The Problem of the Neolithic in Khorramabad Valley, Luristan, Iran: Questions and Presuppositions

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Abstract

Two important points have been the motivations of the writers of this article. The first motivating factor is the importance of the Neolithic Period especially the phase of shifting from Epi-Paleolithic to Neolithic in nowadays archaeological argumentation. The second factor is the importance of Khorramabad valley at the Paleolithic period and the abundance of early Chalcolithic sites and having no knowledge about the valley's archaeology in Neolithic Period. Exploring two important sites namely Ro hol and Merijelo and finding three sites namely Sarab Kotela, Kohele and Kharmanj Haft Cheshmeh in this valley, have opened promising horizons for archaeologists to understand the cultural changes of the Neolithic period. Surveying the surface findings and studying on the settlement layers of these sites have provided an opportunity for initial recognition of the existence of social life in Neolithic period in the valley.

The general archaeological researches on central Zagros and specific researches on Khorramabad valley and also identifying and preliminary surveying of two under- discussion sites have created a proper opportunity for proposing a new mission to excavate the sites and to conduct systematic compact survey on Khorramabad valley. This article reviews the literature of archaeological studies on central Zagros and Khorramabad valley briefly and propounds the theories of beginning of food production and Neolithisation, proposes key questions and presupposition corresponding to the writers' suggestive plan.

Keywords: Khorramabad Valley, Epi-paleolithic, Neolithisation, Roahol, Merijelo.

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Introduction

Khorramabad valley is located between longitude of 48°21' and latitude of 30°43'on central Zagros Mountains. The average height of this valley is 1170 meters from the sea level and has a length of 15 km and width of 2 km. The valley is surrounded by Sefidkouh, Kamarsi h (Makhmal Kouh) and Hasht dpahlou mountains. The city of Khorramabad has been formed in the middle and northern part of the valley which has the less width and gradually has developed toward sedimentary and flat plain of Korreg h which is located in the south. The Valley of Khorramabad and alluvial plain of Korreg h are fed by the mass water sources such as mirages, streams and rivers namely Korreg h and Bal roud. In the recent century, various kinds archaeological researches have been done by Iranian and foreign archaeologists on Khorramabad valley.

However, we see no reports about Neolithic period; and the majority of researches are related to Paleolithic period and excavations in the caves and rocky shelters of the valley and some sites around the city namely Sh pourkh st and the castle namely Falakolafl k. This article is aimed to study the Neolithic period of the valley and to propose new questions and pre-suppositions based on the new investigations and findings.

Settlement Situation of Khorramabad Valley Before and After Neolithic Period

Henry Field, an American anthropologist, was the first researcher who pointed to the existence Paleolithic period of Khorramabad. He visited the region with anthropomorphic the aim of registering and finally he could collect the stone tools in Konji cave in 1950 (Field, 1951: 91). Between the years of 1963 and 1965 Frank Hole from the Rice University and Kent Flannery from the Michigan studied University the valley. The mentioned scholars could identify 17 Paleolithic sites that among them, 5 sites concerned to the middle Paleolithic, Mousterian, and the other were related to the late Paleolithic and Epi-Paleolithic (Hole and Flannery, 1967). They excavated in Ghamary, Konji, Gar Arjeneh and Yafteh caves and also P sangar rock shelter. They could identify the frequency of Khorramabad valley paleolithic industry by studying the found stone tools. In spring and summer of 1969, Jhon Speth reexcavated the Konji cave and followed the previous researches (1971: 172-173).

Up to 1970, fieldwork activities have focused on Paleolithic period Khorramabad valley. During recent decades some researches have been done on the basis of collected stone tools through excavating Khorramabad valley (Baumler & Speth 1993; Lindly 1997). In winter of 2000. the Iranian Organization of Cultural Heritage supported the plan of surveying Khorramabad valley with the aim of identifying the Paleolithic sites of Luristan province (Roustaei et al., 2000: 46- 64). Moreover, in 2006 a board under the leadership of Marcel Otte re-excavated Yafteh Cave. In the winter of 2011 Behrouz B zgir a Ph.D. student of prehistoric archaeology from Rovira Virgili University of Spain, excavated Gilvar n cave (Fig. 5) and some other caves with the aim of reviewing Khorramabad valley in the Paleolithic period (Bazgir & Davoodi, 2014).

