (Unpublished) (in Persian).

- Fazeli Nashli, H., Gregg, M. & Safari, M., (2017). "Preliminary Report of Archaeological Excavations at the pre-Neolithic Site of Komishani". *The 16th Annual Reports of Iranian Archaeology*, 361-366 (in Persian).

- Fazeli Nashli, H., (2021a). "Stratigraphic Excavation of Hotu Cave". Cultural Heritage Organization of Mazandaran (Unpublished) (in Persian).

- Fazeli Nashli, H., (2021b). "Excavation of Kamarband Cave, Behshahr City". Cultural Heritage Organization of Mazandaran (Unpublished) (in Persian).

- Garazhian, O., Papoli Yazdi, L. & Fakhr Ghaemi, H., (2014). "Qaleh Khan: A Site in Northern Khorassan and the Neolithic of North Eastern Iranian Plateau". *Archäologische Mitteilungen aus Iran und Turan*, Band 46: 21-50.

- Gregg, M. W. & Thornton, C., (2012). "A preliminary analysis of prehistoric pottery from Carleton Coon's excavations of Hotu and Belt Caves in Northern Iran: implications for future research into the emergence of village life in Western Central Asia". *Intl. J. Humanities* 19 (3): 56-94.

- Gregg, M. W. & Slater, G. F., (2012). *Isotopic characterization of fatty acids surviving in fired clay and pottery fragments from Mesolithic and Neolithic occupations of Hotu and Belt caves in northern Iran*. The University of Pennsylvania Museum Archives

- Harris, D. R. (2010). *Origins of Agriculture in Western Central Asia: An Environmental-Archaeological Study*. University of Pennsylvania Press, Philadelphia. <https://doi.org/10.9783/9781934536513>

- Le Mièrè, M., (2017). "The Earliest Pottery of West Asia: Questions Concerning Causes and Consequences". In: A. Tsuneki, O. Nieuwenhuyse, S. Campbell (eds.), *The Emergence of Pottery in West Asia*. OXBOW BOOKS.

- Leroy, S. A. G., Amini, A., Gregg, M. W., et al., (2019). "Human responses to environmental change on the southern coastal plain of the Caspian Sea during the Mesolithic and Neolithic periods". *Quaternary Science Reviews*, 218: 343-364. <https://doi.org/10.1016/j.quascirev.2019.06.038>

- Mahfrozzi, A., (2009). *Report on determining the boundaries of Qale'Pey Dasht-e-Frim*. Documentation Center of the Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (in Persian).

- Mahfrozzi, A., (2010). *Report on Determining the Boundaries of Tepe Terkam*. Documentation Center of the Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (in Persian).



- Mahfroozi, A., (2000). *Descriptive report of archaeological survey in the east of Mazandaran*. Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (in Persian).
- Mahfroozi, A., (2003). *The Third Round of Eastern Mazandaran Archaeology Investigations*. The Documentation Center of the Cultural Heritage Organization (in Persian).
- Mahfroozi, A., (2009). *Report on determining the boundaries of Tepe Saad*. Documentation Center of the Cultural Heritage, Handicrafts, and Tourism Organization of Mazandaran (in Persian).
- Malek Shahmirzadi, S. & Nokandeh, J., (2000). *Aq Tepe*. Cultural Heritage Organization, Tehran (in Persian).
- Matson, F. R., (1951). "Notes on the composition and manufacture of sherds from Belt Cave, Appendix III, Cave Explorations in Iran 1949". *University of Pennsylvania Museum*, Philadelphia: 93-95.
- McBurney C. B. M., (1964). "Preliminary Report on Stone Age Reconnaissance in North-Eastern Iran". *Proceeding of the Prehistoric Society*, 30: 382-399. <https://doi.org/10.1017/S0079497X00015176>
- McBurney, C. B., (1968). "The Cave of Ali Tepe and the Epi-Palaeolithic in N.E. Iran". *Proceedings of the Prehistoric Society*, 12: 385-413. <https://doi.org/10.1017/S0079497X00013955>
- Mousavi Koohpar, S. M., (2007). "Descriptive report of archaeological studies in order to prepare a map of the archaeological atlas of the country". Cultural Heritage, Tourism and Handicrafts Organization of Mazandaran Province (Unpublished) (in Persian).
- Nemati Loujandi, H., (2021). "The Probing Project for Determination of the Land and Proposal of the Privacy of Tepe Valiki of Neka". Cultural Heritage, Handicrafts and Tourism Organization of Mazandaran (Unpublished) (in Persian).
- Nikzad, M., (2017). "Human evolution through the transition from the Mesolithic to the Neolithic period at the Southeastern of the Caspian Sea, based on the excavation of Komishan Cave". Ph.D. Dissertation, University of Tarbiat Modares (in Persian).
- Nieuwenhuyse, O. P., (2017). "The Initial Pottery Neolithic at Tell Sabi Abyad, Northern Syria". In: A. Tsuneki, O. Nieuwenhuyse, & S. Campbell (eds.), *The Emergence of Pottery in West Asia*. OXBOW BOOKS.
- Qasemi Gorji, S., (2018). "The Beginning of the Iron Age in the Eastern Plains of Mazandaran (Case Study: Gohar Tepe Rostam Kola)". Master's thesis in archaeology, University of Mazandaran (in Persian).