According to the findings of the studies conducted in a certain time, before and after the Islamic Revolution in 1979, Khorramabad valley and surrounding regions from the last phases of Neolithic or early Chalcolithic period which has been known as the "B gh-e- No Culture" to the historical and recent age had been resident (sometimes frequently shorter gaps). Under this circumstance the contribution of chalcolithic historical and the early centuries of Islam are more than the others. The Chalcolithic period of Khorramabad valley is divided into 3 shorter stages namely "B gh-e-No", "D r ei & Ghamary" and "Konji & M sour" which have got their own cultural specifications (Hole, 2007: 71-72; Farzin & Parviz, 2011: 9; Bahrami, et al., 2012a). In each of the periods, important and central settlements had smaller marginal settlements which indicates their hierarchy system. In B gh-e- No period some important hills such as "B gh-e-No", "Sar b-e- Y s", "Soheil Beigi 1" and "N servand 2" with about 1 hectare width have been known as the main settlement.

There are marginal settlements with

smaller scale and shorter periods at the far and close distances from these centers. Most probably the period of "B gh-e- No" which concerned settlements have been identified around Khorramabad, Boroujerd and Doroud (Parviz, 2006; 2008), consists of several phases. In case of accomplishing scientific excavations in the sites of this period, one can obtain a chronology on the basis of identified potteries. There are two different dates have been presented for the B gh-e- No period on the basis of radiocarbon with 1000 year difference. Frank Hole has dated it 5000 B.C. (2007: 71). He also has presented an exact date which is 5420- 4895 B.C. (Hole, 1987: 138; Goff, 1971: 134, table 3).

According to another radiocarbon dating, it is estimated that the history of B ghe-e- No backs to 4250 B.C. Its potteries have been compared with ceramics of the Tepe Se Gabi C and Tepe Gi n Va, Sialk I & II and Qaleh Rostam in Bakhti ri and also B kun A in Fars (MacDonald, 1979: 530).

At the last decade, the systematic and careful surface surveys have been done in Khorramabad, Boroujerd and Doroud and the pottery of Bagh-e- No studied more. According to the studies, the pottery of B gh-e- No has been dated to a transitional phase between the end stages of late Neolithic and early Chalcolithic which fills the gap between Late Sar b and Gi n Va (Farzin & Parviz, 2011: 9). Bahrami has estimated the date of the socialeconomical life of B gh-e- No during a period of one thousand year since 53004300 B.C. (Bahrami, et al., 2012b). Middle Chalcolithic period in Khorramabad valley has been known under the title of "D r ei Phase" (Hole, 2007: 72). In D r ei period important hills such as D r ei, Z hedShir and Tepe Kh ki consisting a square about 2-5 hectares have been identified as the main settlements. In a several hundred meters up to several kilometers of these sites there are marginal settlements with small size. Moreover, in this period seasonal and mobile settlements were formed in highlands which indicates the changes in lifestyle from permanent residence to permanent-mobile one. It seems that Frank Hole's view should be accepted (2007: 72) which indicates that there was little gap between D r ei Phase and B gh-e- No. D r ei Phase which is dated between 4400- 3800 B.C. by him (2007: 134, table no. 2), is specified by dotted motives which is at the same horizon with Godin IX or painted culture of Seh G bi (SGP) in Kang var, Gi n Vc-b and late Susiana 1 which was the beginning of the interaction between lowlands and highlands (Alizadeh, 2003: 51). Mortensen (1974: 42) dates the middle chalcolithic with the end of 5thmillennium and the beginning of 4th millennium B.C. Pisdeli complex and Seh G bi B have been dated between 3600- 3200 B.C. which have been well match with all the chronologies concerned (Henrickson, 1985: 70). Bahrami estimated the date of 4200- 3600 B.C. for D r ei phase (2012a). It seems that in this period because of the existence of Late Susiana 1 potteries, we

can see the development of pastoralism in Luristan (Alizadeh, 2003: 52); this is the fact that has been resulted from the similarity of the potteries of the southwestern regions of Iran and the presence of graveyards of Hakal n and Parchinah where their relation with their settlements is not clarified yet (Ibid: 83-84).

The late Chalcolithic period Khorramabad valley has been introduced as "Ghamary", "Konji" and "M sour" (Hole, 2007: 73). In this period, important settlements such as M sour, Deh B gher and Sh z deh Abdoll h and also seasonal and mobile settlements have been formed on the highlands and caves which indicate the continue of permanent occupation of former phases (Bahrami, et al., 2012a). The two first phases of this period, as Frank Hole believes; present findings of two famous caves namely Ghamary and Konji. At the same time there were important settlements such as Deh B gher and Sh z deh Abdoll h at the bottom of the valley. The most important phases of Chalcolithic period in Khorramabad valley is M sour. Its name has gotten from M sour site which was the greatest settlement of the valley with about 20 hectares width (Karami n, et al., 2010). This phase and Godin V (3200- 3000 B.C.) were contemporaneous. From stratigraphic point of view, it has been the continuous of Godin VI.

Theoretical Framework and Research Data

What separates and bolds the Neolithic period from the other lifetime of human beings is the important and fundamental changes which was created following the modifications in the economic situations and the human lifestyle. The beginning point of this period backs to 12000 years ago and is simultaneous with the beginning of the last period of the fourth Geological period, Holocene, which is specified by increasing in the earth's temperature and northern hemisphere glacier's pullback. Desired environmental condition resulted from the increasing of weather temperature along with mass rainfall made the technological experiences and intellectual achievements which were achieved during the long period of Paleolithic have being used in the field of the development of subsistence economy and changing the settlement patterns and have been prepared the background of so much changes such as the progress of stone industry and the forming of new industries such as pottery.

In order to explain these developments and changes, scholars such as G. V. Child and R. Braidwood played important role in planning the new compound namely "Neolithic Revolution" and "Oasis Theory" (Child, 1951: 66), and in presenting the hypothesis on the title of "Natural Settlement of Herbal and Animal Species" and "Nuclear Zone Theory" (Braidwood, 1960). Braidwood to test the Child's Theory began a mass and spread work in "the Fertility Crescent" region using new scientific methods such as Geology, Paleoclimatology, Paleobotany and Paleozoology with the aim of searching the origins of agriculture and He challenged husbandry. Child's Hypothesis and questioned about the occurrence of climate changes at the end of Pleistocene and the beginning of the Holocene (Braidwood et al., 1961: 181). Braidwood believed that the domestication is as a result of the trend of changes in human culture and his cognition of wild species of plants and animals in their natural habitats (Braidwood, 1960). According to the theory, human societies began compact exploitation of local region of arched foothills at the final stage of Pleistocene after the maximum of the last Ice Age among interlude of the climate of Bulling, Alerd, Younger Dryas Perboreal (Byrd, 2005).

Most of the archeologists realized the importance of Braidwood's works and confirmed their theories about the methods of transmission to the Neolithic/food production period and stat and reasons of occurrence of this period in this region and not in another region. For instance, it can be referred to Binford (1968) and Flannery (1969)who have used "Density Equilibrium Theory" and "Broad Spectrum Economy" to explain the important change, in fact, these statements were pointed by Braidwood before (1960: 131) but latter; Flannery and Binford explained them more expanded and widely. They believed that the beginning of food production was as a result of inequality between the population growth and the limitation of sources and the increasing of challenges between human and environment sources. This process leaded to settlement and population growth and to make force human to change the living and lifestyle and patterns agriculture (Flannery, 1973: 308)

The other researchers trended to analyze and test the hypothesis presented by Flannery and Binford. Smith and Young both excavated some prehistoric sites in the valleys of central Zagros and proposed the theory of the population pressures and climate changes to explain the turning to the food production pattern in this region. According to their theories, the familiarity with plants and animals which have potential for being domesticate; occurred in highlands for the first time. In the next step, at the beginning of Holocene (11000 years ago), environment and climate conditions were better. So, the pressure of population prepared elements of the changes in technology and first steps toward the domestication and permanent residences in lowlands and the valleys in the mountain-inside plains of Zagros (Smith & Young, 1983); this is a phenomena which its documents have been observed in sites such as Asi b and Ganj Darreh. Then, some other scholars like Cohen (1977),Redding (1988),McCorriston and Hole (1991) suggested some theories. Bar-Yousef (1995) has emphasized on Young Dryas creation and social factors as the most important factors for being neolithic while Henry (1989) has

emphasized on the coordination of the society, environmental and social variables and Melinda Zeder (2009; 2011; 2012) has focused on human factors. Besides, Zeder believes that domesticating the plants and animals were simultaneously, holding the signs of primitive management in potential species morphology in 11500 years ago. Some scholars believe that the decisive factor was rivalry and competition in food production and have presented the theory of "Food Fight" (Hayden, 1995; 2001; 2003) while some others believe that the main factor of food production was religion and emphasize on psychological aspects (Cauvin, 2001; Hodder, 2001).