- Ramezanpour, H., Garazhian, O. & Valipour, H.-R., (2014). "Neolithic and Neolithization of the Eastern Mazandaran Lowlands, Based on New Archaeological Surveys". *Journal of Pazhohesh-ha-ye Bastanshenasi Iran*, 3 (4): 97-116 (in Persian). [https://nbsh.basu.ac.ir/article\\_566.html?lang=en](https://nbsh.basu.ac.ir/article_566.html?lang=en)
- Ramezanpour, H., (2012). "Studies of Neolithic and Neolithization in lowlands of Neka and Behshahr plain based on archaeological survey". Master's degree thesis, Islamic Azad University of Central Tehran (in Persian).
- Roustaiei, K., (2014). "The Neolithization of Northeastern of Iran". Ph.D Dissertation, University of Tarbiat Modares (in Persian).
- Roustaiei, K., (2016). "An emerging picture of the Neolithic of northeast Iran". *Iranica Antiqua*, LI: 21-56. DOI: [10.2143/IA.51.0.3117827](https://doi.org/10.2143/IA.51.0.3117827)
- Roustaiei, K., Mashkour, M. & Tengberg, M., (2015). "Tepe Sang-e Chakhmaq and the Beginning of the Neolithic in North-east Iran". *Antiquity*, 89/345: 573-595. DOI: <https://doi.org/10.15184/aqy.2015.26>
- Thornton, C., (2013) "Tepe Sang-e Chakhmaq: a new look". In: R. Matthews & H. Fazeli Nashali (eds.), *The Neolithisation of Iran: the formation of new societies*: 241-256, Oxford: Oxbow Books. <https://doi.org/10.2307/j.ctvh1dp0q.19>
- Vahdati Nasab H. & Nikzad, M., (2016). "A New Look at the Neolithization of the Southeastern of the Caspian Sea. *Journal of Pazhohesh-Ha-Ye Bastanshenasi Iran*". 6 (11): 7-24. Doi: <https://doi.org/10.22084/nbsh.2016.1736> (in Persian).
- Vahdati Nasab, H., (2009). "The first season of excavation at Komishan cave". I.C.A.R., (Unpublished), (in Persian).
- Zeyghami, M., (2009). "Classification and Typology of Pookerdvall Neolithic Site Potsherds in Gorgan". MA thesis on archaeology, Islamic Azad University, Central Tehran Branch (in Persian).





پژوهش‌های باستان‌شناسی ایران

فصلنامه علمی پژوهش‌های باستان‌شناسی ایران  
P-ISSN: 2345-5225 & E-ISSN: 2345-5500  
نشانی پایگاه نشریه: <https://nbsh.basu.ac.ir>  
شماره ۴۱، دوره چهاردهم، تابستان ۱۴۰۲

## شواهدی تازه از نوسنگی باسفال در شرق مازندران براساس بررسی‌های جدید باستان‌شناسی

سیدکمال اسدی اجایی<sup>I</sup>، رحمت عباس نژادسرسی<sup>II</sup>، راجر ماتیوز<sup>III</sup>، کریستوفر پی. تورنتون<sup>IV</sup>

شناسه دیجیتال (DOI): <https://dx.doi.org/10.22084/NB.2023.28212.2619>  
تاریخ دریافت: ۱۴۰۲/۰۶/۰۱، تاریخ بازنگری: ۱۴۰۲/۰۸/۱۲، تاریخ پذیرش: ۱۴۰۲/۰۸/۱۸  
نوع مقاله: پژوهشی  
صص: ۶۷-۴۱