Watkins believes that the pattern of "simultaneous changes of thoughts and culture" was the main factor for the beginning of Neolithic (2010a; 2010b) and Diamon suggests that the factors of geographical changes and technology developments were very effective to enter the human in to the period of producing food (Diamon, 1977; 2002).

It has been seen that almost all of the hypothesis and theoretical patterns summed up and presented as the result of studies, searches and excavations in Levant, Iraq Zagrosand Anatoly Taurus regions and the contribution of the Iranian prehistoric sites in exposition of the transmission to the Neolithic period and in the process of Neolithisation is so little. One of the most important factors for the retardation in such a research is rooted in the Iranian Cultural Heritage Organization's policies and programs through past three decades.

The researches have been done in recent years at the hills of J ni and Sheikhi b d, Kerm nsh h (Mohammadifar et al, 2011: 9-30) and Chogh Sabz, Luristan (D r bi et al, 2011), eliminated the deficiency to some extent and attracted the researchers' attentions to the role and the importance of Iranian Zagrosregion in this process. Other Neolithic investigations on and Neolithisation in Iran were presented in 7th International Congress on the Archaeology of the Near East (7ICAANE) on 16th April 2010 and were published in a volume by Oxbow Books, Oxford, UK (Matthews and Fazeli Nashli, 2013). Fazeli Nashli and Matthews believe that there is much evidence for continuity in the cultural and material tradition of Iranian communities across the transitional phases between Paleolithic and Neolithic (Fazeli Nashli & Mattheos, 2013: 6). They say that the timing and rates of Neolithisation in different regions of Iran is diverse and locally specific. They propose some points for future direction of the Neolithisation studies of Iran methodologically and theoretically. Performing intensive and comprehensive surface surveys in these regions specially in order to find the sites relating to Pre-Pottery Neolithic that discovering them needs special carefulness and intelligence; is so essential. During performing a survey program by Bahrami on Khorramabad valley and surrounding regions, three sites namely Merijelo (Figs. 2& 7), Ro hol (Fig 3) and Chi torkena have been identified (Bahrami et al., 2012a). Beside. through the recent investigations which have been done in Chegni on the west side and the pound area of Eyvashan Dam in northeastern of Khorramabad valley, two sites namely "Kohele" (Fig 4) and "Kharmanj Haft Cheshmeh" (Fig 6) (Bahrami, 2013), and an area namely Sarab Kotela with more than one meter cultural layer deposits have been identified (Mohammadian, 2013). None of these three sites have potteries. Kohele and Kharmanj Haft Cheshmeh have about 2 or 3 hectares habitats. These sites have located on the highlands with the 2000 m. height from sea level at Sefid Kouh slopes and with the 5th and 10th km. distance from the northwestern of Merijelo hill. Sarab Kotela is located on mountains with the height of about 1850 m. The tools made of obsidian have been found in each of three sites such as which were discovered in Merijelo and Ro hol.

Genetics researches, during recent half century, have specified five regions as the primary centers of domestication. Some regions have been recognized in the south west Asia as the homeland of wild ancestors of some beans such as wheat, barley and lentil (McCarter, 2007: 56). Some parts of middle Zagros of Iran are similar to this region. There are wild ancestors of mentioned beans and animals such as sheep and goat there (Ibid: 85,104). Khorramabad valley is one of these parts of central Zagros. It seems that search for finding Neolithic sites specially, those that are related to transitional phase

from the Paleolithic/ gathering food age to the Neolithic/ producing food age will let to collect information which responds the questions and ambiguities in this field. The background of concerned settlements to the late Paleolithic and Epi-Paleolithic periods and the abundance and wealth of after Neolithic cultures, B gh-e- No period, which was mentioned above, convince us that there have been talent and required capacities to form communities of Neolithic in under discussion region. such Reasons as not to perform comprehensive and precise surveys and infirmity in organizational programming lead to failure to fulfill this goal.

Found sites specially two centers of neolithic, Ro hol and merijelo (Bahrami et al., 2012b: 9) put ahead a chance to understand the development and evolution of Neolithic, the process of Neolithisation, transition from Epi-Paleolithic to Neolithic period and reasons and circumstances of this transmission in Khorramabad valley and its surrounding. Primary survey in these sites, put head hypothesis that through the targeted programmed excavation of them, one can commit to test the hypothesis and search for the answers of the questions (Fig. 1). In this step, reader is expected to be familiar with some of these questions which are the main goal of the present paper:

Regarding the evidences extracted from Epi-Paleolithic sites (Gararjaneh cave and P sangar rock shelter) and also late Neolithic and early Chalcolithic (B gh-e-No Culture) in Khorramabad valley these questions will be answered: can excavation of Merijelo and Ro hol hills fill the gap of early Neolithic and show the settlement sequence in the valley from Epi-Paleolithic to B gh-e- No period? Which Process of the trend of domestication of plant and animal remains resulted from the excavation of Ro hol and Merijelo express? Shall we see the process of transmission from Food-gathering phase to Food-production and permanent residence through the sequences of settlement layers of Ro hol? If the mentioned transmission trend has been seen, would it be as a result regional interaction or fulfilled independently? If it fulfilled was independently, on the basis of what kind of suppositions framework would it be explained and analyzed? If it does not stand in the framework of mentioned theories, which pattern can be considered in this region of central Zagros? How was the situation of internal and external cultural relations compared with the sites of the central Zagros such as Sar b and Gour n and northern Iraq; for example Umm Dabaghiyah (Bahrami et al., 2012b: 8) on the basis of potteries and stone tools made of obsidian? What dating should we consider for it?

Regarding the height of Ro hol and Merijelo hills and acquired data from canal walls which were dug to set up gas pipes and also unplanned and illegal excavations, the thickness of settlement layers of these sites has been estimated about 2 to 3 meters. These layers belong to pre-pottery and pottery Neolithic and are correspond

with the recent chronology which has been proposed by Darabi on the basis of recent investigation in central Zagros in western Iran (Darabi, 2012: 104, Fig 1). In this period that contains 8000- 5500 B.C., the presence of obsidian has been proved in the concerned prehistoric sites in the region (Darabi, et al., 2011). Deposits uncovered from the excavation of East Chia Sabz in western Iran dating from 9th through millennium B.C. exhibited some obsidian artefacts which came from the obsidian sources in southeastern Turkey (Darabi and Glascock, 2013). It might be assumed that obsidian during this time span has imported from southeastern Turkey to northern Iraq and then to western Iran (Ibid: 3808).

observing Superficial layers supports the probability that settlement phases in these sites, remove the gap between Epi-Paleolithic in Gararjaneh and P sangar shelter and early Chalcolithic period, B ghe-e- No Culture (about 5300 B.C.), in Khorramabad valley. Regarding habitation sequence in these sites from Pre-Pottery Neolithic to Pottery-Neolithic period and the existence of architectural evidences and the presence of seasonal sites in highlands, there is a probability that the sites were the first villages with the permanent residence culture who were moving to highlands in some seasons of the year in order to hunt and use of the ecological potentials of the regions. This was such a trend which is being continued at the present time. In the case of excavating Merijelo and Ro hol hills it is probable that one can identify emergence of the transitional process from Epi-Paleolithic to Neolithic and from food gathering trend to permanent settlement and food producing period in their beneath layers. With regard to the existence of ecological potentials in the valley and locating in the region of natural ecology of wild species of beans and animals such as sheep and goat, probably the habitants of the region were succeed to domesticate these species. Studying the surface findings has shown that the sites probably have been formed in the Proto-Neolithic period and habitations in them have been continued to the late Neolithic period. These centers have communicated to lots of simultaneous areas as the dynamic communities of Neolithic. Pottery findings and especially obsidian artefacts indicate such cultural interactions commercial relations.

Modes entanglement between human groups and their surroundings which indicate changes in lifestyle has been demonstrated in Zagros region during final phases of upper Paleolithic and Epi-Paleolithic (Matthews et al., 2013: 29). Besides, it seems that there might have been the modes of entanglement and interaction between human and environment in low and high lands of the central Zagros.

Conclusion:

The mountain-inside plain of Khorramabad in the cultural region of the central Zagros have held the necessary capacity and geographical and ecological conditions and had proper communicate has circumstance. From archeological point of view, this region presents the evidence of middle and late Paleolithic and Epi-Paleolithic periods. Also, acceptable evidences and data have been gathered from the periods of the after Neolithic and the Chalcolithic in this valley. In spite of the wealth of the region from the view point of enjoying the evidences of the phases of the before and after Neolithic, there is no report about Neolithic period. The new-known Neolithic sites especially Ro hol and Merijelo remove this inactivity and have drawn a desired perspective to study the Neolithic period. Identifying and performing surface surveys and studying surface finds, indicate the probability of the beginning of social life of the region in the beginning process of the Neolithic period. Performing the aimed program of excavation along with interdisciplinary studies and absolute dating in these sites can reveal the important and dynamic role of the Khorramabad valley in the Neolithic period and can open a new horizon for the Neolithic researches on the valley and central Zagros.

By identifying the seasonal sites in highlands and permanent settlements in lowlands, it can be concluded that the people of these sites in Neolithic hold the movement of coming and going in a limited region throughout the period in order to use of the hunting capacities and collecting beans and animal species which had potentials for being domesticated during a long term. In case of fulfillment

an excavation program in under discussion sites, desired information about the Neolithisation process and the transmission from the Paleolithic/ gathering period to the Neolithic/ food producing period; will be extracted.

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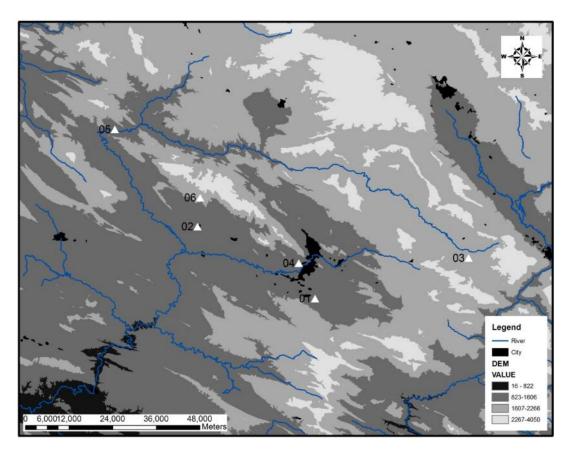


Fig. 1: The Location of Neolithic Sites in Khorramabad Valley: Roahol 02. Merijelo 03. Sarab Koteleh 1 04. Gilvaran Cave 05. Kharmanja Haft Cheshme 06. Kohele.



Fig. 2: Merijrlo Hill, Seeing from South.

Fig. 3: Roahole Hill, Seeing from South.

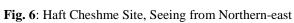




Fig. 4: Kohele Site, Seeing from West.

Fig. 5: Gilvar n Cave, Seeing from South.





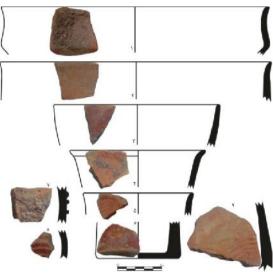


Fig. 7: Roahole Hill, Pottery Sherds

مسئله نوسنگی در درهی خرم آباد، لرستان، ایران: پرسشها و پیشفرضها

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دو نکتهی بسیار مهم انگیزهی نگارندگان برای تدوین این مقاله شده است. اولین عامل انگیزشی، اهمیت دورهی نوسنگی و بهویژه دورهی انتقال از فراپارینه سنگی به نوسنگی یا نوسنگی شدن در مباحث روز باستان شناسی بوده است. عامل دوم، اهمیت در مخرم آباد در دورهی پارینه سنگی و غنای آثار دورهی مس و سنگ قدیم در آن و عدم شناخت از وضعیت باستان شناسی در ه در دوران نوسنگی است. کشف دو محوطهی بسیار مهم به نام های رواهل و مریژلو در این در ه و نیز شناسایی سه محوطهی سراب کتله ۱، خرمن جا هفت چشمه و کوهله، افق امیدوار کنندهای را برای درک تحولات دوران نوسنگی در این منطقه پیش روی باستان شناسان قرار داده است. بررسی یافته های سطحی و مطالعه بر روی لایه های استقراری این محوطه ها، فرصتی برای شناخت اولیه از وجود حیات اجتماعی در دوران نوسنگی در در آه فراهم نموده است. پژوهش های باستان شناختی در زاگرس میانی به طور عام و در آه ی خرم آباد به طور خاص و هم چنین شناسایی و بررسی اولیه ی دو محوطهی مورد بحث بستر مناسبی برای تدوین پیشنهاد کاوش آن ها و بررسی فشرده و پیمایشی در در آه خرم آباد ایجاد کرده است. این مقاله ضمن مروری اجمالی بر پیشینهی مطالعات باستان شناسی در زاگرس میانی و در آهی خرم آباد و طرح نظریه های آغاز تولید غذا و نوسنگی-باستان شناسی در زاگرس میانی و در آهی خرم آباد و طرح نظریه های آغاز تولید غذا و نوسنگی-باستان شناسی کلیدی و پیش فرضهای مربوط به طرح پیشنهادی نگارندگان را مطرح می سازد.

واژگان کلیدی: درّه خرّمآباد، پارینهسنگی، فراپارینهسنگی، نوسنگیشدن،رواهٔل، مِریژلو.

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