### چکیده

مسأله نوسنگی شدن و اهلی سازی، تولید غذا و رسیدن به سبک زندگی نوسنگی در منطقه شرق مازندران پس ۷۰ سال مسکوت ماندن در یک دهه اخیر بار دیگر موضوع جذابی برای باستان‌شناسان و پژوهشگران شده است. کاوش‌ها و بررسی‌های میدانی طی این سال‌ها برای طرح فرضیات نوسنگی شدن صورت گرفته که با وجود روشن شدن برخی از مسائل، پرسش‌های بیشتری نیز مطرح شده که هنوز بی پاسخ مانده‌اند؛ از طرف دیگر، بررسی‌های میدانی گذشته نتوانسته به خوبی ظرفیت‌های نوسنگی شرق مازندران را معرفی کنند؛ بنابراین یک برنامه بررسی میدانی با دو پرسش و هدف اصلی تعریف و پیشنهاد شد: (۱) ارتباطات درون منطقه‌ای بین محوطه‌های نوسنگی باسفال شرق مازندران واقع در ارتفاعات و دشت‌های جلگه‌ای با توجه به فرضیات نوسنگی شدن براساس عوامل درون‌زا چگونه بوده است؟ و (۲) روابط فرامنطقه‌ای شرق مازندران در دوران نوسنگی باسفال با مناطق همجوار نظیر: دشت گرگان، دشت شاهرود، شمال شرق ایران و جنوب ترکمنستان و مسیرهای احتمالی آن در راستای فرضیات نوسنگی شدن براساس عوامل برون‌زا چگونه بود؟ در بررسی مذکور ۵۳ محوطه مورد بررسی و شناسایی قرار گرفتند و نیز برخی از مجموعه‌های سفالی نیز بازنگری شدند. حاصل کار، شناسایی و اضافه شدن ۳۰ محوطه نوسنگی جدید به فهرست محوطه‌های نوسنگی باسفال است که در ارتفاعات و دشت‌های جلگه‌ای واقع شده‌اند؛ بنابراین، در حال حاضر تعداد محوطه‌های نوسنگی منطقه شرق مازندران به ۴۲ محوطه افزایش یافته است. مطالعه سفال‌های جمع‌آوری شده نشان می‌دهد که برهمکنش‌هایی بین دشت‌ها و سرزمین‌های مرتفع برقرار بود که می‌تواند در راستای الگوی زیست چراگردی فصلی مورد تحلیل قرار گیرد. هم‌چنین روابط فرامنطقه‌ای با مناطق همجوار را با توجه به شواهد، احتمالاً نه از طریق دشت‌های میان‌کوهی، بلکه از طریق دشت‌های جلگه‌ای، به خصوص دشت گرگان باید جستجو کرد؛ این موضوع، احتمال روند نوسنگی شدن براساس عوامل برون‌زا را مطرح می‌کند. روش پژوهش حاضر، مبتنی بر توصیف و تحلیل یافته‌های برنامه بررسی یادشده و مطالعات مقایسه‌ای یافته‌های محوطه‌ها و مناطق همجوار با شرق مازندران است.

**کلیدواژگان:** سفال پوک کاسپی، شرق مازندران، برهم‌کنش‌های فرهنگی، فرهنگ جیتون.

- I. دانشجوی دکترای باستان‌شناسی، گروه باستان‌شناسی، دانشکده هنر و معماری، دانشگاه مازندران، بابلسر، ایران
- II. دانشیار گروه باستان‌شناسی، دانشکده هنر و معماری، دانشگاه مازندران، بابلسر، ایران (نویسنده مسئول).
- III. استاد گروه باستان‌شناسی، دانشگاه ری‌دینگ، ری‌دینگ، بریتانیا.
- IV. پژوهشگر مشاور در دانشگاه پنسیلوانیا، آمریکا.

ارجاع به مقاله: اسدی اجایی، سید کمال؛ عباس نژادسرسی، رحمت؛ ماتیوز، راجر؛ و پی. تورنتون، کریستوفر. (۱۴۰۲). «شواهدی تازه از نوسنگی باسفال در شرق مازندران براساس بررسی‌های جدید باستان‌شناسی». پژوهش‌های باستان‌شناسی ایران، ۴۱(۴۱): ۶۷-۴۱. doi: 10.22084/nb.2023.28212.2619  
صفحه اصلی مقاله در سامانه نشریه: [https://nbsh.basu.ac.ir/article\\_5725.htm-1?lang=fa](https://nbsh.basu.ac.ir/article_5725.htm-1?lang=fa)

فصلنامه علمی گروه باستان‌شناسی دانشکده هنر و معماری، دانشگاه بوعلی سینا، همدان، ایران.

© حق نشر متعلق به نویسنده(گان) است و نویسنده تحت مجوز Creative Commons Attribution License به مجله اجازه می‌دهد مقاله چاپ شده را در سامانه به اشتراک بگذارد، منوط بر این‌که حقوق مؤلف اثر حفظ و به انتشار اولیه مقاله در این مجله اشاره شود.